The acquisition of gender and case in Polish and Russian: A study of monolingual and bilingual children

Janssen, B.E.

Citation for published version (APA):
LIST OF TABLES

Table 2.1 Vowel reduction relative to stress in Russian for hard and soft contexts 25
Table 2.2 The most basic syntactic roles of each case for Polish and Russian 30
Table 2.3 The Polish case marking system in the singular 31
Table 2.4 The Russian case marking system for end-stressed nouns in the singular 33
Table 2.5 The Russian case marking system for stem-stressed nouns in the singular 34
Table 2.6 Polish case markings for (attributive) adjectives in the singular 40
Table 2.7 Russian case markings for adjectives with end stress in the singular 41
Table 2.8 Russian case markings for adjectives with stem stress in the singular 41
Table 2.9 Stress and vowel transparency in Russian noun-adjective combinations 43
Table 2.10 Stress and vowel transparency in Russian noun-past tense verb combinations 44
Table 2.11. Possible interpretations of singular gender and case endings in Polish 45
Table 2.12 Possible interpretations of singular gender and case endings in Russian 46
Table 2.13 Stress and transparency of endings in Russian and Polish 47
Table 2.14 Simplex forms and their diminutives per gender for Polish 50
Table 2.15 Simplex forms and their diminutives per gender for Russian 51
Table 3.1 Overview of background measures and experimental tasks 71
Table 3.2 Overview of monolingual participants 74
Table 3.3 Overview of bilingual participants 76
Table 3.4 Overview of structures in the Po-SRT and Ru-SRT (4 sentences per structure) 81
Table 3.5 Verbs in Russian and Polish used in the case comprehension task 107
Table 3.6 Ordering of tasks (background measures and experimental tasks) 111
Table 3.7 Interrater reliability: transcription and coding per task for Polish and Russian (in percentage) 112
Table 3.8 Measures for the gender tasks 116
Table 3.9 Error types for the gender production and comprehension task  
Table 3.10 Measures for the case production tasks per language  
Table 3.11 Error types for the genitive and the accusative production task  
Table 3.12 Measures for the case comprehension task per language  
Table 3.13 Number of participants per task per group  
Table 4.1 Background information on age and gender on the participants per group  
Table 4.2 Percentage of parents of monolingual children with a high education level  
Table 4.3 Background information on the participants per group on gender, age, AoO and LoE to Dutch: bilinguals  
Table 4.4 Background information on the participants per group on AoI and preferred language: bilinguals  
Table 4.5 Percentage of parents of bilingual children with a high education level  
Table 4.6 Percentage accuracy on Po-SRT and Ru-SRT (mean, standard deviation, range): monolinguals  
Table 4.7 Percentage accuracy on Po-SRT and Ru-SRT (mean, standard deviation, range): bilinguals  
Table 4.8 Accuracy on Du-SRT (mean, standard deviation, range): bilinguals  
Table 4.9 Dominancy groups in the two bilingual groups  
Table 4.10 Accuracy on memory task (maximum memory span)  
Table 5.1 Percentage accuracy (mean, standard deviation, range) on gender production for Polish and Russian per gender: monolinguals  
Table 5.2 Multiple regression analysis of factors related to the gender production task in monolinguals  
Table 5.3 Distribution of mistakes over error types (percentage onto total amount of items) on gender production task: monolinguals  
Table 5.4 Percentage accuracy (mean, standard deviation, range) on gender production for Polish and Russian per gender: bilinguals  
Table 5.5 Distribution of mistakes over error types (percentage of total amount of items) on gender production task: bilinguals  
Table 5.6 Multiple regression analysis of factors related to gender production task in bilinguals  
Table 5.7 Multiple regression analysis of factors related to gender production task in monolinguals and bilinguals
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.8</td>
<td>Percentage accuracy (mean, standard deviation, range) on gender comprehension for Polish and Russian per gender: monolinguals</td>
<td>160</td>
</tr>
<tr>
<td>5.9</td>
<td>Multiple regression analysis of factors related to the gender comprehension task in monolinguals</td>
<td>162</td>
</tr>
<tr>
<td>5.10</td>
<td>Distribution of mistakes over error types (percentage of total amount of items) on gender comprehension task: monolinguals</td>
<td>163</td>
</tr>
<tr>
<td>5.11</td>
<td>Percentage accuracy (mean, standard deviation, range) on gender comprehension for Polish and Russian per gender: bilinguals</td>
<td>165</td>
</tr>
<tr>
<td>5.12</td>
<td>Distribution of mistakes over error types (percentage of total amount of items) on gender comprehension task: bilinguals</td>
<td>168</td>
</tr>
<tr>
<td>5.13</td>
<td>Multiple regression analysis of factors related to gender comprehension in bilinguals</td>
<td>171</td>
</tr>
<tr>
<td>5.14</td>
<td>Multiple regression analysis of factors related to gender comprehension in monolinguals and bilinguals</td>
<td>172</td>
</tr>
<tr>
<td>6.1</td>
<td>Percentage accuracy (mean, standard deviation, range) on the genitive production task for Polish and Russian per gender: monolinguals</td>
<td>177</td>
</tr>
<tr>
<td>6.2</td>
<td>Multiple regression analysis of factors related to the genitive production task in monolinguals</td>
<td>180</td>
</tr>
<tr>
<td>6.3</td>
<td>Distribution of mistakes over error types (onto total number of items) on the genitive production task: monolinguals</td>
<td>180</td>
</tr>
<tr>
<td>6.4</td>
<td>Accuracy (mean, standard deviation, range) on the genitive production task for Polish and Russian per gender: bilinguals</td>
<td>182</td>
</tr>
<tr>
<td>6.5</td>
<td>Distribution of mistakes over error types (percentage of total number of items) on genitive production task: bilinguals</td>
<td>185</td>
</tr>
<tr>
<td>6.6</td>
<td>Multiple regression analysis of factors related to genitive production task in bilinguals</td>
<td>188</td>
</tr>
<tr>
<td>6.7</td>
<td>Multiple regression analysis of factors related to genitive production task in monolinguals and bilinguals</td>
<td>190</td>
</tr>
<tr>
<td>6.8</td>
<td>Percentage accuracy (mean, standard deviation, range) on the accusative production task for Polish and Russian per gender: monolinguals</td>
<td>192</td>
</tr>
<tr>
<td>6.9</td>
<td>Multiple regression analysis of factors related to the accusative production task in monolinguals</td>
<td>195</td>
</tr>
<tr>
<td>6.10</td>
<td>Distribution of mistakes over error types (percentage of total number of items) on accusative production task: monolinguals</td>
<td>196</td>
</tr>
<tr>
<td>6.11</td>
<td>Percentage accuracy (mean, standard deviation, range) on the accusative production task for Polish and Russian per gender: bilinguals</td>
<td>198</td>
</tr>
</tbody>
</table>
Table 6.12 Distribution of mistakes over error types (percentage of total amount of items) on accusative production task: bilinguals

Table 6.13 Multiple regression analysis of factors related to the accusative production task in bilinguals

Table 6.14 Multiple regression analysis of factors related to accusative production task in monolinguals and bilinguals

Table 6.15 Percentage accuracy (mean, standard deviation, range) on accusative comprehension per gender per word order: monolinguals

Table 6.16 Multiple regression analysis of factors related to accusative comprehension in monolinguals

Table 6.17 Percentage accuracy (mean, standard deviation, range) on dative comprehension per gender per word order: monolinguals

Table 6.18 Percentage accuracy (mean, standard deviation, range) on accusative comprehension per gender per word order: bilinguals

Table 6.19 Percentage accuracy (mean, standard deviation, range) on dative comprehension per gender per word order: bilinguals

Table 6.20 Multiple regression analysis of factors related to case comprehension in bilinguals

Table 6.21 Multiple regression analysis of factors related to accusative comprehension in monolinguals and bilinguals

Table 7.1 Polish vs. Russian in gender and case production and case comprehension in monolinguals and bilinguals

Table 7.2 Polish vs. Russian stem-stressed and Polish vs. Russian end-stressed items for gender and case production and case comprehension in monolinguals and bilinguals
LIST OF FIGURES

Figure 3.1 Screenshot of the PowerPoint presentation that was used for the Polish, the Russian, and the Dutch SRTs

Figure 3.2 Example item from the odd-one-out task

Figure 3.3 Pictures for items ‘airplane’ masculine, ‘spoon’ feminine, and ‘tree’ neuter

Figure 3.4 Screenshots for items ‘I want the golden to be in the basket’ and ‘I want the blue to be in the wardrobe’ (gender information is only on the adjective, which is sufficient to select the correct noun).

Figure 3.5 “Smurf”

Figure 3.6a-d Pictures of the four different locations

Figure 3.7 Pictures for Polish items ‘airplane’ neuter, ‘strawberry’ feminine, ‘tomato’ masculine, and ‘pear’ feminine

Figure 3.8 Pictures as they appeared on the screen for the item for Polish ‘The crocodile kisses the giraffe’ Left: match, Right: mismatch

Figure 3.9 Pictures as they appeared on the screen for the item for Russian ‘The rooster touches the snake’ Left: match, Right: mismatch

Figure 3.10 Pictures as they appeared on the screen for the item for Polish and Russian ‘The egg kisses the sausage’ Left: mismatch, Right: match

Figure 3.11 End screen in Polish, Russian, and Dutch

Figure 4.1 The relationship between accuracy on SRT for monolinguals (Polish: left; Russian: right) and age

Figure 4.2 The relationship between accuracy of bilinguals on Po-SRT (left) and Ru-SRT (right) and age

Figure 4.3 Accuracy on Po-SRT and Ru-SRT in monolinguals and bilinguals

Figure 4.4 The relationship between accuracy of Polish-Dutch (left) and Russian-Dutch (right) bilinguals on Du-SRT and age

Figure 4.5 Polish-Dutch (left) and Russian-Dutch (right) children’s accuracy on the SRT in their two languages: divided into three language dominancy groups

Figure 5.1 Average accuracy on the gender production task per dominancy group for the Polish-Dutch bilinguals

Figure 5.2 Average accuracy on the gender production task per dominancy
group for the Russian-Dutch bilinguals
Figure 5.3 Average accuracy on gender comprehension per dominancy group for the Polish-Dutch bilinguals
Figure 5.4 Average accuracy on gender comprehension per dominancy group for the Russian-Dutch bilinguals
Figure 6.1 Average accuracy on the genitive production task per dominancy group for the Polish-Dutch bilinguals
Figure 6.2 Average accuracy on the genitive production task per dominancy group for the Russian-Dutch bilinguals
Figure 6.3 Average accuracy on the accusative production task per dominancy group for the Polish-Dutch bilinguals
Figure 6.4 Average accuracy on the accusative production task per dominancy group for the Russian-Dutch bilinguals
Figure 6.5 Average accuracy on accusative comprehension per dominancy group for the Polish-Dutch bilinguals
Figure 6.6 Average accuracy on accusative comprehension per dominancy group for the Russian-Dutch bilinguals
Figure 6.7 Average accuracy on dative comprehension per dominancy group for the Polish-Dutch children
Figure 6.8 Average accuracy on dative comprehension per dominancy group for the Russian-Dutch children
List of Abbreviations

1 First person
3 Third person
ACC Accusative case
AN Animate
ANOVA Analysis of variance
AoI Amount of input
AoO Age of onset
BICLCO Bi-clausal sentence: coordination
BICLSU Bi-clausal sentence: subordinate
BiPo Polish-Dutch bilinguals
BiRu Russian-Dutch bilinguals
COND Conditionals
DAT Dative case
Du Dutch
F Feminine
GEN Genitive case
INAN Inanimate
INS Instrumental case
L1 First language
L2 Second language
LOC Locative case
LoE Length of exposure
LP Language proficiency
M Masculine
M Mean
MoPo Polish monolinguals
MoRu Russian monolinguals
N Neuter
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOM</td>
<td>Nominative case</td>
</tr>
<tr>
<td>ns.</td>
<td>Not significant</td>
</tr>
<tr>
<td>O</td>
<td>Object</td>
</tr>
<tr>
<td>OOU</td>
<td>Odd-one-out</td>
</tr>
<tr>
<td>OR</td>
<td>Object relative</td>
</tr>
<tr>
<td>OVS</td>
<td>Object-verb-subject word order</td>
</tr>
<tr>
<td>PL</td>
<td>Plural</td>
</tr>
<tr>
<td>Po</td>
<td>Polish</td>
</tr>
<tr>
<td>PRWH</td>
<td>Sentence with a prepositional WH-question</td>
</tr>
<tr>
<td>Ru</td>
<td>Russian</td>
</tr>
<tr>
<td>S</td>
<td>Subject</td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>SES</td>
<td>Socio-economic status</td>
</tr>
<tr>
<td>SG</td>
<td>Singular</td>
</tr>
<tr>
<td>SLI</td>
<td>Specific language impairment</td>
</tr>
<tr>
<td>SOV</td>
<td>Subject-object-verb word order</td>
</tr>
<tr>
<td>SR</td>
<td>Subject relative</td>
</tr>
<tr>
<td>SRT</td>
<td>Sentence repetition task</td>
</tr>
<tr>
<td>SVO</td>
<td>Subject-verb-object word order</td>
</tr>
<tr>
<td>SVO/FP</td>
<td>Subject-verb-object word order with a free preposition</td>
</tr>
<tr>
<td>SVO/OP</td>
<td>Subject-verb-object word order with an obligatory preposition</td>
</tr>
<tr>
<td>SVOO</td>
<td>Sentence with both a direct and an indirect object</td>
</tr>
<tr>
<td>TD</td>
<td>Typically developing</td>
</tr>
<tr>
<td>V</td>
<td>Verb</td>
</tr>
<tr>
<td>WH</td>
<td>Sentence with a WH-question</td>
</tr>
</tbody>
</table>
Firstly, I would like to express my sincere gratitude to my supervisors, prof. dr. Anne Baker, prof. dr. Wim Honselaar and dr. Alla Peeters-Podgaevskaja, for their unremitting support throughout my project, for their motivation and inspiration, guidance and patience with me and my texts and, of course, for their tremendous energy and time they devoted to supervising me. I would like to thank Anne for her great methodological knowledge, for introducing me to colleagues abroad, for telling everyone about my project, for the great time we had when she visited me in Saint Petersburg, Russia, for editing my English, and for her kindness, friendship and enthusiasm. Thanks too to Wim for his tremendous knowledge of the Slavic languages, his eye for detail and moral support. To Alla my gratitude for inspiring me to choose this research topic for my MA thesis and developing it into a PhD project with me, for believing in me, the great congress trips to Saint Petersburg, Minsk and Sarajevo, endless discussions at every stage of the project, her critical reading, creative thinking and her personal friendship.

I thank Dirk-Jan Vet, the electro technician from the phonetics department of the ACLC, for his help in programming the experiments, and for all his technical support throughout the work on my thesis. Without him, the computerised experiments would not have worked half so well.

I would like to thank my student-assistants Marta Czarnecka, Daria Dubiela and Finka Heinemann for their help in recruiting the monolingual Polish and Dutch-Polish children, and for collecting and transcribing the Polish data. I would also like to thank Nadine Hut for her help with collecting data on the Russian-Dutch children.

My sincere thanks also go to my friends Mila Chevalier and Anna Vyborova of the Dutch Institute in Saint Petersburg, Russia, and Ekaterina Toritsyna at Saint Petersburg State University, who helped me recruit children in Russia. Without their support it would not have been possible to conduct this research.
I am grateful for the participation in this project of all the participants, their parents and all schools in Poland and Russia, weekend-schools in the Netherlands that I cannot mention for reasons of privacy. It was a true joy working with all those interesting, witty, sweet and funny kids. Without their participation, this book would have been an empty shell.

I am grateful that I was able to be a member of the COST action IS0804 “Language impairment in a multilingual society”, through which I met and got a chance to work with very inspiring colleagues Natalia Meir, Sharon Armon-Lotem, Vicky Chondrogianni, Esther Ruigendijk, Natalia Gagarina, Natalia Ringblom, Ewa Haman and Peri Iluz-Cohen.

The COST action gave me a STSM grant with which I went to Sharon Armon-Lotem and Natalia Meir at the Bar Ilan University to adapt their Russian sentence repetition task for use with younger participants. A special thank you to Natalia Meir and Sharon for helping with that task and for their constructive feedback on my research plans and further joint work.

I am also grateful to Elżbieta Weiss for all her help with the Polish part of the thesis.

I thank too Marina Borisovna Eliseeva and Stella Naumovna Cejtlin of the Herzen State Pedagogical University of Russia for welcoming Anne and me while in Russia, for their feedback on the Russian results, and for welcoming Alla and me to their congresses.

My fantastic colleague, Bart de Boer, gave me tremendous support and help with statistics. My friend and colleague, Ekaterina Bobyleva, helped with my written Russian and the reliability check for Russian, and my friend Trudie Stoppelenburg helped with the reliability check for Dutch and with her editorial support throughout the PhD. My colleague Vadim Kimmelman also helped with Russian, and my colleague Konrad Rybka with Polish.

My sincere thanks also go to my fellow members of the Grammar and Cognition research group for all the input and constructive feedback at different stages of my project: Aafke Hulk, Fred Weerman, Jeannette Schaeffer, Petra Sleeman, Elma Blom, Tuba Yarbay, and others.
ACKNOWLEDGEMENTS

My fellow ACLC PhD candidates were supportive, and especially my roommates Iris Duinmeijer and Tiffany Boersma. We had stimulating discussions, useful coffee breaks, and much fun over the last four and a half years.

Furthermore, I would like to express my appreciation of the staff at the Slavic department for embracing me as a member of their department, involving me in all activities and events and, of course, for allowing me to teach Russian to their undergraduate students. I would also like to thank all my students at the Slavic department: teaching you Russian made the last two and a half years of my PhD so much more fun.

Last and certainly not least I would like to thank my parents, siblings and friends for their love and support.
CHAPTER 1
INTRODUCTION

The success and speed of monolingual and bilingual acquisition of the grammatical system is dependent on language-specific as well as typological factors. Research on the influence of such factors across languages is often hampered by the fact that the languages being compared differ from each other in too many aspects, that is in terms of their morphology, syntax, pronunciation, prosody, etc. In order to be able to assess possible positive or negative effects of language-specific factors on acquisition, it is necessary to compare languages that are typologically closely related with minimally differentiated variables. In this respect, the gender and case systems in Russian and Polish form an ideal combination and an excellent testing ground for language-specific factors that might influence the acquisition of these systems. The languages are typologically very close and have highly comparable nominal morphology within their gender and case systems in their written form. But they show crucial differences in their spoken form, specifically in the phonetic realisation of unstressed vowels.

No comparative research has been done on the acquisition of gender and case in Polish and Russian in monolingual and bilingual children. This study will focus on these systems in order to explore the impact of language-specific factors, in particular the phonetic realisation of unstressed vowels, on their acquisition.

This chapter will first discuss in general why certain features are acquired faster than others (Section 1.1), what strategies are used by learners (Section 1.2), and why certain learners acquire language faster than other learners (Section 1.3). Section 1.4 will consider the topic and goals of this study. Finally, the organisation of this book will be presented in Section 1.5.

1 Polish and Russian are Indo-European languages that belong to the group of Slavic languages; Polish belongs to the West-Slavic languages (with Czech, Slovak and Sorbian), and Russian belongs to the East-Slavic languages (with Ukrainian and Belarusian).
1.1 Why are certain features acquired faster than other features?
When acquiring the basic features of their mother tongue, young children have to
deduce them implicitly from the input they receive, without any school
instruction or explicit communication of the rules. Across languages, similar
features are not necessarily acquired similarly: there can be great variation in terms
of the age and speed of acquisition. It has been suggested that the more
transparent the features of a linguistic system, the higher their learnability. It is
easier for children to deduce these features from the input, and they acquire them
earlier (Slobin, 1973, 1985, 1997; MacWhinney & Bates, 1989; MacWhinney,
2005; Peters, 1997). Transparency is usually seen as a scale, where all linguistic
features are somewhere between fully transparent and fully non-transparent
(Leufkens, 2015). From the acquisition literature, four factors emerge that appear
to make grammatical features in general, and gender and case systems in
particular, more transparent and therefore more easily learnable. These are
morphological analysability, morphophonetic clarity, morphophonological
regularity, and pattern frequency. These four factors will be discussed below.
Please note, these four factors are interrelated and sometimes difficult to
distinguish, but they are all relevant for the perception and production of gender
and case endings in learners.

1.1.1 Morphological analysability
There is evidence that, if forms are non-syncretic, that is where one form has one
meaning, the acquisition of those forms is fast and early (Slobin, 1973, 1985). For
example, languages that mark case can do so in two ways: via the process of
agglutination or via fusion. In agglutinating languages, one form principally has
only one function (e.g., in Turkish, in *evlerimde* ‘in my houses’, each suffix has its
own function: -*ler* expresses number, -*im* possession, and -*de* marks the locative
case). In fusional languages, on the other hand, a form has more than one function
(e.g., in Russian, in *domov* ‘houses-GEN’, -*ov* marks plural, genitive case and

---

2 We avoid the term “simplicity” here. As mentioned in Leufkens (2015), simplicity of a
grammatical system does not contribute to a greater transparency.
masculine gender).\(^3\) For agglutinating languages, there is less chance of misinterpreting suffixes and less need to rely on context than in fusional languages. Agglutinating case marking is therefore more transparent than case marking for fusional case systems. Within languages with an agglutinating or a fusional case system, the relative transparency of each inflection can also vary (again ranging from transparent to non-transparent).

Furthermore, endings (syncetic or not) can be homophonous. By homophony of endings we do not mean the fact that fusional languages combine gender, case and number information in one suffix, but the fact that those suffixes can be used for more than one combination of gender, case and number. For example, the ending -\(\mu\) in Russian is used for both singular feminine accusatives and for masculine and neuter datives in the singular. From the literature, it is clear that grammatical features that are homophonous with other grammatical features are less transparent, and, therefore, less easy to acquire than non-homophonous features (Goldschneider & DeKeyser, 2001: 26-27).

Cross-linguistic research has shown that children acquiring languages with agglutinating case endings with a 1:1 form-meaning mapping, such as Turkish, are much faster in acquiring the case system than children acquiring a case system with a great deal of syncretism and homophony of endings, like German (Aksu-Koç & Slobin, 1985; Schipke, Knoll, Friederici & Oberecker, 2012).\(^4\) Aksu-Koç and Slobin (1985: 845) show that monolingual Turkish children acquire the basis of the case morphology at least by age 2, whereas their monolingual German peers do not acquire German gender and case marking (marked mainly on articles) until age 6 (e.g., Mills, 1986; Dittmar, Abbot-Smith, Lieven & Tomasello, 2008).

As mentioned above, Slavic languages, on the whole have a richer and more differentiated, but more transparent gender and case systems than languages like German. According to the relatively little literature that exists, children acquiring Slavic languages acquire case relatively early on. However, since gender, number

---

\(^3\) The distinction between agglutinating and fusional languages is not clear-cut: some agglutinating languages can have fusional features, and fusional languages agglutinating features.

\(^4\) Within fusional languages, syncretism of endings and homophony are difficult to disentangle. In both cases it means that one form has more than one function. In this study, the term homophony will be used.
and case markings in Slavic languages are expressed by one ending, and not all are unique, there is a great deal of syncretism and homophony, which makes the system less transparent than, for instance, in Turkish. In terms of acquisition speed, they seem to be somewhere in-between Turkish and German children. Monolingual children acquiring, for example, Polish, master the basis of the gender and case system around age 4 (Smoczyńska, 1985), which is considerably later than their Turkish peers, but faster than German monolinguals.

Within languages, one part of the system can be more transparent than the other. For example in Spanish, although the distribution of nouns over genders is transparent for most of the nouns (most masculine nouns end in -o, and feminine in -a), there is a group of non-contrasting masculine and feminine nouns that both end in a consonant, are homophonous and therefore non-transparent for gender. In monolinguals the acquisition of grammatical gender and gender agreement is therefore slower in these non-transparent nouns compared to the nouns that are transparent for gender (Mariscal, 2009). Likewise, for L2 learners of Russian, there appear to be more difficulties with those nouns that have non-transparent gender markings compared to transparent gender marking (Akhutina, Kurgansky, Polinsky & Bates, 1999; Taraban & Kempe, 1999).

1.1.2 Morphophonetic clarity
Greater morphophonetic clarity, or perceptual salience, contributes to faster acquisition (Goldschneider & DeKeyser, 2001). Cross-linguistically, there is evidence that, if nouns are saliently and overtly marked for gender and case (i.e., endings are clear), markers are acquired earlier. For this discussion, we will elaborate on four relevant sub-factors of morphophonetic clarity: syllabicity, sonority, stress, and rhyme in relation to the perception and production of word-final morphemes.

First, word-final morphemes that consist of a syllable rather than a single consonant are easier to perceive and thereby more learnable than verbal endings in English. For example, this is evident from the English verbal inflection markers -s and -ing. The -ing forms a separate syllable; it is therefore easier to perceive than the -s that becomes part of the final syllable (Goldschneider & DeKeyser, 2001: 24).
Secondly, word-final morphemes that are more sonorous are easier to perceive. Sonority can be seen as a scale for speech sounds going from low vowels (most sonorous) to stops (least sonorous). When vowels are reduced, the distinction between them becomes vague or may even disappear (they may become homophonous, see Section 1.1.1). The perception of those sounds is thus negatively affected and in turn affects comprehension. This can also cause a delay in forming a category and thereby also affect production. For example, in a comparative sentence repetition task for Polish and Russian, it was found that the sonorous reflexive particle *się* in Polish was hardly ever omitted, whereas the non-sonorous unstressed and reduced reflexive suffix *-sja* in Russian was often omitted (Verhagen & Peeters-Podgaevskaja, 2015).

Thirdly, stressed endings are perceptually more salient and, therefore, perceived more easily than unstressed endings. Stress thus contributes to a greater transparency. For example, as mentioned in Polišenská (2010), Italian and Hebrew children diagnosed with specific language impairment (SLI), perform as well as typically developing (TD) children on word-final morphemes that are vocalic, syllabic and stressed, but perform worse on non-stressed forms.

Fourthly, rhyme patterns, especially in agreement between modifiers and noun endings, can promote faster acquisition (Voeikova, 2011). For Russian, three types of “rhyme agreement” between head noun and adjective can occur ranging from no rhyme agreement to reduplicating forms. These are: 1) forms where the endings have nothing in common, e.g., *užasnaja smert’* (horrible-F.SG.NOM death-F.SG.NOM), are the most difficult combinations to acquire; 2) where the head noun and adjective are rhyming forms, e.g., in Russian *krasiv-oj knig-oj* (beautiful-F.SG.INSTR book-F.SG.INSTR), etc., which are relatively easy to acquire; and, finally, 3) reduplicating forms, where the ending of the adjective contains a reduplication of vowel in the case ending, e.g., *krasiv-uju knig-u* (beautiful-F.SG.ACC book-F.SG.ACC), which are the easiest to acquire (Voeikova, 2011: 256-257).

1.1.3 Morphophonological regularity
As stated before, the morphophonological regularity of a grammatical feature contributes to its transparency (Goldschneider & DeKeyser, 2001). Very regular
and predictable patterns are acquired faster than less regular and less predictable patterns (Leufkens, 2015). Violations of morphophonological regularity are homophony, allomorphy, and redundancy. Homophony, as was already discussed in Section 1.1.1, can lead to a greater number of non-transparent endings, and thus to a less analysable form-meaning mapping.

Furthermore, morphophonological regularity is negatively affected by allomorphy; grammatical features that are expressed with a higher number of phonological alternations are more difficult to acquire. For example, monolingual children acquiring English are much quicker at sorting out the plural markings in -s than monolingual children acquiring the far wider array of plural markings in German (Mills, 1985).

In the context of regularity, Goldschneider and DeKeyser (2001: 27) discuss redundancy, i.e., “to what extent the use of the functor is required to convey meaning”. Many grammatical features are redundant in at least some contexts. Redundancy in case markings is, for example, present in situations where the relevance of case markings in expressing syntactic relations is overridden by prepositions, the “redundant” case markings are left out more often in acquisition than in contexts where the case endings are crucial for interpretation. To exemplify, American-Russian bilinguals fail to apply case endings in preposition-governed cases in Russian, since the semantic content of the preposition makes the information from the case endings not necessary for interpretation (Polinsky, 2007b: 179). For instance, after the Russian preposition k ‘to’ the noun always takes the dative case. When confronted with the preposition k, it is clear that a noun or pronoun in the dative case will follow, and thus the case ending on the noun does not have a disambiguating function.

It is clear that in some aspects regularity interacts with frequency. For example, in Dutch, all nouns are marked for gender (common or neuter) on definite articles (definite articles de for nouns of common gender, and het for neuter nouns, as opposed to indefinite een for all nouns). The het-class is far less frequent than the de-class. In agreement, modifiers take an ending depending on the gender and definiteness of the head noun. These modifiers, for example adjectives, end in an -e, except in agreement with an indefinite neuter noun, after which they are zero-marked. Both gender and gender agreement are difficult aspects of Dutch for
monolinguals (Orgassa, 2009), bilingual learners (Blom, Polišenská & Weerman, 2008; Blom & Vasić, 2011; Weerman, Bisschop & Punt, 2006), or L2 learners (Ziemann, Weerman & Ruigendijk, 2011). Thus, these types of lack of regularity make the system less transparent and reduce the learnability of those features.

1.1.4 Pattern frequency
Features that are frequent in the input are more salient than those that are infrequent. This saliency promotes faster acquisition of these forms (Goldschneider & DeKeyser, 2001). This influence of frequency has been shown from both language-internal and cross-linguistic comparisons. For example, within Dutch, the regular past tense verbs take the past tense marking -te/ten or -de/den, depending on the phonological context. The -te/ten marking is more frequent than the -de/den marking. In monolingual children with and without SLI and in bilingual children the -te past tense forms were more accurate than -de (Rispens & de Bree, 2014, 2015).

Moreover, if certain cases are infrequent in the input, they are acquired later than others. For example, the instrumental case in Polish is relatively infrequent (used in about 4% of the input (Dąbrowska & Tomasello, 2008)) and is acquired later than the more frequent cases, such as the nominative, the accusative or the genitive (Dąbrowska & Tomasello, 2008). The same is true for Russian. In contexts in which an instrumental plural noun form is required, children initially fail to produce it. However, Protassova (1997) reports that children often use correct forms of the highly frequent, but morphologically irregular, drużjami ‘with friends’, or det’mi ‘with children’ in the instrumental case plural. This suggests that they have stored these forms as lexical wholes, and cannot apply this regular morphology to other nouns.

Another example from Russian is the masculine genitive plural, which is expressed by means of three different endings that depend on the phonological context and differ in frequency: -ov, -ev, or -ej. It has been reported that in monolingual children masculine nouns with a palatalised stem in -ej are acquired relatively late and substituted by the default form -ov (Cejtlin, 2009b: 190-194; Eliseeva, 2005: 26; Zemskaja, 2004: 388).
In sum, the following four factors contribute to the relative transparency of linguistic features, and thereby support faster acquisition:

1. Morphological analysability
2. Morphophonetic clarity
3. Morphophonological regularity
4. Pattern frequency

1.2 Learner strategies
Monolingual and bilingual children use strategies that help them interpret gender and case endings correctly, i.e., deduce the form-meaning mapping from their input. For each language, there are different strategies that can support correct interpretation. Here, three possible strategies will be evaluated that are relevant for Polish and Russian monolinguals and bilinguals: a case cue strategy (Section 1.2.1), a semantic-pragmatic strategy (Section 1.2.2), and a word order strategy (Section 1.2.3).

Please note that these strategies do not operate in isolation. The relative importance of a strategy in a particular language determines the outcome. When two strategies lead to the same correct interpretation of a sentence, they foster quick acquisition, or, conversely, when they are in conflict with each other, they delay acquisition.

1.2.1 Case strategy
For highly inflecting languages, paying attention to case endings is the most reliable strategy in comprehension. In general, when trying to deduce meaning from form, children have to focus on word endings (MacWhinney, 2002, 2005; Slobin, 1973; Gerken, 1994). According to Slobin’s operational principles, children pay attention to word endings in order to comprehend sentences (1973). In MacWhinney’s Unified Competition Model it is stated that in the comprehension of sentences in highly inflecting languages, a case strategy is the most reliable strategy, or ‘cue’ (MacWhinney, 2002, 2005). In Polish and Russian, the cue reliability (does the cue always signal the same relation?) and the cue availability (how frequently does a child encounter that particular cue in the input?) of the case cue are high, while the cue cost (how difficult is that cue?) is
not very low. According to MacWhinney (2005), the case cue is the strongest cue for comprehension in Russian; the same seems also to be true for Polish. For other languages (e.g., English), the word order cue is relatively the strongest cue (MacWhinney, 2005). L2 learners are also sensitive to the relative cue strength in their L2. A study comparing L2 learners of Russian and German (in German, the case cue is less available than in Russian) showed a stronger case effect for L2 learners of Russian than for L2 learners of German (Kempe & MacWhinney, 1999).

Even in highly inflecting languages (in some situations however), a case strategy does not always lead to one single interpretation of a sentence. As discussed in the previous section, the amount of homophony in case endings has implications for the ease of interpreting sentences using case information. For example, when the subject and object of a simple transitive sentence both have the same ending (i.e., nominative-accusative neutralisation occurs), other strategies are needed. Often there will be semantic and pragmatic information available related to “world knowledge” (see VanPatten (2004)), that will provide information on the event probability of each interpretation. For example, in Polish, although *mleko widzi dziecko* ‘the milk sees the child’ is morphologically the same as *dziecko widzi mleko* ‘the child sees the milk’, only the latter is pragmatically plausible. There are, however, contexts in which even the event probability of sentences with nominative-accusative neutralisation is identical (e.g., in Polish, *dziecko kocha rodzeństwo* ‘the child loves his/her sibling’ and *rodzeństwo kocha dziecko* ‘the sibling loves the child’ which are morphologically identical). In such cases, word order is used to determine the semantic roles. This basic order is SVO in Polish (Siewierska, 1993: 234).

**1.2.2 Semantic-pragmatic strategy**

As mentioned in the previous section, the semantic-pragmatic strategy can be used to attach meaning to form based on the available input. Because of working memory constraints and attention paid to prosodic cues, L2 learners (and possibly young L1 learners) are unable to process both form and meaning at the same time, but instead choose meaning (VanPatten, 2004, 2007). The strategy to first process semantic cues is expressed for example in the “Primacy of Meaning Principle” of
the Input Processing model of VanPatten (2002, 2004). The processing of a sentence follows a certain logic: first, the learner focuses on content words rather than function words. Once processed, the learner would pay attention to non-redundant grammatical forms, whereby meaningful forms would be processed before non-meaningful forms (VanPatten, 2004, 2007). The relevance of semantic-pragmatic cues is explored in MacWhinney and Bates (1989: 45, 65). In children’s acquisition, animacy they argue is a more reliable cue in finding the subject of a sentence than case marking when the sentence provides both types of cues. Italian children use animacy cues in preference to SV agreement to determine the agent of a sentence up until age 9 (Devescovi, D’Amico & Gentille, 1999).

The preference of semantic-pragmatic information over case information has been shown in research on bilingual acquisition. For example, in a sentence repetition task, Hebrew-Russian children repeated the lexical items, but replaced the case endings with the nominative, which led to the neutralisation of the subject-object opposition (Meir, Armon-Lotem & Walter, 2015).

The same is true for adult learners. When starting to acquire a case language, they do not always use the case strategy. Instead, they may use other strategies present in their L1 (MacWhinney, 2002), for example, more attention may be paid to semantics or word order (see Section 1.2.3). However, this transfer from L1 strategies to L2 decreases with growing L2 competence and leads to strategy preferences similar to monolinguals.

1.2.3 Word order strategy
From the literature, it is clear that language learners often use a strategy in processing a sentence known as the “First Noun Principle”. As formulated by VanPatten (2004), the learners process the first noun or pronoun of a sentence as the subject of that sentence regardless of other information. The reliability of this strategy depends on the language. For languages with a rigid SVO word order (e.g., English), the first noun strategy almost always leads to a correct interpretation. However, even in SVO languages, the application of the first noun principle can be inhibited by event probabilities. Thus the most logical reading of a sentence is then preferred, e.g., for the milk drinks the boy, the SVO reading is unlikely and the
event probability overrides the word order principle.\textsuperscript{5} The preceding context can also constrain the possible interpretation of a sentence as a first noun sentence.

In inflecting languages, however, there is more freedom and variation in word order because of the rich nominal morphology. For example, in both Polish and Russian, the rich case inflection generally marks the relationship between the different constituents in a sentence and thereby allows for word order flexibility.\textsuperscript{6} However, in neutral contexts, Polish and Russian speakers have a clear preference for SVO (for Polish: Siewierska, 1993; for Russian: Dyakonova, 2009; Timberlake, 2004), where a first noun strategy leads to the correct interpretation. However, there are frequent exceptions to that word order. The word order strategy is therefore a less reliable strategy in those languages.

Children have been reported to use the processing strategies in a non-adult-like way. For example, for Dutch monolingual children, SV word order is reported to be the predominant cue (in Dutch monolinguals, the strongest cue is the case on pronouns, followed by SV order and by animacy). When processing sentences with conflicting cues, Dutch children use the strategies in an adult-like way only around age 15-16 (McDonald, 1986).

In bilingual children acquiring a case language as L2, especially for bilingual children whose L1 has little or no case marking (see Section 1.3.4), a word order strategy is expected in processing sentences in the L2. A clear preference for the first noun principle (and little case sensitivity) was observed in bilingual Russian-Dutch and Russian-Hebrew speakers. They misinterpreted OVS sentences, since they identified the object as the subject of the sentence (Janssen, Meir, Baker, Armon-Lotem, 2015). Monolinguals, on the contrary, did not use word order strategies and had a target-like interpretation.

In sum, learner strategies relevant for the acquisition of the morphology of endings, like gender and case, are:

1. Case strategy
2. Semantic-pragmatic strategy
3. Word order strategy

\textsuperscript{5} The event probability can be considered a semantic-pragmatic cue (see Section 1.2.2).

\textsuperscript{6} In a simple transitive sentence with a subject, verb and object, Polish and Russian permit all six basic word orders (SVO, SOV, VSO, VOS, OVS, OSV).
1.3 Why do certain bilingual language learners acquire their L2 faster?
In this section, the influence of factors that are relevant to bilingualism will be discussed. Several factors have been reported to affect the success of acquisition in each of the languages of a bilingual child; the age of onset of each of the two languages, language status, quality and quantity of the input, and the effect of interference between the languages. These will be discussed in separate sections here below.

1.3.1 Age of onset
The age of onset (AoO) of each of the two languages is important for the success of acquisition in bilingual children (e.g., Ortega, 2009; De Houwer, 1999; Anderson, 2004; Guiberson, Barrett, Jancosek & Yoshinaga-Itano, 2006; Unsworth & Blom, 2010; Armon-Lotem, Walters & Gagarina, 2011). If children are raised bilingually from birth, they are considered simultaneous bilinguals (2L1). If children start acquiring one of their two languages after birth, they are sequential bilinguals (their second language is the one they start later than their first language). Children, who are exposed to an L2 before the age of 3-4 years, are technically speaking early sequential bilinguals, but as has been suggested, for example by Meisel (2009), children with an AoO of their L2 of under four years can also be considered simultaneous bilinguals (2L1). Child L2 acquisition differs from adult L2 acquisition in that a large part of L2 acquisition (especially in young children) is implicit.

Another important measure, related to the AoO, is the length of exposure to each of the languages (LoE). For bilingual German-French children, it has been shown that simultaneous bilinguals at age 5 were able to use case cues in Wh-questions in German in the same way as monolinguals, but early sequential children (with a later AoO of German) were not (Roesch & Chondrogianni, 2014). Furthermore, it has been demonstrated that bilingual Russian-English and Russian-Hebrew children with early AoO of Hebrew or English exhibited more

---

7 Of course, there are other factors, as well as individual differences, but these are not very relevant for this study.
8 See for more information on ultimate attainment in child (and adult) L2 acquisition, e.g., Granena (2013) and Long (2013).
CHAPTER I. INTRODUCTION

profound difficulties with the Russian case inflections than children who started later with their Hebrew or English (Meir & Armon-Lotem, 2015; Schwartz & Minkov, 2014; Modyanova, 2006).

1.3.2 Language status
The sociolinguistic status influences the acquisition of both languages. If a language is the majority language, there is usually more input in that language. If a language is acquired as a minority language (usually a home language situation), exposure to that language will usually decrease as soon as a child starts attending school or day care (Ytsma, 1995). Often, when the L1 is being acquired as a minority language, the L2 over time becomes the dominant language (Unsworth, Argyri, Cornips, Hulk, Sorace, Tsimpli, 2014).  

Sociocultural factors may also influence acquisition. A minority language that is considered prestigious or ‘useful’ is more likely to be successfully acquired than a language that is less prestigious (see for information on sociocultural factors on bilingualism (Döpke, 1992, 2000a, 2000b)). Furthermore, parental beliefs about and attitudes towards the use of the home language have a large impact on bilingual acquisition (De Houwer, 1999). Parents who want their child to be able to speak fluently in both languages are more likely to put more effort in raising their child bilingually, thus providing enough input, than parents who do not value bilingualism (see De Houwer (1999) for the influence of parental attitudes on acquisition). In the situation of a minority language, with only one parent providing linguistic input, that language will probably become the weaker language, and the acquisition of that language will have, as it were, features of L2 acquisition independent of AoO (Meisel, 2009).

1.3.3 Quality and quantity of input
The quality and quantity of input plays an important role in the success of acquisition in each of the two languages, and is closely related to the AoO, the language status and the home language use. More and qualitatively diverse input

---

9 This was the case even in children that were L1 dominant.
10 For monolinguals, the quality of the input is important too.
in a language fosters the acquisition of grammar and vocabulary in that language. Furthermore, when a language is only spoken in a certain setting (e.g., at home, at school), children learn a more restricted set of grammatical and lexical items. However, although input is well definable, it is very difficult to quantify. Different studies have used different techniques to determine the amount of input in bilinguals via questionnaires (e.g., cumulative amount of input in Unsworth (2013), child’s output (Pearson, 2007), hour-by-hour input per day in each language (Bedore, Peña, Summers, Boerger, Resendiz, Greene, Bohman, Gillam, 2012)), but a realistic estimate of the actual input is very hard to obtain.

In bilingual acquisition, it is assumed that the same path of acquisition is followed as in monolingual language acquisition (Goldschneider & DeKeyser, 2001). However, since two languages are acquired at the same time, bilingual acquisition implies a reduced input in each of the languages. Simultaneous bilinguals, who are exposed to both languages from birth, cumulatively receive about half of the input in each of their languages as compared to a monolingual child (although the distribution over time is rarely fully equal in both languages) (Unsworth et al., 2014). Therefore, at a certain age, bilingual children may have had insufficient input for sorting out grammatical categories normally acquired by their monolingual peers. Even if a child starts acquiring the L2 from age 3 or four onwards, that does not mean that the L1, and the acquisition speed of the L1, is unaffected by the L2; the L2 may cause attrition and incomplete acquisition in the L1 (Montrul, 2008; Polinsky, 2007b).

Although the basis of the grammatical rules of a language generally has been acquired by age 4, language acquisition is not complete at that age. Through formal education children become literate, and acquire infrequent grammatical patterns, new lexical items and syntactic structures. A lack of school instruction and literacy in one of the languages affects the ultimate attainment of that language in different domains, delaying successful acquisition of new grammatical structures and vocabulary (Peeters-Podgaevskaja, 2015). Therefore we can assume that acquiring an L2 almost always has an effect on the acquisition of the L1; in other words, the influence of bilingualism is always present.

Not only the quantity of input, but also the quality of the input plays an important role. With respect to the quality of input, the type of interaction with
the parents (do parents engage in language acquisition enhancing conversations, or are they merely giving commands like “eat”), as well as the proficiency level of the caretakers have influence on the development of the child’s grammar (Döpke, 1992, 2000a, 2000b). Moreover, if children are mainly exposed to non-native input for one of their languages, they are more likely to have problems with vulnerable areas in grammar (Hulk & Cornips, 2006: 21).

1.3.4 Language interference

If a child acquires two languages, a certain degree of interaction and transfer, both positive and negative, between those languages is to be expected. Positive transfer is expected for linguistic features that are realised in the same manner in both languages, whereas negative transfer is expected in the case of language-specific differences between the languages (Extra & Verhoeven, 1994; Odlin, 2008). This has been reported, for example, for children who acquired Mandarin and English from birth: they transferred features from Mandarin to English, and vice-versa (Yip & Matthews, 2007). Similar bidirectional transfer was observed for a Dutch-English child (De Houwer, 1990). That L1 features influence L2 acquisition is clear from the study by Ionin, Zubizarreta, and Philippov (2009), who investigated L2 acquisition of definiteness in English. They found that learners with an L1 that does not mark for definiteness have much more difficulty in acquiring that distinction than learners with an L1 that does have this category. Likewise, Sleeman (2004) has shown that Dutch L2 learners of French had no problems in acquiring the definiteness distinction in French, while Japanese learners, for whom positive transfer was not possible, did have difficulties. Schwartz, Minkov, Dieser, Protassova, Moin, and Polinsky (2014) demonstrated an effect of L2 on the acquisition of L1 Russian gender: children with an L2 that has a gender category have fewer problems acquiring the gender system in L1 Russian than children whose L2 did not. These results are supported by Meir, Armon-Lotem and Walter (2015), who showed that the fact that Hebrew is a

11 Likewise, transfer from L1 and L2 are expected in the acquisition of a L3 (e.g. in Treichler, Hamann, Schönenberger, Voeikova & Lauts, 2009).
sparse case language has a negative effect on the acquisition of the rich case language Russian.

Thus, the following four factors related to bilingualism are relevant:

1. Age of onset of each of the two languages
2. Language status
3. Quality and quantity of input
4. Language interference

1.4 The topic and goals of this study

Slavic languages are known for their rich nominal morphology. Polish has seven grammatical cases (nominative, genitive, dative, accusative, instrumental, locative and vocative) and Russian has six (no vocative). Both have three genders (masculine, feminine and neuter) and two numbers (singular and plural), and are known for the amount of homophony of endings. In Polish and Russian, gender, case and number have to be marked morphologically on the noun by means of a suffix; this suffix can also have a zero form. On suffixes, the information pertaining to these categories (gender, case and number) is fused and expressed in one ending. Thus, gender cannot be separated from case and number, and case cannot be separated from gender and number. Moreover, in these systems, only few endings are truly transparent in the sense that they are non-syncretic and non-homophonous without context.\textsuperscript{12} For ease of communication, when talking about gender marking in this book, the nominative case will be referred to. When talking about case, the gender will be specified.

The function of the different cases and underlying relations in Polish and Russian are furthermore almost identical; the gender and number marking are realised in the same way. Both languages have an array of different paradigms and amount of homophony in case inflections (gender and case markings in Polish and Russian will be discussed in more detail in Section 2.2).

Despite the similarities between these morphologically closely related languages, there is a difference in the phonetic realisation of unstressed vowels, which could influence the acquisition of nominal morphology. First of all, Polish

has the stress on the penultimate syllable and Russian has a flexible stress pattern (both across paradigms and within words). Polish does not reduce unstressed vowels, which means that all endings in Polish are unstressed, but not reduced; they are always pronounced clearly and do not increase the amount of homophony in the Polish system. In Russian, on the other hand, all unstressed vowels are phonetically reduced. Therefore, in Russian, stressed and unstressed gender and case suffixes can sound remarkably different: stressed endings sound clear and are salient, but unstressed endings are reduced and therefore often difficult to distinguish from other unstressed endings. This leads to a greater number of homophonic endings compared to Polish (see Section 2.1 for a more detailed description of phonetic reduction in Russian).

On the one hand, phonetic reduction reduces the number of distinct case suffixes within the ‘unstressed’ paradigm and blurs the formal gender marking: e.g., the unstressed nominative ending in neuter words sounds the same as in feminine words. On the other hand, phonetic reduction for the system as a whole creates a higher number of case endings in the spoken language due to allomorphy (i.e., reduced morphophonological regularity) (for example, the Russian ending for the instrumental case masculine under stress is [om], and [sm] when unstressed). At the same time it leads to more homophony and lower morphophonetic analysability in the gender and case morphology (the [a], which is used as nominative ending for feminine and genitive for masculine and neuter and masculine animates, and the neuter nominative and accusative [o] all become a schwa, [æ], see Section 2.1). The nominal inflection system in Polish without reduction and with a fixed stress pattern is therefore more transparent than in Russian. Please note that in the transparency of unstressed vowels, three of the factors as introduced in Section 1.1 fall together: morphological analysability, morphophonetic clarity, morphophonological regularity.

The differences between Polish and Russian in stress patterns and in the ensuing phonetic reduction of unstressed vowels play an important role in this

13 Within the Slavic languages, only few endings are truly transparent in the sense that even without context they have only one interpretation. For this study, however, we will refer to transparent endings if the vowel is quantitatively interpretable as that vowel, and non-transparent for vowels that are qualitatively altered.
The main research question this study will address is:

How does the acquisition of case and gender differ between Polish and Russian in monolingual children in Poland and Russia, and bilingual Polish-Dutch and Russian-Dutch children growing up in the Netherlands?

The main hypothesis is that, due to specific characteristics of the linguistic systems (see Section 2.2) of Polish and Russian, gender and case markers will be acquired faster in Polish than in Russian, as has already been suggested by Slobin (1985), Peters (1997), and Smoczyńska (1985). They argued that in Russian, because of the reduction of unstressed gender and case suffixes, gender and case inflections are not easy to determine for Russian children. This should then lead to a substantial delay in their proficiency with gender marking and case inflections. Although plausible, these claims have never been tested cross-linguistically. These hypotheses will therefore be examined in contrastive experimental research. We, moreover, expect that, within Russian, end-stressed nouns will be acquired faster than stem-stressed nouns since they are transparent and salient. We also extend this claim to bilingual acquisition and hypothesise that Polish bilinguals will be faster in the acquisition of gender and case morphology than Russian bilingual children.

1.5 Organisation of this book
The previous sections have already introduced the topic of this study, and featured a short review of relevant literature on general theories of the acquisition of gender and case morphology. The purpose of Chapter 2 is to introduce the
CHAPTER I. INTRODUCTION

general aspects of the nominal morphology system and the gender and case system in Polish and Russian in more detail, including the implications for the acquisition of gender and case in Polish and Russian, and monolingual and bilingual acquisition. Chapter 3 describes and discusses the methodology used in this study: the monolingual and bilingual subjects, the materials used (which include background measures, gender tasks and case tasks), the procedure, and general aspects of analysis and statistics. Chapters 4 to 6 present the results with the statistical analyses of the tasks described in Chapter 3. Chapter 4 discusses all results involving the background variables, Chapter 5 the results on the gender production and gender comprehension tasks taking also into account predictors, and Chapter 6 the results of the genitive and accusative production tasks, and the case comprehension task. Finally, Chapter 7 compares and discusses all results from Chapters 4-6. It presents the main conclusions of this study and recommendations for further research.
CHAPTER 2
THE GENDER AND CASE SYSTEMS IN POLISH AND RUSSIAN AND IMPLICATIONS FOR ACQUISITION

As set out in the previous chapter, this study will examine the acquisition of gender and case in Polish and Russian in monolingual and bilingual children. This chapter will first provide a general overview of similarities and differences between the nominal systems of Polish and Russian (Section 2.1). Thereafter, the gender and case systems in Polish and Russian will be described, specifically in order to highlight the similarities and differences between the two systems that might affect acquisition (Section 2.2). Since this study is focusing on acquisition in young children, orthography will only be discussed where necessary. Subsequently, the current literature on the acquisition of the gender and case system in Polish and Russian in monolingual and bilingual children will be reviewed with respect to frequency and word stress (Section 2.3), followed by a formulation of the research questions and hypotheses (Section 2.4).

2.1 Polish and Russian: similarities and differences in the nominal system
As was mentioned in Section 1.2, Polish and Russian are Slavic languages that belong to two different language subfamilies and have many commonalities as well as some differences in their linguistic systems. Some features of nominal morphology, phonology and syntax will be discussed here paying attention only to

1 Apart from similarities in the nominal system, there are similarities in other linguistic areas as well, for example, in the verbal system. Both Polish and Russian have a relatively simple verbal system of tense: both languages mark present, past and future tense. Grammatical aspect, on the other hand, makes the verbal system in Polish and Russian more complicated (for more about verbal aspect, see e.g., Dickey, 2000). Furthermore, there is a great deal of lexical similarities between Polish and Russian. As was mentioned in Section 1.2, both Polish and Russian have a relatively free word order.
those aspects that are relevant for understanding and interpreting gender and case as investigated in this study (see Section 1.2).²

As was mentioned in Section 1.2, inflectional suffixes mark Polish and Russian nouns for number (singular and plural), gender (masculine, feminine and neuter), and case (nominative, genitive, dative, accusative, instrumental, locative, and, for Polish, vocative). On the basis of its morphological gender, each noun belongs to a declensional class/paradigm, which is reflected in the case endings in the singular and plural.³ At the same time, nouns are marked for animacy. This is relevant for the singular in the masculine accusative case only (see Section 2.2.1).⁴

In both Polish and Russian case and gender are not only marked by inflections on nouns, but also on parts of speech that modify nouns. These modifiers agree in case, gender, and number with nouns. A more detailed description of gender markers, case suffixes and agreement will be provided in Section 2.2.

Some aspects of the phonological system are relevant for the understanding of the way case and gender are expressed in Polish and Russian. As well as making a voicing distinction, Polish and Russian distinguish between non-palatalised “hard” consonants and palatalised “soft” consonants, a fundamental feature of the phonological system. The terms “hard” and “soft” consonants will be used further in this study. Most consonants form a “hard-soft” opposition pair, such as /d/⁵ and /d’/, or /t/ and /t’/.⁶ The opposition “hard-soft” is phonemic in both languages and thus leads to minimal pairs, for example, in Polish bicz [bitʃ] ‘whip’ contrasts with bić [bite] ‘to beat’ and in Russian byt’ ‘daily-life’ contrasts with byt’

---

² Section 2.1 thus does not intend to cover all areas of Polish and Russian grammar, or even all areas of their nominal systems; for a full overview of the Polish and the Russian grammar, see reference grammars for Polish Swan (2002), and for Russian Timberlake (2004).
³ The term paradigm is used narrowly to refer to each of the declensional patterns.
⁴ The animate/inanimate distribution in Polish and Russian is identical in the singular, where it plays a role in the masculine accusative only. In Polish, in the plural nouns are divided into two groups: virile (for male humans) and non-virile (for all other masculine nouns, including masculine animate nouns that are non-human (for example, the animate kogut ‘rooster’ is in the non-virile class), and all feminine and neuter nouns). In the plural in Russian the animate distinction is relevant for masculine, feminine and neuter.
⁵ Note the use of bracket conventions //, [], <>, and {}: /a/ is phonemic, [a] is phonetic, <a> is a grapheme, and {−a} is morphological.
⁶ Not all consonants are paired with regard to the “soft-hard” opposition: some hard consonants do not have a soft counterpart, or vice versa.
‘to be’. The way the “hard-soft” opposition is coded in orthography differs. In Polish, it is coded on the consonant grapheme itself using a superscript to mark softness, as in bić, or by inserting a grapheme <i> after the consonant, as in dzieci ‘children’. In Russian, a grapheme that follows the consonant marks whether the consonant is hard or soft. A jotated vowel (ja, jo, and ju), the soft sign (’), or the vowels <e> and <i> code the softness of the preceding consonant.

Both in Polish and Russian obligatory morphophonological alternations in the stem occur as a result of inflectional changes. There are two types of obligatory morphophonological stem alternations involving both consonants and vowels. In Polish, adding or changing an inflectional suffix may lead to a different realisation of the stem-final consonant. On the other hand, in Russian, this process is limited to the palatalisation of the final stem consonant (see examples in (2.1)).

(2.1) Examples of consonant and vowel stem alternations in Polish and Russian

Po (a): kogut-ø > koguci-e
rooster.M.SG.NOM rooster-M.SG.LOC/VOC
/ø/ becomes /ɛ/.

Ru (a): zvezd-a > zvezd-ε
star-F.SG.NOM star-F.SG.DAT.LOC
/ø/ becomes /ε’, which is indicated by the grapheme /ε/.

Po (b): ogórek-ø > ogórk-a
cucumber-M.SG.NOM cucumber-M.SG.GEN
the /ɛ/ is elided in the genitive

Ru (b): ogon’-ø > ognj-a
fire-M.SG.NOM fire-M.SG.GEN
the second /o/ is elided in the genitive

As is clear from examples (2.1a), adding an inflectional suffix may change the length of the noun (in terms of the number of syllables), especially masculine nouns. However, this is not always the case due to morphophonological alternations in the stem. In the case of the so called “fleeting”/“mobile” vowels

7 When the <i> is added between the consonant and the vowel to mark softness of the preceding consonant it does not constitute a separate syllable.

8 Because the stress position is flexible, stressed vowels are underlined throughout this book.
(for Polish: /e/; for Russian: /o/ or /e/) the number of syllables in oblique cases remains the same as in the nominative, since the extra syllable from the endings compensates the loss of the vowel in the stem (see example (2.1b)).

Two important differences between Polish and Russian are related to word stress and vowel reduction. Polish is a fixed stress language with all words having a stressed penultimate syllable. In contrast, Russian is a stress-based language with a flexible stress pattern (i.e., stress may fall on any syllable, even within the same paradigm). However, within a paradigm, there are two types of stress: stable stress throughout the whole paradigm (i.e., either on the stem or on the ending of the word), or mobile stress (the stress shifts forward or backward). Stable stress (either stem stress or end stress) is more frequent and productive than mobile stress. However, a small number of highly frequent nouns have a mobile stress pattern, such as the feminine nouns *voda* ‘water’, *golova* ‘head’, where the stress shifts throughout the paradigm, both in the singular and plural (e.g., Zasorina, 1977). Note that differences in stress in Russian can lead to orthographically minimal pairs in nouns, for example, *zamok* ‘lock’ vs. *zamok* ‘castle’, and within paradigms, such as *ruk* ‘arm/hand-F.SG.GEN’ vs. *ruk* ‘arm/hand-F.PL.NOM/ACC’.

The second important difference between Polish and Russian is vowel reduction. Whereas in Polish unstressed vowels are not phonetically reduced, in Russian all unstressed vowels are, and thus undergo qualitative change, but the degree of reduction depends on the position of the vowel relative to the stressed syllable (Bethin, 2012: 1233; Timberlake, 2004: 42-49). Reduction occurs both in pretonic and posttonic positions. Two unstressed vowels are reduced only quantitatively: /i/ and /u/, that have the same reduction for pre- and post-tonic syllables as well as for hard and soft contexts (by context we mean here the hardness or softness of the preceding phoneme). Other vowels, such as the /a/,
the /e/ and the /o/, change in quality of the sound (for example, an unstressed /e/ changes into an [ɨ], see also Table 2.1).

There are two degrees of reduction: a milder degree of reduction in the first pre-tonic syllable or at the beginning of a word, and the second degree in the further pre-tonic or post-tonic positions, for instance, compare, *pamjat* [pám’tʼ], but *aprel’ja* [Apʼélʼa] (see Table 2.1).

<table>
<thead>
<tr>
<th>Tonic syllable</th>
<th>first degree hard context</th>
<th>first degree soft context</th>
<th>second degree hard context</th>
<th>second degree soft context</th>
<th>second degree soft final</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ú]</td>
<td>[u]</td>
<td>[u]</td>
<td>[u]</td>
<td>[u]</td>
<td>[u]</td>
</tr>
<tr>
<td>[i]</td>
<td>[i]</td>
<td>[i]</td>
<td>[i]</td>
<td>[i]</td>
<td>[i]</td>
</tr>
<tr>
<td>[ɛ]</td>
<td>[ɛ]</td>
<td>[ɛ]</td>
<td>[ɛ]</td>
<td>[ɛ]</td>
<td>[ɛ]</td>
</tr>
<tr>
<td>[ə]</td>
<td>[ə]</td>
<td>[ə]</td>
<td>[ə]</td>
<td>[ə]</td>
<td>[ə]</td>
</tr>
</tbody>
</table>


Inflectional endings in Polish are mainly unstressed but since the vowels are not reduced, they are all phonetically transparent (i.e., the endings keep their distinctive features). In Russian, stressed vowels are all transparent, but unstressed vowels may be non-transparent, depending on the vowel and the place relative to the stress. For example, the vowel written as <o> in the Polish word *piwo* ‘beer’, and the <a> in the Polish *ćwiza* ‘rainbow’ are distinctive, but in Russian, the pronunciation of post-tonic <a> and <o> is the same, as for example in *piw o* [pʼiwə] ‘beer’ and *kukla* [kúklə] ‘doll’. Note that the orthographic form in Polish corresponds to a great degree with how it is pronounced (with a few exceptions). The orthographic form for Russian corresponds to a lesser degree with the actual pronunciation.

In the discussion of gender and case in Section 2.2, we will consider the phonetic clarity of gender and case inflections, which appear at the end of the word. Only post-tonic vowel reduction (Russian) is relevant because gender and case endings are necessarily tonic or post-tonic. Most case suffixes in Russian end

---

12 In the instrumental case plural, the ending itself is disyllabic. Here, the stress is on the penultimate vowel, thus on the ending and not on the stem.
in a vowel (see Section 2.2.2), and therefore, this reduction is highly relevant for the transparency of the final morpheme.

It is important to note here that in both Polish and Russian, the rich case inflection goes together with a certain flexibility in word order. In a simple transitive sentence with a subject (S), verb (V) and object (O), Polish and Russian permit all six basic word orders (SVO, SOV, VSO, VOS, OVS, OSV). The choice and acceptability of any one of those orders is determined by specific pragmatic factors (Timberlake, 2004: 449-454). In topicalisation all six word orders are possible under certain conditions (see Dyakonova, 2009: 6; Voeikova, 2011: 152). However, as was mentioned in Section 1.2.3, in neutral contexts, Polish and Russian have a clear preference for SVO (for Polish: Siewierska, 1993: 234; for Russian: Dyakonova, 2009: 3; Timberlake, 2004: 450).

2.2 The gender and case system in Polish and Russian
The description of the gender and case systems of Polish and Russian will be given in four sub-sections. Firstly, general aspects of the gender systems will be introduced (Section 2.2.1), followed by general aspects of the case systems (Section 2.2.2). Agreement will then be discussed (Section 2.2.3). Finally, the implications of word stress in Russian nouns on the transparency of the gender and case distinction as compared to Polish will be elaborated upon (Section 2.2.4).

2.2.1 Gender in Polish and Russian
As was briefly mentioned in Section 2.1, every noun in Polish and Russian has a grammatical gender (Corbett, 1991). Gender has to be morphologically expressed on the noun in a final suffix, which can also have a zero form. This suffix does not mark gender only, but also number and case. It is not possible, therefore, to look at gender strictly in isolation. For the ease of discussion we will focus on gender as expressed in the nominative case as the ‘default’ form of a word; this form is used also in dictionaries.
In the singular, both Polish and Russian have a threefold gender system for nouns: masculine, feminine, or neuter. The morphological gender – in the orthographic form – is overt for most nouns. The phonological form of the nominative singular is a fairly reliable cue to gender in both languages. The morphological gender of a noun is the basis for the distribution of nouns over declensional classes. Depending on the declensional class, the noun takes different case endings in the oblique cases (see Section 2.2.2). The morphological gender of a noun usually coincides with the reference – or semantic – gender of the noun; reference gender is relevant for agreement (see Section 2.2.3).

**Masculine noun declension**

Nouns that are morphologically masculine end in a consonant, which can be either hard (e.g., Polish *rower* ‘bike’ and Russian *dom* ‘house’), or soft (e.g., Polish *gość* ‘guest’ and Russian *medved* ‘bear’). About 48.5% of the nouns in Russian are masculine (Honselaar, 2014: 128); we expect a similar percentage for Polish. For masculine nouns, there are different declension paradigms for animate and inanimate nouns: in the accusative case, they take different case endings depending on animacy (see Section 2.2.2).

**Feminine noun declension**

In total, about 37.4% of the nouns in Russian are feminine (Honselaar, 2014: 128), and we expect a similar percentage for Polish. Nouns that are

---

13 This study does not involve gender markings in the plural. The Polish and Russian gender systems in the plural differ from one another. As was mentioned in footnote 4, while in Russian there are three genders in plural – masculine, feminine and neuter – in Polish there are only two: virile and non-virile (where virile includes nouns referring to male persons and non-virile includes all other nouns).

14 This is a simplification; in the Polish literature, as many as 11 gender patterns are distinguished. For example, the masculine gender in the singular is divided into three genders: *meskoosobowy* for male persons, *meskozywotny* for male animals, and *meskoniezywotny* for inanimate objects.

15 Some abbreviations are subject to inflection in case the ending of the abbreviation fits into an inflection category. For example, the Russian *GOMS* ‘Hydrological Operational Multipurpose System’, for which the reference gender is feminine (last component of the abbreviation is feminine: *sistema* ‘system’), but it behaves as masculine (ending in a hard consonant, thus subject to regular inflection).

16 I follow the division into declensional patterns of Timberlake (2004: 130-158). The examples are mine, unless stated otherwise.
morphologically feminine are divided over two distinct declensional classes depending on their final phoneme in the nominative singular. Feminine nouns can end in {-a}, or in a soft consonant. Nouns that end in an {-a} are declined according to what will be referred to as the “feminine a-declension” and form one declensional class, for instance, Polish kobieta ‘woman’ and Russian babuška ‘grandmother’. Feminine nouns that end in a soft consonant form a different declensional class, which will be referred to as “feminine on a soft consonant”, for example, Polish miłość ‘love’ and Russian kost’ ‘bone’. Of all Russian nouns, 10% belong to this latter declension (Zasorina, 1977). Of feminine nouns, for Russian, about 20% end in a soft consonant (Honselaar, 2014: 132-134); we expect a similar percentage for Polish.

The feminine a-declension includes nouns that are morphologically feminine (i.e., end in {-a}), but are semantically masculine (refer to masculine human beings: their reference gender is masculine (see Section 2.2.3)), such as Polish mężczyzna ‘man’ and Russian deduška ‘grandfather’. For Russian, the group of morphologically feminine nouns also includes informal forms of masculine proper names that end in {-a}, for example, Oležka (from Oleg) or Saša (from Aleksandr). The feminine a-declension also includes nouns referring to human beings that are of common reference gender. Common gender means that the same morphological form is used to refer both the males and females, but depending on the gender of the referent, it functions in agreement as either masculine or feminine. For example, in Russian, sirotā ‘orphan’ is morphologically feminine, but in agreement it can be either feminine or masculine depending on the gender of the referent.

**Neuter noun declension**

Nouns that are morphologically neuter consists of groups of nouns that have the following shared endings in the nominative singular. Most often neuter nouns end in {-o} (e.g., Polish drzewo ‘tree’ and Russian okno ‘window’), or in {-e} (e.g.,

---

17 In the present study, proper names are not included.
Polish pole ‘field’ and Russian znanie ‘knowledge’). Here too, pronunciation may differ from spelling. About 14% of Russian nouns are neuter (Honselaar, 2014: 128); we expect a similar low frequency for Polish nouns. Moreover, there is a small group of neuter nouns that end in {-mie/że} and {-u} for Polish and {-mja} for Russian, for instance, imię ‘name’ and imja ‘name’ respectively.

In sum, nouns in both languages ending in a hard consonant are morphologically masculine; nouns ending in {-a} are of the feminine gender (the a-feminine declension), and nouns ending in {-o} and {-e} quite consistently follow the neuter gender pattern. When faced with determining the morphological and reference gender on the basis of the ending in the nominative singular, the learner is faced with one main complicating factor. Both languages have feminine nouns ending in a soft consonant and such nouns therefore resemble masculine nouns that end in a soft consonant. For example, Polish miłość ‘love’ and Russian kost’ ‘bone’ are feminine nouns, whereas Polish gość ‘guest’ and Russian gost’ ‘guest’ are masculine nouns. Furthermore, the group of referentially masculine nouns and nouns of common gender that end in {-a} share an ending usually associated with feminine morphological gender. This results in a more ambiguity in gender marking (see 2.2.4).

As was demonstrated above, Polish and Russian share features that complicate the possibility of distinguishing between the three genders. However, in Russian there are two additional features that make the gender distinction even more difficult: stress and phonetic reduction. So far, we have only looked at Russian nouns that carry stress on the ending. However, in nouns that have stem stress, feminine nouns ending in {-a} and neuter nouns ending in {-o} are subject to vowel reduction (as introduced in Section 2.1). The phonetic distinction between {-a} and {-o} is lost under qualitative vowel reduction and reduced to a schwa ([ə]), which makes them sound identical. As a result, it is impossible to hear the difference between many morphologically feminine and neuter nouns (although

---

18 Like the feminine nouns that denote masculine persons, there is a very limited and infrequent group of nouns that end in the neuter {-e} but refer to male persons. For example, the animate Russian podmaster’e ‘journeyman’ has a masculine reference gender (Timberlake, 2004: 130).

in the written form the distinction remains clear). In such cases specific linguistic contexts (i.e., adjectival or past tense verbal agreement) can disambiguate the gender.

2.2.2 The case system in Polish and Russian

Case marking is a fully grammaticised cue that signals the syntactic role of each noun, pronoun, adjective, demonstrative and numeral in an utterance (Timberlake, 2004; Brecht & Levine, 1986; Mel’čuk, 1986). As mentioned earlier, Polish has seven basic cases (nominative, genitive, dative, accusative, instrumental, locative and vocative), and Russian six (nominative, genitive, dative, accusative, instrumental and locative). Both the case inflections and the syntactic functions expressed by the cases are very similar in the two languages, although there are a few small differences (see for differences Wierzbicka 1986, Janda 1993). The basic syntactic roles of the Polish and Russian cases are given in Table 2.2.

<table>
<thead>
<tr>
<th>Case</th>
<th>Basic syntactic role(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominative</td>
<td>Subject of a sentence, naming</td>
</tr>
<tr>
<td>Genitive</td>
<td>Possessive relations, negated object, partitive</td>
</tr>
<tr>
<td>Dative</td>
<td>Indirect object (recipients, experiencers)</td>
</tr>
<tr>
<td>Accusative</td>
<td>Direct object</td>
</tr>
<tr>
<td>Instrumental</td>
<td>Instrument, nominal predicate (in copular sentences)</td>
</tr>
<tr>
<td>Locative (or prepositional)</td>
<td>Location (always with a preposition)</td>
</tr>
<tr>
<td>Vocative (Polish only)</td>
<td>Addressing someone</td>
</tr>
</tbody>
</table>

As mentioned in Sections 2.1 and 2.2.1, case is marked on a final suffix (shared with gender and number), which can also have a zero form. Nouns are declined for case according to the declensional class they belong to. The morphological gender of a noun as expressed by the nominative case (as introduced in Section

---

20 In Russian, some nouns have a historical vocative form, for example in Боже ‘God’. For more on the vocative case in Russian, see Timberlake (2004).

21 For this discussion, only basic meanings of cases will be taken into account. Next to this basic meaning, some cases have secondary meanings. Secondary meanings of cases will not be discussed. For a discussion of secondary cases in Polish, see Swan (2002: 333), and for Russian, see Timberlake (2004: 327).

22 Some nouns do not fall into any of those classes: see Swan (2002) for a reference grammar for Polish; see Timberlake (2004) for a list of exceptions for Russian.
2.2.1) serves as the basis for the classification of nouns into declensional patterns. For the sake of clarity, in this discussion declensional classes will be defined on the basis of the morphological gender of the group of nouns they consist of: the masculine noun declension contains nouns of the masculine morphological gender, nouns that are morphologically neuter belong to the neuter declension, feminine nouns that end in {-a} will be referred to as belonging to the feminine \(a\)-declension, and feminine nouns that end in a soft consonant belong to the feminine declension ending in a soft consonant.

Although the spelling is irrelevant to child language acquisition, it is interesting to note that the phonological nature of consonants (hard vs. soft) as mentioned, has influence on the spelling, including case endings: whereas the endings concerning soft and hard stems are phonologically identical, the graphic realisation can be different.\(^{23}\) Note, in this discussion, no distinction will be made between hard and soft stems for Polish nouns and Russian end-stressed nouns. However, it is relevant for the case endings of stem-stressed nouns in Russian. When describing these case endings in stem-stressed nouns across declensional classes, soft and hard stem paradigms will be discussed separately.

In the following description, first, an overview of the case system in Polish will be given, followed by Russian: case endings for stem-stressed and end-stressed nouns will be presented and discussed separately.

\(^{23}\) In the plural, the situation is slightly different, but since the plural will not be addressed in this study, the issue will not be discussed further. See Swan (2002) for more information on noun plurals in Polish, and Timberlake (2004) for Russian.
Polish case system

Table 2.3 The Polish case marking system in the singular*

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine animate inanimate</th>
<th>Masculine animate in animative</th>
<th>Neuter</th>
<th>Feminine in -a</th>
<th>Feminine in soft cons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom</td>
<td>język-ø</td>
<td>kogut-ø</td>
<td>'apple'</td>
<td>'love'</td>
<td></td>
</tr>
<tr>
<td>Gen</td>
<td>język-[a][a]</td>
<td>kogut-[a][a]</td>
<td>jawlk-[a][a]</td>
<td>lyżk-[a][a]</td>
<td>miłość-ø</td>
</tr>
<tr>
<td>Dat</td>
<td>język-[owi][ɔwi]</td>
<td>kogut-[owi][ɔwi]</td>
<td>jawlk-[u][u]</td>
<td>lyżc-[e][ɛ]</td>
<td>miłość-[i][i]</td>
</tr>
<tr>
<td>Ins</td>
<td>językki-[em][ɛm]</td>
<td>kogutki-[em][ɛm]</td>
<td>jawlki-[em][ɛm]</td>
<td>lyżk-[ɛ][ɛ]</td>
<td>miłość-[i][i]</td>
</tr>
<tr>
<td>Loc</td>
<td>język-[u][u]</td>
<td>koguci-[e][ɛ]</td>
<td>jawlk-[u][u]</td>
<td>lyżc-[e][ɛ]</td>
<td>miłość-[i][i]</td>
</tr>
<tr>
<td>Voc</td>
<td>język-[u][u]</td>
<td>koguci-[e][ɛ]</td>
<td>jawlk-[o][ɔ]</td>
<td>lyżk-[ɔ][ɔ]</td>
<td>miłość-[i][i]</td>
</tr>
</tbody>
</table>

*As mentioned above, no distinction will be made between hard and soft stems.

As within the paradigms, as a result of adding case endings, softening in the stem (for example, in the masculine instrumental) as well as obligatory consonant alternations may occur (for example, in the feminine dative and in the locative case) (see example Po 2.1a in Section 2.1).

As becomes clear from Table 2.3, there is a high degree of syncretism within the Polish paradigms, that is to say, many endings in their phonological form do not unambiguously signal a certain case. For feminine nouns ending in a soft consonant, there is an even higher degree of syncretism of endings: there are only three endings for the seven cases, with the instrumental {-q} ([ɔ]) being the only distinctive ending. Syncretism not only occurs within the declensional patterns, but also across the declensional classes. For example, the {-a} ([a]) ending is used for masculine genitive, masculine animate accusative, neuter genitive and feminine nominative. Although unambiguous in spelling, in modern spoken Polish, the feminine accusative suffix {-ɛ} ([ɛ]) often loses its nasality and is often pronounced as [ɛ], especially in rapid speech (Swan, 2000: 18-19). As a consequence, the feminine singular accusative becomes homophonous with the dative and locative.25 The only case suffix that is unique across declensional patterns in spoken Polish is the masculine dative suffix {-owi}.

It is important to note that masculine nouns and feminine nouns ending in a soft consonant undergo stress changes within the paradigm. As has been

---

24 See Swan (2002: 69-74) for a description of the distribution of genitive masculine singular {-a/-u}-endings in Polish and a few other exceptional endings in oblique cases.

25 Polish speakers living abroad are unable to distinguish between words ending in {-ɛ} and in {-q}. Swan (2002: 18-19) proposes that the distinction is only maintained by the pressure of formal education.
mentioned earlier, Polish nouns are stressed on the penultimate syllable, which means that in the oblique cases (where an inflectional suffix is added), stress shifts forward to the new penultimate syllable. For example, the nominative kogut ‘rooster’ has stress on ko-; in oblique cases -gu- is stressed. This change is very regular and applies to almost all masculine nouns and all feminine nouns ending in a soft consonant that have a zero ending in the nominative.\(^{26}\)

**Russian case system**

In contrast to Polish, the expression of the Russian case system is more complex since Russian has flexible stress (see Section 2.1). However, for this discussion, we will look at nouns that have a stable stress position throughout the paradigm in the singular, that is those that have either stem stress or end stress. Below, the Russian case endings in the singular are introduced as they appear in grammars in written form. This matches the pronunciation in spoken Russian only if the case endings bear stress. Case endings of stem-stressed nouns as pronounced in spoken Russian will be presented and discussed later.

### Table 2.4 The Russian case marking system for end-stressed nouns in the singular

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine inanimate</th>
<th>Masculine animate</th>
<th>Neuter</th>
<th>Feminine in -a</th>
<th>Feminine in soft cons.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom</td>
<td>karandaš-ø</td>
<td>petux-ø</td>
<td>okn-ø</td>
<td>zvezd-ø</td>
<td>ljubov-ø</td>
</tr>
<tr>
<td>Gen</td>
<td>karandaš-[ã][á]</td>
<td>petux-[ã][á]</td>
<td>okn-[ã][á]</td>
<td>zvezd-[y][ý]</td>
<td>ljubv-[j][j]</td>
</tr>
<tr>
<td>Dat</td>
<td>karandaš-[u][ú]</td>
<td>petux-[u][ú]</td>
<td>okn-[u][ú]</td>
<td>zvezd-[e][ě]</td>
<td>ljubv-[j][j]</td>
</tr>
<tr>
<td>Acc</td>
<td>karandaš-ø</td>
<td>petux-[ã][á]</td>
<td>okn-[ã][ó]</td>
<td>zvezd-[u][ú]</td>
<td>ljubov-ø</td>
</tr>
<tr>
<td>Ins</td>
<td>karandaš-[om][óm]</td>
<td>petux-[om][óm]</td>
<td>okn-[om][óm]</td>
<td>zvezd-[o][ó]</td>
<td>ljubov-ø</td>
</tr>
<tr>
<td>Loc</td>
<td>karandaš-[c][ć]</td>
<td>petux-[c][ć]</td>
<td>okn-[c][ć]</td>
<td>zvezd-[ć][ć]</td>
<td>ljubv-[ć][ć]</td>
</tr>
</tbody>
</table>

* Feminine nouns for which the stem ends in a non-palatalised consonant have the genitive ending {-y}, while feminine nouns with a stem ending in a palatalised consonant or a guttural consonant (/g/, /k/, /x/) take the genitive ending {-j}.

*b* Within the paradigms, as a result of adding case endings, softening in the stem can occur, for example, in the feminine dative or the locative (see example Ru 2.1a Section 2.1).

*c* Note that the stress in the instrumental case is not on the ending.

---

\(^{26}\) Although adding a case ending to masculine nouns usually lengthens the noun, that does not apply to masculine and neuter nouns that have a fleeting vowel in the stem (see Section 2.1).

\(^{27}\) See Timberlake (2004: 327-333) for a description of secondary genitives (partitives) in {-u} and secondary locatives in {-u} in Russian.
As is clear from Table 2.4, within the Russian paradigms (as in Polish, compare Table 2.3) there is a high degree of syncretism. For example, the case suffix {-\textit{u}} ([\textit{u}]) is used for the dative case in masculine and neuter nouns and for the accusative case of feminine nouns. Again as in Polish, feminine nouns ending in a soft consonant exhibit an even higher degree of syncretism of endings with only three endings for the six cases. Across declensional patterns, the only case suffix that is unique is {-\textit{oj}} ([\textit{oj}]) marking the instrumental case of feminine nouns.

So far, we have looked at case markings bearing stress, in which vowels are, furthermore, not reduced. In stem-stressed nouns, however, many endings contain unstressed vowels, which are qualitatively or quantitatively reduced (see Section 2.1). As a consequence, the transparency of case endings in stem-stressed nouns as compared to end-stressed nouns is much lower: vowel reduction in case suffixes of stem-stressed nouns leads to increased homophony of case endings (see Section 2.1). In Table 2.5, the phonetic realisation of the endings of stem-stressed nouns is presented.

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine inanimate</th>
<th>Masculine animate</th>
<th>Masculine animate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom</td>
<td>stakan-Ø</td>
<td>nogo-Ø</td>
<td>žiraf-Ø</td>
</tr>
<tr>
<td>Gen</td>
<td>stakan-{a}[ə]</td>
<td>nogo-{a}[ə]</td>
<td>žiraf-{a}[ə]</td>
</tr>
<tr>
<td>Dat</td>
<td>stakan-{u}[u]</td>
<td>nogo-{u}[u]</td>
<td>žiraf-{u}[u]</td>
</tr>
<tr>
<td>Acc</td>
<td>stakan-o\textsuperscript{b}</td>
<td>nogo-o</td>
<td>žiraf-o</td>
</tr>
<tr>
<td>Ins</td>
<td>stakan-{om}[əm]</td>
<td>nogo-{em}[um]</td>
<td>žiraf-{om}[əm]</td>
</tr>
<tr>
<td>Loc</td>
<td>stakan-{e}[i]\textsuperscript{b}</td>
<td>nogo-{e}[i]</td>
<td>žiraf-{e}[i]</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Note that the second \textless o\textgreater in \textit{nogo}’ is a fleeting \textless o\textgreater.

\textsuperscript{b} Within the paradigms, as a result of adding case endings, softening in the stem can occur, for example, in the feminine dative or the masculine locative (see example Ru 2.1a Section 2.1).
When we look at Table 2.5 (a and b), we see that many Russian stem-stressed nouns end in [ə] and [i]. As is clear from a comparison of Table 2.5 with Table 2.4, stem-stressed nouns are less transparent with respect to case marking than end-stressed nouns. Reduction causes increased homophony of endings in stem-stressed nouns, both in soft and in hard stems. Compared to end-stressed nouns, the clear distinction between the feminine genitive and feminine dative ending is lost. Within the neuter paradigm, the distinction between the nominative/accusative and genitive is lost. Across declensional patterns the distinction between feminine and neuter nouns in the nominative singular is lost (see Section 2.1). Compared to end-stressed nouns, the total number of [ə] and [i]-endings for stem-stressed nouns within and across the declensional paradigms significantly increases (with [ə]-endings being more frequent in hard stems, and [i]-endings more frequent in soft stems, including feminine nouns that end in a soft consonant). Moreover, for the masculine, the genitive (and accusative for animate nouns) becomes homophonous with the feminine nominative and the neuter nominative, genitive and accusative.

To sum up, for Polish and Russian end-stressed nouns, case endings are not unique across the declensional patterns: there are many homophonous suffixes. For example, the Polish and Russian (stressed) ending [ə] can be interpreted as

---

28 I am aware of the fact that the phonological realisation of the reduction of unstressed a, e, and o, is one of a range of possible realisations of pronunciation in modern spoken Russian. The exact realisation a speaker of modern standard Russian pronouns depends on such phenomena as “ikan’e”, “ekan’e” and “akan’e”, see Timberlake (2004: 44-45). This difference is not relevant for this study.
feminine nominative, as masculine genitive and animate accusative, and as neuter genitive. Moreover, as a result of vowel reduction, Russian stem-stressed nouns have an even higher degree of homophony in case endings than Polish nouns and Russian end-stressed nouns.

The amount of homophony in case endings in both languages has implications for the ease of interpreting sentences and forms within the sentence. In order to correctly interpret case markings it is very important for a learner to know to which declensional pattern a noun belongs. The homophonous forms are certainly problematic when the subject of a sentence is a feminine noun and the object is a masculine animate noun since they both end in [a] or [o], see for example in (2.2). In (2.2) there is no semantic or pragmatic reason for preferring the one noun or the other as subject or object, and without knowing the declensional pattern the learner cannot deduce the syntactic role based on the case endings.

(2.2) Examples of syncretism of endings of case marking (nominative feminine vs. accusative masculine)

Po: *Królow-a widzi król-a*
queen-F.SG.NOM sees king-M.SG.ACC
‘(The) queen sees (the) king.’

Ru: *Korolev-a vidit korolj-a*
queen-F.SG.NOM sees king-M.SG.ACC
‘(The) queen sees (the) king.’

Knowledge of the declensional pattern of a noun is still not enough to unambiguously determine the roles of each noun on the basis of case marking only. In transitive sentences in which both the subject and the object are masculine inanimate nouns, neuter nouns or feminine nouns ending in a soft consonant, nominative-accusative neutralisation occurs, and the subject and the object of the sentence cannot be identified on the basis of the case system only. In such cases, “world knowledge”, see Section 1.2.2 (see VanPatten (2004)), can often be helpful in resolving the issue (see example 2.3), and the nominative-

---

29 This is relevant for production as well.
accusative opposition becomes semantically or pragmatically (but not morphologically) transparent, as exemplified in (2.3).

(2.3) Examples of nominative-accusative neutralisation in sentences that are pragmatically unambiguous

Po:  
\textit{Dzieck-o} widzi \textit{mlek-o}  
child-N.SG.NOM/ACC sees milk-N.SG.NOM/ACC  
‘The child sees the milk.’ or ‘The milk sees the child.’

Ru:  
\textit{Avtobus-o} \textit{slomal} \textit{velosiped-ø}  
bus-M.SG.NOM/ACC destroyed bicycle-M.SG.NOM/ACC  
‘The bus destroyed the bicycle.’ or ‘The bicycle destroyed the bus.’

In (2.3), in terms of morphology, the unlikely meaning \textit{the milk sees the child} is the same as the semantically-pragmatically correct \textit{the child sees the milk}. As already discussed in Section 1.2.3, for sentences in which nominative-accusative neutralisation occurs and where both nouns are pragmatically equally likely as agent, the most usual interpretation is in terms of word order, SVO (Jakobson, 1998: 137). See (2.4) for examples of nominative-accusative neutralisation in Polish (two neuter nouns) and in Russian (two inanimate masculine nouns).

(2.4) Examples of nominative-accusative neutralisation

Po:  
\textit{Dzieck-o} \textit{kocha} \textit{rodzeństw-ø}.  
child-N.SG.NOM/ACC loves sibling-N.SG.NOM/ACC  
‘The child loves his/her sibling.’ or ‘The sibling loves the child.’

Ru:  
\textit{Avtobus-o} \textit{sbil} \textit{gruzovik-ø}.  
bus-M.SG.NOM/ACC hit truck-M.SG.NOM/ACC  
‘The bus hit the truck.’ or ‘The truck hit the bus.’

As is clear from examples (2.4), both possible meanings \textit{the child loves his/her sibling} and \textit{the sibling loves the child} have morphologically identical expressions here. In such cases, normally word order serves as a pragmatic cue to allocate semantic roles. With an SVO reading, \textit{the child loves his/her sibling} is the most likely interpretation.

Nominative-accusative neutralisation also occurs in feminine nouns ending in a soft consonant (2.5), and here again, SVO is the most plausible interpretation.
(2.5) Examples of nominative-accusative neutralisation in feminine nouns in a soft consonant

Po:  

<table>
<thead>
<tr>
<th>Po</th>
<th>Wesz-ø</th>
<th>denerwuje</th>
<th>mysz-ø</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>louse-F.SG.NOM/ACC</td>
<td>makes+nervous</td>
<td>mouse-F.SG.NOM/ACC</td>
</tr>
</tbody>
</table>

‘The louse makes the mouse nervous.’ or ‘The mouse makes the louse nervous.’

Ru:  

<table>
<thead>
<tr>
<th>Ru</th>
<th>Mat'-ø</th>
<th>ljubit</th>
<th>doč'-ø</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mother-F.SG.NOM/ACC</td>
<td>loves</td>
<td>daughter-F.SG.NOM/ACC</td>
</tr>
</tbody>
</table>

‘The mother loves her daughter.’ or ‘The daughter loves her mother.’

The Russian example in (2.5) could be interpreted as the mother loves her daughter or as the daughter loves her mother. The word order here makes it more likely that the mother is the subject of the sentence, and the daughter the object.

In sum, both Polish and Russian have a considerable number of homophonous case endings. In Russian, the amount of homophony is larger than in Polish due to the fact that endings of stem-stressed nouns are reduced resulting in identical vowels. In some cases, the semantic and pragmatic plausibility and/or word order are the only cues for interpretation.

2.2.3 Agreement

The ending of a noun in any oblique case is determined by its declinational pattern/morphological gender. The reference gender of the noun determines the agreement forms for any related forms (Corbett, 2006). Although those two gender types in Polish and Russian generally fall together, there are, especially for animate referents, many cases in which they do not correspond. Agreement manifests itself in modifiers and past tense verb forms. For example, in Polish, mężczyzna ‘man’ and in Russian, dядя ‘uncle’ are morphologically feminine, but agree with the masculine form of modifiers (e.g., mój/moj ‘my’). Adjectives, most attributive pronouns (demonstrative, possessive and relative), numerals, and participles agree with the reference gender and number of the nouns they modify. Past tense verbs agree in number and gender with the subject noun. Moreover, adjectives, participles, numerals, and pronouns also agree with nouns in terms of

---

30 Masculine diminutive and augmentative nouns ending in {-o} and {-e} in Russian, like xlebusk-o [э] ‘small/nice bread’, or domišt-e [и] large house’, will not be discussed here.
case. These word classes thus take gender markings corresponding to the reference gender of the noun they modify, and not according to the declensional class of the noun (overt morphological marking). To exemplify, Polish and Russian nouns that belong to the feminine $a$-declensional class but that are – referentially – masculine, are modified by masculine forms of the adjective.\textsuperscript{31} Below, markers for adjectival and past tense verbal agreement (and their transparency) will be discussed.

For both Polish and Russian, agreement as marked on an adjective can disambiguate the reference gender of nouns that are non-transparent for morphological gender; and since reference gender usually corresponds with morphological gender, morphological gender will be clear as well. This applies to nouns of common gender that take agreement markers according to the reference gender of the head noun. Moreover, agreement helps to disambiguate masculine and feminine nouns that end in a consonant. For example, due to the marking on the adjective in the Polish/Russian noun phrases interesujący gości/interesnyj gost’ ‘interesting guest’, the noun is interpretable as masculine for reference gender, and czerwona krew/krasnaja krov’ ‘red blood’ as referentially, and by implication, morphologically, feminine, ending in a consonant. For Russian, agreement with end-stressed adjectives or past tense verb forms can moreover disentangle the gender of stem-stressed feminine and neuter nouns that have homophonous endings in the nominative.

However, in Russian, the disambiguating power of adjectives and past tense forms of verbs does not exist in the case of stem-stressed modifiers. In stem-stressed contexts, adjectival nominative endings for both the feminine and the neuter are reduced to [әә], and the past tense verb endings are reduced to [ә] for feminine and neuter.

\textsuperscript{31} In abbreviations, the gender cannot be determined on the basis of the form and is derived from the gender of the head noun; for example, Russian BMP (= boevaja mašina pexaty ‘infantry fighting vehicle’) ends in a hard consonant but the reference gender is feminine, due to the fact that mašina ‘vehicle’ is feminine.
Adjectival attributive agreement

Adjectival modifiers agree in case, reference gender and number with the noun they modify. Adjectival case endings for agreement with masculine, neuter and feminine nouns for Polish (Table 2.6), and for end-stressed adjectives for Russian (Table 2.7) as they occur in their written form are presented below with the phonetic form alongside.

Table 2.6 Polish case markings for (attributive) adjectives in the singular

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Neuter</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom</td>
<td>biał-[y][a]</td>
<td>bial-[e][e]</td>
<td>bial-[a][a]</td>
</tr>
<tr>
<td>Gen</td>
<td>biał-[ego][ego]</td>
<td>bial-[ego][ego]</td>
<td>bial-[ej][ej]</td>
</tr>
<tr>
<td>Dat</td>
<td>biał-[emu][emu]</td>
<td>bial-[emu][emu]</td>
<td>bial-[ej][ej]</td>
</tr>
<tr>
<td>Acc</td>
<td>biał-[ego][ego]</td>
<td>bial-[e][e]</td>
<td>mleko</td>
</tr>
<tr>
<td>Ins</td>
<td>biał-[ym][ym]</td>
<td>bial-[ym][ym]</td>
<td>bial-[a][a]</td>
</tr>
<tr>
<td>Loc</td>
<td>biał-[ym][ym]</td>
<td>bial-[e][e]</td>
<td>mleko</td>
</tr>
<tr>
<td>Voc</td>
<td>biał-[y][a]</td>
<td>bial-[e][e]</td>
<td>mleko</td>
</tr>
</tbody>
</table>

*a* Adjectival case endings for masculine and neuter genitive and dative are disyllabic. Here, the stress is on the penultimate vowel, thus on the ending and not on the stem.

*b* For animate nouns: the form of the accusative is the same as for the genitive; for inanimate nouns: the form of the accusative is identical to the nominative.

As Table 2.6 shows, in adjectival endings there is a high degree of homophony and syncretism as there is in the noun endings. Within the genders, masculine and neuter endings for the instrumental case and the locative case are identical. Across the masculine and neuter, most case endings are identical; the only difference is in the nominative and the accusative. Feminine adjectival case endings show a great deal of homophony: the ending [ej] is used for the genitive, the dative, and the locative case, and the nasal [a]-ending is used for the accusative and the instrumental case.

As with nouns, Russian adjectives can be either end-stressed (for example, bol’soj ‘big’), or stem-stressed (for example, krasnýj ‘red’) and this is relevant for case markings. Unlike nouns, adjectives do not shift stress position within a paradigm. We will start with end-stressed adjectives.

---

32 For Russian, only long forms of adjectives are taken into account, e.g., the long form nov-ýj ‘new-M.SG.NOM’ vs. the short form nov-a ‘new-M.SG’. Short forms can be used predicatively only, and thus agree only in gender and number with the noun they modify (see Timberlake (2004: 124, 286)).

33 However, short forms may have mobile stress.
agreement with a stem almost undistinguishable (as discussed in Section 2.1.2). Importantly, for Russian, case are now almost identical, masculine and neuter endings for the instrumental case and the locative (Table 2.8).

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Neuter</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘big boot’</td>
<td>‘big window’</td>
<td>‘big star’</td>
<td></td>
</tr>
<tr>
<td>Nom</td>
<td>bol’s-[oj][oj]</td>
<td>sapog</td>
<td>bol’s-[a]ja[a]</td>
</tr>
<tr>
<td>Gen</td>
<td>bol’s-[ogo][ova][a]</td>
<td>sapoga</td>
<td>bol’s-[a]ja[a]</td>
</tr>
<tr>
<td>Dat</td>
<td>bol’s-[omu][o]mu</td>
<td>sapogu</td>
<td>bol’s-[o]j</td>
</tr>
<tr>
<td>Acc</td>
<td>bol’s-[oj][oj][b]</td>
<td>sapog</td>
<td>bol’s-[o]ja[a]</td>
</tr>
<tr>
<td>Ins</td>
<td>bol’s-[im][im]</td>
<td>sapogom</td>
<td>bol’s-[o]jm</td>
</tr>
<tr>
<td>Loc</td>
<td>bol’s-[om][o]m</td>
<td>sapoge</td>
<td>bol’s-[o]om</td>
</tr>
</tbody>
</table>

*Note, in disyllabic endings only the first vowel can bear stress.

For animate nouns: the form of the accusative is the same as for the genitive; for inanimate nouns: the form of the accusative is identical to the nominative.

**Russian is slightly different to Polish, as in Russian more adjectival endings are disyllabic. Within the masculine and neuter genders adjectival end-stressed case endings are quite distinct (see Table 2.7). Across declensional paradigms, the masculine and neuter adjectival endings are almost the same, differing only in the nominative and the accusative, like in Polish. This is not true for feminine adjectival case endings, which are homophonous in all oblique cases except the nominative and accusative.**

<table>
<thead>
<tr>
<th>Case</th>
<th>Masculine</th>
<th>Neuter</th>
<th>Feminine</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘red house’</td>
<td>‘red arm-chair’</td>
<td>‘red rose’</td>
<td></td>
</tr>
<tr>
<td>Dat</td>
<td>krasn-[omu][o]mu</td>
<td>domu</td>
<td>krasn-[o]mu[o]mu</td>
</tr>
<tr>
<td>Acc</td>
<td>krasn-[yj][yj][b]</td>
<td>dom</td>
<td>krasn-[o]ja[a]</td>
</tr>
<tr>
<td>Ins</td>
<td>krasn-[yj][yj][yj]</td>
<td>domom</td>
<td>krasn-[yj][yj][yj]</td>
</tr>
<tr>
<td>Loc</td>
<td>krasn-[om][o]m</td>
<td>dome</td>
<td>krasn-[o]m[o]m</td>
</tr>
</tbody>
</table>

*For animate nouns: the form of the accusative is the same as for the genitive; for inanimate nouns: the form of the accusative is identical to the nominative.

The amount of homophony in endings of stem-stressed adjectives (as presented in Table 2.8) is greater compared to end-stressed adjectives. For example, within the genders, masculine and neuter endings for the instrumental case and the locative case are now almost identical, i.e., differences are marginal. Between genders, the feminine nominative and neuter nominative and accusative case endings are now almost undistinguishable (as discussed in Section 2.1.2). Importantly, for Russian, agreement with a stem-stressed adjective does not help to distinguish between...
neuter and feminine nouns in the nominative case, as stem-stressed adjectives are not transparent for gender.

**Past tense verbal agreement**

In Polish and Russian in the singular, past tense verb forms agree with subject nouns in reference gender (and number). Thus, gender is not only visible on the noun but also on the verb (see (2.6a-c)).

Thus, the form of the predicate can help to determine the gender of the subject. This works well for Polish past tense forms and for Russian past tense verb forms that are end-stressed, because those feminine and neuter markings are transparent for gender. However, when these verb forms are stem-stressed, they are homophonous and do not disambiguate feminine and neuter subject nouns (see (2.7)).

(2.6) Examples of past tense gender marking (transparent)

**a. Masculine**

Po:  

\[Słon-ø \text{ spal.}\]

\[\text{elephant-M.SG.NOM slept.M.3SG}\]

‘The elephant slept.’

Ru:  

\[Słon-ø \text{ spal.}\]

\[\text{elephant-M.SG.NOM slept.M.SG}\]

‘The elephant slept.’

**b. Feminine**

Po:  

\[Wiewiórk-a \text{ spal-a.}\]

\[\text{squirrel-F.SG.NOM slept-F.3SG}\]

‘The squirrel slept.’

Ru:  

\[Bělk-a \text{ spal-a.}\]

\[\text{squirrel-F.SG.NOM slept-F.SG}\]

‘The squirrel slept.’

**c. Neuter**

Po:  

\[Drzew-ø \text{ padl-ø.}\]

\[\text{tree-N.SG.NOM fell-N.3SG}\]

‘The tree fell.’

Ru:  

\[Dřev-ø \text{ rosl-ø.}\]

\[\text{tree-N.SG.NOM grew-N.SG}\]

‘The tree grew.’

(2.7) Examples of past tense gender marking with stem-stressed verbs in Russian (non-transparent for feminine and neuter)

**a. Masculine**

Ru:  

\[Malčik-ø \text{ kušal.}\]

\[\text{boy-M.SG.NOM ate.M.SG}\]

‘The boy ate.’

34 In contrast to Russian, in Polish the person is also marked in the verb ending.
CHAPTER 2. THE ACQUISITION OF GENDER AND CASE IN POLISH AND RUSSIAN

b. Feminine

Ru:  
Devuśk-a [ə]  kuşal-a [ə].  
girl-F.SG.NOM ate-F.SG  
‘The girl ate.’

c. Neuter

Ru:  
Myl-o [ə]  upał-o [ə].  
soap-N.SG.NOM fell-N.SG  
‘The soap fell.’

In the sentences (2.7), both the subject noun and the verb form have the same stress-position (stem stress). Therefore, the feminine and neuter nouns and past tense verbs for feminine and neuter fall together, being all realised as [ə]. Thus, the gender and case markings are non-transparent for feminine and neuter nouns with stem stress in agreement with stem-stressed past tense verbs.

So far, we have looked at situations in which both the head and modifier, and the subject and past tense verb have the same stress position (i.e., stem stress or end stress). Now, we will consider situations in which the head noun and modifier, and the head noun and past tense verb have a different stress position. In Table 2.9 and Table 2.10, all four combinations of stem-stressed and end-stressed nouns and modifiers and subject nouns and past tense verb forms are set out.

<table>
<thead>
<tr>
<th>Stress modifier</th>
<th>Stress head</th>
<th>Feminine</th>
<th>Neuter</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem</td>
<td>Stem</td>
<td>belaja [aja] white</td>
<td>beloc [aja] white</td>
<td>kreslo [ə] arm-chair</td>
</tr>
<tr>
<td>Stem</td>
<td>End</td>
<td>belaja [aja] white</td>
<td>beloc [aja] white</td>
<td>vedra [o] bucket</td>
</tr>
<tr>
<td>End</td>
<td>Stem</td>
<td>bol’saja [aja] big</td>
<td>bol’še [oja] large</td>
<td>kreslo [ə] arm-chair</td>
</tr>
<tr>
<td>End</td>
<td>End</td>
<td>bol’saja [aja] large</td>
<td>bol’še [oja] large</td>
<td>vedra [o] bucket</td>
</tr>
</tbody>
</table>
Table 2.10 Stress and transparency of endings in Russian noun-past tense verb combinations

<table>
<thead>
<tr>
<th>Stress verb</th>
<th>Stress head</th>
<th>Feminine</th>
<th>Neuter</th>
<th>Transparency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem</td>
<td>Stem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End</td>
<td>Stem</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End</td>
<td>End</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The most transparent combination is the one in which both the head noun and the modifier are end-stressed, as in the neuter “large bucket”, in which both head noun and modifier have clear [ö]-endings, or the feminine “The snake slithered”, in which both subject and past tense verb have clear [á]-endings. The least transparent cases are those combinations in which both head noun or subject and modifier or past tense verb marker are stem-stressed (and for which both feminine and neuter head nouns and past tense markers are reduced to [ə]). Since only one of the forms is transparent in the other two combinations, it is not clear how transparency should be judged for the noun phrase as a whole.\(^{35}\)

To summarise, agreement can provide the basis for establishing the reference gender, especially in the written form and, by implication, of the morphological gender. Agreement can provide additional information on the reference gender of a noun in the following situations:

1. with nouns ending in a soft consonant: feminine or masculine marking on the adjective or past tense verb makes gender transparent;
2. with nouns of common gender that are declined according to the feminine declension; and with nouns that are morphologically feminine, but have masculine reference gender.

\(^{35}\) It is an empirical question whether the ending on the noun or adjective is more important in processing. This research has not yet been carried out.
3. with feminine and neuter nouns with stem stress, if the adjectives, pronouns, and/or past tense verbs are end-stressed.\(^{36}\)

### 2.2.4 Implications for acquisition in children

As has been demonstrated in Section 2.2, a learner of Polish or Russian hypothetically encounters an enormous variety of gender and case suffixes in the input, as is also illustrated in Table 2.11 and Table 2.12 (per suffix, the possible interpretations in terms of gender and case combinations are only displayed for the singular).

| Table 2.11 Possible interpretations of singular gender and case endings in Polish |
|-----------------|-----------------|-----------------|-----------------|
| [u] M loc M M M N N N | | | |

\(^{36}\)In Russian, some high-frequent possessives (for example moja, moë ‘my’ and tvoja, tvoë ‘your’), some adjectives (for example, drugaja, drugoe ‘other’ and bol’saja, bol’soe ‘large’) and some past tense forms (for example, žila ‘lived’, byla ‘was’ and vozila ‘took’) are end-stressed.

---

\(^{a}\)F’ stands for feminine ending in a soft consonant

\(^{b}\)M.inan stands for masculine inanimate

\(^{c}\)M.an stands for masculine animate

---

45
As is clear from Table 2.11, in Polish, there are 12 different phonetic endings for the singular for 43 functions (including the vocative), per ending ranging from one to seven possible interpretations; for Russian, there are 17 different endings, but for 55 functions, per suffix ranging from one to eight different interpretations (and with one case less than Polish; the vocative). Polish has thus a smaller amount of homophony of endings in the gender and case system than Russian. The Polish gender and case system seems therefore to be more transparent than the Russian gender and case system.

Table 2.12 Possible interpretations of singular gender and case endings in Russian

| [i] | F | gen |
| [i] | F | instr |
| [i] | F | instr |
| [i] | F | instr |
| [i] | M | N | instr |
| [i] | M | N | instr |
| [i] | M | N | instr |
| [i] | M | instr | M.inan |
| [i] | N | N | acc |
| [i] | M | M.inan | F | F’ | acc | nom |
| [i] | F | M | F | N | loc |
| [i] | F’ | F’ | F’ | loc |
| [i] | M | M.an | F | N | gen |
| [i] | M | M.an | F | N | gen | acc |
| [i] | M | M.an | F | N | N | N | instr |

As is clear from Table 2.11, in Polish, there are 12 different phonetic endings for the singular for 43 functions (including the vocative), per ending ranging from one to seven possible interpretations; for Russian, there are 17 different endings, but for 55 functions, per suffix ranging from one to eight different interpretations (and with one case less than Polish; the vocative). Polish has thus a smaller amount of homophony of endings in the gender and case system than Russian. The Polish gender and case system seems therefore to be more transparent than the Russian gender and case system.
The least transparent endings for Russian (see Table 2.12) are the reduced endings [ə] and [ɨ]. As has been discussed in Section 2.1 and 2.2, whereas Polish has only one stress option but does not phonetically reduce unstressed vowels; Russian has two options (stem stress and end stress). Especially the stem stress contributes to increased homophony on the one hand, and increased variety on the other. The stress options for Polish and Russian, from transparent to less transparent, are set out in Table 2.13.

<table>
<thead>
<tr>
<th>Nr.</th>
<th>Stress in ending</th>
<th>Vowel transparency</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>+ stress (end stress)</td>
<td>+ transparent vowel</td>
<td>Russian</td>
</tr>
<tr>
<td>2.</td>
<td>- stress</td>
<td>+ transparent vowel</td>
<td>Polish</td>
</tr>
<tr>
<td>3.</td>
<td>- stress (stem stress)</td>
<td>- transparent vowel</td>
<td>Russian</td>
</tr>
</tbody>
</table>

In the two languages the three types, as set out in Table 2.13 could hypothetically be acquired in various orders according to the relative importance of factors such as the frequency of cases and case endings, regularity, and phonological clarity. It would therefore seem likely that this difference is an important factor in acquisition.

One of the possible hypotheses is “unstressed endings (in Polish and Russian) are acquired before stressed endings”. This sounds very implausible: salient and transparent endings are normally acquired before non-transparent endings (Slobin, 1985). A more plausible acquisition order would be “stressed endings that are not reduced are acquired first, followed by unstressed but non-reduced endings, and finally, unstressed and reduced endings”. Another hypothesis could be that gender and case endings are acquired faster in Polish than in Russian, because of the fact that Russian has two stress options and Polish just one. Thus, phonetic clarity is likely to be an important factor in acquisition.

Although both the Polish and Russian noun systems in the singular reveal a considerable variety in gender and case suffixes (see Tables 2.11 and 2.12), in

37 This is a simplification: if the ending consists of more than one syllable, the ending (the penultimate syllable) is stressed (for example, for the dative noun ending {-owi}). In Russian, end stress can also be on the stem in the case of a zero ending in the nominative singular.
reality, a young child is not exposed to the individual inflectional endings in equal amounts. It is possible that frequency also influences acquisition.

Since input is adapted to the child’s cognitive and linguistic development (and utterances in the input are to a high degree lexically restricted (Stoll, Abbot-Smith & Lieven, 2009)), as a result of the daily life situations the nominative is the most frequent case in child directed speech (CDS), followed by accusative and genitive. According to recent findings in Polish, in early childhood (around age 2), about 54% of nouns in CDS is in the nominative, 19% in the accusative, and 12% in the genitive (Dąbrowska & Szczerbiński, 2006: 567). The contexts for the use of the dative, locative or instrumental occur significantly less frequently (Dąbrowska & Szczerbiński, 2006: 567). However, with age, new morphological forms are added and become more frequent in the input. Since Russian is closely related to Polish, we assume – with caution – that these percentages would be similar in Russian.

It is important to note here that it was necessary to select the cases to be examined in this study. The genitive, accusative and dative case have more or less the same functions in Russian and Polish, therefore, this study will focus on those cases. Although the usage of the locative/prepositional case is comparable in Polish and Russian, it is relatively infrequent in CDS. The same is true for the instrumental case. Furthermore, the use of that case differs between Polish and Russian. These two cases will therefore be excluded.

There is some frequency information available with respect to Russian stem- and end-stressed nouns in adult speech and CDS, although the latter has been only analysed for younger children (2-3 years old), younger than the children included in this study. Frequency counts in CDS have shown that end-stressed nouns in Russian adult speech and in Russian CDS are infrequent: around 13% of all noun types and tokens in CDS have end stress (e.g., Janssen, 2014). End-stressed masculine and feminine nouns each make up 6% of the total number of

38 Naming objects – nominative; performing basic actions or activities with objects, such as eating, washing, feeding – accusative; determining which object belongs to whom – genitive.
39 Dąbrowska & Szczerbiński (2006: 567) state that a Polish child at the age of 2 hears only 4% of instrumental and locative forms in his/her input.
tokens in Russian CDS, as they also do in adult spoken Russian.\textsuperscript{40} End-stressed neuter endings are particularly rare: they make up only 0.5\% of the total number of tokens in Russian CDS (Janssen, 2014). The remaining 87\% of nouns have stem stress. Because the number of end-stressed nouns in CDS is very small, some of the possible acquisition orders are less likely. For example, the possible acquisition order “Polish is acquired before Russian end stress and stem stress”, which is compatible with Slobin (1985) and Smoczyńska (1985), becomes more plausible because the possible positive effect of end-stressed nouns on acquisition becomes less likely due to their low frequency (see Section 2.4 for hypotheses of this study).

Moreover, taking into account not only the relative infrequency of Russian end-stressed nouns, but also the frequency of the different oblique cases as compared to the nominative case in Russian, we can assume that some transparent forms (for example, end-stressed neuter dative endings) are very infrequent. Although the implications of the different amount of homophony of case endings in Polish and Russian in the oblique cases are difficult to determine, we can now draw a more realistic image of the input a child is generally exposed to in early childhood (nominatives, genitives and accusatives only of standard masculine, feminine $a$-declension and neuter).

According to what we now know about frequency, we see that a considerable amount of homophony and variety in the endings (as shown in Tables 2.11 and 2.12) is not necessarily present in CDS, since some cases and declensional classes are infrequent or even absent. Taking this fact into consideration, we can reconstruct a more realistic view of the input a 2-year-old is exposed to: it mainly consists of noun forms in the nominative, accusative and genitive singular. But the gender and case systems in Polish and Russian are quite challenging. This is especially true for Russian, where opaque endings lead to an even greater number of homophonous gender and case endings. Note that the current study deals with children between 4 and 6 years old. For children of that age, the proportion of the input in each oblique case is not yet known.

\textsuperscript{40} This is the same for Russian in general, see Honselaar (2014).
Although the gender and case systems in Polish and Russian are challenging, there are some factors that might contribute to a faster or delayed acquisition of the nominal system. In CDS, diminutives are highly frequent (Kempe, Brooks & Pirot, 2001; Kempe & Brooks, 2001). On the one hand, diminutives contribute to the uniformity and transparency of declensional patterns and relationships between case and gender for Polish and Russian (Protassova & Voeikova, 2007; Dąbrowska & Szcerbiński, 2006; Kempe, Brooks, Mironova, Pershukova & Fedorovo 2007). On the other hand, for Russian, diminutives increase the amount of non-transparent forms in the input.41

Therefore, for Russian, however, this reduction in the variation of endings of the declensional patterns does not lead to a greater transparency, as neuter and feminine diminutives sound identical due to the fact that the endings of diminutives are unstressed and thus phonetically reduced (see Section 2.1).42 Moreover, Russian, unlike Polish, has a number of morphologically masculine nouns, such as proper names or animals, which in the diminutive form take the morphologically feminine suffix [ka], for example, zajac-o 'hare' becomes zajk-a '(little/sweet) hare'. Thus, the role of diminutives in facilitating the gender and case acquisition for the system as a whole is disputable, at least for Russian. For Polish, however, the effect of diminutives in regularising the input and fostering quick acquisition of the declensional patterns is positive. In Table 2.14 for Polish and 2.15 for Russian examples of diminutive formation per genders are given.

<table>
<thead>
<tr>
<th>Polish</th>
<th>simplex form</th>
<th>diminutive form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masc.</td>
<td>baran</td>
<td>baran-ek '(little) ram'</td>
</tr>
<tr>
<td>Fem. in -a</td>
<td>ryb-a</td>
<td>ryb-ka '(little) duck'</td>
</tr>
<tr>
<td>Neut.</td>
<td>mlek-o</td>
<td>mle-czko '(little) milk'</td>
</tr>
<tr>
<td>Fem, soft in oblique cases</td>
<td>krew</td>
<td>krew-ka '(little) blood'</td>
</tr>
</tbody>
</table>

41 The three most frequent patterns are masculine diminutives ending in a consonant [k], feminine diminutives ending in {ka} (for Polish [ka] and for Russian [kə]), and neuter diminutives ending in {ko/ce/co} (for Polish [ko/ce/cə], and for Russian [ko/ko/ko/co]). Please note, this is a simplification. There are many more diminutive suffixes. For more information on diminutive formation and meaning, see Swan (2002) for Polish and Timberlake (2004) for Russian.

42 Some neuter and masculine diminutives preserve final stress, for example, moloko ‘milk’ becomes moloka~ (little) milk’ (see Peeters-Podgaevskaja & Honselaar, 2007: 550).
As briefly mentioned in Section 2.2.3, agreement hypothetically facilitates the acquisition of the gender system, because the morphological information on modifiers and past tense verbal forms may contribute to the interpretation of the gender and case status of nouns. The role of agreement in CDS is, however, unclear. Moreover, although agreement can help disambiguate the gender of nouns for which the morphological and reference gender are in conflict (see Section 2.2.3), it is not clear whether it can help in disambiguating the morphological gender of Russian feminine and neuter stem-stressed nouns. Stem-stressed modifiers in combination with stem-stressed nouns do not provide additional gender information. As most modifiers and past tense verbal forms are stem-stressed, and end-stressed adjectives, pronouns and past tense verbs are very rare in Russian (although they belong to the basic vocabulary), we can hypothetically say that the whole agreement system does not facilitate the process of gender and case acquisition in young children due to the large amount of variation and exceptions.

However, regardless of the fact that the degree of homophony of endings is large for Polish, and even larger for Russian, it is likely that a clear linguistic and situational context will help disambiguate the many multi-functional case endings. For example, the fact that the dative feminine and the locative for all genders are often homophonous in Polish and Russian, does not lead to problems in comprehension or production due to different usages and contexts (for instance, in Russian, the marking of the indirect object *mama* ‘mama.F.SG.DAT’ vs. marking of spatial localisation *stol* ‘table.M.SG.LOC’). The increased homophony in stem-stressed nouns is relevant, however, for the distinction between feminine nominative and neuter nominative/accusative.

In sum, although the implications of the amount of syncretism and homophony of case endings in Polish and Russian in the oblique cases are difficult to determine, it is obvious that the Polish and Russian gender and case systems are
complicated. The fact that stem-stressed nouns in Russian contribute to an even greater number of homophonous endings as well as the fact that end-stressed nouns in Russian are infrequent could make the acquisition of the gender and case system even more challenging as compared to Polish. The next section (Section 2.3) will deal with the evidence from the literature on the acquisition of case in Polish and Russian in monolingual and bilingual children.

2.3 The acquisition of gender and case in Polish and Russian

As was mentioned in Section 1.4, the aim of this study is to establish whether gender and case are acquired faster in Polish than in Russian as a result of the fact that Russian has a higher level of homophony and variation. Smoczyńska (1985) and Slobin (1973) have both claimed that Polish children are faster in acquiring the gender and case system than Russian children because of the differences in the linguistic systems, but these claims have to date not been empirically tested, and no cross-linguistic studies have been reported. Nevertheless, there have been a number of individual studies on monolingual and bilingual children acquiring gender and case morphology in Polish or Russian. This overview will therefore report on these studies but attention will be paid only to those regular declensional patterns and oblique cases (taking into account vowel clarity) that are relevant for this study (the genitive, accusative and dative case only with respect to the singular). Furthermore, the influence of stress and morphophonological transparency on acquisition will be discussed – in particular in the light of stress, frequency and vowel transparency of the endings.

As was mentioned in Section 1.3, this study includes the acquisition of gender and case in bilingual Polish/Russian children who acquire Polish/Russian from birth in a minority language situation. Polish/Russian acquired bilingually in Poland/Russia as a majority language will not be considered in this review since most of those studies involved sequential bilinguals that had an age of onset (AoO) of Polish/Russian of around 4 years (see Section 3.1), thus a quite different population to the one in this study.43

---

43 For Russian, there are data available on how Russian as a majority language is acquired e.g., by Russian-Azeri (e.g., Sučkova, 2008; Baskakov, 1976) and Russian-Buryat children (e.g., Darbeeva, 1976).
CHAPTER 2. THE ACQUISITION OF GENDER AND CASE IN POLISH AND RUSSIAN

In the following, the production and comprehension of gender in monolinguals and bilinguals will be discussed in Section 2.3.1, followed by the production and comprehension of case in 2.3.2. In both sections, special attention will be paid to effects of AoO, length of exposure (LoE) to the L2 (not Polish/Russian) and the amount of input (AoI) in each of the languages on the acquisition of gender and case in bilinguals, as well as the effects of word stress and frequency of stress patterns/cases.

2.3.1 The acquisition of gender in Polish and Russian

It is very difficult to say when the acquisition of gender is complete: on the basis of only a correct nominative singular it is impossible to determine reliably whether the child knows the gender of that noun, or has simply stored the form lexically. For this discussion, gender will be considered as acquired when it is correct in agreement when either a modifier or a past tense verb agrees with the noun.

As was shown in Section 2.2, the gender systems of Polish and Russian are not wholly transparent: a substantial part of the system is transparent, while a smaller part is opaque. As was mentioned in Section 1.1, from studies of other languages it has been claimed that transparent markings are acquired faster than opaque markings (e.g., Goldschneider & DeKeyser, 2001: 22). For both Polish and Russian, the least transparent morphological gender is feminine where the nouns end in a soft consonant (which are less frequent than masculine, neuter and feminine nouns that end in typically feminine {-a}). Feminine nouns ending in a soft consonant are also reported as being acquired more slowly in their simplex form than in the diminutive form, which ends in [ə] and thus belongs to the frequent feminine a-declension (Smoczyńska, 1985; Protassova & Voeikova, 2007; Kempe, Seva, Brooks, Mironova, Pershukova & Fedorova, 2009). According to the authors, although children around age 4 know the irregular feminine pattern, they are unlikely to apply it when there is a diminutive form available. If children do not avoid the simplex form, they will either treat feminine nouns ending in a soft consonant as masculine or they will add the regular feminine {-a}-ending and treat them as regular feminine nouns (Smoczyńska, 1985: 625). Russian children of age 5-7 still make mistakes when declining
feminine nouns ending in a soft consonant (Eliseeva, 2005: 26). Although there has been interesting research into the role of diminutives in the acquisition of gender and case, we will not go into these in depth here, since diminutives are beyond the scope of this study.

Since there is more homophony in the Russian gender system than in Polish (see Section 2.2.1), we expect the Polish gender system to be acquired faster. For the monolingual children, the question is at what age the endings are acquired. For bilinguals, there will be the additional question as to how their acquisition progresses.

We thus expect that the transparent forms (i.e., masculine) will be acquired at a similar rate, but that, in Polish, gender for feminine and neuter will be acquired faster than in Russian due to the higher degree of transparency/phonetic clarity. Within Polish and Russian, neuter is expected to be more difficult than masculine and feminine, as it is less frequent (see Section 2.2).

According to Smoczyńska (1985: 645), most Polish children acquire the gender distinction before age 2;0. That does not mean that they correctly apply gender agreement by that age. According to Dąbrowska (2006), however, the distinction between masculine and feminine is not acquired before 2;4. Russian children acquire the regular masculine and feminine gender distinction between age 2;0 and 3;0 (Eliseeva, 2005: 22). From the literature it is unclear when they acquire the neuter gender, although Cejtlin (2009b: 151) demonstrates that at age 4, the reanalysis of stem-stressed neuter as feminines still occurs. According to the author (Cejtlin, 2003: 430) Russian children acquire the basis of both the gender system (throughout the whole paradigm) and agreement by the age of 3 (but that does not include neuter). Ševa, Kempe, Brooks, Mironova, Pershukova, Fedorova (2009: 120-121) conducted an elicited production experiment with novel nouns and known nouns both in their simplex and diminutive form in 24 Russian children (2;10-4;6). They found a main effect for familiarity status, and a main effect for gender: fewer errors were made with masculine than with feminine (neuter was not included in their study). Dąbrowska (2006: 129) found a robust gender effect in Polish monolingual children, with the performance on the masculine being better than on the feminine, and on the feminine better than on the neuter, "due to a combination of several factors: type frequency, phonological
structure of the domain of application, phonological salience of the affixes, participant’s reliance on product-oriented schemas”.

From the literature we know that 2-year-old bilinguals have no idea of gender distinctions (Oestinova, 2015; Ringblom, 2014), and even at age 7 they have difficulties in correctly producing gender in Russian, for example for Lithuanian-Russian (Mixal’čenko, 1976: 205-206), or Dutch-Russian children (Peeters-Podgaevskaja, 2008: 616-619). Laskowski (2009) examined the linguistic abilities in Polish of 5-15 year old Polish-Swedish bilingual children in Sweden. Laskowski reports problems with grammatical gender and agreement, especially with neuter gender, caused by the fact that Swedish has a two-gender system which does not include neuter (Laskowski, 2009: 93-94). Furthermore, Polish-Swedish children make agreement errors on all genders, for example, applying masculine modifiers and verb forms to feminine nouns (Laskowski, 2009: 93-94).

From the Polish data it is unclear when children acquire subject-verb or adjectival agreement. We have more information about Russian children. They start acquiring adjective-noun and verb-noun agreement at age 2;4-2;6. Between age 2;10 and 3;0 the agreement of gender in nouns and adjectives and past tense verbs is completed. At age 3;0-3;3 gender agreement is always correct (Gvozdev, 2007). Although the above study indicates that the gender distinction is acquired before age 3;3, the study of Popova (1973: 271) indicated that of 55 Russian children aged 1;10 to 3;6, only 24% used correct subject-past tense verb agreement (for feminine and masculine words only). It remains unclear what the correlation with age was in this study.

As has been demonstrated in Section 2.2.1, within Russian, a part of the gender system is transparent for gender (masculine nouns ending in a hard consonant, and end-stressed feminine and neuter nouns) and another part is non-transparent (feminine nouns ending in a palatalised consonant, and feminine and neuter stem-stressed nouns). Rodina and Westergaard (2012, 2013, 2015) conducted research into the acquisition of grammatical gender in bilingual Russian-Norwegian children in their Russian and Norwegian. They investigated gender agreement in transparent and opaque nouns in Russian using elicitation experiments, and showed that bilingual children have more problems with opaque (masculine and feminine nouns ending in a palatalised consonant, and stem-
stressed neuters) than with transparent nouns. Feminine agreement was
overgeneralised with neuter opaque nouns, and masculine agreement was
overused for feminine opaque nouns. The performance on stem-stressed neuter
nouns was worse than on the other opaque nouns (Rodina & Westergaard, 2015).

The study of Schwartz, Minkov, Dieser, Protassova, Moin, and Polinsky
(2014), who examined Russian gender through agreement in early sequential
bilingual preschool children (age 4-5; n=70) with four different L2 backgrounds:
Russian-English, Russian-Hebrew, Russian-German, and Russian-Finnish
(compared with age-matched and younger monolinguals), has drawn comparable
conclusions. The authors found that stem-stressed neuter nouns were interpreted
as feminine; feminine nouns ending in a palatalised consonant were interpreted as
masculine, and stem-stressed feminine nouns ending in [ə] as masculine.
Moreover, they found that bilingual groups were quantitatively similar to the
younger monolinguals. For example, phonologically opaque noun forms in
Russian caused difficulties for both younger monolinguals and bilingual children.
Furthermore, the L2 (non-Russian) played a considerable role. The authors
concluded that the presence of a gender category in the L2 facilitates gender
acquisition, especially if the neuter gender is present.

In conclusion, despite methodological differences in the definition of
“acquired” and range of phenomena studied, previous research indicates that both
Polish and Russian children acquire the distinction between masculine and
feminine around age 2;0, but the neuter later on. Bilingual children at age 7 are
still making agreement mistakes. Phonologically opaque noun forms in Russian
cause difficulties to both younger monolingual and bilingual children, and
bilingual children have more problems, especially with opaque neuter.
Furthermore, it seems that gender acquisition is especially challenging for
bilinguals that acquire Russian in combination with a language that does not have
a gender distinction or has a more restricted system of genders. It is, however,
difficult to say from this overview whether Polish children are faster in acquiring
their gender system than Russian children.


2.3.2 Acquisition of case in Polish and Russian

As was reported in Section 2.2, gender and case markings are fused in one ending. Since there is a large degree of syncretism of endings, it is often difficult to determine whether a child uses the wrong case function (but the correct declensional class) or the wrong declensional class (but the correct case function).

In the literature, there are conflicting views on whether errors in young monolingual children are the result of competence or performance, in other words, whether the erroneous endings are the result of a lack of knowledge of case functions, or whether the child does know the correct case contexts but does not master the variety of endings associated with that individual case.

On the one hand, there are claims that the mistakes monolinguals make mainly consist of applying endings of the wrong declensional pattern to nouns, and that monolinguals never replace one oblique case with another: they have simply not acquired the variety of case endings of the different declensional patterns yet (e.g., Cejtlín, 2003; Eliseeva, 2005). Babyonyshev had previously shown in her observational data that Russian children quite consistently and appropriately used the case markings “from the moment of the appearance of structures that demand it” (Babyonyshev, 1993: 41). This is confirmed by Gordishevsky and Schaeffer (2008), who report that between ages 1;8-2;0, Russian children make almost no errors in the oblique cases in the singular, and by Krajewski, Lieven and Theakston (2010: 29), who confirm that a Polish child at age 2;0 “can use all case categories in both numbers, with virtually all endings possible, and making a highly limited number of morphological errors (i.e., supplying a wrong ending to a given stem)”.

On the other hand, there is also proof for the opposite claim that children make mistakes in the function of case (hence, the acquisition of case is considered a gradual process: both functions and endings follow a developmental path). The data of Smoczyńska (1985) for Polish and Lepskaja (1997) for Russian showed that Polish and Russian monolinguals sometimes replaced the case endings of one oblique case with those of another one. Some Polish monolinguals, for example, are reported to go through a transitional period in which they overextend genitive endings to the dative case, following earlier correct use of the dative case (Smoczyńska, 1985: 626). The same inappropriate use of the genitive and dative
inflections by Polish children was reported by Dąbrowska and Szczerbiński (2006: 592). For Russian monolinguals, Lepskaja claimed that children initially used the wrong case and did not simply apply the wrong declensional class (Lepskaja, 1997: 46-47). This is supported by observations of Zemskaja (2004: 388-389) who found that Russian children were still mixing the genitive and dative singular endings for feminine words or using one case instead of another at age 3;5. Thus, both errors in case endings as well as errors in the selection of a case function occurred.

As was mentioned in Section 1.2, there are no cross-linguistic comparisons of case acquisition in Polish and Russian. Therefore, available information on monolingual and bilingual acquisition of Polish and Russian case endings split up per case relevant for this study (thus: accusative, genitive, dative) will be elaborated upon.

**Accusative**

Accusative case endings emerge early on in both Polish and Russian children; in Polish monolinguals, the accusative inflections generally emerge in the third month of the two-word stage, which is between age 1;6 and 2;0 (Smoczyńska, 1985: 618). Russian children use frozen nominatives at age 1;6 (Cejtlin, 2009b: 149, 164, 168), and acquire the most basic opposition of the nominative and accusative singular between 1;10-2;0 (El’konin, 1973: 557). At age 2 children produce more than 90% correct forms in the positions where accusative is an obligatory structural case (Babyonyshev, 1993: 27; Polinsky, 2007a: 14).

However, there is no information about the accuracy of accusative markers, when a child produces animate masculine nouns. From other research, we know that animacy, which is relevant for masculine accusative only, is not acquired before age 4 by Russian children (Gvozdev, 2007: 380; Zemskaja, 2004: 389). Animacy is also a rather complicated morphological category for bilinguals. The absence of animacy in the languages investigated causes difficulties and leads to the overuse of inanimate forms (which are identical to the nominative singular) in 7-year-old children – or even later. For example, the lack of the grammatical category of animacy in Lithuanian or Dutch causes big difficulties for bilingual
Russian-Lithuanian and Russian-Dutch children who use the accusative inanimate form instead of the accusative animate one with animate objects:

_Papa kormit krolik_ [instead of correct _krolika_].

_Ja ėtot mal’čik_ [instead of correct _ētogo mal’čika_] _davno znaju._
'I know this boy. SG.INANIM.ACC [SG.ANIM.ACC] for a long time' (Peeters-Podgaevskaja, 2008: 616-619).

From different studies, it is clear that many bilingual children have difficulties not only with animacy, but also with the most basic nominative-accusative opposition even at age 6-7. For example, Lithuanian-Russian children of age 7 overgeneralise feminine accusative singular endings by using them for all three genders, for example:

_Ja narisoval risunku_ [instead of correct _risunok_].
'I have drawn a picture. F.SG.ACC [M.SG.ACC]' (Mixal’čenko, 1976: 205).


There is only very limited information on the comprehension of accusatives in Polish in monolinguals. In Smoczyńska (1985: 662), it was mentioned that Zabielski (1974) tested case comprehension in several types of sentences in 80 Polish monolinguals from 3-6 years old, and found that in the younger children the comprehension was relatively high, and at age 6, they scored 90% correct. Furthermore, in Smoczyńska (1985: 662) it was mentioned that Slobin (1982) had conducted an act-out-experiment studying the interaction between word order and case in Polish monolingual children (n=10; age: 2;6 and 3;6) in semantically reversible sentences. Half of the sentences was grammatical and "inflected", and half of the sentences was "uninflected" (not marked for case: both nouns were in the nominative, thus nominative-accusative neutralisation
occurred). The children obtained high scores on both conditions: in the inflected sentences, children followed a case strategy, and in the uninflected sentences a word order strategy (see Section 1.1.3). There is no information on accusative comprehension in Polish bilingual children.

There is some research on accusative comprehension in Russian in monolinguals and bilinguals. For example, Janssen, Meir, Baker and Arnon-Lotem (2015) demonstrated that for both Russian-Hebrew and Russian-Dutch children sentences in OVS were more difficult than in SVO word order, while monolinguals were equally good at both sentence types. The authors did not report findings per gender. Furthermore, Dutch-dominant Russian bilinguals as late as 6-9 years old still showed very little case sensitivity, and had non-native processing strategies: they mainly used a word order strategy (Janssen, 2010; Janssen & Peeters-Podgaevskaja, 2012a, 2012b).

**Genitive**
The genitive case appears early on in both Polish and Russian children; in Polish monolinguals, the genitive inflections generally emerge in the third month of the two-word stage, which is between age 1;6 and 2;0 (Smoczyńska, 1985: 618); in Russian monolinguals, the partitive genitive emerges at age 2;0, and the genitive of negation around age 2;8 (El’konin, 1973: 577). In these accounts, it is unclear whether that applies to genitive endings in all genders or not. Dąbrowska and Szczerbiński (2006) tested Polish children (n=57; age: 2;4-4;8) on their ability to produce genitive on nonce words and real nouns, both in simplex and diminutive form. The performance on genitive neuter forms was worse than on masculine and feminine genitive forms. The preference order of applying the different genders was: masculine > feminine > neuter. We do not know the application preference for Russian.

Genitive production in bilinguals is delayed compared to monolinguals, although, for instance, Polish-Swedish bilingual children in Sweden use the genitive more often than the dative or the locative (Laskowski, 2009). Modyanova (2006) investigated the genitive of negation (see Section 2.2) in Russian-English bilinguals (n=11; age: 5-10) using an elicited production task. She compared the results of her study to results of monolinguals as stated in Babyonyshev, Ganger,
Pesetsky, and Wexler (2001). Modyanova (2006: 8) found a strong effect of age of onset of Russian: those who were born in English-Russian families or those who were exposed to English before age 4;0 did not acquire the genitive of negation at all. Only children that grew up as monolinguals till age 4;0 acquired the genitive of negation (but much later than the monolinguals). Comparable results were reported by Polinsky (2007a: 27-33) who stated that American-Russian bilinguals do not use the genitive of negation and possession either; and by Van den Akker (2009), who demonstrated that Dutch-Russian bilinguals (age 5-6) do not use genitive case endings where required. Russian-Hebrew simultaneous bilinguals (3-5 years old) showed poor results on the genitive case (Schwartz & Minkov, 2014: 72).

There is no information on the comprehension of the genitive in Polish or Russian.

**Dative**

After the genitive case has been acquired, the dative case emerges in Polish monolinguals around age 1;9-1;10 (Smoczyńska, 1985), and around age 2;2 in Russian monolinguals (El’konin, 1973: 577). However, in their development, Polish children go through a transitional phase in which they substitute genitive for the dative case (1;7-1;10 and 1;9-2;5)\(^4\). This phase usually follows some early correct production of the dative (Smoczyńska, 1985: 626). Dąbrowska and Szczerbiński (2006) tested Polish children (n=57; age: 2;4-4;8) on their ability to produce dative on nonce words, both in simplex and diminutive form. The role of gender and case were examined. They concluded that performance on neuter words, both nonce and real, in the dative case was dramatically poor. In general, nonce words caused difficulties. The children showed a clear preference for masculine endings where feminine or neuter endings were required. Even the adult group had very low scores on the neuter nonce words. For the real words, the scores were better. The preference order of applying the different genders was masculine > feminine > neuter, whereby the neuter genitive scored even worse

\(^4\) This is in conflict with Slobin (1973), Cejtlin, Achapkina & Voejkova, (2007) and Cejtlin (2009a).
than the neuter dative (21.9% vs. 54.4%). Dąbrowska and Szczerbiński (2006) furthermore claimed that 2-year-olds were productive with all cases except for dative in neuter nouns.

In sum, when we compare the results of the Polish naturalistic data with those of the experimental studies, we see remarkable differences between the accounts of Dąbrowska and Szczerbiński (2006) and that of Smoczyńska (1985). While Smoczyńska claims that the dative is acquired by age 2;5, Dąbrowska and Szczerbiński (2006) showed that at age 4;8 the dative neuter is still not mastered. Also the neuter genitive is not yet acquired fully at this age. As Dąbrowska and Szczerbiński (2006) showed, Polish monolinguals generally have more difficulties with the neuter gender than with the other two genders.

Compared to monolingual children, bilingual children are delayed in their production of dative case endings. Laskowski (2009: 161-162) found that Polish-Swedish bilingual children in Sweden do not often use the dative case, but instead use a preposition in combination with the genitive case or the accusative case, Peeters-Podgaevskaja (2008: 616-619) demonstrated that Dutch-Russian (unbalanced) bilingual children (age 5-7) do not even occasionally use the dative. When a dative is required, the child generally substitutes it with a genitive form or with a frozen nominative. For example, Ty že govorila, čto motocikl [instead of the correct motociklu] zdes’ nel’zja exat’ ‘You have already told me that the motor bike. NOM/ACC [DAT] is not allowed to ride here’. This was confirmed by Van den Akker (2009), who showed that when the dative case was required, either a nominative or an accusative case ending was used by Dutch-Russian bilinguals aged 5-6. Russian-Hebrew bilinguals (3-5 years old) also had poor results on the dative case (Schwartz & Minkov, 2014: 72). This was true mostly for the simultaneous bilinguals, and to a lesser extent to the sequential bilinguals.

There are very few studies that deal with the comprehension of the dative in Polish and Russian. Janssen, Meir, Baker, and Armon-Lotem (2015) demonstrated that for both Russian-Hebrew and Russian-Dutch children sentences in OVS were more difficult than in SVO, while for monolinguals, it did not matter whether sentences were in SVO or OVS word order.
CHAPTER 2. THE ACQUISITION OF GENDER AND CASE IN POLISH AND RUSSIAN

Transparency in Russian

Although phonetic clarity and transparency are significant factors in the acquisition of the gender and case system in Russian (See Section 2.2.3), Zacharova (1973) is the only study explicitly examining stress or transparency of the case endings in Russian monolinguals. The acquisition of neuter nouns in Russian pre-preschool children is divided into two patterns: neuter nouns bearing end stress are acquired fast and without problems as compared to stem-stressed neuter nouns. Pre-preschool children confuse the endings of stem-stressed neuter nouns and interpret them as either masculine or feminine. Older children interpret the words as words ending in {-a} and decline them accordingly (Zacharova, 1973: 283).

Pulling it all together, on the basis of previous research, it is difficult to say whether or not the Polish children are faster in acquiring the case system in Polish, than the Russian children in Russian. However, from the Polish literature, it seems as if Polish children are slightly ahead of the Russian children in acquiring basics of their case system. Is this because Polish children are indeed faster, or is this due to methodological issues? As was mentioned for gender acquisition, first of all, it is not clear which criteria are used to determine “acquired” (occurred once vs. 90% correct). The different studies apply different methodologies (naturalistic observations, diary studies, elicitation experiments, comprehension tasks), report on different phenomena, and test different children (age, number, socio-economic status).

What is clear, however, is that, both Polish and Russian children start acquiring the case system before age 2;0, and in the most pessimistic view acquire the accusative, genitive, and dative inflections and core functions before age 3;6. The full paradigm for neuter is acquired later than that for masculine and feminine in both Polish and Russian children. It is, however, difficult to say from this overview whether Polish monolingual children are faster in acquiring their case system than Russian children. Only similar tests with comparable sets of children will make a reliable comparison possible.

Regardless of whether mistakes are due to incomplete acquisition of the functions of oblique cases, or due to errors in performance when selecting a case ending, it is clear that bilingual children have greater difficulty with case endings
in Polish and Russian than monolingual children. It seems that case acquisition is especially challenging for bilinguals who acquire Polish or Russian in combination with a language that does not have a case system. Due to the lack of data on Polish case acquisition in bilinguals, it is not possible to determine whether Polish bilinguals are faster in acquiring the case system than Russian bilinguals.

Phonologically opaque noun forms in Russian cause difficulties to both younger monolingual and bilingual children, and bilingual children have more problems, especially with opaque neuter forms. Furthermore, the arguments that homophonous forms in an inflectional system will slow down language acquisition and that the child must select phonologically unique forms as the first realisations of inflection (see Section 1.1), are not supported by the data. For example, in Polish and Russian, the genitive feminine ending [ą], which serves a number of functions, is among the earliest inflections used by children (Smoczyńska, 1985: 674).

Little is known about the comprehension of case in Polish and Russian monolinguals and bilinguals. It is clear, however, that not only case markings, but also word order plays a large role in the comprehension of children up to age 6.

2.4 Research questions and rationale
As has been stated in Section 1.2, the main research question of this study is:

How does the acquisition of case and gender differ between Polish and Russian in monolingual children in Poland and Russia, and bilingual Polish-Dutch and Russian-Dutch children growing up in the Netherlands?

On the basis of the descriptions of the gender and case systems (Section 2.2) and evidence from the previous literature (Section 2.3), more detailed research questions and hypotheses can now be formulated with respect to the comparison of the acquisition of the gender and case system in Polish and Russian. Error analyses with the data of the monolingual children will be used in order to look for explanations for the path of acquisition.
2.4.1 Gender

The main research question with respect to the acquisition of gender is: **How does the acquisition of gender differ between Polish and Russian?** This question is split into sub-questions dealing with monolingual and bilingual acquisition.45

i. **How does the acquisition of the gender system differ between monolingual Polish and Russian children?**

i.i How does the production of gender differ?

It is hypothesised that the production of the Polish gender system will be faster than for the Russian gender system due to differences in the linguistic system. Monolingual Polish children should in general be quicker and better in sorting out the gender system than Russian monolingual children, because the distinction between all three genders is transparent on the noun ending for Polish, but not for Russian (see Section 2.1 and 2.2), where the endings of the frequent stem-stressed feminine and neuter nouns sound identical (see Section 2.2.1). However, due to the early age of acquisition of gender in both Polish and Russian, we do not expect to detect differences between the groups of children studied (Section 2.3).

i.ii How does the comprehension of gender differ?

The comprehension of the Polish gender system will also be faster than for the Russian gender system due to differences in the linguistic system. The comprehension of gender in monolingual Polish and Russian has not been studied before. This study is the first to report evidence on comprehension for monolingual children who are in their final stages of the acquisition of gender. On the basis of the linguistic systems of Polish and Russian, we can make predictions about the comprehension of gender. First of all, Polish monolinguals are expected to be faster in the comprehension of the gender system than Russian monolinguals because of the fact that gender marking is more transparent in Polish than in Russian. Secondly, for both Polish and Russian it has not been shown whether the production of noun morphology precedes or follows

---

45 For gender, masculine nouns ending in a consonant, feminine nouns ending in {-a} (Polish [a], Russian [a] or [əә]), and neuter nouns ending in {-o} (Polish [ɔ], Russian [o] or [əә]), are considered.
comprehension, nor at what age gender is comprehended. We can hypothesise that once children can correctly assign gender to a noun, they will also be able to comprehend the gender. On the other hand, a number of studies has shown that correct production of certain morphemes does not necessarily imply correct comprehension (cf. the acquisition of Turkish evidentials (Ünal & Papafragou, 2013)). Because there is no information on the age at which monolinguals are able to comprehend gender, it is not clear whether we will be able to detect differences between Polish and Russian monolinguals.

ii. How does the acquisition of the gender system differ between bilingual Polish-Dutch and Russian-Dutch children growing up in the Netherlands?

ii.i How does the production of gender differ?
Bilingual Polish-Dutch children will also be quicker and better in sorting out the gender system than Russian-Dutch bilingual children for the same reasons as argued for the monolingual children. Reports on gender acquisition in bilingual children (see Section 2.3) have shown that at age 7 bilingual children still encounter difficulties with the gender system in Russian. Differences between Polish and Russian should therefore still be observable in the age group to be studied.

ii.ii How does the comprehension of gender differ?
There is no information available on how bilingual Polish-Dutch or Russian-Dutch children develop the comprehension of gender in Polish and Russian respectively. The same predictions as for monolinguals regarding the possible production-comprehension asymmetries hold. Moreover, Polish-Dutch children are expected to be better in gender comprehension than Russian-Dutch children, due to the differences in the linguistic system. As we do not know the age at which monolingual children comprehend gender, it is hard to predict whether or not differences in comprehension of bilingual children will be observed. If both bilingual groups turn out to be totally insensitive to grammatical gender in comprehension, no differences will be detected.
ii.iii What is the role of predictors (AoO, the LoE, the AoI) on gender proficiency in each of the languages involved?

It is hypothesised that children with an early AoO, a relatively small AoI of Polish or Russian, and a longer LoE to Dutch will have more profound problems with gender production than children that started the acquisition of Dutch later. Relatively more input in Polish and Russian will lead to a faster acquisition of gender. Furthermore, Russian-Dutch children with an early AoO of Dutch will have an enhanced/combined negative effect of AoO and Russian compared to early AoO of Dutch and Polish.

Furthermore, it is hypothesised that an early AoO of Dutch, long LoE to Dutch and small AoI to Polish and Russian will negatively influence children’s ability to process and comprehend gender. Russian-Dutch children with an early AoO of Dutch will have an enhanced/combined negative effect of AoO and Russian compared to early AoO of Dutch and Polish.

iii. What is the role of the distribution of the transparent endings in Russian?

iii.i For monolingual Russian children

As monolingual children are expected to perform at ceiling on the gender production task, we do not expect to detect differences between less transparent stem-stressed and more transparent end-stressed items. In comprehension, however, if monolinguals perform below ceiling, differences are expected between stem and end stress: the comprehension of end-stressed items will be better than stem-stressed nouns for feminine and neuter only.

iii.ii For bilingual Russian-Dutch children

Unlike the monolingual children, the bilingual Russian-Dutch children are not expected to perform at ceiling on the gender production task. Therefore, we expect to find differences between stem-stressed and end-stressed items in gender production, with performance on end-stressed items being better than on stem-stressed items. In gender comprehension, we expect bilingual Russian-Dutch children to have more problems with stem-stressed than end-stressed items for the feminine and neuter gender.
2.4.2 Case
As was mentioned in Sections 2.2 and 2.3, it will not be possible to test all cases. The genitive, accusative and the dative are the most frequent cases in CDS and are highly comparable between Polish and Russian, these cases will therefore be studied here but in the singular only.46

The main research question related to case is: **How does the acquisition of the case system differ between Polish and Russian?** This question is split into two sub-questions:

i. **How does the acquisition of the case system differ between monolingual Polish and Russian children?**

i.i How does the production of the case system differ?
The production of the Polish case system will be faster than the Russian case system due to differences in the linguistic system (see Section 2.2). Monolingual Polish children will be quicker and better in sorting out the case system than the Russian monolingual children, because of the unreduced endings in Polish as opposed to reduced endings in stem-stressed nouns in Russian. However, due to the early age of acquisition of case in both Polish and Russian (see Section 2.3), we do not expect to detect differences in the monolingual children studied.

i.ii How does the comprehension of case differ?
The comprehension of the Polish case system will also be faster than the Russian case system due to differences in the linguistic system, such as stress position and reduction of unstressed vowels. The comprehension of case in monolingual Polish and Russian children has hardly been studied. We can, however, make predictions on the basis of the linguistic system: monolingual children are expected to process and comprehend case on sentences in both SVO and OVS word orders.

ii. **How does the acquisition of the case system differ between bilingual Polish-Dutch and Russian-Dutch children growing up in the Netherlands?**

46 The plural is less frequent in CDS, is acquired later, and has no explicitly marked gender distinction (except in the genitive case) and no gender specific adjectival and verbal argument.
CHAPTER 2. THE ACQUISITION OF GENDER AND CASE IN POLISH AND RUSSIAN

ii.i How does the production of case differ?
Bilingual Polish-Dutch children are expected to be quicker and better at sorting out the case system than the Russian-Dutch bilingual children because of cross-linguistic differences between Polish and Russian (see Section 2.2). Reports on case acquisition in bilingual children (see Section 2.3) have shown that at age 7 bilingual children still have difficulties with the case system in Russian. Therefore, we expect to detect differences between Polish and Russian on the case production task for bilinguals, with an advantage of Polish over Russian.

ii.ii How does the comprehension of case differ?
There is no information available on how bilingual Polish-Dutch or Russian-Dutch children develop the comprehension of the case systems in Polish and Russian, respectively. The same predictions as for monolinguals regarding the possible production-comprehension asymmetries hold. Moreover, it is expected that Polish-Dutch children will be better at case comprehension than Russian-Dutch children due to the differences in the linguistic system (Section 2.2). As we do not know at what age monolingual children correctly interpret case, it is hard to predict whether or not differences in the comprehension of bilingual children will be observed. If both bilingual groups turn out to be fully insensitive to case in comprehension, no differences will be detected.

In contrast to their monolingual peers, bilingual children are expected to exhibit problems with case cue processing in sentences with OVS word order. According to VanPatten’s information processing principles (VanPatten, 2004) and MacWhinney’s Competition Model for L2 learners (MacWhinney, 2005) (see Section 1.2), bilingual children will exhibit a stronger bias for the word order cue, which will be reflected in lower accuracies in the OVS sentences. Bilingual children acquiring Russian will have even greater difficulties with case comprehension than bilingual Polish children because of vowel reduction.

ii.iii What is the role of predictors on case proficiency (AoO, LoE, and AoI) in each of the languages involved?
It is hypothesised that children with an early AoO, a relatively small AoI of Polish or Russian, and a longer LoE to Dutch have more profound problems with case production and comprehension than children that started acquiring Dutch
somewhat later. Relatively more input in Polish and Russian will foster a faster acquisition of case. Furthermore, Russian-Dutch children with an early AoO of Dutch are expected to have an enhanced/combined negative effect of AoO and Russian compared to early AoO of Dutch and Polish.

iii. What is the role of the distribution of the transparent endings in Russian?

iii.i For monolingual Russian children
As monolingual children are expected to perform at ceiling on the production tasks, we do not expect to detect differences between stem-stressed and end-stressed items. In comprehension, however, if monolinguals perform below ceiling, differences are expected: the comprehension of end-stressed items should be better than stem-stressed nouns. In the oblique cases (genitive, accusative and dative), this applies to all genders.

iii.ii For bilingual Russian-Dutch children
Unlike the monolingual children, bilingual children are not expected to perform at ceiling on the production tasks. Therefore, we expect to find differences between stem-stressed and end-stressed items in case production, with end-stressed items being produced more accurately than stem-stressed items. In case comprehension, we do not expect bilingual Russian-Dutch children to have more problems with stem-stressed than end-stressed items, as they are expected to pay more attention to word order than to case endings.
CHAPTER 3
METHODOLOGY

In this study on the acquisition of case and gender in Polish and Russian in monolingual and bilingual children the primary aim is to determine whether the system of grammatical gender and case is acquired faster in Polish than in Russian and, if so, whether this is due to specific linguistic features of these languages (see Section 2.4.1 for research questions and hypotheses on the acquisition of gender, and Section 2.4.2 for research questions and hypotheses on the acquisition of case). Different types of participants were necessary to test the hypotheses: monolingual Polish and Russian children, bilingual Polish-Dutch and Russian-Dutch children, and adult control groups (Section 3.1). The test battery consisted of three types of instrument: background measures, tasks on gender, and tasks on case. An overview is provided in Table 3.1.

Table 3.1 Overview of background measures and experimental tasks

<table>
<thead>
<tr>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background measures</strong></td>
</tr>
<tr>
<td>Parental questionnaire</td>
</tr>
<tr>
<td>Polish language proficiency test</td>
</tr>
<tr>
<td>Russian language proficiency test</td>
</tr>
<tr>
<td>Dutch language proficiency test</td>
</tr>
<tr>
<td>Non-verbal working memory</td>
</tr>
<tr>
<td><strong>Gender tasks</strong></td>
</tr>
<tr>
<td>Gender production task</td>
</tr>
<tr>
<td>Gender comprehension task</td>
</tr>
<tr>
<td><strong>Case tasks</strong></td>
</tr>
<tr>
<td>Genitive production task</td>
</tr>
<tr>
<td>Accusative production task</td>
</tr>
<tr>
<td>Case comprehension task</td>
</tr>
</tbody>
</table>

The background measures will be presented in Section 3.2. The tasks used to assess the production and comprehension of gender will be presented in Section 3.3, and for case in Section 3.4. The procedure used for the data collection will be
described in Section 3.5, followed by general aspects of analysis and the preparation of data for analysis (Section 3.6).¹

3.1 Participants
The typically developing children (n=158) were divided into four groups: monolingual Polish children (MoPo), bilingual Polish-Dutch children (BiPo), monolingual Russian children (MoRu), and bilingual Russian-Dutch children (BiRu). For each group, approximately equal numbers of participants were recruited. In addition to these four experimental groups, two monolingual adult control groups were formed: for Polish (AdultPo: n=10) and Russian (AdultRu: n=10). Details of the relevant linguistic background of the groups will be described below in separate sections: the monolingual children (MoPo and MoRu) (Section 3.1.1), the adult control groups (Section 3.1.2) and the bilingual participants (Section 3.1.3). Informed parental consent was obtained prior to participation.²

3.1.1 Monolingual children
The monolingual control groups were recruited at kindergartens in Warsaw, Poland and Saint-Petersburg, Russia. In order to be included in the study, the monolingual participants had to meet two specific criteria related to language status and age:
1) be monolingual speakers of standard Polish or Russian. Obviously, being bilingual is an exclusion criterion for the monolingual groups.
2) be typically developing (TD). This study looks at typically developing children only. Using the language background questionnaire (Section 3.2.1) and the general language proficiency tests (Section 3.2.2), we excluded children that were at risk of being diagnosed with a Specific Language Impairment (SLI).³ The background questionnaire also provided information that could lead to exclusion

¹ Specific details of the analyses will be reported in the relevant sections in Chapters 4-6.
² This study was approved by the Ethics Committee of the Faculty of Humanities of the University of Amsterdam (1012-7).
³ See Leonard (1998, 2000) for SLI.
of children on the basis of hearing problems, or disabilities like ADHD as will be
discussed below.

3) be aged between 3;6 and 6;6. The age range, 3;6-6;6, was chosen on the basis of
evidence that the grammatical phenomena being studied are usually fully acquired
between 3 to 4/5 years in monolingual children, but slightly later in bilingual
children (as already discussed in Section 2.3). Moreover, children aged 3;6 and
older are able to participate in the type of tasks used for this project. The upper
age range was selected in relation to the bilingual children (see Section 3.1.3).

Every effort was made to create comparable groups with respect to socio-
economic status (SES) of the parents. It is not possible to make a good
comparison of economic status between adults in the Netherlands, Poland and
Russia; educational level was therefore used. We did not focus on a specific SES
but rather tried to minimise differences in SES between the groups. Because of the
relative difficulty of recruiting bilingual Polish-Dutch and Russian-Dutch
children and the heterogeneity within those groups, we aimed to recruit
monolingual groups that were as similar as possible to the bilingual groups in
terms of SES (see Section 3.1.3). The information was obtained via a background
questionnaire. Previous studies have shown a great advantage for children from
families with a high SES on the performance in language and executive function
tasks (Calvo & Bialystok, 2014).

On the basis of these three criteria, 40 Polish monolingual children (mean age:
61 months) and 41 Russian monolingual children (mean age: 57 months) were
finally selected to participate in this study (see Table 3.2). As reported by the
parents, none of the children had hearing problems that could lead to problems
with the tasks. During the process of recruitment and data collection it was
necessary to exclude a total of ten monolingual children. Some were judged to be
at risk for SLI (Polish: n=4, Russian: n=2). This assessment was done using the
language proficiency tasks for Polish and Russian (see Section 3.2). Any child with
a score below two standard deviations of the monolingual mean score was
excluded. This decision was supported by parental concerns expressed in the
parental questionnaire (see Section 3.2.1) regarding the language development
and concerns of a speech therapist for Polish (also the experimenter), or a teacher
for Russian. A few children had to be excluded for other reasons: on the basis of
missing data as a result of missing one or more sessions (Russian: n=2), being older than 6;6 years (Russian: n=1), and bilingualism (Russian: n=1).

Table 3.2. Overview of monolingual participants

<table>
<thead>
<tr>
<th>Total (n)</th>
<th>MoPo*</th>
<th>MoRu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (months)</td>
<td>61</td>
<td>57</td>
</tr>
<tr>
<td>Standard deviation age (SD)(months)</td>
<td>9.3</td>
<td>8.3</td>
</tr>
<tr>
<td>Range age (months)</td>
<td>44-78</td>
<td>41-78</td>
</tr>
</tbody>
</table>

* MoPo=monolingual Polish participants; MoRu=monolingual Russian participants.

The questionnaire (Section 3.2.1) provided information on languages spoken at home, and this was a criterion for including the child in the sample. Although a few parents in both groups reported that their child had had some form of formal education with respect to English, and knew some words and songs in English, there had not been enough exposure to English to exclude them as monolinguals. Therefore, these participants were not excluded from the sample.

3.1.2 Monolingual adults

Ten adult native speakers of Polish and ten adult native speakers of Russian were included in order to test whether the tests were well constructed: adult native speakers should score at ceiling. For Polish, eight out of ten participants were female, and for Russian nine out of ten. The adult monolingual Polish and Russian participants all spoke standard Polish or Russian, and were between 18 and 45 years old. In both adult control groups, nine out of the ten participants had followed higher education. Monolingual standard Polish speakers were recruited mostly from Warsaw University. Standard Russian speakers were selected mostly among students of Saint Petersburg State University and employees of the Netherlands Institute in Saint Petersburg. The monolingual adults were asked to answer a few questions about their language and educational background before participating in the study.
3.1.3 Bilingual children

Bilingual Polish-Dutch and Russian-Dutch children were recruited at Saturday/Sunday schools in major cities in the Netherlands. To be included in the study, a bilingual child had to meet three criteria:

1) be a simultaneous or early sequential bilingual. Exposure to Russian or Polish needed to be from birth onwards. The Age of Onset (AoO) for all participants of Dutch had to be less than 3 years in order to exclude late sequential bilinguals (See Section 2.3). Furthermore, the Length of Exposure (LoE) to Dutch had to be longer than 24 months. The background information on the AoO and the LoE was obtained using the background questionnaire (Section 3.2.1).

2) be typically developing (TD). As reported in Section 3.1.1, children who were at risk of being diagnosed with hearing problems or SLI were excluded from the study. This latter assessment was done in the same way as for the monolingual children using the language proficiency tasks for Polish and Russian (see Section 3.1.1). Any child who did not score at least 15% correct on one of the languages (i.e. floor score in both languages) was excluded. This decision was supported by parental concerns regarding the language development reported in the parental questionnaires (see Section 3.2.1) and concerns of a speech therapist for Polish (also the experimenter), or a teacher for Russian.

3) be between 3;6 and 6;6 years old. As reported in Section 3.1.1, the age range 3;6-6;6 was chosen on the basis of evidence that the grammatical phenomena being studied are usually fully acquired between 3 to 4/5 years in monolingual children. They are expected to emerge later in bilingual children (see Section 2.3). It has been reported that bilinguals (Polish and Russian) still have a very rudimentary knowledge of gender and case inflection at age 7;0 (Peeters-Podgaevskaja, 2008). The upper age range limit was set at 6;6, because around age 7;0 the weekend schools typically start teaching the distinctions between gender, possibly affecting the understanding of the distinction between neuter and feminine gender. Learning to write and to read can also affect this understanding.

On the basis of these criteria, two groups of bilingual participants were selected for the study: 38 bilingual Polish-Dutch children (mean age: 64 months) and 39 bilingual Russian-Dutch children (mean age: 61 months) (see Table 3.3). Before this selection was made, 13 children (Polish: n=5, for Russian: n=8) had to
be excluded. This was due to missing data as a result of missing one or more sessions (Polish: n=1; Russian: n=6), being too young (Polish: n=2) or too old (Polish: n=1). Three children also had to be excluded due to complete unproductivity in Russian (n=2) and Polish (n=1), that means, administering the test in Polish or Russian was impossible because the child could not answer very basic questions and name highly frequent items. One bilingual Polish-Dutch child who was able to take the test in Polish and Dutch nevertheless scored at floor for language proficiency in both Polish and Dutch and was therefore excluded from participation because of being at risk for SLI. No Russian-Dutch participants had to be excluded because of being at risk for SLI.

<table>
<thead>
<tr>
<th>Table 3.3 Overview of bilingual participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>BiPo*</td>
</tr>
<tr>
<td>Total (n)</td>
</tr>
<tr>
<td>Mean age (months)</td>
</tr>
<tr>
<td>SD age (months)</td>
</tr>
<tr>
<td>Range age (months)</td>
</tr>
</tbody>
</table>

* BiPo=Polish-Dutch participants; BiRu=Russian-Dutch participants.

The questionnaire (Section 3.2.1) provided information on languages spoken at home, and this was a criterium for including the child in the sample. Some children were reported to be exposed to a third language on several occasions. The input in these third language situations was very limited and/or infrequent and seemed to be insufficient to qualify the child as a trilingual. Therefore, those participants were not excluded from the sample.

Parents of children that were exposed to English mentioned that their child knew a few words or songs in English. In the parental rating of each of the languages the child knew, most parents did not fill out the question for English, the parents who did fill out the question (n=3) noted very low ratings for the child’s English. Moreover, the parents of a few participants communicated amongst themselves in English. These children heard English on a daily basis, but were unable to speak it. Others reported that they went on holiday to Turkey three weeks a year, or had an English-speaking babysitter once a week, and so on. Moreover, a few Russian-Dutch children were exposed to Azeri, Georgian, or Kyrgyz on occasional visits to grandparents who do not live in the Netherlands.
3.2 Background measures

A number of measures were taken in order to provide information for the selection of participants (see Section 3.1) and for later analysis. The materials are adaptations (to Polish and Russian) of existing instruments. Section 3.2.1 will describe the language background questionnaire used to obtain information about the linguistic background of all child participants. To establish the general language level in each of the languages involved (Polish, Russian, and Dutch), sentence repetition tasks were administered (Section 3.2.2). The Polish and the Russian tasks were constructed in such a way that they used identical grammatical constructions, and were highly comparable in length and lexical items. Section 3.2.3 will describe the non-verbal memory task used to ensure comparability of memory span between groups.

All audio stimuli for the sentence repetition tasks and the non-verbal memory task were recorded in a soundproof studio involving male and female native speakers of Polish, Russian and Dutch, and were edited with the help of PRAAT (Boersma & Weenink, 2015). This also applied to the stimuli for the comprehension tasks (see Sections 3.3 and 3.4). All stimuli were recorded in stereo and scaled to a constant volume of 70 dB. The length of each item was controlled for, and pauses between words as well as the voice onset time were of equal length. All visual stimuli were child-friendly pictures.

Finally, in the choice and design of background measures and experiments, maturational constraints of the participants had to be taken into account. Certain tasks, like sentence repetition tasks, require a minimum short-term memory span, and are therefore impossible to perform with toddlers. The children studied are between 4 and 6 years old (see Section 3.1). At that age, they have developed skills necessary for participating in elicited production tasks, sentence repetition tasks, and simple comprehension tasks.

3.2.1 Language background questionnaire

Extensive information on the language background of the bilingual participants and basic information on the language background of the monolingual participants was obtained with a language background questionnaire. This questionnaire is an adaptation of Questionnaire for Parents of Bilingual Children
For this project, the questionnaire was translated into Polish and Russian. These questionnaires are widely used to collect background languages information on monolingual and bilingual children (see Appendix I.I for its English translation).

The questionnaire contains general developmental questions as well as questions on the language input the child is exposed to, the situations in which the child speaks Polish or Russian and, if applicable, Dutch, the educational level and language knowledge of the parents/caregivers, and possible indication of language impairment in the child and the family. The results of this language background questionnaire were important for the selection of participants (see Sections 3.1.1 and 3.1.3). Information obtained from the questionnaire (especially regarding language dominancy in bilingual participants) will be used as covariates in specific analyses (see Chapters 4-6).

The parents of the potential child participants were given a cover letter, explaining the goal and purpose of the study and the procedure. In that cover letter, parents were asked for approval of their child’s participation in the research. They were also asked to fill out the language background questionnaire. The parents/caregivers were assured that all information would be treated confidentially and that all results would be analysed and reported anonymously. All parents that indicated that they were interested in the results of the study received a summary of the results of the study for Polish or Russian respectively. All schools also received general results of the study. Individual results of this study were not made available, as the tests are not standardised. For the monolingual participants, one parent/caregiver filled out the questionnaire (most often the mother). For the bilingual participants, this was the parent or one of the parents whose native language was Polish or Russian.

The questionnaire contained questions involving rating the performance of the children on each of the languages involved. Parental ratings are reported to correlate strongly with actual performance (cf. Gatt, O’Toole & Haman (2015)).

---

4 That questionnaire in itself is an adaptation of the Alberta Language Environment Questionnaire (ALEQ) (Paradis, 2011) and the Alberta Language and Development Questionnaire (ALDeQ) of Paradis, Emmerzael & Sorenson Duncan (2010). An adaptation by Kus, Otwinowska, Banasik & Kiebzak-Mandera (2012) of a previous Polish version of the PaBiQ (COST Action IS0804, 2011) was used.
CHAPTER 3. METHODOLOGY

The questions in Polish and Russian were identical but some of the Polish parents interpreted them differently to the Russian parents. Therefore, it was decided not to use this information further. The information from the language background questionnaire allowed a comparison of the educational level of the parents. This will be returned to in Section 4.1.

On the basis of the language background questionnaire it was also possible to calculate the relative amount of input (AoI) in both languages for bilinguals. Furthermore, the AoI, the AoO and the LoE for all languages the participant was exposed to on a regular basis, could be determined.\(^5\) AoO of Dutch will be used as covariate in the statistical analyses in Chapter 5 and 6. Moreover, the AoI, AoO and LoE will be correlated with results of the comprehension and production tasks on the basis of the hypothesis that the more the child is exposed to the language, the higher his/her scores should be (see Section 2.4). If there are significant correlations, it will be tested whether they predict accuracy on the gender and case tasks (See Section 3.6).

3.2.2 Sentence repetition tasks

Previous research has shown that sentence repetition tasks (SRTs) give a good indication of language proficiency (e.g., Marinis, 2010; Marinis & Armon-Lotem, 2015; Meir, Armon-Lotem & Walter, 2015; Chiat, Armon-Lotem, Marinis, Polisenska, Roy & Seeff-Gabriel, 2010; Komeili & Marshall, 2013; Armon-Lotem & Meir, 2016). SRTs are widely used as general language proficiency task, both with typically developing populations and with populations with SLI. SRTs successfully differentiate between children at risk for SLI and TD children, both in monolingual and bilingual settings (Marinis & Armon-Lotem, 2015). Children’s scores on SRTs correlate strongly with their scores on normed language proficiency tasks (e.g., Meir, Armon-Lotem & Walter, 2015). SRTs have a great advantage over longer test batteries in that they take far less time to administer, and allow a very general comparison of general language proficiency across languages.

\(^5\) Please note, only the quantity of the input was targeted, the quality of input was not taken into consideration (see Section 1.3.3).
The Polish Sentence Repetition Task for Young Children (Po-SRT) and the Russian Sentence Repetition Task for Young Children (Ru-SRT) along with the Dutch Sentence repetition task (Du-SRT) were used in this study as measures for general language proficiency as well as an inclusion criterion for this study (as set out in Section 3.1). For the bilingual children, a general language measure for both their languages was needed to interpret the results of the experimental tasks. It is important to be able to compare results of the experimental tasks (see Section 3.3 and 3.4) taking into consideration the general language proficiency of the child in each of his/her languages.

The Ru-SRT for young children consists of 48 sentences involving 12 different structures (see Table 3.4) with four sentences per structure. These structures were chosen because of their ability to distinguish TD children from children with language impairment, and to differentiate between language proficiency levels. The Ru-SRT is based on and contains a subset of the SRep-LITMUS, developed to screen Russian-Hebrew children of 6-7 years old (Meir & Armon-Lotem, 2015). Since most of the children tested in this project were younger (3;6-6;6 vs. 6;0-7;0), the test was shortened so that it contained 48 instead of 72 sentences: structures normally acquired from age 6 onwards were deleted and sentences that were more than 14 syllables long were shortened to be more suitable for the younger participants (9-14 syllables instead of 10-17 syllables). This version of the Sentence Repetition Task for Russian (Ru-SRT) was piloted in Israel with 5-year-old Israeli-Russian children.

For Polish, an existing SRT developed by Banasik, Haman, and Smoczyńska (2011) (that was based on Marinis, Chiat, Armon-Lotem, Gibbons & Gipps (2011)) could not be used for this project, since the structures tested were very different from the structures in the Ru-SRT. A Polish version of the Ru-SRT (Po-SRT) was therefore developed by the author in collaboration with Polish linguists at the University of Amsterdam. The Po-SRT tested the same 12 structures as the Ru-SRT (Table 3.4). The lexical items used in the Po-SRT were from the same

---

6 The LITMUS-SRep-Russian in itself is based on a longer and more difficult version (72 items) of that LITMUS-SRep-Russian that was developed and pilot-tested in Israel with 6- to 7-year-old Israeli-Russian children (by Armon-Lotem & Meir, 2015).

7 In collaboration with Sharon Armon-Lotem and Natalia Meir at the Bar-Ilan University, Israel.
semantic fields but were adapted to fit the Polish cultural situation. The gender and number of the lexical items as well as the number of words per sentences were matched between Polish and Russian. The number of syllables was also kept as comparable as possible.8

Table 3.4 Overview of structures in the Po-SRT and Ru-SRT (4 sentences per structure)

<table>
<thead>
<tr>
<th>Construction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SVO/OP</td>
<td>SVO with an obligatory preposition</td>
</tr>
<tr>
<td>SVO/FP</td>
<td>SVO with a free preposition</td>
</tr>
<tr>
<td>SVOO</td>
<td>Sentence with both a direct and an indirect object</td>
</tr>
<tr>
<td>SOV</td>
<td>SOV word order</td>
</tr>
<tr>
<td>OVS</td>
<td>OVS word order</td>
</tr>
<tr>
<td>COND</td>
<td>Conditionals</td>
</tr>
<tr>
<td>BICLCO</td>
<td>Bi-clausal sentence: coordination</td>
</tr>
<tr>
<td>BICLSU</td>
<td>Bi-clausal sentence: subordinate</td>
</tr>
<tr>
<td>WH</td>
<td>Sentence with a WH-question</td>
</tr>
<tr>
<td>PRWH</td>
<td>Sentence with a prepositional WH-question</td>
</tr>
<tr>
<td>SR</td>
<td>Subject relative</td>
</tr>
<tr>
<td>OR</td>
<td>Object relative</td>
</tr>
</tbody>
</table>

Table 3.4 shows the 12 different types of structures used. Examples of three of those structures are presented below: transitive sentences with an obligatory preposition (in 3.1), SOV word order (in 3.2), and subject relatives (in 3.3). A complete list of items in the Po-SRT and the Ru-SRT can be found in Appendix I.II.

(3.1) Examples of sentences with an obligatory preposition

Po: *Tygrys*-ø *nadeptal na żółwi-a.*
   tiger-M.SG.NOM stepped on turtle-M.AN.SG.ACC
   ‘The tiger stepped at the turtle.’

Ru: *Tigr*-ø *nastupil na čerepax-u.*
   tiger-M.SG.NOM stepped on turtle-F.SG.ACC
   ‘The tiger stepped at the turtle.’

8 For example, the case endings in Polish relative pronouns in oblique cases consist of fewer syllables than the case endings in Russian relative pronouns. Therefore, it was not possible to use the same number of words and the same number of syllables at all times.
(3.2) Examples of sentences in SOV word order

Po: Matk-\(a\) córk-\(e\) karmi\(a\) w kuchni.
mother.F.SG.NOM daughter.F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

Ru: M\(a\)m-\(a\) do\(ć\)-\(u\) korm\(i\)-la na k\(u\)xne.
mother.F.SG.NOM daughter.F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

(3.3) Examples of sentences with subject relatives

Po: To jest baranek-\(o\), \(k\)tóry kocha\(ł\) wielb\(łą\)-\(d\)-\(a\).
this is lamb-M.SG.NOM that loved camel-M.AN.SG.ACC
‘This is the lamb that loved the camel.’

Ru: Ţeto žiraf-\(o\), \(k\)otoryj ljubi\(l\) verbl\(ju\)d-\(a\)
this giraffe-M.SG.NOM that loved camel-M.AN.SG.ACC
‘This is the giraffe that loved the camel.’

Dutch language proficiency of the bilingual participants was checked for two reasons. Firstly, bilingual children who scored very low on the Polish or Russian task but were good at the Dutch task could not be labelled as having SLI. They were therefore not excluded (see Section 3.1.3). Secondly, the results from the Dutch task contribute to determining language dominancy, which will be discussed in Chapters 5 and 6 in relation to performance on the gender and case tests.

All bilingual children took the Dutch Sentence Repetition Task (Du-SRT). The Du-SRT was produced for and pilot-tested on 6- to 8-year-olds.\(^9\) The original version of the test contained 72 items; for this project, a subset of the sentences (48) of the simplest constructions was used to avoid fatigue in the participants. A complete list of items for the Du-SRT can be found in Appendix I.II.

For all three SRTs used for this study, all items were pre-recorded and were offered in a PowerPoint presentation (see Figure 3.1 for a screenshot of the PowerPoint presentation). The audio and visual stimuli for all SRTs were presented in PowerPoint, on an 11-inch notebook with built-in speakers of

---

\(^9\) Developed by Luuk van de Scheur under supervision of Jan de Jong (2012).
reasonable quality. Each of the SRTs took about 10-15 minutes to administer, depending on the language level of the child, the child’s age, and the character of the child. The interviewer introduced the task (see Instructions below) and carried out four practice items with the child before the actual task started.

Figure 3.1 Screenshot of the PowerPoint presentation that was used for the Polish, the Russian, and the Dutch SRTs

Instructions

We are going to play a game. You will hear a woman and a man read some sentences, and you have to try to repeat them as precisely as possible. Every time you get a whole line of correct answers, you will see a little sun. For every sun I will give you a nice little sticker. We will try to collect as many stickers as possible. Now, let’s try the game together first.

After every few sentences the interviewer gave positive feedback, regardless of whether the sentences were repeated accurately or not. After every eighth sentence the child saw a smiley and received a sticker that he/she was encouraged to stick to the reward-paper. When the child hesitated, or remembered only part of the sentences, the child was told that that did not matter, and the interviewer continued with the next item (for more details on the procedure see Section 3.5).

After the test sessions, all the recordings were transcribed and coded. Accuracy on language proficiency was based on correct target repetition (percentage score). The accuracy scores on the SRTs were both used for inclusion in the study (Sections 3.1.1 and 3.1.3). Monolingual participants who scored below two standard deviations of the monolingual mean score were at risk for SLI and were excluded from participation in this study. Bilingual participants who scored at floor (an accuracy at or below 10%) on both SRTs (Polish or Russian and Dutch)
combined with parental concerns were also considered as being at risk of having SLI and were excluded from this study. For each participant, the scores will be also used as a covariate for language level in the analysis of the experimental tasks (see Chapters 5 and 6).

3.2.3 Non-verbal working memory
Since working memory can affect the ability of children to remember morphological patterns (as discussed in Marinis & Armon-Lotem (2015)), it was decided to take a measure of non-verbal memory as a variable when analysing the results. To this end, Henry’s (2001) odd-one-out (OOU) task was selected. The OOU test was developed to test spatial/non-verbal working memory along with pattern recognition. The test consisted of four items per level; the highest attainable level is level six. The OOU test was administered using the E-prime 2.0 software (Psychology Software Tools, 2012) on a computer with a touch screen.

In the OOU task, children were presented with sequences of pictures with three figures depicting abstract geometrical shapes (see an example in Figure 3.2).

Figure 3.2 Example item from the odd-one-out task

Sequences increased in length from one to six pictures, and in each picture one of the figures was different from the other two. Children first had to identify the odd-one-out in every picture by touching it on the screen. After all pictures in the sequence had been presented, the children were asked to indicate in empty boxes where the odd-ones were located. It is important to note that if the child wrongly identified the odd-one-out (perhaps due to problems in pattern recognition),

---

10 This test has been used with diverse populations, both with typically developing children and children with SLI. An electronic version was developed for this study to facilitate administration by Iris Duinmeijer, Dirk Jan Vet and Bibi Janssen at the Amsterdam Centre for Language and Communication.
CHAPTER 3. METHODOLOGY

his/her incorrect response was taken as input for the memory phase. The results are therefore not dependent on pattern recognition. This task itself is non-verbal but the instructions were verbal. All instructions were pre-recorded by female native speakers of Polish, Russian, and Dutch. The bilingual children were allowed to choose whether the instructions were given in Polish/Russian or in Dutch. The children were told that they would be doing a game on a computer with a touch screen. After hearing the instructions (see Instructions below), the children were given two practice items followed by the experimental part. If a child failed to select and press on the odd-one-out during the test, the interviewer repeated the instructions avoiding any indication as to which picture was the odd-one-out. Depending on the child’s memory span, the test took one to ten minutes.

Instructions

We are going to play a game. First we will practice the game together. You will see three figures. You have to touch the odd-one-out. Then, you will see an empty box. You have to press the box there, where you saw the odd-one-out. Which figure is different? Where was the figure that was different? We will now start the real game. The instructions will remind you what to do, and the tester will help you if you forget what to do. You will see three things. You have to touch the odd-one-out. Then, you will see an empty box. You have to press the box there, where you saw the odd-one-out. /.../ Very good, and now you see two pictures with figures at the time. /.../ Great! We will make the game a bit more difficult. Now you see three pictures with figures in a row. /.../ Well done! We will make the game again a bit more difficult because you are doing so well. Now you see four pictures with figures in a row. /.../ Great! We will make the game even a bit more difficult. Now you see five pictures with figures in a row. /.../ Very well done! Now it is going to be very difficult! Now you see six pictures with figures in a row.

If groups differ significantly on their highest attained memory span, then their performance will be taken into account for the analyses of the gender and case results in Chapters 5 and 6. The OOU variables will then be used as predictors for the experimental tasks, since a significantly higher average memory could positively influence performance on the sentence repetition tasks as well as on the comprehension tasks (See Section 3.2.2). Moreover, when the variance within
groups on the memory span is large, individual differences on the memory task might explain higher/lower sentence repetition accuracy.

3.3 Gender tasks
Several experimental tasks had to be designed to allow a clear comparison between gender acquisition and case acquisition in Polish and Russian in the monolingual and bilingual participants. Before the tasks for gender will be described in more detail, several general comments applicable to both the gender and case tasks need to be made.

In all tasks all three genders were tested. The experimental tasks were designed in such a way that they controlled for as many variables as possible, and with the only controlled difference between them being the language, thereby enabling a comparison between Polish and Russian. Secondly, all tasks involving Russian contrasted end-stressed endings with stem-stressed endings (see Section 2.1). This contrast was necessary to establish if there is difference in the acquisition of nouns with stressed endings compared to nouns with stem stress (production and comprehension) as made explicit in the research questions (see Section 2.4). In consequence, the experimental tasks for Russian contained twice as many items as the Polish tasks. Thirdly, in the case production tasks the genitive and accusative cases were tested, in the case comprehension task the accusative and the dative cases. Finally, word order (canonical vs. non-canonical) was contrasted in the case comprehension task.

The nouns used in all tasks had to be two- or three-syllable nouns and derived from basic lexical items expected in a child vocabulary. They also had to be easily depicted, and of similar frequency. The amount of two- and three-syllable nouns was kept constant across gender, language and stress type in Russian. Any consonant clusters had to be of similar complexity and length, thus making the items comparable across languages. The great majority of items were included in the Polish and the Russian adaptations of the MacArthur-Bates Communicative Development Inventory (for Polish: Smoczyńska (1999); for Russian: Vershinina,
CHAPTER 3. METHODOLOGY

Eliseev, Lavrova, Ryskina & Cejtlin (2011), Vershinina & Eliseeva (2007)). Any other lexical items were frequent in child directed speech occurring in Polish and Russian child language corpora (for Polish: Haman, Etenkowski, Łuniewska, Szwabe, Dąbrowska, Szreder, and Łaziński (2011), Weist & Witkowska-Stadnik (1986); Weist, Wysocka, Witkowska-Stadnik, Buczowska & Konieczna (1984); for Russian: the Tanja and Varja corpora in CHILDES (in Bar-Shalom & Snyder (1997 and 1998)). All stimuli were of a comparable relative frequency in the Polish and Russian CDS. In order to have sufficient items for the Polish and Russian versions of the tasks, half of the items were two-syllable words, and half three-syllable words (equally distributed across gender and stress-patterns). The pictures for the gender and case comprehension tasks were drawn or adapted by the author.

Firstly, the gender production task will be described (Section 3.3.1), then the comprehension task (Section 3.3.2).

3.3.1 Gender production task

The gender production task tests possessive pronoun-noun agreement in the nominative case for masculine, feminine and neuter nouns. Gender is tested through agreement because it cannot be established in isolation (see Section 2.2). The question ‘what is that?’ is likely to be answered with a noun in the nominative case that has an obligatory marking for gender. However, it is impossible to judge whether the child has assigned gender or has retrieved the noun with its marking stored in memory as a whole lexical item. Therefore, correct assignment of gender can only be tested through agreement – either verbal or adjectival. The aim of this task was therefore to find out whether or not the

11 For example, Polish kielbasa ‘sausage’ and kolo ‘wheel’, Russian kolbasa and koleso were not in the CDI, but frequent in CDS.
13 It is not possible to test gender independent of case because there is only one ending responsible for both case and gender marking. The nominative case is usually seen as the ‘default’ case (discussed in Section 2.2.1). As discussed in Section 2.3, similar (gender) elicited production tests have been carried out with pre-school children in various languages, for example, by Zacharova (1973). This test was piloted in Israel with 5-year-old Israeli-Russian children in cooperation with Sharon Armon-Lotem at the Bar-Ilan University, Ramat Gan.
participants correctly produced gender in the context of agreement. The choice was made for a linguistic context with the first person singular possessive pronoun *my* (marked for gender in Polish and Russian): for Polish *mój* for masculine, *moja* for feminine and *moje* for neuter nouns, and for Russian *moj* for masculine, *mojá* [mʌjá] for feminine nouns, and *moē* [mʌjó] for neuter. For all items, the morphological and reference gender are identical.

The gender production task consisted of 24 items for Polish, and 36 items for Russian. In each language the test contained equal numbers of items for each gender: eight items per gender for Polish, and twelve items per gender for Russian (see examples 3.4). The pictures were presented by an interviewer in a fixed random order; see Figure 3.3 for pictures for example items ‘airplane’ (masculine), ‘spoon’ (feminine), and ‘tree’ (neuter). This ensured that the same gender was not presented more than twice in a row in order to reduce the chance of the child automatically opting for one of the genders. The interviewer encouraged the child to name the cards using the possessive pronoun ‘my’ as had been done by the interviewer in the test items. See Appendix II.1 for a complete list of items of the gender production task.

![Figure 3.3 Pictures for items ‘airplane’ masculine, ‘spoon’ feminine, and ‘tree’ neuter.](image)

**Conditions**

**Measure 1. Gender**

Polish and Russian will be compared for gender production in the masculine, feminine and neuter gender in order to establish whether the differences between the Polish and the Russian gender systems (see Section 2.2.1) result in gender in Polish being acquired faster than gender in Russian in monolingual and bilingual children. Examples for each gender in the two languages are set out in (3.4).
(3.4) Examples of expected responses in the gender production task in Polish and Russian

Masculine

Po: To jest samochód-ø. To jest mój-ø samochód-ø.
that is car-M.SG.NOM that is my-M.SG.NOM car-M.SG.NOM
'That is a car. It is my car.'

Ru: Ėto stakn-ø. Ėto moj-ø stakn-ø.
that cup-M.SG.NOM that my-M.SG.NOM cup-M.SG.NOM
'That is a cup. It is my cup.'

Feminine

Po: To jest łyżk-a. To jest mo-ja łyżk-a.
that is spoon-F.SG.NOM that is my-F.SG.NOM spoon-F.SG.NOM
'That is a spoon. It is my spoon.'

Ru: Ėto ložk-a. Ėto mo-ja ložk-a.
that spoon-F.SG.NOM that my-F.SG.NOM spoon-F.SG.NOM
'That is a spoon. It is my spoon.'

Neuter

Po: To jest drzew-o. To jest mo-je drzew-o.
that is tree-N.SG.NOM that is my-N.SG.NOM tree-N.SG.NOM
'That is a tree. It is my tree.'

Ru: Ėto derev-o. Ėto mo-ê derev-o.
that tree-N.SG.NOM that my-N.SG.NOM tree-N.SG.NOM
'That is a tree. It is my tree.'

Measure 2. Stress pattern

For the Russian items across genders, half of the nouns has stress on the final syllable, and the other half has the stress on the root (see examples in 3.5). The variable of stress was chosen in order to test the effect of the transparency of endings on gender agreement in monolingual and bilingual children (see Section 2.2).
(3.5) Examples of stem-stressed and end-stressed target items in Russian

Stem-stressed

Ru:  Ėto kūkl-а. Ėto mo-ja kūkl-а.
that doll-F.SG.NOM that my-F.SG.NOM doll-F.SG.NOM
‘That is a doll. It is my doll.’

End-stressed

Ru:  Ėto okn-о. Ėto mo-ë okn-о.
that window-N.SG.NOM that my-N.SG.NOM window-N.SG.NOM
‘That is a window. It is my window.’

For each participant, the accuracy per gender (expressed as the percentage of correct answers) will be calculated and used as variable in the results section (see Section 5.1). The results of this task will indicate whether agreement with all three genders is equally well mastered. It will be possible to compare Polish and Russian, and within Russian, to compare stressed and unstressed endings.

For both Polish and Russian, neuter is expected to be the weakest gender. Neuter is the most infrequent in CDS (see Section 2.2); feminine and masculine are equally frequent. No predictions as to whether feminine or masculine gender is acquired faster can be made on the basis of the linguistic system. For Russian, however, when feminine end-stressed and stem-stressed endings are taken together, masculine is expected to show higher scores, since for the masculine nouns the stem-stressed condition should not cause extra difficulty. For feminine and neuter nouns we predict that the end-stressed condition facilitates a faster acquisition expressed by a higher accuracy on end-stressed items for feminine and neuter. Because of frequency effect, stem-stressed neuter is expected to show lower scores than stem-stressed feminine.

Procedure

The interviewer first explained the task (see Instructions below). She then gave the child a pile of cards (n=36 for Russian, n=24 for Polish) but kept six practice items (two for each gender) for herself. The interviewer showed the first practice item to the participant. She then named it and qualified the noun using a
possessive pronoun ‘my’, for example for the item ‘duck’: “Look, this is a duck, it is my duck.” The interviewer named all six practice items in this manner. After that, the interviewer encouraged the child to start naming the cards and using the possessive pronoun ‘my’ in a similar manner to the practice items. Whenever the child failed to use the possessive pronoun ‘my’, the interviewer reminded the child of the task by referring to the practice stage: “Do you remember what we were doing before? Look, I have a duck here, it is my duck.” The average duration of this task including instructions was three minutes for Polish and five minutes for Russian.

**Instructions**

Look, here we have some interesting cards! Let’s both take some cards. Look, I have a car, it is my car. And here, I have a wheel, it is my wheel. And now you show me what cards you have.

**3.3.2 Gender comprehension task**

The gender comprehension task was fully computerised and tests comprehension through adjective-noun agreement for Polish and Russian. Again, gender comprehension cannot be tested in isolation or without involving metalinguistic questions (see Section 2.2). The test was administered using the E-prime 2.0 software (Psychology Software Tools, 2012) on a notebook with a touch screen in order to have exactly the same input for all participants and to be able to keep track of accuracy per participant per item.

The gender comprehension task consisted of 12 items for Polish, and 24 items for Russian, equally divided over the three genders. For each item, three pictures were presented on the left side of the screen under one another with one match and two mismatches (see Figure 3.4). The only difference between the pictures was the gender of the noun: masculine, feminine and neuter. In the sentence the children heard (see below), the gender information is on the adjective (and on the past tense verb form at the end of the sentence) and therefore, the form of the adjective is sufficient to select the correct noun in the pictures. The location (high – middle – low) of the correct picture on the screen was randomised. Before the pictures appeared on the screen, a fixation point was projected on the screen to
prevent the participants from having a preference for one of two sides of the screen. The correct picture had to be dragged towards an item on the right side of the screen (see Figure 3.6a-d). The length of the intervals between the items was controlled for. The task took about four minutes in Polish, and six minutes in Russian.

The nouns were presented with one of two colour adjectives “blue” or “gold” for Polish and for Russian, see example (3.6) and Figure 3.4. These adjectives were selected because they are end-stressed in Russian, easily depictable and occur in the vocabulary of children at the ages tested. All items were presented in a random order. The position of the correct response on the screen was also randomised. The sentences contained a subsection of nouns of the gender production task. Each noun was used maximally twice with the same adjective.

(3.6) Adjectives (masculine, feminine and neuter) used in the gender comprehension task in Polish and Russian

<table>
<thead>
<tr>
<th>Masculine</th>
<th>Feminine</th>
<th>Neuter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Po: niebieski/zloty</td>
<td>niebieska/zlota</td>
<td>niebieskie/zlote</td>
</tr>
<tr>
<td>‘blue/golden’</td>
<td>‘blue/golden’</td>
<td>‘blue/golden’</td>
</tr>
</tbody>
</table>

| Ru: goluboj/zolotaj  | golubaja/zolotaja | goluboe/zolotae  |

Figure 3.4 Screenshots for items ‘I want the golden to be in the basket’ and ‘I want the blue to be in the wardrobe’ (gender information is only on the adjective, which is sufficient to select the correct noun).
CHAPTER 3. METHODOLOGY

Conditions

Measure 1. Gender

Polish and Russian were compared with respect to comprehension of gender using agreement in order to test whether differences between the Polish and the Russian system (see Chapter 2.2) result in gender in Polish being comprehended and processed more accurately than in Russian by monolingual and bilingual children.

(3.7) Examples of items for the gender comprehension task in Polish and Russian

Masculine

Po: *Chcę, aby złot-y ... znalazł się w szafie.*
  I want, that gold-M.SG.NOM ... appeared.M.3SG in wardrobe.
  ‘I want the gold... to appear in the wardrobe.

Ru: *Ja xoču, čtoby golub-oj ... okazalsja v škafu.*
  I want, that blue-M.SG.NOM ... appeared.M.SG in wardrobe.
  ‘I want the blue... to appear in the wardrobe.

Feminine

Po: *Chcę, aby złot-a ... znalazła się na stole.*
  I want, that gold-F.SG.NOM ... appeared-F.3SG on table.
  ‘I want the gold... to appear on the table.

Ru: *Ja xoču, čtoby golub-aja ... okazal-as’ na stole.*
  I want, that blue-F.SG.NOM ... appeared-F.SG on table.
  ‘I want the blue... to appear on the table.

Neuter

Po: *Chcę, aby niebieski-e ... znalazł-o się na talerzu.*
  I want, that blue-N.SG.NOM ... appeared-N.3SG on plate.
  ‘I want the blue... to appear on the plate.

Ru: *Ja xoču, čtoby zolot-oe ... okazal-os’ na tarelke.*
  I want, that gold-N.SG.NOM ... appeared-N.SG on plate.
  ‘I want the gold... to be on the plate.
Measure 2. Stress

In order to test the effect of transparency of endings on gender agreement for comprehension in monolingual and bilingual children in Russian, half of the nouns were end-stressed across genders (see 3.8), and the other half was stem-stressed (see 3.8).

(3.8) Examples of stem-stressed and end-stressed target items for Russian

Stem-stressed

Ru:  

*mašin-a*  

car-F.SG.NOM  

‘car’

End-stressed

Ru:  

*zvezd-a*  

star-F.SG.NOM  

‘star’

The results of this task will indicate whether comprehension through agreement with all three genders has been equally well mastered. It will enable us to compare gender comprehension in Polish and Russian, and within Russian, to compare the comprehension of stressed and unstressed endings. For each participant, the accuracy (percentage of correct responses) per gender will be calculated and used as a variable in the results section (see Section 5.2). For Russian, accuracy on stem-stressed and end-stressed nouns will also be compared.

As was discussed in Section 2.2, the most distinct adjectival gender ending in Polish is feminine (masculine and neuter sound more alike, but not identical). Therefore, we predict feminine to be the most accurate for Polish. For Russian, the masculine gender is the most distinct (in the unstressed condition, feminine and neuter sound identical). Therefore, the comprehension of masculine gender is predicted to be the most accurate (see Chapter 7).

Procedure

The children completed this task on a notebook with a touch screen. First, the interviewer explained the task and practiced three practice items together with the
participant. The participant heard a sentence, and then had to decide which of the three pictures offered had to be moved to the indicated location on the screen (see Figure 3.4). The three objects represented three nouns differing only in gender. On the screen, they saw a puppet “Smurf” (see Figure 3.5) that told them where the objects had to be placed.

![Figure 3.5 “Smurf”](image)

The participants had to help the puppet by moving one of the three objects on the screen into the location indicated by the puppet. The puppet said, for example, “I want the blue (marked for gender)... to appear (marked for gender) in the box.” The children saw three blue items: one blue item depicting a masculine noun, one blue item depicting a feminine noun, and one blue item depicting a neuter noun. They had to select the correct item based on gender agreement with the adjective uttered by the puppet. They moved one of three pictures to the place indicated (see Figure 3.6 for locations) only after the audio file had finished playing. After the screen having been touched, the next audio file was played.

![Figure 3.6 a-d. Pictures of the four different locations](image)

14 Note that the production task checked whether the child had identified the correct lexical item. For example, the picture of a tree had to be identified as tree not as an oak (which has a different gender to tree in Polish and Russian).
Before starting the experimental items, the interviewer made sure that the participant understood the task and that the audio played at a comfortable volume. During the test, the interviewer gave no hints. If the child was slow to respond, the interviewer said: “Which one did Smurf ask for?” to encourage the child to choose one of three options. In case the participant failed to select an item ten seconds after the audio file had been fully played, E-prime continued automatically with the next item. After the last item had been administered, the child saw a prize on the screen, and the interviewer gave the participant a sticker for good work.

Instructions

We are going to play a game. My name is Smurf. My arm hurts, and my house is a mess. Could you help me clean up? First, we are going to practice together. At the screen, you will see big toys. I want that the big ... appears on the table. And now, we will play for real. I want, that the blue ... appears on the table. I want, that the gold ... appears on the table/in the box/on the shelf/on the plate.

3.4 Case tasks

The same general remarks about vocabulary items and procedure made at the beginning of Section 3.3 apply also to the case tasks. The production task will first be described for genitive case (Section 3.4.1) and then for accusative case (Section 3.4.2). The comprehension task will be presented in Section 3.4.3.

3.4.1 Genitive production task

The genitive case production task used the context of negation (see Section 3.1).\(^{15}\) Stating “there is no (noun)” requires the use of genitive case on the noun (see Section 2.4). The aim of this task was to examine whether children can correctly use genitive case endings with masculine, feminine and neuter nouns.\(^{16}\) For example, Polish: *nie ma krokodyl-a*; Russian: *net krokodiıl-a* ‘(there is) no crocodile

---

\(^{15}\) Similar elicited case production tests have been performed with children in various languages from age 2;4 onwards, for example by Dąbrowska and Szcerbiński (2006) for Polish genitive, accusative and dative cases.

\(^{16}\) Although care has been taken in designing the task, two items evoked the optional genitive in Polish in some of the adult speakers. Therefore, both the standard genitive and the optional genitive are scored as correct.
CHAPTER 3. METHODOLOGY

(M.SG.GEN)’. The test consisted of 24 items for Polish, and 36 items for Russian, equally distributed over the three genders and took on average three minutes for Polish and five minutes for Russian.

The items were the same lexical items as used in the gender production task and the same test material was used (see Section 3.3.1; see Figure 3.3 for example pictures). The items in picture form were presented by an interviewer in a fixed random order to make sure that the same gender was not presented more than twice in a row to reduce the chance of the child automatically opting for one of the genders. The picture was turned over and the child was encouraged to produce an utterance “Now there is no (noun)”. See Appendix II.I for the full list of items used in the genitive production task.

Measures
Measure 1. Gender
Polish and Russian are compared with respect to the production of the genitive case in order to test whether differences between the Polish and the Russian gender and case systems (see Section 2.2.2) result in case in Polish being acquired faster than in Russian in monolingual and bilingual children, that is, with fewer errors in the production task. See (3.9) for an example per gender for Polish and Russian.

(3.9) Examples of expected responses for the case production task in Polish and Russian

Masculine

Po: Nie ma krokodyla. Ru: Net krokodyła.
‘There is no crocodile.’

Feminine

Po: Nie ma kielbasy. Ru: Net kolbasy.
‘There is no sausage.’

Neuter

Po: Nie ma drzewa. Ru: Net dereva.
‘There is no tree.’
Measure 2. Stress pattern
In order to test the effect of transparency of endings on the production of the genitive case in monolingual and bilingual children in Russian, half of the nouns was end-stressed across genders, and the other half was stem-stressed (see 3.10).

(3.10) Examples of items with stem-stressed and end-stressed nouns in Russian

Stem-stressed

Ru:  *Net łożki.*
     ‘There is no spoon.’

End-stressed

Ru:  *Net kolbasy.*
     ‘There is no sausage.’

The results of this task will indicate whether the production of genitive case endings has been equally well mastered in all three genders. It will make possible a comparison of the production of genitive case markings in Polish and Russian, and within Russian, the production of stressed and unstressed endings. For each participant, the accuracy (percentage of correct responses) per gender will be calculated and used as a variable in the results section (see Section 6.2). For Russian, the accuracy of stem-stressed and end-stressed nouns will also be compared.

Procedure
The interviewer first explained the task (see Instructions below). She then gave the child a pile of cards (n=36 for Russian, n=24 for Polish) but kept six practice items (two for each gender) for herself. The interviewer showed the first practice item to the participant, for example a picture of a water melon. She then named the picture “water melon” and turned over the card saying, “and now there is no water melon”. The interviewer named all six practice items in this manner. After they were named, the interviewer encouraged the child to start naming the cards and then expressing the absence of the object too. Whenever the child failed to remember the test instructions, the interviewer reminded the child of the task by
referring to the practice stage. The average duration of this task including instructions was three minutes for Polish and five minutes for Russian.  

Instructions

We are going to play a game. Look, here is a water melon. [Interviewer turns over the card], and now there is no water melon (M.SG.GEN). There is a ring. [Interviewer flips over the card], and now there is no ring (N.SG.GEN). We have a rainbow. [Interviewer turns over the card], and now there is no rainbow (F.SG.GEN). Now it is your turn. Try to do the same.

3.4.2 Accusative production task

This accusative case production task was a sentence completion task that elicited nouns in the accusative case using singular masculine, feminine and neuter nouns. The accusative production task aimed to test if there were differences in the production of the accusative between Polish and Russian children. Furthermore, it aimed to explore if the participants have stored neuter words (with or without final word stress for Russian) as feminine words (see Section 2.2).

For this task, the pictures were grouped thematically (in groups of four or five). The task consisted of 24 items for Polish and 36 items for Russian and took approximately three minutes to administer in Polish, and five in Russian. The same lexical items and pictures were used as in the gender production task and the genitive case production task, but the pictures were grouped together instead of presented individually (see Figure 3.7).

---

17 This test has been piloted in Israel with 5-year-old Israeli-Russian children in cooperation with Sharon Armon-Lotem at the Bar-Ilan University, Ramat Gan.

18 Similar elicitation tasks have been performed for Polish, amongst others by Dąbrowska & Szczerbiński (2006), who showed participants pictures that they had to describe.
The plastic cards were presented in a fixed random order. The child was encouraged to produce the name of the pictures in the context “I see (noun)”. See Appendix II.I for the full list of sentences used in the accusative case production task.

Measures

Measure 1. Gender

Polish and Russian are compared with respect to the production of the accusative case in order to test whether differences between the Polish and the Russian gender and case systems (see Section 2.2) result in case in Polish being acquired faster than in Russian in monolingual and bilingual children, that is, with fewer errors.

(3.11) Examples of expected responses for the accusative production task in Polish and Russian

Masculine

Po: \( \text{Widzę kogut-ą.} \)  
Ru: \( \text{Viжу petux-ą.} \)  
I see rooster-M.AN.SG.ACC  
I see rooster-M.AN.SG.ACC  
‘I see a rooster.’

Feminine

Po: \( \text{Widzę kielbas-ę.} \)  
Ru: \( \text{Viżu kolbas-u.} \)  
I see sausage-F.SG.ACC  
I see sausage-F.SG.ACC  
‘I see a sausage.’

Neuter

Po: \( \text{Widzę jajk-o.} \)  
Ru: \( \text{Viżu jaje-o.} \)  
I see egg-N.SG.ACC  
I see egg-N.SG.ACC  
‘I see an egg.’
Measure 2. Stress pattern
In order to test the effect of transparency of endings on the production of the accusative case in monolingual and bilingual children in Russian, half of the nouns were end-stressed across genders, and the other half was stem-stressed (see 3.12).

(3.12) Examples of expected responses with stem-stressed and end-stressed nouns for Russian

Stem-stressed

Ru: \( \text{Vɪžu \ lọžk-u.} \)
\( \text{I see \ spoon-F.SG.ACC} \)
‘I see a spoon.’

End-stressed

Ru: \( \text{Vɪžu \ kọlbas-u.} \)
\( \text{I see \ sausage-F.SG.ACC} \)
‘I see a sausage.’

The results of this task will indicate whether the production of accusative case endings with all three genders has been equally well mastered. The production of accusative case markings in Polish can be compared to Russian, and within Russian, stressed endings can be compared to unstressed endings. For each participant, the accuracy (percentage of correct responses) per gender will be calculated and used as a variable in the results section (see Section 6.2). For Russian, accuracy of stem-stressed and end-stressed nouns will also be compared.

If the participants perceive neuter nouns as feminine ones, we expect them to use the \( \{-ę\} \) (Polish)/ \( \{-u\} \) (Russian) feminine accusative ending for neuter nouns. For example, in the sentence ‘I see a tree’ in Polish we expect the \( \text{tree (neuter)} \) to be given a feminine ending: \( \ast \text{Widzę drzew-ę} \) instead of \( \text{Widzę drzew-o} \) ‘I see tree-N.SG.ACC’; and in Russian: \( \ast \text{Vɪžu dɛrev-u} \), instead of \( \text{Vɪžu dɛrev-o} \) ‘I see tree-N.SG.ACC’.

---

19 Although \textit{sapog} ‘boot’ has no ending, it is still considered end-stressed (see Section 2.1).
**Procedure**

The interviewer first explained the task (see Instructions below). She then gave the child a pile of cards (n=36 for Russian, n=24 for Polish) but kept one practice item (containing one picture for each gender) for herself. The interviewer asked the participant to close his/her eyes and then started naming the pictures on the card with the verb ‘see’. For example, “I see a duck, a water melon, and a ring” (whereby the target noun is always in the accusative case). Then the interviewer asked the child to open his/her eyes and to check whether the interviewer had correctly described the pictures. If the child confirmed that the items had been named correctly, the interviewer gave the next card to the child and asked the child to describe what he/she saw on the cards, while the interviewer kept her eyes shut. After the pictures on the practice item were named, the interviewer encouraged the child to start naming the cards in a similar manner. Whenever the child failed to first say ‘I see’ (to make sure the accusative was primed), the interviewer reminded the child of the task by referring to the practice stage: “Do you remember what we were doing before? Look, I see a duck, I see a water melon and I see a ring.” The average duration of this task including instructions was three minutes for Polish and five minutes for Russian.

**Instructions**

We are going to play a game. Please close your eyes.” Child closes eyes. Experimenter: “I see a rainbow (F.SG.ACC), a water melon (M.SG.ACC) and a ring (N.SG.ACC). Now you can open your eyes. Did I say that correctly?” Child reacts. Experimenter: “Very good. Do you want to have a look at this card and tell me what you see? I will close my eyes and check. Start with: “I see...”.

### 3.4.3 Case comprehension task

An online forced-choice case comprehension task using picture matching was used to test comprehension of case for masculine, feminine and neuter gender in Polish and Russian. The task consisted of 30 (Polish) and 52 (Russian) fully reversible transitive sentences, with objects in accusative and dative case, both in canonical (SVO) and non-canonical (OVS) word order. The case comprehension

---

20 Picture matching tasks can normally be carried out with children from age 2;0 upwards (Schmitt & Miller, 2010).
task was administered using the E-prime 2.0 software (Psychology Software Tools, 2012) on an 11-inch notebook with a touch screen. The case comprehension task was designed in E-Prime in order to have exactly the same input for all participants and to be able to keep track of accuracy per participant per item. For each item, two pictures were presented on the screen; one match and one mismatch to the sentence presented on an audio-track (see Figures 3.8-3.10). The only difference between the pictures was the syntactic role assigned to the nouns: in one of the pictures noun a was the subject, and in the other picture noun a was the object. The location (left – right) of the correct picture on the screen was randomised. E-prime mirrored the pictures on a vertical axis as to whether the agent/patient was on the left or on the right side of each picture. The length of the intervals between the items was controlled for. Before the pictures appeared on the screen, a fixation point was projected on the screen to prevent the participant developing a preference for one of the two sides of the screen. The items were presented in two parts: one using animate and one with inanimate nouns. The child was asked to choose the picture that matched the sentence. The test took five minutes to administer in Polish, and about ten minutes in Russian. See Appendix II.II for the full list of items used in the case comprehension task.

Figure 3.8 Pictures as they appeared on the screen for the item for Polish ‘The crocodile kisses the giraffe’ Left: match, Right: mismatch
All sentences in the case comprehension task were fully reversible in order to ensure that both nouns could be a logical subject/object and to avoid other information being used. As neuter nouns had to be tested (see Section 2.3), the referents were personified by drawing a face on the normally inanimate object (see Figure 3.10) in order to make them equally plausible subjects as objects. They were paired with other inanimate nouns, for instance as in Figure 3.10, ‘The egg kisses the sausage’.

Measures
The three measures for Polish (gender, word order, and case) and four measures for Russian (the same as for Polish and also including stress) are discussed below.

Measure 1. Gender
The main measure of this task is the gender of the syntactic object. See 3.13 for example sentences with nouns of masculine, feminine and neuter gender as syntactic objects (marked bold). Polish and Russian are compared with respect to
the comprehension of case (accusative and dative, see condition 3) in order to test whether differences between the Polish and the Russian gender and case systems (see Section 2.2) result in case in Polish being acquired faster than in Russian in monolingual and bilingual children, that is with fewer errors.

(3.13) Examples of sentences in the case comprehension task in Polish and Russian

Masculine

Po: Krokodyl-ø całaje kogut-a.
crocodile-M.SG.NOM kisses rooster-M.AN.SG.ACC
‘The crocodile kisses the rooster.’

Ru: Petyx-ø ljubit žiraf-a.
rooster-M.SG.NOM loves giraffe-M.AN.SG.ACC
‘The rooster loves the giraffe.’

Feminine

Po: Jajk-o cała je kielbas-ę.
egg-N.SG.NOM kisses sausage-F.SG.ACC
‘The egg kisses the sausage.’

Ru: Jajc-ø celuet kolbas-u.
egg-N.SG.NOM kisses sausage-F.SG.ACC
‘The egg kisses the sausage.’

Neuter

Po: Kielbas-a przygłąda się jajk-u.
sausage-F.SG.NOM looks+at egg-N.SG.DAT
‘The sausage looks at the egg.’

Ru: Ogurec-ø ulybaetsa jajc-u.
cucumber-M.SG.NOM smiles+at egg-N.SG.DAT
‘The cucumber smiles at the egg.’

Measure 2. Word order
In order to avoid measuring the use of word order strategies instead of the comprehension of case endings, word order was controlled for. Half of the items
was in SVO word order, and half of the items was in OVS. As discussed in Section 2.1, SVO is the most frequently used word order in both Polish and Russian. In sentences with an OVS word order, the use of a word order strategy taking SVO as default leads to failure in comprehension (e.g., assigning the role of the subject to the first noun of the sentence irrespective of the case ending). The results will indicate whether differences between the gender and case systems of Polish and Russian lead to an increased complexity in the interpretation of OVS sentences in monolingual and bilingual children. See (3.14) for an example sentence in SVO word and for OVS word order. Objects are in bold face.

(3.14) Examples of sentences in SVO and OVS in Polish and Russian

**SVO**

Po: \( Krokodyl-\varnothing \quad \text{caluje} \quad \text{kogut-\alpha}. \)
\( \text{crocodile-M.SG.NOM} \quad \text{kisses} \quad \text{rooster-M.AN.SG.ACC} \)
‘The crocodile kisses the rooster.’

Ru: \( Petu\bar{x}-\varnothing \quad \text{troya\c{e}} \quad \text{zme-ju}. \)
\( \text{rooster-M.SG.NOM} \quad \text{touches} \quad \text{snake-F.SG.ACC} \)
‘The rooster touches the snake.’

**OVS**

Po: \( Gruszk-\epsilon \quad \text{widi} \quad \text{jablk-\varnothing}. \)
\( \text{pear-F.SG.ACC} \quad \text{sees} \quad \text{apple-N.SG.NOM} \)
‘The apple sees the pear.’

Ru: \( Petu\bar{x}-\alpha \quad \text{ljubit} \quad \text{\v{z}iraf-\varnothing}. \)
\( \text{rooster-M.AN.SG.ACC} \quad \text{loves} \quad \text{giraffe-M.SG.NOM} \)
‘The giraffe loves the rooster.’

**Measure 3. Case**

The case comprehension task examined whether the participant understood the relations between actors and patients in a simple transitive sentence as expressed

\footnote{In order to make the OVS reading of sentences more natural, lead-in sentences prompting the OVS order could be used. However, that would also make attention to case endings redundant. Since we want to test to what extent children pay attention to case endings, lead-in sentences cannot be used.}
by the nominative case and the accusative or dative case. Objects both in the accusative and dative case were included in order to be able to generalise across case (see Table 3.5 for a list of verbs used for sentences in the accusative case and verbs used for sentences in the dative case). The object position was filled with accusatives and datives in random order across the sentences (see examples 3.13, objects in bold face).

Table 3.5 Verbs in Russian and Polish used in the case comprehension task

<table>
<thead>
<tr>
<th>Practice</th>
<th>English</th>
<th>Polish</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice</td>
<td>to hear</td>
<td>słyszeć</td>
<td>słyszat'</td>
</tr>
<tr>
<td>to bite</td>
<td>gryźć</td>
<td></td>
<td>kusat'</td>
</tr>
<tr>
<td>Accusative</td>
<td>to kiss</td>
<td>całować</td>
<td>celować'</td>
</tr>
<tr>
<td>to see</td>
<td>wiedzieć</td>
<td>gradient</td>
<td>wiedzi'</td>
</tr>
<tr>
<td>to love</td>
<td>kochać</td>
<td></td>
<td>ljubsit'</td>
</tr>
<tr>
<td>to touch</td>
<td>popychać</td>
<td></td>
<td>trogat'</td>
</tr>
<tr>
<td>Dative</td>
<td>to smile</td>
<td>przeglądać się</td>
<td>ulybat'sja</td>
</tr>
<tr>
<td>to call</td>
<td>-</td>
<td></td>
<td>zvonit'</td>
</tr>
<tr>
<td>to like</td>
<td>podobać się</td>
<td></td>
<td>nravit'sja</td>
</tr>
</tbody>
</table>

Measure 4 (for Russian only): Stress on object

For Russian, half of the objects were end-stressed and half stem-stressed (equally distributed over gender, word order, and case (accusative or dative)). See example 3.16 for an object with end stress and an object with stem stress (objects in bold face).

(3.15) Examples of sentences with stem-stressed and end-stressed objects in Russian

Stem-stressed

Ru: Zmej-ä ulybatsja žiraf-u.  
snake-F.SG.NOM smiles_at giraffe-M.SG.DAT  
‘The snake smiles at the giraffe.’

End-stressed

Ru: Jajc-ä celuet kolbas-u.  
egg-N.SG.NOM kisses sausage-F.SG.ACC  
‘The egg kisses the sausage.’
The results of this task will indicate whether the comprehension of dative and accusative case endings in canonical and non-canonical sentences with all three genders has been equally well mastered. Case comprehension in Polish will be compared to Russian, and within Russian, stressed endings to unstressed endings. For each participant, the accuracy (percentage of correct responses) per gender will be calculated and used as a variable in the results section (see Section 6.3). For Russian, the accuracy of stem-stressed and end-stressed nouns will also be compared.

Procedure
Children sat in front of a (notebook with) touch-screen. First, the interviewer practiced four items together with the participant (see Instructions below). The participant heard a sentence, and then had to decide which of the two pictures described the situation, and touch that picture. Once this choice was made, the next audio file was played. Corrections were not possible. After the practice items, the real test started. Before starting, the interviewer made sure that the participant understood the task, and that the audio was played at a comfortable volume. During the test, the interviewer gave no hints. When a participant was slow in responding, the interviewer said: “Which one is correct?” to encourage the child to choose one of two options. If the participant failed to make a decision ten seconds after the audio file had been played, E-prime continued automatically with the next item. After the last item, the child saw a prize on the screen, and the interviewer gave the participant a sticker for good work.

Instructions
We are going to play a game. At the zoo, all animals communicate with each other. You will hear a woman saying something about them. On the screen, you will see two pictures. You have to press the picture that is correct. Touch with your finger the picture that is correct. Watch out, the pictures look a lot like each other, so you have to watch carefully. //Now we are in the supermarket. Look at these friendly products. Now, these products are communicating with each other. You have to find out which picture is correct.
3.5 General test procedure

Each child was tested individually by a female interviewer. The interviewer always sat next to the participant. Before starting the experiment, the interviewer had some informal conversation with the child in order to make him/her feel comfortable with the situation. When the child was at ease, the interviewer started the experiment. The interviewer orally gave instructions for each of the tasks. Instructions were learned by heart, and repeated as similarly as possible each time to ensure that all participants received identical instructions. For each test, practice items were administered to familiarise the children with the task and – if applicable – the electronic equipment. After the practice stage, the interviewer asked the child whether he/she understood the task. The experimenter gave positive feedback after the practice items, during the break and after completion of the task, for example, “You are doing very well”. After completion of each test or each part of a test participants received a sticker, and after having completed all tasks they got a medal and a small present (usually a small toy or writing/drawing utensil).

![Figure 3.11 End screen in Polish, Russian, and Dutch](image)

For all participants, the interviewer was a female in her mid or late twenties, and from a similar educational background, ensuring a similar setting for each of the participants. The monolingual Polish children were recruited and tested by a female research assistant, who was a native speaker of Polish and a graduate student of the department of Speech Therapy at Warsaw University. She had been trained and supervised extensively prior to the first test sessions. The Polish-Dutch participants were recruited and tested in Polish by one of two female research assistants, both native speakers of Polish recently resident in the
Both research assistants had been previously trained and supervised extensively. The Polish-Dutch children were tested in Dutch by the author. All monolingual Russian participants were tested in Russian by the author and recruited with the help of the Netherlands Institute in Saint Petersburg. All Russian-Dutch children were tested in Russian by the author, and in Dutch by a research assistant or by the author.

All stimuli (both visual and audio) were identical for all participants (see introduction of the current chapter). All children took the comprehension tasks and the memory task on an 11-inch touch screen, either on a notebook with reversible touch screen, or on a separate touch screen (connected to a note book) with the same size. All utterances of the participants were recorded during the experiment with one of two identical voice recorders (Olympus digital voice recorder).

The parents/caregivers of the bilingual subjects were given the choice as to whether their child was tested at the weekend school or at home. The monolingual children were tested at school with only a few exceptions. If the child was tested at school, several test sessions were necessary because the teachers and parents did not want the child to miss too much of one class. If the child was tested at home, all tests were administered in one long session, but with enough breaks to avoid the child getting tired. As a result, each participant was tested in one to four sessions. In order to avoid maturation effects during the study, the time in between the first and last session was kept as short as possible (but not exceeding six weeks). For a few Russian-Dutch participants, the time between the first and last session was more than six weeks (due to unforeseen sickness of the child, longer vacations, and special circumstances).

As the Polish tests took less time to administer than the Russian tests, and the bilingual children had also to take a test in Dutch, the maximum number of sessions for each of the groups was different. Monolingual Polish children were tested for a total of approximately 50 minutes, divided over one or two sessions,

22 An undergraduate student of the Slavic department of the University of Amsterdam and a graduate student of translation studies at the University of Amsterdam.
23 A Dutch native speaker who at that time was a graduate student of the Slavic department at the University of Amsterdam.
and monolingual Russian children were tested for a total of 60 minutes, divided over one to three sessions. Bilingual Polish-Dutch participants were tested for a total of approximately 60-70 minutes divided over one or two sessions. Russian-Dutch children were tested for a total of approximately 70-80 minutes, divided over one to four sessions. All adult participants were tested in one session for approximately 30-40 minutes. All tests were presented in a fixed order (see Table 3.6).

<table>
<thead>
<tr>
<th>Task</th>
<th>Estimated duration (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Po-SRT/Ru-SRT</td>
<td>10-15</td>
</tr>
<tr>
<td>Gender production task</td>
<td>3-5</td>
</tr>
<tr>
<td>Genitive production task</td>
<td>3-5</td>
</tr>
<tr>
<td>Accusative production task</td>
<td>3-5</td>
</tr>
<tr>
<td>Gender comprehension task</td>
<td>5-10</td>
</tr>
<tr>
<td>Case comprehension task</td>
<td>5-10</td>
</tr>
<tr>
<td>Non-verbal memory task OOU</td>
<td>3-7</td>
</tr>
<tr>
<td>Du-SRT</td>
<td>10-15</td>
</tr>
</tbody>
</table>

The first task was always the Ru-SRT or Po-SRT, followed by the gender production and case production tasks. After the production tasks the OOU was administered. The OOU was followed by the gender comprehension task and the case comprehension task. For bilinguals, the Du-SRT was administered as the final task. Enough time for a transition between Polish or Russian and Dutch was ensured by a small break followed by some informal chat in the other language about school, hobbies, etc. However, for very shy Dutch-dominant bilinguals, sometimes the Du-SRT was administered first, in order to make the child feel comfortable. In such a case, the Du-SRT was followed by a break and an informal chat in Polish or Russian. Thereafter, the Po-SRT or Ru-SRT was administered, followed by the other task in the same order as described above.

If the experiment was divided over separate sessions, the Po-SRT or Ru-SRT was always administered during the first session. If time allowed, the production tasks – which were always administered during one session – were administered as well. The two comprehension tasks were also administered during one session, and always after the production tasks. The OOU could be merged with any session, but was usually administered during the session with comprehension tasks.
3.6 Analysis

3.6.1 Preparation of data for analysis

All the data from the SRTs and the production tests were transcribed and coded by the author and checked by native speakers of the relevant languages. All answers were scored for accuracy using a codebook per task. Interrater reliability of the transcription and coding was done by native speakers of Russian and Polish for a random selection (10-12%) of the participants. See Table 3.7 for the interrater reliability for the transcription and coding per task for Polish and Russian.

Table 3.7 Interrater reliability: transcription and coding per task for Polish and Russian (in percentage)

<table>
<thead>
<tr>
<th></th>
<th>Polish</th>
<th></th>
<th>Russian</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Transcript</td>
<td>Coding</td>
<td>N</td>
</tr>
<tr>
<td>Po-SRT</td>
<td>n=8</td>
<td>85</td>
<td>95</td>
<td>n=8</td>
</tr>
<tr>
<td>Ru-SRT</td>
<td>n=8</td>
<td>-</td>
<td>-</td>
<td>n=8</td>
</tr>
<tr>
<td>Du-SRT</td>
<td>n=4</td>
<td>58</td>
<td>98</td>
<td>n=4</td>
</tr>
<tr>
<td>Gender production</td>
<td>n=8</td>
<td>98</td>
<td>99</td>
<td>n=8</td>
</tr>
<tr>
<td>Genitive production</td>
<td>n=8</td>
<td>96</td>
<td>98</td>
<td>n=8</td>
</tr>
<tr>
<td>Accusative production</td>
<td>n=8</td>
<td>97</td>
<td>98</td>
<td>n=8</td>
</tr>
</tbody>
</table>

The transcript agreement is based on the percentage identically transcribed sentences onto total. For the sentence repetition tasks, the transcript agreement was based on whether the sentences were coded fully identical, so that any small difference in spelling would already lead to a zero agreement for that sentence. For Polish and Russian, the transcript agreement between coders based on full sentences was high (85% and 90% respectively). For the Dutch sentence repetition tasks, the agreement between coders on the transcript was lower (58% and 57% respectively). This can be explained by the fact that some of the eight participants that were randomly selected here scored very low, and did not articulate well. Therefore, although the coders were unanimous about the target score, their transcripts differed slightly. To obtain a more fine-grained measure of agreement, the word-by-word transcript agreement was determined. It turned out that 97% of the words in the sentence repetition task for the Polish-Dutch bilinguals was coded identically, and 98% for the Russian-Dutch bilinguals. The scoring agreement was high for all the versions of the sentence repetition task. For
all experimental tasks, the transcript agreement and the scoring agreement between coders was very high (above 90%).

The comprehension tasks and the OOU were coded automatically by E-Prime; therefore, it was not necessary to check for errors in coding. The questionnaire data were imported into an Excel sheet. All imported questionnaire data were checked by a research assistant to exclude errors.

3.6.2 Background measures
Using the questionnaire data, the age at testing (in months) for the child as well as the educational level of each of the parents were determined (on the basis of low-high). For the bilingual participants, measures for the AoO for each of the languages, LoE to Dutch, and AoI in Polish/Russian were also calculated. For the latter variable, several estimates of the relative input a bilingual child received in each of the languages were used (see Appendix I and Section 4.1). These measures will be examined for any significant correlation with language proficiency. If there is a correlation, a regression analysis will be applied to see which measures predict language proficiency. Only those measures that predict language proficiency will be used as covariates in the analyses of experimental tasks.

All utterances for each of the SRTs were scored for the accuracy of repetition of the target structure. The target structure was defined as subject-verb agreement, and correct cases on obligatory parts of the construction. Correct target structure repetition meant that this target part of the sentence was repeated fully and correctly (see Table 3.2 for a list of the structures). If a child failed to respond, the code “not answered” was used. Some changes to the target sentence (3.16a) were not considered a mistake: for example, replacement of a lexical item by a lexical item from the same declensional class (for example, ‘grandmother’ instead of ‘mother’ in example (3.16b)); omission of a lexical item that does not form a necessary part of the target structure (for example, omission of ‘in the kitchen’ in example (3.16c)), or any grammatically correct addition (for example, adding an adjective as in (3.16d)).
(3.16a) Examples of sentences in SOV word order: target

Po: Matk-a córk-ę karmila w kuchni.
mother-F.SG.NOM daughter-F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

Ru: Mam-a dočk-u kormila na kuchne.
mother-F.SG.NOM daughter-F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

(3.16b) Examples of sentences in SOV word order: permissible substitution

Po: Babci-a córk-ę karmila w kuchni.
grandmother-F.SG.NOM daughter-F.SG.ACC fed in kitchen
‘The grandmother fed the daughter in the kitchen.’

Ru: Babušk-a dočk-u kormila na kuchne.
grandmother-F.SG.NOM daughter-F.SG.ACC fed in kitchen
‘The grandmother fed the daughter in the kitchen.’

(3.16c) Examples of sentences in SOV word order: permissible omission

Po: Matk-a córk-ę karmila.
mother-F.SG.NOM daughter-F.SG.ACC fed
‘The mother fed the daughter.’

Ru: Mam-a dočk-u kormila.
mother-F.SG.NOM daughter-F.SG.ACC fed
‘The mother fed the daughter.’

(3.16d) Examples of sentences in SOV word order: permissible addition

Po: Matk-a starsz-ą córk-ę karmila w kuchni.
mother-F.SG.NOM eldest-F.SG.ACC daughter-F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

Ru: Mam-a staršuj-u dočk-u kormila na kuchne.
mother-F.SG.NOM eldest-F.SG.ACC daughter-F.SG.ACC fed in kitchen
‘The mother fed the daughter in the kitchen.’

On the other hand, some changes to the sentence lead to a zero score: for example, replacements of lexical items of another declensional class, so that there was a subject-verb agreement violation as between ‘father’ and ‘fed’ in example (3.17a); changes in word order lead to a different structure than the target structure (SOV
changed in SVO as in example (3.17b)); or omissions that lead to ungrammatical versions of the target structure as in (3.17c) where omitting the object leads to an ungrammatical sentence.

(3.17a) Examples of sentences in SOV word order: replacement leads to violation of target structure

Po: *Tatuś-ō córk-ę karmił-a w kuchni.
father-M.SG.NOM daughter-F.SG.ACC fed-PAST.F.3SG in kitchen 'The father fed the daughter in the kitchen.'

Ru: *Otec-ø doćk-u kormil-a na kuxne.
father-M.SG.NOM daughter-F.SG.ACC fed-PAST.F.3SG in kitchen 'The father fed the daughter in the kitchen.'

(3.17b) Examples of sentences in SOV word order: word order change leads to violation of target structure

Po: Matk-a karmila córk-ę w kuchni.
mother-F.SG.NOM fed daughter-F.SG.ACC in kitchen 'The mother fed the daughter in the kitchen.'

Ru: Mam-a kormila doćk-u na kuxne.
mother-F.SG.NOM fed daughter-F.SG.ACC in kitchen 'The mother fed the daughter in the kitchen.'

(3.17c) Examples of sentences in SOV word order: omission that leads to violation of target structure

Po: Matk-a karmila w kuchni.
mother-F.SG.NOM fed in kitchen 'The mother fed in the kitchen.'

Ru: Mam-a kormila na kuxne.
mother-F.SG.NOM fed in kitchen 'The mother fed in the kitchen.'

The language proficiency in Polish or Russian will be used in the analyses of the experimental tasks as a covariate. Language dominancy was measured based on the results of the Du-SRT and either the Po-SRT or Ru-SRT. If a child spoke both languages at an equal level, he/she was categorised as a balanced bilingual. This
categorisation was operationalised in terms of a maximum discrepancy between the two scores, i.e. the SRT scores could be maximally 30% apart. All other children were categorised as unbalanced bilinguals and according to the direction of the difference as either “Polish/Russian-dominant”, or “Dutch-dominant”. These labels express the relation between the two languages in the participants, and do not reflect their absolute scores. For a balanced bilingual, scores can be anywhere on the scale as long as the difference is not larger than 30%. By this definition, this means that unbalanced bilinguals must have an accuracy of at least 31% in their strongest language, and at maximally 69% in their weaker language.

The non-verbal memory task was coded automatically in E-prime, resulting in a binary score. For every picture in an item, if the correct location of the picture was chosen, it scored ‘1’, whereby the input of the participant on pattern recognition “which one is the odd-one-out?” was taken as the reference point for correct recall. An item was coded correct only if all pictures in that item were coded ‘1’. An item with any incorrect responses got a zero score. There were six levels of four items. When a child had more than two out of four items on a particular level incorrect, E-prime automatically terminated the task. The groups were compared on the average highest attained memory level. If the groups do not differ significantly on memory span, this measure will not be taken into account in the analyses of the experimental task (see Section 4.3).

3.6.3 Gender tasks

For the gender tasks, two measures were included in this study: gender and stress (for Russian), each of which has more than one value. Gender has three values: masculine, feminine and neuter; stress has two: items can be stem-stressed or end-stressed. For the comparison of Polish and Russian, only one measure is relevant: gender. The average accuracy over each of the values for gender is entered as a separate variable for the statistical analysis. For the analysis of the influence of stress on the Russian gender tasks, two measures are relevant: gender and stress (Table 3.8).

<table>
<thead>
<tr>
<th>Table 3.8 Measures for the gender tasks</th>
<th>Polish</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (three values: M, F, N)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stress (two values: stem-stressed, end-stressed)</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
To calculate their effect as well as the interaction between these measures, each combination of values was entered as a separate variable (e.g., the average score on the feminine end-stressed nouns was a variable as well as the average score on the neuter stem-stressed items).

For the gender production task all responses were coded following a codebook. If a participant did not respond to an item, that item was coded as ‘not answered’. If the child’s response did not contain the possessive pronoun ‘my’, or if the response included a non-target lexical item, the response was coded as ‘unanalysable’ (see section 3.3.1). If more than half of the responses from a participant on a certain variable was coded as ‘not answered’ or ‘unanalysable’, that variable or value of the variable was excluded from further analysis for that child. All analysable answers were coded as either correct ‘1’, or incorrect, ‘0’. For all incorrect items, the error type involving the substitution of one gender for another was determined (see Table 3.9: error types 1-6).

<table>
<thead>
<tr>
<th>Error type</th>
<th>Target</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenderError1</td>
<td>Masculine</td>
<td>Feminine</td>
</tr>
<tr>
<td>GenderError2</td>
<td>Masculine</td>
<td>Neuter</td>
</tr>
<tr>
<td>GenderError3</td>
<td>Feminine</td>
<td>Masculine</td>
</tr>
<tr>
<td>GenderError4</td>
<td>Feminine</td>
<td>Neuter</td>
</tr>
<tr>
<td>GenderError5</td>
<td>Neuter</td>
<td>Masculine</td>
</tr>
<tr>
<td>GenderError6</td>
<td>Neuter</td>
<td>Feminine</td>
</tr>
</tbody>
</table>

These error types will be used for a qualitative error analysis and for suggestions for further research (see Chapter 7). For each participant, the average score per gender for Polish and Russian, and for Russian the average score per stress type (percentage correct of analysable responses) was calculated (see Table 3.9). Language proficiency in Polish or Russian was taken into account in the analyses as covariate (see Section 4.2). In Section 5.1.3 the question as to whether the relevant background measures (see Section 4.1), language proficiency and age are good predictors for accuracy in gender production will be explored.

For the gender comprehension task, all coding was done automatically in E-prime. For items in which the child either did not respond or did not respond within the time available (10 seconds after the audio file finished), the response was coded as ‘not answered’ and was excluded from the analyses. If more than half
of the responses from a participant for a specific variable were coded as ‘not answered’, that variable was excluded from further analyses for that individual participant. All other responses were analysable. The selected picture was compared with the target item: a match was coded ‘1’, and a mismatch was coded ‘0’. Items that were coded zero were subsequently coded for error type in the same way as for the gender production task (see Table 3.8). As in the production task, the same error types will be used for a qualitative error analysis.

For each participant, the average score per gender for Polish and Russian, and the average score per stress type for Russian (percentage correct of analysable responses) were calculated. Language proficiency in Polish or Russian was taken into account in the analyses as a covariate (see Section 3.6.1 and Section 4.2). In Section 5.2.3 analyses will be done to consider whether the relevant background measures (see Section 4.1) as well as language proficiency and age are good predictors for accuracy in gender comprehension.

3.6.4 Case tasks
As in the gender tasks, the case production tasks involved the measures: gender and stress (for Russian), each of which had more than one value. Gender had three values: masculine, feminine and neuter; stress has two: stem stress and end stress. Moreover, for the case comprehension task, two more measures were relevant: case and word order. Both measures had two values: accusative and dative for case, and SVO and OVS for word order.

For the comparison of Polish and Russian in the case production tasks, within each case, the measure “gender” was relevant. For the analysis of the influence of stress for the Russian task, two measures were relevant: gender and stress. For each participant, the average score per gender (percentage correct of analysable responses) for Polish and Russian, and the average score per stress type per gender for Russian were calculated (see Table 3.10).

<table>
<thead>
<tr>
<th>Table 3.10 Measures for the case production tasks per language</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polish</strong></td>
</tr>
<tr>
<td>Gender (three values: M, F, N)</td>
</tr>
<tr>
<td>Stress (two values: stem-stressed, end-stressed)</td>
</tr>
</tbody>
</table>
To calculate their effect as well as the interaction between these measures, each combination of values was entered as a separate variable (e.g., the average score on all feminine end-stressed nouns is a variable as well as the average score on neuter stem-stressed items). For the case comprehension task, for the comparison of Polish and Russian three measures and the interaction between those measures were relevant: gender, case and word order. The average scores of all combinations of the values of these measures were entered as variables for the statistical analyses (e.g., the average accuracy on Dative_SVO_Masculine was a variable, as well as Accusative_OVS_Neuter). For the analysis of stress within Russian, all four measures were taken into account. The average accuracy for each of the combinations of the values of the four measures was entered as variable (e.g., Dative_OVS_Feminine_Stem-stressed).

For the case production tasks all responses of the participants were transcribed and coded. If a participant did not respond to an item, that item was coded as ‘not answered’. If the response did not contain the targeted syntactic structure (negation for the genitive production task and the verb ‘to see’ for the accusative production task), or if the response involved a non-target lexical item, it was coded as ‘unanalysable’. If more than half of the responses from a participant for a specific variable was coded as ‘not answered’, that variable was excluded from further analyses for that individual participant. All analysable responses were coded as either correct ‘1’, or incorrect, ‘0’. For all incorrect items, the error type was determined (Table 3.11: 1-9 for genitive production; 1-10 for accusative production). For example for the accusative production task, a masculine target item that was produced with the feminine {-u} ending in Russian was coded as AccError3. Those error types will be used for a qualitative error analysis.
Table 3.11 Error types for the genitive and the accusative production task

<table>
<thead>
<tr>
<th>Error type</th>
<th>Target</th>
<th>Genitive production</th>
<th>Error type</th>
<th>Target</th>
<th>Accusative production</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenError1</td>
<td>M</td>
<td>no ending</td>
<td>AccError1</td>
<td>M</td>
<td>no ending (on animates)</td>
</tr>
<tr>
<td>GenError2</td>
<td>M</td>
<td>{-i} (feminine)</td>
<td>AccError2</td>
<td>M</td>
<td>{-a} (on non-animates)</td>
</tr>
<tr>
<td>GenError3</td>
<td>M</td>
<td>other</td>
<td>AccError3</td>
<td>M</td>
<td>{-e}/{-u} (feminine)</td>
</tr>
<tr>
<td>GenError4</td>
<td>F</td>
<td>{-a} (F: nominative; M/N: genitive)</td>
<td>AccError4</td>
<td>M</td>
<td>other</td>
</tr>
<tr>
<td>GenError5</td>
<td>F</td>
<td>{-e}/ {-u}</td>
<td>AccError5</td>
<td>F</td>
<td>{-a} (F: nominative; M/N: genitive)</td>
</tr>
<tr>
<td>GenError6</td>
<td>F</td>
<td>other</td>
<td>AccError6</td>
<td>F</td>
<td>{-e} (feminine)</td>
</tr>
<tr>
<td>GenError7</td>
<td>N</td>
<td>{-o} (=nominative)</td>
<td>AccError7</td>
<td>F</td>
<td>other</td>
</tr>
<tr>
<td>GenError8</td>
<td>N</td>
<td>{-i} (feminine)</td>
<td>AccError8</td>
<td>N</td>
<td>{-a} (genitive)</td>
</tr>
<tr>
<td>GenError9</td>
<td>N</td>
<td>other</td>
<td>AccError9</td>
<td>N</td>
<td>{-e}/{-u} (feminine)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AccError10</td>
<td>N</td>
<td>other</td>
</tr>
</tbody>
</table>

*{-e} is Polish accusative feminine; {-u} is Russian accusative feminine.

For each participant, the average score per gender (percentage correct of analysable responses) for Polish and Russian, and the average score per stress type for Russian were calculated. Again, language proficiency was taken into account as a covariate (see Section 3.6.1). Furthermore, in Sections 6.1.3 and 6.2.3 the relevant background measures (see Section 4.1), language proficiency and age will be examined as to whether they are good predictors for accuracy in the case production tasks.

For the case comprehension task, all coding was done automatically in E-prime. For items in which the child did not respond or not within the time available (10 seconds after the audio file finished), the response was coded as ‘not answered’ and was excluded from the analyses. All other answers were analysable. If more than half of the responses from a participant for a specific variable were coded as ‘not answered’, that variable was excluded from further analyses for that individual participant. The picture selected was compared with the target item: a match was coded ‘1’, and a mismatch was coded ‘0’. For each participant, the average score per gender (percentage correct of analysable responses) for Polish and Russian, and the average score per stress type for Russian were calculated. In addition to the variables used in the production tasks, the case comprehension task included two more variables: case and word order. The total number of combinations of variables used for comparison was therefore larger (see Table 3.12). Language proficiency was taken into account as a covariate (see Section
Finally, in Section 6.3.3 the relevant background measures (see Section 4.1), language proficiency and age will again be studied to determine whether they are good predictors for accuracy on the case comprehension task.

Table 3.12 Measures for the case comprehension task per language

<table>
<thead>
<tr>
<th>Measure</th>
<th>Polish</th>
<th>Russian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (three values: M, F, N)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Case (two values: dative, accusative)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Word order (two values: SVO, OVS)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Stress (two values: stem-stressed, end-stressed)</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

3.6.5 Production/comprehension asymmetries

This study will consider both production and comprehension of gender and case. Many studies have reported asymmetries between language production and comprehension (e.g., Chapman & Miller, 1975; Chapman, 1978; Rice, 1984; Gagarina, 2011; Verhagen & Blom, 2014). As is argued in Hendriks and Koster (2010), there are several reasons why comprehension and production tasks have yielded different results. First, asymmetries can be an experimental artefact (Hendriks & Koster, 2010: 1890). For instance, in Brandt-Kobele and Höhle (2010), it is argued that the task demands of production and comprehension are different and have to be accounted for when interpreting comprehension-production asymmetries. Second, asymmetries can be the result of a lack of pragmatic knowledge; although children may have acquired all the grammar of their language, they may not have acquired all pragmatic contexts (Hendriks & Koster, 2010: 1891). Third, asymmetries may result from a lack of metalinguistic awareness or cognitive limitations; although children may have acquired all grammatical features of their language, they may be unable to apply those grammatical rules due to cognitive limitations (Hendriks & Koster, 2010: 1892). Fourth, in production and comprehension different learner strategies are applied (Keenan & McWhinney, 1987).

Although this study will test the production and comprehension of gender and case, gender and case production and comprehension will not be compared statistically, since the tasks in this study were not specifically designed to tap into these asymmetries. Therefore, by no means it can be concluded that the
production and comprehension were equally difficult or that they involved executive functions to the same extent.24

3.6.6 Statistics, data sets and missing data
The adult data set was transcribed and coded. All adults scored at ceiling (above 90%) on all production tasks as well as on the comprehension tasks. If there was an item on which the adults as a group did not perform at or above 90%, that item was deleted. This applied to three items for the Polish comprehension tasks, and to five items for the Russian comprehension tasks. No items of the production tasks had to be removed.

As set out in Sections 3.1.1 and 3.1.2, the data from the 40 MoPo, 41 MoRu, 38 BiPo and 39 BiRu child participants were defined as the data set (Table 3.13). A data subset was defined as the data of a participant on a certain task. Within each subset, there were several variables (see Section 3.6.1-3.6.2). Each variable was made up of several items.

The maximum number of data subsets across the various tasks would be 1341 (158 participants * 8 measures + 77 bilinguals on the Du-SRT). Of those, 19 were missing (1.4%). Most of the missing data sets were from the Russian participants. This was mainly because of a temporarily malfunctioning notebook and planning problems due to illness of several participants.25 See Table 3.13 for all data sets included in this study.

| Table 3.13 Number of participants per task per group |
|---------------------------------|---|---|---|---|
|                                | MoPo | MoRu | BiPo | BiRu |
| Total (max)                    | 40   | 41   | 38   | 39   |
| Language Background Questionnaire | 40   | 41   | 37   | 39   |
| SRT (Polish/Russian)           | 40   | 41   | 38   | 38   |
| SRT Dutch                      | -    | -    | 38   | 39   |
| OOU                             | 38   | 39   | 37   | 37   |
| Gender production              | 40   | 41   | 38   | 39   |
| Gender comprehension           | 40   | 38   | 38   | 36   |
| Genitive production            | 40   | 41   | 38   | 39   |
| Accusative production          | 40   | 40   | 38   | 38   |
| Case comprehension             | 39   | 38   | 38   | 37   |

25 As mentioned in Section 3.1, an exclusion criterion for participation in this study was missing three or more linguistic tasks (missing data on the memory task did not count for missing data). The missing data reported in Table 3.13 is from children who missed less than three linguistic tasks.
Missing or unanalysable data points within a data subset were found across groups. In the description of the results of every task, the number of children who did not complete the task will be mentioned. If the number of analysable items of a participant on a specific task or variable was less than 50%, that task or variable was not taken into consideration for analysis for that individual. The participant remained in the study, however, and his/her results on other tasks/variables were taken into account.

After all data was entered in SPSS, the normality of each variable was determined. The nature of the groups under investigation made it unlikely that the data would be normally distributed: especially on the production tasks, the monolinguals were expected to perform at ceiling (see Section 2.4). The bilingual groups were not expected to perform at ceiling (although, within the bilingual groups individual participants might perform at ceiling). Since the variation in bilingual scores was expected to be large (from floor to ceiling), data transformations were not possible. Reliability analyses were performed on the scale of each task for each language: for each task the Cronbach’s alpha is reported for Polish and for Russian separately.

In order to test the research hypotheses (see Section 2.4), different statistical procedures were determined. If the data required it, testing was done non-parametrically with a Mann-Whitney U test for independent samples to compare groups on conditions, and with a Friedman test for related samples repeated measures within groups were tested. A Wilcoxon signed-ranks test for Post hoc comparisons was used after a significant difference on the variables of the Friedman test was found. The \( p \)-value was set at .05. Bonferroni adjustments were made where necessary. Exploring main effects and interaction effects with designs with between-subject and within-subjects measures was, however, not possible non-parametrically. Moreover, in non-parametric tests, covariates cannot be controlled for, and effect sizes cannot be calculated. Even if the data were non-normally distributed, all data were analysed with parametric tests in an exploratory data analysis, while therefore acknowledging that observed significant differences between groups might be based on overestimations of the variance (relevant for ceiling effect).
In order to test the dependent measures of the gender tasks as well as the case production tasks, the data were analysed with repeated measures ANOVAs with gender as within-subject factor, and group, language (Polish vs. Russian) and/or bilingual status (monolingual vs. bilinguals) as between-subject factors, and with LP, age, and AoO of Dutch (for bilinguals) as covariates. For the Russian stress condition, two-way mixed factorial ANOVAs were performed with gender and stress as within-subjects effects, and bilingual status as between-subject factor, with language proficiency, age and AoO of Dutch (for the bilinguals) as covariates.

To test case comprehension, three-way (3x2x2) mixed factorial ANOVAs were performed with gender, case and word order as within-subject factors, and with group, language (Polish vs. Russian) or bilingual status (monolingual vs. bilinguals) as between-subject factors, and with language proficiency, age and AoO of Dutch as covariates. For the Russian case comprehension task, four-way (3x2x2x2) mixed factorial ANOVAs were performed with gender, stress, case and word order as within-subject factors, and with bilingual status (monolingual vs. bilinguals) as between-subject factor, and with LP age and AoO of Dutch as covariates.

Post hoc comparisons were conducted with Sidak tests where variances were equal because group sizes were not identical, and the Games-Howel test where variances were not equal and equality of group size was not assumed. The p-value was set at .05. Bonferroni adjustments were made where necessary.

Ideally a three-way comparison between Polish, Russian stem-stressed and Russian end-stressed should be made. Such a comparison is not possible, however, since for Russian it would require a repeated measures design. The comparison between Polish and Russian is a factorial design. If for Russian two groups of children had been recruited and one of those groups had had only stem-stressed items, and the other group only end-stressed items, such a comparison would have been possible. However, this would have confronted children with a highly unnatural set of items. Furthermore, the unstressed condition would lead to many non-interpretable responses (see Section 2.4). Another possibility would be to look at the stem-stressed items in half of the Russian participants, and at the end-stressed items in the other half of the participants. Unfortunately, there were too
few items and too many missing data points to perform such an analysis. Therefore, the Polish, Russian stem-stressed and Russian end-stressed were compared pairwise in an explorative analysis.

Finally, to check to what extent the accuracy on the dependent measures could be predicted by the independent variables, multiple linear regression analyses were carried out. In all regression tables, B and SE B as well as $\beta$ (standardised b) will be reported. For the monolingual groups, the independent variables entered as predictors in the regression analyses were age and language proficiency in Polish/Russian. For the bilingual groups, age, language proficiency in each of the two languages, AoO, LoE, AoI, and dominancy were entered as predictors in the regression analyses.\footnote{For the measure language (Polish vs. Russian), Polish was coded ‘1’, and Russian ‘2’; for the measure bilingual mode (monolingual vs. bilingual), monolingual was coded ‘1’ and bilingual ‘2’.
} Furthermore, for the bilingual groups, dominancy will be discussed separately for each task. Although it would be interesting to check the product terms of the dummy variables with especially the predictor variable ‘language’, this could not be done due to the small group sizes in the Polish and Russian dominancy groups.
CHAPTER 4
RESULTS BACKGROUND MEASURES

This chapter presents the results of the analysis of the background measures as described in Section 3.2. Information about both the monolingual and bilingual children obtained via the language background questionnaire will be presented in Section 4.1. The results of the language proficiency tests for Polish, Russian, and Dutch (for bilinguals) will be set out in Section 4.2; language dominancy for bilinguals will be taken into account in that discussion. The results of the non-verbal memory task will be discussed in Section 4.3. Per task, the actual number of participants that had provided enough responses to analyse that task (see Section 3.6.5) will be reported.

Language proficiency in Polish/Russian as well as background measures that are predictors of language proficiency will be used as covariates in the analyses of the gender tasks (Chapter 5) and the case tasks (Chapter 6).

4.1 Language background questionnaire
The results of the language background questionnaire (Section 3.2.1) for monolinguals will be introduced in Section 4.1.1, those for bilinguals in Section 4.1.2.

4.1.1 Monolinguals
All questionnaires were returned, most often filled in by the mother. Some parents, however, did not fill out the entire questionnaire. The questionnaire provided information on age and gender (see Table 4.1).
Table 4.1 Background information on age and gender in the participants per group

<table>
<thead>
<tr>
<th></th>
<th>MoPo* (n=40)</th>
<th>MoRu (n=41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>21 boys</td>
<td>22 boys</td>
</tr>
<tr>
<td></td>
<td>19 girls</td>
<td>19 girls</td>
</tr>
<tr>
<td>Age (months)</td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td></td>
<td>60.84 (9.34)</td>
<td>56.76 (8.26)</td>
</tr>
<tr>
<td>Range</td>
<td>44-78</td>
<td>41-78</td>
</tr>
</tbody>
</table>

*MoPo=monolingual Polish participants; MoRu=monolingual Russian participants.

A series of one way ANOVAs showed that there was no significant difference in age between the two groups of monolingual children ($F(3,154)=6.416, p<.001$). A Sidak Post hoc also showed that the two monolingual groups did not differ significantly in age ($p=.079$) nor in the ratio boys/girls ($F(3,154)=2.254, p=.084$). The monolingual groups turned out to be highly comparable.

Table 4.2 Percentage of parents of monolingual children with a high education level

<table>
<thead>
<tr>
<th></th>
<th>MoPo (n=40)</th>
<th>MoRu (n=41)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers’ education=high</td>
<td>79%</td>
<td>83%</td>
</tr>
<tr>
<td>Fathers’ education=high</td>
<td>57%</td>
<td>63%</td>
</tr>
<tr>
<td>Mothers’ &amp; fathers’ education=high</td>
<td>82%</td>
<td>88%</td>
</tr>
</tbody>
</table>

All parents of the Polish participants were monolingual speakers of Polish and were born in Poland. All parents of the Russian participants were born in the USSR and were monolingual speakers of Russian (or Russian-dominant bilinguals). For both groups, fewer fathers than mothers were highly educated (see Table 4.2). No significant differences were found in the educational background of the parents comparing the Polish and the Russian monolingual groups (i.e. high-educated mothers ($F(1,77)=.403, p=.527$), fathers ($F(1,75)=.258, p=.613$), and mothers and fathers combined ($F(1,77)=.446, p=5.06$)). The groups are thus comparable in terms of parental education. Parental education will not be taken into account as a variable when comparing the monolinguals on gender and case proficiency as measured in Chapters 5 and 6.
4.1.2 Bilinguals

For the Polish-Dutch participants all but one questionnaire were filled out and returned; for the Russian-Dutch participants all were returned. The parent that spoke Russian or Polish filled in the questionnaire. Some parents did not fill out the entire questionnaire.

The questionnaire confirmed that all Polish-Dutch and Russian-Dutch participants were bilinguals and exposed to Polish or Russian from birth onwards (AoO=0 months). For all bilingual participants, the LoE to Polish or Russian is the same as their age. Exposure to Dutch had started at the latest at 3;1 years old (see Section 3.1.2). See Table 4.3 for the age, the AoO of Dutch, the LoE to Dutch, and gender distribution for the bilingual participants.

Table 4.3 Background information on the participants per group on gender, age, AoO and LoE to Dutch: bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo (n=38)</th>
<th>BiRu (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>boys</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>girls</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>Age (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>64.32</td>
<td>61.08</td>
</tr>
<tr>
<td>(SD)</td>
<td>(7.77)</td>
<td>(7.71)</td>
</tr>
<tr>
<td>Range</td>
<td>47-78</td>
<td>48-77</td>
</tr>
<tr>
<td>AoO of Dutch (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>7.24</td>
<td>7.05</td>
</tr>
<tr>
<td>(SD)</td>
<td>(10.07)</td>
<td>(11.11)</td>
</tr>
<tr>
<td>Range</td>
<td>0-37</td>
<td>0-36</td>
</tr>
<tr>
<td>LoE to Dutch (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>57.08</td>
<td>54.03</td>
</tr>
<tr>
<td>(SD)</td>
<td>(12.04)</td>
<td>(12.96)</td>
</tr>
<tr>
<td>Range</td>
<td>31-74</td>
<td>26-77</td>
</tr>
</tbody>
</table>

*BiPo=Polish-Dutch participants; BiRu=Russian-Dutch participants.

A series of one-way ANOVAs showed that, as in the monolingual groups, there was no significant difference in age between the bilingual groups ($F(3,154)=6.416$, $p<.001$); a Sidak Post hoc also showed that the two bilingual groups did not differ significantly in age ($p=.422$)). There was also no significant difference between

---

1 For one participant an AoO of Russian of 24 months was reported. This is probably a mistake. However, even if it were true and the child was exposed to Russian only from 24 months onwards, the LoE of this child was 32 months for Russian at the age of testing. The minimum requirement of LoE to each of the languages was still met.
the groups in the ratio boys/girls ($F(3,154)=2.254$, $p=.084$). Furthermore, the groups did not differ significantly on AoO of Dutch ($F(1,75)=.006$, $p=.939$) or on LoE to Dutch ($F(1,75)=1.146$, $p=.228$). Moreover, a Pearson Correlation test showed that in both bilingual groups AoO of Dutch and LoE were highly correlated (BiPo: ($r(38)=.767$, $p<.001$) and BiRu: ($r(39)=.806$, $p<.001$)).

Furthermore, the parents of Polish-Dutch and Russian-Dutch children provided information on which language(s) their child had been exposed to at home, how much their child was exposed to Polish/Russian on a daily basis compared to Dutch (amount of input (AoI)), and which language their child preferred speaking (see Table 4.4). The measure for AoI was estimated on the basis of the question “until age 3;0, how often did your child hear the following languages?”, since other questions targeting the AoI were filled out inconsistently. The preferred language of the child was based on what the parents thought the preferred language of the child was at the time of filling in the questionnaire.

Table 4.4 Background information on the participants per group on AoI and preferred language: bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo (n=38)</th>
<th>BiRu (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AoI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polish/Russian</td>
<td>57%</td>
<td>53%</td>
</tr>
<tr>
<td>Dutch</td>
<td>43%</td>
<td>47%</td>
</tr>
<tr>
<td>Preferred language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Po/Ru</td>
<td>9 (25%)</td>
<td>9 (26%)</td>
</tr>
<tr>
<td>Po/Ru &amp; Du:</td>
<td>9 (25%)</td>
<td>15 (38.5%)</td>
</tr>
<tr>
<td>Dutch:</td>
<td>18 (50%)</td>
<td>15 (38.5%)</td>
</tr>
</tbody>
</table>

No significant differences between the groups were observed between the AoI in Polish/Russian ($F(1,75)=.917$, $p=.341$). There were also no significant differences between the distributions of preferred languages between the two bilingual groups ($F(1,73)=1.560$, $p=.216$), see Table 4.4.

The groups did however differ on the relative amount of formal education they had received in Polish and Russian. A large majority in each of the bilingual groups had at least some formal education at weekend schools for Polish or Russian and had attended Dutch schools. There is a difference, however, in the frequency of this direct instruction, since most of the Polish schools in the Netherlands have only two school days per month, whereas most of the Russian
schools have four. Thus, on average, the Polish-Dutch children in this study have had less formal education in Polish than the Russian-Dutch children in Russian.²

<table>
<thead>
<tr>
<th></th>
<th>BiPo (n=38)</th>
<th>BiRu (n=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers’ education=high</td>
<td>63%</td>
<td>95%</td>
</tr>
<tr>
<td>Fathers’ education=high</td>
<td>50%</td>
<td>84%</td>
</tr>
<tr>
<td>Mothers’ &amp; fathers’ education=high</td>
<td>68%</td>
<td>95%</td>
</tr>
</tbody>
</table>

Table 4.5 Percentage of parents of bilingual children with a high education level

As reported in Section 3.1.1, every attempt was made to create groups that were comparable with respect to socio-economic status (SES) on the basis of the educational level of each of the parents. Although the monolingual groups were similar, there was a difference between the bilingual groups. The parents of the bilingual Polish children had diverse educational backgrounds, whereas the parents of the bilingual Russian children were mostly highly educated (an indication of a high SES) (see Table 4.5). Fewer fathers than mothers were highly educated in both bilingual groups. Significantly more parents of the Russian-Dutch children were highly educated than of the Polish-Dutch children (mothers education: \( F(1,74)=14.182, \ p<.001 \), fathers education \( F(1,71)=10.077, \ p=.002 \), mothers and fathers education combined \( F(1,75)=10.469, \ p=.002 \).

Parental education has been shown to be a relevant factor for vocabulary development (see Section 2.3). The language proficiency tasks are partially dependent on vocabulary size; therefore, the correlation between parental education and language proficiency in Polish/Russian and Dutch will be determined in Section 4.2.3. The experimental tasks in Chapter 5 and 6, however, involve grammatical measures, which should be less sensitive to differences in parental educational level. Therefore, regardless of the fact that the groups differ on parental educational level, it will not be used as covariate in the analyses nor as predictor in the regression analyses in Chapters 5 and 6 (see Section 4.2.3).

² Since the children in this study are pre-school age, the effect of reading and writing instruction in either language is presumed to be nihil.
In Section 4.2.3, all relevant language background measures as presented in Section 4.1.2, will be correlated with the language proficiency for the bilingual groups.

4.2 Language proficiency in Polish, Russian and Dutch

This section deals with the language proficiency as measured by the sentence repetition tasks (SRTs) in Polish, Russian and Dutch (see Section 3.2.2). This section is divided into three further sub-sections: Section 4.2.1 will present the results of the monolinguals on the Polish and the Russian SRT, Section 4.2.2 will set out the results of the bilingual participants on the Polish and Russian as well as on the Dutch SRTs. Section 4.2.3 will discuss language dominancy within the bilinguals, taking into account measures on input as reported in Section 4.1.2.

As discussed in Sections 3.1 and 3.1.2, one of the aims of including the three SRTs in this study was to provide a measure for language proficiency to be taken into account as a covariate for further analysis of the experimental tasks in Chapters 5 and 6. Although the SRT tasks in Polish and Russian targeted twelve different structures (see Section 3.2.2), only the total scores will be reported here and only the total scores will be taken into consideration for further analyses in Chapters 5 and 6 as covariates.3

The SRTs for Polish, Russian and Dutch were checked with an item-analysis and turned out to have a good internal reliability (for Polish: $\alpha=.884$; for Russian: $\alpha=.923$; for Dutch: $\alpha=.950$). No outliers in items were observed; all items were therefore included in the analysis. Moreover, as an extra check as to whether the test was well designed, it was administered to adult monolingual speakers. Native speakers were expected to be able to score at ceiling, and this was the case. In this study, scores of 90% and higher are considered ceiling scores (see Section 3.6.6). Floor scores are scores of 10% or lower.

---

3 Janssen & Peeters-Podgaevskaja (in prep) deals with the SRTs in much more detail, discussing also the relation between overall language proficiency and target structures.
4.2.1 Monolinguals

All 40 monolingual Polish children and all 41 monolingual Russian children (as reported in Section 3.6.5) completed the SRT in Polish and Russian respectively. The maximum number of analysable items was 1920 for Polish and 1968 for Russian (see Section 3.2.2). Of those, 3.6% of the responses from the Polish participants were not analysable. Of the Russian participants, this was 2.6%. All other items were scored as correct ‘1’ or incorrect ‘0’. The results in terms of accuracy (correct target repetition based on all 48 items) for monolingual participants are set out in Table 4.6.

<table>
<thead>
<tr>
<th></th>
<th>MoPo ((n=40))</th>
<th>MoRu ((n=41))</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>(SD)</td>
<td>(14)</td>
<td>(11)</td>
</tr>
<tr>
<td>range</td>
<td>52-100</td>
<td>57-100</td>
</tr>
</tbody>
</table>

A substantial number of the monolingual participants (Polish: \(n=20\); Russian: \(n=16\)) scored at ceiling (above 90%) on the SRT in Polish and Russian respectively. A Pearson Correlation test revealed that, for both monolingual groups, there was a weak but significant correlation between age and accuracy on the SRT (for Polish: \(r=0.434, p=0.005\); for Russian, \(r=0.345, p=0.027\)). For the analyses in Chapters 5 and 6, age has therefore to be taken into account as a covariate alongside language proficiency. See Figure 4.1 for the accuracy on the SRT of the monolinguals for both languages plotted against age (in months). Each symbol represents a participant.
As mentioned in Section 3.2.2, although the Polish and the Russian versions of the SRT were parallel and considerable care was taken in their design, no statistical comparisons between the tasks in the two languages can be made as not all aspects could be controlled for. However, the fact that both monolingual groups scored identically on target sentence repetition is a good indication of their comparability. In the following section, the results of the Polish monolingual children will be compared statistically with the Polish-Dutch bilingual children, and the Russian monolingual children with the Russian-Dutch bilinguals.

4.2.2 Bilinguals: Polish, Russian and Dutch
The SRTs for Polish and Russian were completed by 38 Polish-Dutch and 38 Russian-Dutch children respectively. One Russian-Dutch child did not take the task for organisational reasons. The data of two Polish-Dutch children could not be included in the analysis because they had missing responses for more than half of the task; the number of BiPo participants reported in Table 4.6 is thus 36. The maximum number of analysable items for both Polish and Russian was 1824 (see Section 3.2.2). Of those responses, 8.8% from the Polish participants had to be disregarded. For the Russian participants, this was 4.7%. The bilingual Russian participants, if they were unable to repeat the sentence, repeated one word of the sentence (and as a result got a zero score for that item), whereas the Polish-Dutch children did no reply at all (and got a missing response), hence the difference in
percentages. The results in terms of accuracy for bilingual participants are set out in Table 4.7.

Table 4.7 Percentage accuracy on Po-SRT and Ru-SRT (mean, standard deviation, range): bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo (n=36)</th>
<th>BiRu (n=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>53</td>
<td>50</td>
</tr>
<tr>
<td>(SD)</td>
<td>(32)</td>
<td>(28)</td>
</tr>
<tr>
<td>range</td>
<td>00-100</td>
<td>00-98</td>
</tr>
</tbody>
</table>

As expected, compared to the monolinguals (see Table 4.6), the Polish-Dutch and Russian-Dutch bilinguals performed worse on the SRT. A one-way ANOVA test confirmed this observation: Polish: \(F(1,74)=31.574, p<.001\), Russian: \(F(1,77)=53.252, p<.001\). As expected, for the bilingual groups, the range and standard deviation are much larger than for monolingual groups (see also Table 4.6). Unlike the monolingual groups, there is no significant correlation between age and performance on the SRT tasks for the bilinguals (Polish: \(r=.062, p=.719\); Russian: \(r=.018, p=.916\), compare Figures 4.1 and 4.2).

Figure 4.2 The relationship between accuracy of bilinguals on Po-SRT (left) and Ru-SRT (right) and age

Six bilingual participants scored at ceiling (Polish: n=5; Russian: n=1), far fewer than the monolinguals (Polish: n=20; Russian: n=16), and 12 bilingual
participants scored at floor level (Polish: n=6; Russian: n=6). In Figure 4.3, the accuracy of the bilingual groups is compared with the monolinguals.

![Box plot showing accuracy on Po-SRT and Ru-SRT in monolinguals and bilinguals](image)

**Figure 4.3** Accuracy on Po-SRT and Ru-SRT in monolinguals and bilinguals

From visual inspection of Figure 4.3, it becomes clear that roughly half of the participants of each of the bilingual groups scored within the monolingual range, and the other half scored below the monolingual range. As already mentioned, the variation within the bilingual groups was much larger than the variation in the monolingual groups.

As discussed in Section 3.2.2, language proficiency in Dutch was measured with the Du-SRT and completed by 38 Polish-Dutch and 39 Russian-Dutch children. The data of one Polish-Dutch child and two Russian-Dutch participants were excluded from the analysis on the ground of having too few analysable items. The number of participants taken into account for analysis was therefore 37 for Polish, and 37 for Russian. The maximum number of analysable items was 5520 (see Section 3.2.2). Of those, 6% of the responses had to be disregarded (334 missing responses and 2 unanalysable items). See Table 4.8 for accuracy on the Du-SRT.
Table 4.8 Accuracy on Du-SRT (mean, standard deviation, range): bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo (n=37)</th>
<th>BiRu (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>.58</td>
<td>.58</td>
</tr>
<tr>
<td>(SD)</td>
<td>(.28)</td>
<td>(.25)</td>
</tr>
<tr>
<td>range</td>
<td>.00-.94</td>
<td>.04-1.0</td>
</tr>
</tbody>
</table>

No significant differences on the Du-SRT were observed between the two groups ($F(1,72) = .004, p = .948$). Eight participants scored at ceiling (Polish: $n=5$; Russian: $n=3$), and five at floor (Polish: $n=3$; Russian: $n=2$). Thus, the bilingual groups have a very comparable level of Dutch. Below, Figure 4.4 shows the results of the scores (mean accuracy) of the Du-SRT plotted against age.

![Figure 4.4](image)

Figure 4.4 The relationship between accuracy of Polish-Dutch (left) and Russian-Dutch (right) bilinguals on Du-SRT and age

Visual inspection of Figure 4.4 suggests a correlation between accuracy on the Du-SRT and age, which is confirmed by a Pearson Correlation test (for Polish, $r = .573, p < .001$; for Russian, $r = .429, p = .008$).

4.2.3 Language dominancy and input related measures in bilinguals

In order to determine the language dominancy of each participant, it is necessary to compare the performance of the bilinguals on the SRT in Polish/Russian with their performance in Dutch, as discussed in Section 3.2.2. Each participant was placed in one of three dominancy groups. See Figure 4.5 for the scores of the
bilinguals on the SRTs (in Polish and Russian) plotted onto their scores on the Du-SRT, and divided into three dominancy groups.

![Graph](image-url)

**Figure 4.5** Polish-Dutch (left) and Russian-Dutch (right) children’s accuracy on the SRT in their two languages: divided into three language dominancy groups

The distribution of bilinguals over dominancy groups is presented in Table 4.9.

<table>
<thead>
<tr>
<th>Dominancy groups in the two bilingual groups</th>
<th>Balanced bilingual (n)</th>
<th>Polish/Russian dominant (n)</th>
<th>Dutch dominant (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BiPo (n=38)</td>
<td>19</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>BiRu (n=37)</td>
<td>19</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

As the data in Table 4.9 shows the majority of the participants in both groups were balanced bilinguals. A statistical analysis revealed no significant differences between groups on their distribution over dominancy groups. For the BiPo group, there was surprisingly no significant correlation between the dominancy groups and the preferred language of the child ($r=.314$, $p=.062$), as indicated in the questionnaire responses (Section 4.1.2). Many parents overestimated the preference for Dutch of their child. For the BiRu group, on the other hand, there was a significant correlation between the dominancy as predicted by the language proficiency tasks and the preferred language of the child ($r=.505$, $p=.001$).

---

4 For those bilinguals for whom one of the two SRTs – or part of the SRTs – was missing, parental rating for both languages as well as the reported preferred language were used to determine their dominancy (for Polish: n=5; for Russian: n=3).
Language dominancy will be further discussed in relation to the results in Chapters 5 and 6.

The correlation between input related factors (as introduced in Section 4.1) and language proficiency (as measured by the SRTs) is relevant for later regression analyses, as predictor variables cannot have a too high correlation. First, the correlation between the input related measures and language proficiency in Polish/Russian was determined for AoI (percentage in Polish/Russian), AoO Dutch, LoE Dutch, and parental education.

To check if there is a correlation between language proficiency in Polish/Russian and several input related measures, Pearson Correlation tests were performed. For the bilinguals, Pearson Correlation tests showed that there were significant correlations between the SRT scores on Polish/Russian and AoO of Dutch (for BiPo, $r=.558, p<.001$; for BiRu, $r=.379, p=.019$). Furthermore, the accuracy on the Dutch SRT significantly correlated with LoE to Dutch for the Polish bilinguals, $r=-.430, p=.00$, but not for the Russian bilinguals, $r=-.313, p=.055$. There was a highly significant correlation between AoO of Dutch and LoE to Dutch, $r=.781, p<.001$. Therefore, only AoO will be used in Chapters 5 and 6.

For all participants, the accuracy on the Polish/Russian SRT and age will be used to predict the accuracy on the dependent variables in Chapters 5 and 6. In addition to that, for the bilinguals, AoO of Dutch, AoI in Polish/Russian, and dominancy group will be considered.

### 4.3 Results non-verbal memory task

The non-verbal memory task was administered to 38 monolingual Polish, 39 monolingual Russian, 37 bilingual Polish-Dutch, and 36 Russian-Dutch children. Due to technical problems, some children did not take part in this task. It was argued that, if one group was significantly better on non-verbal memory, that group could have an advantage in repeating sentences in the SRTs, which would influence the language proficiency scores. If that is the case, non-verbal memory variable would have to be included in further analyses as a covariate. Accuracy in terms of maximum memory span for all groups is presented in Table 4.10.
On the basis of the maximum memory span (i.e., how many rows of odd-one-outs could a participant remember) a one-way ANOVA showed significant differences between groups ($F(3,146)=3.754, p=.012$); a Post hoc comparison using a Sidak test showed that Russian-Dutch bilinguals significantly outperformed the Polish monolingual group. However, this is mainly due to two outliers in the bilingual Russian-Dutch group that obtained an exceptionally high score on maximum memory span (i.e., a memory span of 4 and 5 respectively). If those two participants are excluded (BiRu: $M=2.00; SD=.55$), no significant difference remains between the groups ($F(3,144)=2.119, p=.100$). The results of the non-verbal memory task are therefore not taken into account in further analyses.

As expected, for both monolingual groups, there was a weak significant correlation between age and maximum memory span (for Polish: $r=.374, p=.021$; for Russian: $r=.331, p=.040$). Contrary to expectations, no such correlation was found for the bilinguals (for Polish-Dutch bilinguals: $r=.141, p=.501$; for Russian-Dutch bilinguals: $r=.216, p=.205$). This might be due to the fact that the age range was slightly larger for monolinguals (towards the young end) than for bilinguals. In none of the groups did non-verbal memory correlate with language proficiency.

### 4.4 Summary

This chapter has described the results of the background measures. It was found that the monolingual groups were very comparable in terms of age, gender and parental education. The bilingual groups were highly comparable in terms of age, gender, AoO and LoE to Dutch, and AoI. The bilingual groups were comparable in distribution over dominancy groups and in preferred language of the children.

---

5 BiRu44 (max memory=5) and BiRu17 (max memory=4) did not perform exceptionally high on the SRTs.
The educational background of the parents of the bilingual groups differed. In monolinguals, language proficiency correlated with age. In the bilingual groups, there was no correlation with age on the proficiency in Polish and Russian, but there was a correlation with age for the Du-SRT.

The following measures will be taken into account as covariates in the analyses in Chapters 5 and 6: language proficiency in Polish or Russian and age for all participants; language proficiency in Dutch, AoO of Dutch, AoI in Polish-Russian and dominancy group for the bilinguals. The scores on the dependent variables will also be displayed for each of the dominancy groups in order to check if those who are Dutch-dominant have more problems with case and gender than those who are balanced bilinguals or Polish/Russian dominant as expected.
CHAPTER 5
RESULTS GENDER TASKS

The aim of this chapter is to examine the main research question with respect to the acquisition of the gender system, that is whether this differs between Polish and Russian monolingual children, and bilingual Polish-Dutch and Russian-Dutch children growing up in the Netherlands (see Section 2.3). The results of the gender production task and the gender comprehension task will be presented and discussed separately (Sections 5.1 and 5.2). Sections 5.1.2 and 5.2.2 will also explore the relation between gender acquisition and background measures: language dominancy, the age of onset of Dutch (AoO), and the amount of input (AoI) in each of the languages involved (as described in Chapter 4). Finally, Section 5.3 will summarise the main results.

5.1 Results gender production task

In Section 5.1.1, the results of the monolingual participants on gender production will be introduced, followed by the results of the bilingual participants in Section 5.1.2. The relation between performance on the gender production task and language measures, AoO and AoI for the bilingual participants will also be examined in Section 5.1.2. Language dominancy as measured by the sentence repetition tasks (SRTs) will be explored here.

In Section 2.4, it was argued on the basis of the literature that Polish monolingual children should be quicker in acquiring the gender system than Russian monolingual children. However, this acquisition occurs early (see Section 2.3), it will not be possible to observe any differences between the Polish and Russian monolinguals since the participants in this study were older (between 4-6 years old). Differences between the two groups of bilingual participants are expected: the Polish-Dutch children should show a higher accuracy in using the gender system than the Russian-Dutch children (see Section 2.4). Furthermore, it was hypothesised that an early AoO of Dutch, and a small AoI to Polish and
Russian would negatively influence the children’s ability to produce gender inflections. Moreover, Russian-Dutch children with an early AoO of Dutch and a small AoI to Russian were predicted to have an enhanced/combined negative effect of AoO and Russian compared to early AoO of Dutch and Polish. The role of dominancy is explored as well; especially the relation between Dutch-dominant children and gender morphology will be elaborated upon.

The gender production tasks for both Polish and Russian were checked with an item-analysis and turned out to have a good internal reliability (for Polish: $\alpha=.925$, for Russian: $\alpha=.933$). No outliers in items were observed; all items were therefore included in the analysis. Moreover, as an extra check to verify if the test was constructed well, it was administered to adult monolingual speakers. Native speakers were expected to be able to score at ceiling, and this was the case (accuracy: 100% in both adult groups).

5.1.1 Results gender production task: monolinguals
All 40 monolingual Polish children and all 41 monolingual Russian children completed the gender production task. The maximum number of analysable items was 960 for Polish and 1476 for Russian (see Section 3.3.1). Of those, 2% of the responses from the Polish participants had to be disregarded (zero missing responses, 20 unanalysable items). For the Russian participants, this was 6% (23 items were not responded to and 72 items were unanalysable). All other items were scored as correct ‘1’ or incorrect ‘0’. The number of unanalysable responses was higher for Russian than for Polish. This is caused by the fact that a few pictures could be named in a different way with a lexical alternative in Russian, but not in Polish. The results in terms of accuracy for monolingual participants are set out in Table 5.1.
### Table 5.1 Percentage accuracy (mean, standard deviation, range) on gender production for Polish and Russian per gender: monolinguals

<table>
<thead>
<tr>
<th></th>
<th>MoPo*</th>
<th>MoRu</th>
<th>Stem-stressed</th>
<th>End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>mean</td>
<td>(SD)</td>
<td>(SD)</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>range</td>
<td>range</td>
<td>range</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>Total</td>
<td>n=40</td>
<td>n=41</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>98</td>
<td>95</td>
<td>95</td>
<td>62-100</td>
<td>74-100</td>
</tr>
<tr>
<td>(7)</td>
<td>(6)</td>
<td>(7)</td>
<td>69-100</td>
<td>71-100</td>
</tr>
<tr>
<td>Masculine</td>
<td></td>
<td>Feminine</td>
<td></td>
<td>Neuter</td>
</tr>
<tr>
<td>n=40</td>
<td>n=41</td>
<td>n=41</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>99</td>
<td>96</td>
<td>96</td>
<td>0-100</td>
<td>75-100</td>
</tr>
<tr>
<td>(4)</td>
<td>(8)</td>
<td>(8)</td>
<td>67-100</td>
<td>67-100</td>
</tr>
<tr>
<td>75-100</td>
<td>70-100</td>
<td>60-100</td>
<td>67-100</td>
<td></td>
</tr>
<tr>
<td>Neuter</td>
<td></td>
<td></td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>n=40</td>
<td>n=41</td>
<td>n=41</td>
<td>n=41</td>
<td>n=41</td>
</tr>
<tr>
<td>99</td>
<td>93</td>
<td>93</td>
<td>75-100</td>
<td>42-100</td>
</tr>
<tr>
<td>(5)</td>
<td>(11)</td>
<td>(12)</td>
<td>50-10</td>
<td>33-100</td>
</tr>
</tbody>
</table>

*MoPo=monolingual Polish participants; MoRu=monolingual Russian participants.

Visual inspection of the data in Table 5.1 makes clear that both the Polish and Russian monolingual participants perform at ceiling: the mean scores on all variables are above 90%. An independent samples Mann-Whitney U test showed that there were significant differences between the Polish and Russian monolinguals on the test as a whole (U=499; p=.001). For the individual genders, a series of independent samples Mann-Whitney U tests showed that the Polish monolinguals outperformed the Russian monolinguals on feminine (U=626, p=.005) and neuter (U=532.5, p<.001), but not on masculine (U=693, p=.113). The advantage of Polish was predicted due to the fact that Russian has stem-stressed and end-stressed endings. Feminine and neuter were expected to be more challenging (see Section 2.2). These differences were found even though the children were scoring above 90%.

A related samples Friedman’s two-way analysis of variance by ranks showed that within the Polish task ($\chi^2(2)=3.379; p=.185$) there were no significant
differences between the genders; unexpectedly, the same was the case for the Russian task ($\chi^2(2)=2.854; p=.240$).

Further, one-way mixed factorial ANOVA with gender as within-subjects factor and with language as between-subjects factor was performed. Language proficiency and age were entered as covariates.\footnote{Please note that gender and case – next to other grammatical measures – contribute considerably to the total score in the language proficiency tasks. Therefore, the language proficiency and gender and case scores are not totally independent.} No significant main effects of gender or language, nor for the interaction between gender and language were observed. Age and language proficiency were also non-significant.

As described in Section 2.2, the transparency of the last syllable is expected to be an important factor in the production of gender. In the discussion above, the scores on the Russian stem-stressed and end-stressed items were taken together per gender. In order to determine the role of transparency of the ending on the gender production in Russian it is necessary to consider them separately. As is clear from Table 5.1, for all gender*stress combinations the Russian monolinguals performed at ceiling: the mean accuracy for the monolingual Russian children on stem-stressed and end-stressed nouns is almost identical. A related samples Wilcoxon signed rank test confirmed that there were no differences between the stem-stressed and end-stressed items for Russian ($Z=.-362; p=.717$). The expected advantage of end stress over stem stress for nouns is thus not confirmed. Comparing Russian stem-stressed and end-stressed items across genders, we see no differences between the masculine stem-stressed and end-stressed ($Z=.-567; p=.571$), no differences between the feminine stem-stressed and end-stressed ($Z=.-119; p=.905$), and no differences between the neuter stem-stressed and end-stressed ($Z=.-672; p=.502$).

Main effects and interaction effects of gender and stress were explored in a two-way mixed factorial ANOVA, with stress and gender as within-subjects factors, and with language proficiency and age as covariates. No main effects of gender or stress, and no interaction between gender and stress were found. The covariates were also non-significant. As was mentioned in Section 3.6.5, ideally a three-way comparison between Polish, Russian stem-stressed and Russian end-stressed
nouns should be made. Since this is not possible, Polish, Russian stem-stressed, and Russian end-stressed items were compared pairwise.

Exploring the differences between Polish and Russian stem-stressed and between Polish and Russian end-stressed with a series of independent samples Mann-Whitney U tests, we see that for the total scores there are significant differences between Polish and Russian stem-stressed ($U=552.5$, $p=.004$), and between Polish and Russian end-stressed ($U=611$, $p=.020$). Looking at individual genders, we see that the Polish monolinguals outperform the Russian monolinguals only on the two neuter conditions (stem-stressed: $U=626$, $p=.010$; end-stressed: $U=670$, $p=.036$). This confirms that neuter is more difficult in Russian than in Polish (see Section 2.4), but does not confirm the relevance of stress.

Subsequently, multiple regressions were carried out to explore the independent variance in gender production that might be accounted for by language (Polish or Russian), language proficiency and age in monolingual participants. The predictors ‘language proficiency in Polish/Russian’ and ‘age’ were entered in a first separate block, the predictor ‘Polish vs. Russian’ was entered in block two. The results of the regression are presented in Table 5.2.

Table 5.2 Multiple regression analysis of factors related to the gender production task in monolinguals

<table>
<thead>
<tr>
<th>Model 1</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.834</td>
<td>.057</td>
<td></td>
<td>14.571</td>
<td>.000</td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.001</td>
<td>.228</td>
<td>1.927</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.036</td>
<td>.062</td>
<td>.069</td>
<td>.585</td>
<td>ns.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.876</td>
<td>.065</td>
<td></td>
<td>13.462</td>
<td>.000</td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>.001</td>
<td>.184</td>
<td>1.498</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.044</td>
<td>.062</td>
<td>.085</td>
<td>.720</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.019</td>
<td>.015</td>
<td>-.149</td>
<td>-1.321</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.069$ ($p=.061$) for block 1, $ΔR^2=.021$ ($p=.190$) for block 2.

The initial and final regression models were both not significant, (model 1, $F(2,80)=2.892$, $p=.061$; model 2 $F(3,80)=2.528$, $p=.063$). Gender production
cannot be predicted by ‘age’, ‘language proficiency’ and ‘Polish vs. Russian’ in these groups, probably because they are at ceiling.

Despite the fact that no differences were observed, neither within nor between languages, the error types revealed interesting qualitative facts. However, significance could not be checked due to the small numbers. See Table 5.3 for a distribution of mistakes per gender.

Table 5.3 Distribution of mistakes over error types (percentage onto total amount of items) on gender production task: monolinguals

<table>
<thead>
<tr>
<th>GenderError type</th>
<th>MoPo Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-Stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenderError 1 (F for M)</td>
<td>0.2</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>GenderError 2 (N for M)</td>
<td>1.4</td>
<td>0.7</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>GenderError 3 (M for F)</td>
<td>0.1</td>
<td>0.3</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>GenderError 4 (N for F)</td>
<td>0.2</td>
<td>0.9</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>GenderError 5 (M for N)</td>
<td>0.1</td>
<td>1.2</td>
<td>0.3</td>
<td>0.8</td>
</tr>
<tr>
<td>GenderError 6 (F for N)</td>
<td>0.3</td>
<td>0.9</td>
<td>0.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Total GenderError</td>
<td>2.3</td>
<td>4.5</td>
<td>2.3</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Errors in gender production are infrequent in the Polish and in the Russian monolinguals (there was a ceiling effect for all genders across language). It is clear from Table 5.3 that the mistakes of the Russian participants were more evenly distributed over error types than for the Polish participants. For the Polish monolinguals, the most frequent error type was GenderError 2: using neuter for masculine (moje instead of moj), while for Russian, the opposite mistake was the most frequent: using masculine for neuter. For Russian, other relatively frequent mistakes were mixing feminine and neuter genders (equally often in both directions).

Turning now to the error patterns in stem-stressed and end-stressed items, we see that, even though the differences between stem-stressed and end-stressed items were not statistically significant, there are interesting differences in error types. In stem-stressed nouns, Error 6, the error expected to be most frequent, was indeed the most frequent, followed by Error 4. This suggests that feminine and neuter in stem-stressed nouns are most likely to be confused. For end-stressed nouns, Error 5 (masculine for neuter) was the most frequent error, followed both
by Error 2 and Error 4 (neuter for masculine and neuter for feminine). Because of the low number of errors, no statistical analysis can be carried out.

Furthermore, for Russian, it was expected that at least a number of the mistakes in the feminine and masculine could be caused by a strategy of overusing the neuter possessive *moë* without a head noun (see Section 2.4). However, this is not clear from the error analysis. This hypothesis can therefore be ruled out.

In sum, as expected, both monolingual groups performed at ceiling on the gender production task. The Polish monolinguals still outperformed the Russian monolinguals on feminine and neuter. Although this was not expected at this age because of ceiling performance, Polish was better than Russian. Contrary to expectations with respect to Russian, there were no differences observed between stem-stressed and end-stressed items. The types of errors were also not expected: for the Polish monolinguals, neuter was most often used instead of masculine (the opposite was expected), while for Russian the opposite mistake was the most frequent (feminine for neuter was expected).

### 5.1.2 Results gender production task: bilinguals

All bilingual Polish-Dutch children and all Russian-Dutch children (38 and 39 respectively) completed this task. The maximum number of analysable items was 912 for Polish and 1404 for Russian (see Section 3.3.1). Of those, 3% of the responses from the Polish participants had to be excluded (4 no response and 19 unanalysable). For the Russian participants, this was 6% (4 no response and 74 unanalysable). A few pictures could be named using a possible lexical alternative in Russian, but not in Polish. Therefore, the number of unanalysable responses was higher for Russian. Accuracy scores per gender for both bilingual groups are set out in Table 5.4.
Table 5.4 Percentage accuracy (mean, standard deviation, range) on gender production for Polish and Russian per gender: bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo</th>
<th>BiRu</th>
<th>BiRu</th>
<th>BiRu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
</tr>
<tr>
<td></td>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
</tr>
<tr>
<td>Total</td>
<td>n=38</td>
<td>n=37</td>
<td>n=38</td>
<td>n=38</td>
</tr>
<tr>
<td></td>
<td>78</td>
<td>64</td>
<td>63</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>(23)</td>
<td>(25)</td>
<td>(26)</td>
<td>(26)</td>
</tr>
<tr>
<td></td>
<td>33-100</td>
<td>23-100</td>
<td>22-100</td>
<td>17-100</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>67</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>(28)</td>
<td>(41)</td>
<td>(41)</td>
<td>(43)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Feminine</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
</tr>
<tr>
<td></td>
<td>74</td>
<td>69</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>(35)</td>
<td>(36)</td>
<td>(38)</td>
<td>(36)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Neuter</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
<td>n=38</td>
</tr>
<tr>
<td></td>
<td>76</td>
<td>55</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>(35)</td>
<td>(38)</td>
<td>(41)</td>
<td>(41)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

* BiPo=Polish-Dutch participants; BiRu=Russian-Dutch participants.

Visual inspection of the data shows that, unlike the monolinguals (cf. Table 5.1), the bilinguals did not score at ceiling. The accuracy of the Polish-Dutch bilinguals is also higher than that of the Russian-Dutch group. An independent samples Mann-Whitney U test confirmed that there are significant differences between the Polish-Dutch and Russian-Dutch bilinguals on the test as a whole ($U=485.5$, $p=.009$), as was expected (see Section 2.4). Considering the individual genders, a series of independent samples Mann-Whitney U tests showed that the Polish-Dutch children also outperformed the Russian-Dutch children on masculine ($U=530.5$, $p=.030$) and neuter ($U=477.5$, $p=.010$) gender nouns, but not on feminine ($U=627.5$, $p=.408$). This is contrary to expectations: it was expected that especially in masculine there would be no differences (as was the case in the monolinguals, see Section 5.1.1; this will be further addressed in Section 7.2).

A related samples Friedman’s two-way analysis of variance by ranks showed that within the Polish task there are no significant differences between the
genders within the task ($\chi^2(2)=3.071; p=.215$); for the Russian-Dutch children, there are significant differences ($\chi^2(2)=8.176; p=.017$). However, a series of Wilcoxon signed rank tests did not show significant differences between any of the gender combinations.

Further, main effects of gender in a one-way mixed factorial ANOVA with language as between-subjects factor, and with language proficiency and age as covariates were explored. No significant main effect and also no significant interaction effect were found. Language proficiency and age were also non-significant.

In the discussion above, the scores on the Russian stem-stressed and end-stressed items were taken together per gender, as was done previously in Section 5.1.1. The comparison of stem-stressed and end-stressed items for Russian (see Table 5.4) showed a similar pattern as for the Russian monolinguals (cf. Table 5.1): no significant differences between stem-stressed and end-stressed nouns were observed using a related samples Wilcoxon signed rank test ($Z=-.841; p=.401$). A comparison of stem-stressed and end-stressed nouns per gender indicated no significant differences within each of the genders (masculine, $Z=-1.437, p=.151$; feminine, $Z=-.599, p=.549$; neuter, $Z=-.129, p=.897$). Apparently, the place of the stress does not matter for gender production. The expected advantage of stem stress over end stress was thus not confirmed for the bilinguals.

A two-way mixed factorial ANOVA with gender and stress as within-subject effects and with language proficiency and age as covariates with a Greenhouse-Geisser correction determined that there were no main effects of gender or stress. There was, however, a significant interaction effect of stress and gender ($F(2,66)=3.681 p=.034, \eta^2=.1$). When bilingual status was added to the model, there were no significant main or interaction effects. When controlled for language proficiency, stress and gender do not influence the bilinguals differently than the monolinguals.

The differences between Polish and Russian stem-stressed nouns and between Polish and Russian end-stressed nouns were explored pairwise with a series of independent samples Mann-Whitney U tests. Again for the total scores, there were significant differences between Polish and Russian stem-stressed ($U=461.5,$
and between Polish and Russian end-stressed ($U=506.5, p=.024$). If we look at individual genders, we see that the Polish-Dutch group outperformed the Russian-Dutch children only on both neuter conditions (stem-stressed: $U=506, p=.030$; end-stressed: $U=485, p=.017$), and on masculine stem-stressed ($U=505, p=.031$). This confirms that neuter is more difficult in Russian than in Polish as discussed above, but does not confirm the relevance of stress for feminine and neuter – although the advantage of stress was predicted especially on those genders.

When comparing the results of the bilingual groups to the monolingual groups with a Mann-Whitney U test, it becomes apparent that both bilinguals groups were significantly outperformed by their monolinguals peers on the test as a whole, as well as on each of the genders: Polish total, $U=355.5, p<.001$; masculine, $U=606, p=.041$; feminine, $U=389.5, p<.001$; neuter, $U=401.5, p<.001$; Russian total, $U=218, p<.001$; masculine, $U=496.5, p=.002$; feminine, $U=399.5, p<.001$; neuter, $U=298, p<.001$.

When adding bilingual mode to a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language and bilingual mode as between-subject factors, with language proficiency and age as covariates, we observed neither a significant main effect nor an interaction effect. This highlights the fact that differences between the groups are mainly due to a difference in language proficiency, and not an enhanced negative effect of bilingualism. Language proficiency and age were also non-significant.

As indicated above, the fact that performance with feminine gender nouns was worse than with masculine nouns in the bilingual Polish-Dutch children but not in the Russian-Dutch children was not expected. An error analysis might provide more insight. The distribution across the error types (see Section 3.6.3) is set out in Table 5.5.
Table 5.5 Distribution of mistakes over error types (percentage of total amount of items) on gender production task: bilinguals

<table>
<thead>
<tr>
<th>GenderError type</th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenderError 1 (F for M)</td>
<td>2.1</td>
<td>5.4</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>GenderError 2 (N for M)</td>
<td>2.4</td>
<td>4.4</td>
<td>2.4</td>
<td>2.1</td>
</tr>
<tr>
<td>GenderError 3 (M for F)</td>
<td>6.1</td>
<td>2.9</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>GenderError 4 (N for F)</td>
<td>2.3</td>
<td>6.5</td>
<td>3.2</td>
<td>3.3</td>
</tr>
<tr>
<td>GenderError 5 (M for N)</td>
<td>6.4</td>
<td>3.5</td>
<td>1.4</td>
<td>2.1</td>
</tr>
<tr>
<td>GenderError 6 (F for N)</td>
<td>1.2</td>
<td>10.0</td>
<td>5.6</td>
<td>4.5</td>
</tr>
<tr>
<td>Total GenderError</td>
<td>20.5</td>
<td>32.8</td>
<td>16.7</td>
<td>16.1</td>
</tr>
</tbody>
</table>

The Polish-Dutch bilinguals were found to more often substitute with masculine than the other genders: it was most likely that a child erroneously chose the masculine variant (GenderErrors 3 and 5). The Russian-Dutch children, on the other hand, most often interpreted neuter nouns as feminine and feminine nouns as neuter (GenderErrors 4 and 6). The patterns of Polish and Russian errors are almost in mirror-image. Although the interpretation of neuter nouns as feminine was predicted for Russian nouns, the reverse phenomenon was not predicted. Furthermore, for Russian, the expected strategy of overusing the neuter possessive moë without a head noun (see Section 2.4) was not clear from the error analysis. This hypothesis can therefore be ruled out.

For Russian, the error patterns in stem-stressed and end-stressed nouns were compared. In spite of the predicted overuse of feminine for neuter (GenderError 6), especially for stem-stressed items, the error patterns for stem stress and end stress were similar: in both conditions most errors stemmed from mixing feminine and neuter endings.

In sum, errors in gender production were more frequent in the bilinguals than in the monolinguals (see Table 5.3); and compared to the monolinguals, the bilinguals showed a larger number of errors more evenly distributed over the error patterns (cf. Table 5.3). For the Polish monolinguals, the most frequent error type was GenderError 2: using neuter for masculine, whereas the Polish-Dutch children mainly overused the masculine moj for both feminine and neuter items (GenderErrors 3 and 5). The Russian monolinguals overused masculine for neuter, while the Russian-Dutch bilinguals most often mixed feminine and neuter endings (mistakes were most often in the direction of feminine to neuter).
Dominancy groups and gender production
As explained in detail in Section 4.2.3, each bilingual participant was put into one out of three dominancy groups based on his/her accuracy on the Polish/Russian SRT and the Dutch SRT. Below, the results of the gender production task will be discussed in the light of the three dominancy groups. See Figures 5.1 and 5.2 for the accuracy per dominancy group per gender for both Polish-Dutch and Russian-Dutch children.

Figure 5.1 Average accuracy on the gender production task per dominancy group for the Polish-Dutch bilinguals

Figure 5.1 reveals that, as expected, the dominancy groups in Polish show a clear pattern: the Polish-dominant bilinguals achieved the highest accuracy, followed by the balanced bilinguals, with the Dutch-dominant bilinguals having the lowest scores and the largest within-group variation. The differences between the genders within each group were, however, relatively small.
As is clear from Figure 5.2, the dominancy groups in Russian also showed a relatively clear pattern: as expected, Russian-dominant bilinguals achieved the highest accuracy, followed by balanced bilinguals, and the Dutch-dominant bilinguals showed the largest within-group variation on feminine and neuter, and were at floor for masculine. Within the groups, the relative distribution of accuracy on the different genders shows a similar pattern for the balanced bilinguals and the Russian-dominant bilinguals: masculine is the most accurate, followed by feminine and neuter scored lowest. The Dutch-dominant group, however, scored worse on masculine: they were almost at floor.

**Predictors for gender production**

To explore the independent variance in gender production in all bilingual participants according to language (Polish or Russian), input related measures and the dominancy groups, multiple regressions were carried out. The predictors ‘language proficiency in Polish/Russian’, ‘language proficiency in Dutch’ and ‘age’ were entered in a first separate block, the predictors ‘AoO of Dutch’, and ‘AoI in Polish/Russian’ were entered in block two, ‘Polish vs. Russian’ was entered in block three and in order to test for the dominancy groups, two dummy variables were created. In the fourth block, the two dummy variables were entered (baseline: balanced bilinguals; Dummy 1: Polish/Russian dominant vs. balanced bilinguals;
Dummy 2: Dutch dominant vs. balanced bilinguals. Table 5.6 presents the results of the regression.

Table 5.6 Multiple regression analysis of factors related to gender production task in bilinguals

<table>
<thead>
<tr>
<th>Model</th>
<th>(Constant)</th>
<th>Age</th>
<th>LP Polish/Russian</th>
<th>LP Dutch</th>
<th>Polish vs. Russian</th>
<th>AoO of Dutch</th>
<th>AoI Russian/Polish</th>
<th>Po/Ru dominant vs. balanced bilinguals</th>
<th>Du dominant vs. balanced bilinguals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>.226</td>
<td>.174</td>
<td>1.298</td>
<td>ns.</td>
<td>.004</td>
<td>.003</td>
<td>.128</td>
<td>1.387</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 2</td>
<td>.651</td>
<td>.184</td>
<td>3.547</td>
<td>.001</td>
<td>.001</td>
<td>.003</td>
<td>.025</td>
<td>2.94</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 3</td>
<td>.634</td>
<td>.204</td>
<td>3.101</td>
<td>.003</td>
<td>.001</td>
<td>.003</td>
<td>.027</td>
<td>2.95</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 4</td>
<td>.704</td>
<td>.210</td>
<td>3.351</td>
<td>.001</td>
<td>.000</td>
<td>.003</td>
<td>-.004</td>
<td>-.043</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.570$ ($p<.001$) for model 1, $\Delta R^2=.097$ ($p<.001$) for model 2, $\Delta R^2=.000$ ($p=.978$) for model 3, $\Delta R^2=.016$ ($p=.229$) for model 4.

Although all models were significant, the step from the second to the third and from the third to the fourth model did not result in a significant change in $R^2$.  

156
The second model was significant, $F(4,68)=32.032, p<.001$, and explained 67% of the variance in gender production in all groups taken together (57% of the variance was already explained at block 1, with ‘language proficiency in Polish/Russian’ as well as ‘language proficiency in Dutch’ being the significant predictors). In model three, ‘language proficiency in Polish/Russian and Dutch’ as well as ‘Polish vs. Russian’ were significant predictors. AoO of Dutch, AoI in Polish/Russian as well as the dominancy groups were not significantly related to gender production.

Finally, to explore the independent variance in gender production in all participants accounted for by language (Polish or Russian), bilingual status (monolingual or bilingual), language proficiency and age, a multiple regression analysis was carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate block, and the predictors ‘Polish vs. Russian’ and ‘bilingual status’ were entered in block two. The results of the regression analysis with input related measures are presented in Table 5.7.

**Table 5.7 Multiple regression analysis of factors related to gender production task in monolinguals and bilinguals**

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>$SE_B$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.505</td>
<td>.083</td>
<td></td>
<td>6.052</td>
<td>.000</td>
</tr>
<tr>
<td>Age</td>
<td>-.001</td>
<td>.001</td>
<td>-.056</td>
<td>-1.076</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.618</td>
<td>.042</td>
<td>.771</td>
<td>14.878</td>
<td>.000</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.812</td>
<td>.099</td>
<td></td>
<td>8.206</td>
<td>.000</td>
</tr>
<tr>
<td>Age</td>
<td>-.002</td>
<td>.001</td>
<td>-.072</td>
<td>-1.397</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.546</td>
<td>.048</td>
<td>.682</td>
<td>11.277</td>
<td>.000</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.091</td>
<td>.021</td>
<td>-.212</td>
<td>-4.263</td>
<td>.000</td>
</tr>
<tr>
<td>Bilingual mode</td>
<td>-.065</td>
<td>.027</td>
<td>-.150</td>
<td>-2.421</td>
<td>.017</td>
</tr>
</tbody>
</table>

Note $R^2=.597 (p<.001)$ for model 1, $\Delta R^2=.059 (p<.001)$ for model 2.

The final regression model was significant, $F(4,152)=70.490, p<.001$, and explained 66% of the variance in gender production in all groups taken together (60% of the variance was already explained at block one, with language proficiency in Polish/Russian being the only significant predictor). ‘Polish vs. Russian’, ‘bilingual status’ and ‘language proficiency in Polish/Russian’ were all significantly
related to gender production. As was expected, the bilingual children scored lower than the monolingual children and the Russian children, scored lower than the Polish children.

To summarise, both bilingual groups were outperformed by both monolingual groups on the test as a whole and on each of the individual genders. Bilingual Polish-Dutch outperformed the bilingual Russian-Dutch children on the gender production task as a whole, and on neuter and masculine. Contrary to expectations, they did not outperform their Russian-Dutch peers on feminine. Within the Russian-Dutch bilinguals, there were no differences between end-stressed and stem-stressed items. Stress appears not to affect production. The pairwise comparison of Polish and the two stress conditions for Russian revealed that the difference in masculine between Polish and Russian was only significant between Polish and Russian stem-stressed items. The Polish-Dutch bilinguals most often used masculine forms for feminine and neuter; the Russian-Dutch children most often interpreted neuter nouns as feminine and feminine nouns as neuter. The dominancy groups revealed the expected pattern: Polish/Russian dominant bilinguals scored better than balanced bilinguals, who in turn scored better than Dutch-dominant bilinguals. The regression analysis for all participants demonstrated that ‘Polish vs. Russian’, ‘bilingual status’ and ‘language proficiency in Polish/Russian’ were all significantly related to gender production. Within the bilingual groups, only ‘language proficiency in Polish/Russian’ and ‘Polish vs. Russian’ were significant predictors.

5.2 Results gender comprehension task
In Section 5.2.1, the results of the monolingual participants will be presented, followed by the results of the bilingual participants in Section 5.2.2. The relation between performance on the gender comprehension task and language measures, AoO and AoI for the bilingual participants will be examined in Section 5.2.2. Language dominancy as measured by SRTs will also be explored here.

In Section 2.4, it was hypothesised that due to differences in the linguistic system the comprehension of the Polish gender system, like production, is more accurate than the comprehension of the Russian gender system. Due to the fact that there is no information available about the age at which monolingual
children acquiring a highly inflected language comprehend gender (see Section 2.3), no clear predictions could be made, although the Polish children were expected to be better in gender comprehension than the Russian children. For the bilinguals, the same situation was expected.

It is an empirical question whether the production of gender morphology precedes or follows comprehension. In this study, it was hypothesised that once children can correctly assign gender to a noun, they will also be able to comprehend the gender (see Section 2.4). It is unclear whether we will be able to detect differences between the Polish and Russian monolinguals or the Polish-Dutch and Russian-Dutch bilinguals tested in this study.

With respect to the errors of the monolingual and bilingual participants, there were expectations as to the type of substitutions but not with respect to the absolute occurrence. Within the Polish gender system, most mistakes were expected in the confusion of masculine and neuter nouns, whereas for Russian feminine and neuter nouns should be confused relatively more often (see Section 2.4).

It was further hypothesised for the bilingual children that an earlier AoO of Dutch, and a lower level of AoI to Polish and Russian would negatively influence children’s ability to comprehend and process gender. Moreover, the Russian-Dutch children with an early AoO of Dutch were predicted to have an enhanced/combined negative effect of AoO and Russian, compared to early AoO of Dutch and Polish. In addition, the role of dominancy will be explored. The relation between Dutch-dominant children and the comprehension of gender morphology will be specifically elaborated upon.

The gender comprehension tasks for both Polish and Russian were checked using an item-analysis and turned out to have a good internal reliability (for Polish: $\alpha=.809$, for Russian: $\alpha=.748$). It appeared that for Polish no items were problematic. For the Russian task, two items resulted in low scores in monolingual children (karandas’h ‘pencil’: accuracy=20%; and mylo ‘soap’ accuracy: 26%). These two items were therefore excluded. As an extra check of the construction of the test, it was administered to adult monolingual speakers. After the correction in the scoring for Russian on the basis of the results of the monolingual children, all adults (Polish and Russian) who took part in the test scored at ceiling (accuracy: 98.2% in Polish, 98.6% in Russian).
5.2.1 Results of gender comprehension task: monolinguals

All 40 monolingual Polish children and 38 monolingual Russian children completed this task (three monolingual Russian children did not complete the task due to technical problems). The maximum number of analysable items was 480 for Polish and 836 for Russian. Of those, 15% from the responses of the Polish participants had to be excluded. For the Russian participants, this was 7%. All other responses were scored correct ‘1’ or incorrect ‘0’ (see Table 5.8).

<table>
<thead>
<tr>
<th>Gender</th>
<th>MoPo Total</th>
<th>MoRu Stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
</tr>
<tr>
<td>Total</td>
<td>n=40 (25)</td>
<td>n=38 (22)</td>
<td>n=38 (24)</td>
</tr>
<tr>
<td></td>
<td>58 (5)</td>
<td>56 (5)</td>
<td>55 (5)</td>
</tr>
<tr>
<td></td>
<td>17-100</td>
<td>28-100</td>
<td>22-100</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=40 (35)</td>
<td>n=38 (28)</td>
<td>n=38 (32)</td>
</tr>
<tr>
<td></td>
<td>51 (5)</td>
<td>55 (5)</td>
<td>56 (5)</td>
</tr>
<tr>
<td>Feminine</td>
<td>n=39 (29)</td>
<td>n=38 (30)</td>
<td>n=38 (30)</td>
</tr>
<tr>
<td></td>
<td>68 (6)</td>
<td>62 (6)</td>
<td>62 (6)</td>
</tr>
<tr>
<td>Neuter</td>
<td>n=39 (37)</td>
<td>n=38 (24)</td>
<td>n=38 (34)</td>
</tr>
<tr>
<td></td>
<td>58 (4)</td>
<td>50 (4)</td>
<td>44 (4)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

Visual inspection of the data in Table 5.8 shows that both the Polish and Russian monolingual child participants were far from performing at ceiling on this task. The Polish and Russian scores were highly similar. An independent samples Mann-Whitney U test showed that there were no significant differences between the Polish and Russian monolinguals on the test as a whole ($U=728.5, p=.753$). A series of independent samples Mann-Whitney U tests showed that there were no significant differences on each of the genders between the Polish and Russian
monolinguals (masculine, \( U=802, p=.673 \); feminine, \( U=656, p=.380 \); neuter, \( U=606.5, p=.168 \)), as was also predicted (see Section 2.4). A related samples Friedman’s two-way analysis of variance by ranks highlighted that within the Polish task \( (\chi^2(2)=5.484; p=.064) \) there were no significant differences between the genders; unexpectedly, the same was the case for the Russian task \( (\chi^2(2)=2.722; p=.256) \).

Further, a one-way mixed factorial ANOVA with gender as within-subjects factor, language as between-subjects factor and with language proficiency and age as covariates was performed to explore main effects and interaction effect in gender comprehension. No significant main effects of gender or interaction effects between gender and language were observed. The effect of the covariates was also non-significant.

As explained earlier, in order to determine the influence of transparency (see Section 2.2) of the ending in the gender comprehension in Russian it is necessary to consider Russian stem-stressed and end-stressed items separately. As is clear from Table 5.8, the Russian monolinguals performed below ceiling for all of the gender*stress combinations unlike their results on production. The mean accuracy for monolingual Russian children on stem-stressed and end-stressed nouns was almost identical for the test as a whole and for masculine and feminine, but it was different for neuter. A related samples Wilcoxon signed rank test confirmed that there were no significant differences between the stem-stressed and end-stressed items for Russian \( (Z=-.664, p=.507) \). Comparing Russian stem-stressed and end-stressed nouns across genders, we see no differences between the stem-stressed and end-stressed items in each gender considered separately (masculine, \( Z=-.334, p=.738 \); feminine, \( Z=-.117, p=.907 \); neuter, \( Z=-1.596, p=.111 \)). The expected advantage of end stress over stem stress is thus again not confirmed.

Subsequently, a two-way mixed factorial ANOVA with gender and stress as within-subjects factors, and with language proficiency and age as covariates was performed to explore main effects and the possibility of any interaction effect in gender comprehension. A significant main effect of stress was found using a Greenhouse-Geisser correction \( (F(1,35)=5.213 \ p=.029, \eta^2=.13) \). No interaction effects were found; the effect of the covariates was also non-significant.
Pairwise comparisons of the differences between Polish and Russian stem-stressed, on the one hand, and between Polish and Russian end-stressed, on the other hand, were performed with a series of independent samples Mann-Whitney U tests. For the total scores, there were no significant differences between Polish and Russian stem-stressed ($U=707.5$, $p=.559$), and between Polish and Russian end-stressed ($U=736$, $p=.810$). Looking at individual genders, we see that results on Polish and Russian stem-stressed nouns as well as scores on Polish and Russian end-stressed items did not differ on any of the genders.

Subsequently, to explore the independent variance in gender comprehension accounted for by language (Polish or Russian), language proficiency and age in monolingual participants, multiple regressions were carried out. Like for gender production, the predictors ‘language proficiency in Polish/Russian’ and ‘age’ were entered in a first separate block, the predictor ‘Polish vs. Russian’ was entered in block two. The results of the regression are presented in Table 5.9.

Table 5.9 Multiple regression analysis of factors related to the gender comprehension task in monolinguals

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE.B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1 (Constant)</td>
<td>-0.066</td>
<td>.201</td>
<td>-0.327</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.007</td>
<td>.003</td>
<td>0.279</td>
<td>2.383</td>
<td>.020</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>0.250</td>
<td>.217</td>
<td>0.135</td>
<td>1.152</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 2 (Constant)</td>
<td>-0.086</td>
<td>.229</td>
<td>-0.377</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.007</td>
<td>.003</td>
<td>0.285</td>
<td>2.340</td>
<td>.022</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>0.246</td>
<td>.219</td>
<td>0.133</td>
<td>1.124</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>0.010</td>
<td>.052</td>
<td>0.021</td>
<td>.191</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.126$ ($p=.007$) for block 1, $\Delta R^2=.000$ ($p=.849$) for block 2.

The initial and final regression models were both significant (model 1, $F(2,77)=5.385$, $p=.007$; model 2 $F(3,77)=3.556$, $p=.018$), both the step to the first and to the second model did not cause a significant change in $R^2$. ‘Age’ was the only significant predictor in gender comprehension: an older child is predicted to be more accurate than a younger child. Gender comprehension could not be predicted by ‘Polish vs. Russian’ or by ‘language proficiency’ in the monolingual groups.
Finally, comparing the results on gender production and comprehension for the Polish and Russian monolinguals, we see – as was expected due to the difference in complexity of the tasks – a substantial difference between comprehension and production. Since the comprehension task was more difficult than the production task, we cannot conclude that comprehension lags behind production. This asymmetry between the production and comprehension tasks will be further addressed in Chapter 7.

Although the analyses above indicated no main effects for gender, error analyses can provide more insight (Table 5.10).

<table>
<thead>
<tr>
<th>GenderError type</th>
<th>MoPo Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenderError 1 (F for M)</td>
<td>6.9</td>
<td>8.7</td>
<td>4.7</td>
<td>4.1</td>
</tr>
<tr>
<td>GenderError 2 (N for M)</td>
<td>6.0</td>
<td>4.8</td>
<td>2.8</td>
<td>2.0</td>
</tr>
<tr>
<td>GenderError 3 (M for F)</td>
<td>4.0</td>
<td>7.1</td>
<td>4.2</td>
<td>2.9</td>
</tr>
<tr>
<td>GenderError 4 (N for F)</td>
<td>5.6</td>
<td>5.6</td>
<td>1.9</td>
<td>3.7</td>
</tr>
<tr>
<td>GenderError 5 (M for N)</td>
<td>5.0</td>
<td>5.6</td>
<td>3.9</td>
<td>2.6</td>
</tr>
<tr>
<td>GenderError 6 (F for N)</td>
<td>7.1</td>
<td>9.1</td>
<td>3.0</td>
<td>5.1</td>
</tr>
<tr>
<td>Total gender error</td>
<td>34.6</td>
<td>40.9</td>
<td>20.5</td>
<td>20.5</td>
</tr>
</tbody>
</table>

As is clear from Table 5.10, mistakes were frequent in both monolingual groups, and the mistakes of the Polish participants were more evenly distributed over error types than those of the Russian participants. The Polish participants most frequently overgeneralised the feminine gender. Feminine appeared to be the default gender. This interpretation is supported by the fact that feminine was more accurately comprehended than the other genders (see Table 5.7). Feminine was also the default gender for the Russian monolinguals; if the masculine or neuter was erroneously not selected, feminine was chosen more often than the other option. For Russian, the overuse of feminine for neuter was predicted; however, interestingly the strategy of overusing feminine was extended to masculine. The use of neuter for masculine or feminine was a less frequent option.

Note that for Russian, there was one more feminine item than masculine and neuter items (since one masculine and one neuter item were deleted from the test); therefore, the proportion of mistakes in feminine items was even an overestimation.
Subsequently, the frequency of error types for stem-stressed and end-stressed items was compared for Russian. Although the total frequency of mistakes in stem-stressed and end-stressed nouns was identical, the distribution over the two stress patterns revealed a difference. Whereas in stem-stressed nouns feminine and masculine were most often interchanged – which is an unexpected result – for end-stressed nouns feminine nouns were overused (most strongly for neuter, but for masculine too). Note that it was predicted that stem-stressed and not end-stressed neuter nouns would be interpreted as feminine. Moreover, the interpretation of feminine as neuter for end-stressed feminine nouns was contrary to expectations.

In sum, neither of the monolingual groups performed at ceiling. There were no significant differences between the groups taking all genders together nor on the individual genders. Within each of the groups, there were also no significant differences between the genders. Contrary to expectations, there were no differences observed between Russian stem-stressed and end-stressed items. The most frequent error in both the Polish and the Russian monolinguals was the incorrect use of the feminine gender. Gender comprehension in monolinguals could be predicted by age only: older children have slightly higher scores than younger children.

5.2.2 Results gender comprehension task: bilinguals

Three bilingual children did not take part in the comprehension task due to technical problems. This resulted in data from 38 bilingual Polish-Dutch children and 36 bilingual Russian-Dutch children. The maximum number of analysable items was 456 for the Polish participants and 792 for the Russian participants. For the monolingual Polish participants, 8% of the items had no response; for the Russian participants this was 6%. All other responses were either correct ‘1’ or incorrect ‘0’ and were taken into account for analysis. See Table 5.11 for a summary of the results on the gender comprehension task per gender.
As is clear from Table 5.11, the accuracy of both the Polish and Russian bilinguals on this task is rather low. An independent samples Mann-Whitney U test showed that there were no significant differences between the Polish-Dutch and Russian-Dutch participants on the test as a whole ($U=647.5, p=.693$), nor on the feminine nouns ($U=562, p=.182$) or the neuter nouns ($U=534, p=.199$). The Russian-Dutch bilinguals, however, outperformed the Polish-Dutch bilinguals on masculine nouns ($U=886.5, p=.007$). A related samples Friedman’s two-way analysis of variance by ranks unexpectedly showed that, within the Polish-Dutch bilinguals, there were significant differences between the genders ($\chi^2(2)=15.517; p=.001$), but that no significant differences between the genders were observed for the Russian-Dutch children ($\chi^2(2)=406; p=.816$). A series of Wilcoxon signed rank tests demonstrated that for the Polish-Dutch group, performance on masculine nouns was significantly worse than on feminine ($Z=-3.474, p=.001$) or neuter ($Z=-2.686, p=.007$).
Main effects and interaction effects between gender as within-subjects and language as between-subject factor were explored in a one-way mixed factorial ANOVA. Language proficiency and age were entered as covariates. There was no significant main effect for gender, but there was a significant interaction effect for gender and language with a Greenhouse-Geisser correction ($F(2,126)=3.297, p=.041, \eta^2=.050$). Age and language proficiency were not significant factors.

The comparison of stem-stressed and end-stressed items for Russian (see Table 5.10) exhibited a similar pattern as for the Russian monolinguals (cf. Table 5.7): no significant differences between stem-stressed and end-stressed nouns were observed. A related samples Wilcoxon signed rank test indicated no differences between the stem-stressed and end-stressed items for Russian ($Z=-.541, p=.589$). When comparing masculine, feminine and neuter stem-stressed with end-stressed nouns, no significant differences were found after a Bonferroni correction (masculine, $Z=-.364, p=.716$; feminine, $Z=-1.598, p=.110$; neuter, $Z=-2.249, p=.025$). The place of the stress does not influence gender comprehension in the bilingual group either.

The main effects and interaction effects were studied in a two-way mixed factorial ANOVA, with gender and stress as within-subjects factors, and with language proficiency and age as covariates. There was no main effect of gender or stress, and no interaction between gender and stress. The interaction between gender, stress and language proficiency was significant with a Greenhouse-Geisser correction ($F(2,56)=3.584, p=.037, \eta^2=.113$).

When the results of gender comprehension in the Russian monolinguals and the bilinguals are taken together, a significant main effect of stress emerged with a Greenhouse-Geisser correction ($F(1,65)=7.842, p=.007, \eta^2=.108$). There was also a significant interaction between stress and language proficieny ($F(1,65)=4.654, p=.035, \eta^2=.067$), and between gender and age ($F(2,138)=3.922, p=.024, \eta^2=.057$). There was no interaction between bilingual status and gender and stress in gender comprehension.

Subsequently, differences between Polish and Russian stem-stressed and between Polish and Russian end-stressed nouns were explored in a pairwise manner with a series of independent samples Mann-Whitney U tests (see Section 3.6.5). For the total scores, there were no significant differences between Polish
and Russian stem-stressed nouns \((U=678, p=.948)\), and between Polish and Russian end-stressed nouns \((U=634.5, p=.592)\). Looking at individual genders, the performance on Polish feminine items was significantly better than on the Russian end-stressed feminine items \((U=483.5, p=.027)\), and on Polish neuter items better than on Russian stem-stressed neuter items \((U=459.5, p=.048)\).

When the scores of the bilingual groups were compared to those of the monolingual groups on gender comprehension (see Table 5.7) with a Mann-Whitney U test, no significant differences were found between the Polish monolinguals and the Polish-Dutch bilinguals on the test as a whole \((U=572, p=.060)\), neither on feminine nouns \((U=604, p=.153)\) nor neuter nouns \((U=619, p=.280)\). The Polish-Dutch bilinguals were, however, significantly outperformed by the Polish monolingual children on masculine nouns \((U=481.5, p=.012)\). Although the Russian bilinguals were outperformed by the Russian monolinguals on the test as a whole \((U=495, p=.041)\), no significant differences were found when considering the individual genders (masculine, \(U=530.5, p=.094\); feminine, \(U=506, p=.053\); neuter, \(U=540.5, p=.166\)).

The accuracies on gender comprehension of the bilingual and the monolingual participants (compare Table 5.1 to Table 5.4) were compared in a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language and bilingual mode as the between-subjects factors. Language proficiency and age were covariates. There was no significant main effect of gender, but there was a significant interaction between gender and language with a Greenhouse-Geisser correction \((F(2,276)=4.498, p=.012, \eta^2=.023)\). Bilingual mode had no interaction effect with gender comprehension. This highlights that differences between the groups were mainly due to a difference in language proficiency, and were not an enhanced negative effect of bilingualism.

Finally, the results on gender production and comprehension for the Polish-Dutch and Russian-Dutch bilinguals were compared. As expected, there was a difference between comprehension and production. Due to the fact that the comprehension task was more complicated than the production task, we cannot conclude that comprehension lags behind production in bilinguals. This asymmetry between production and comprehension will be further explored in Chapter 7.
Even though no main effects for gender were found in the bilingual groups, it is still interesting to see whether one gender was overgeneralised more often than the other genders. The distribution of the errors over the error types (see Section 3.6.3) is set out in Table 5.12, including the errors for both stress options separately.

Table 5.12 Distribution of mistakes over error types (percentage of total amount of items) on gender comprehension task: bilinguals

<table>
<thead>
<tr>
<th>GenderError type</th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenderError 1 (F for M)</td>
<td>11.0</td>
<td>8.3</td>
<td>4.7</td>
<td>3.7</td>
</tr>
<tr>
<td>GenderError 2 (N for M)</td>
<td>9.2</td>
<td>8.1</td>
<td>4.4</td>
<td>3.7</td>
</tr>
<tr>
<td>GenderError 3 (M for F)</td>
<td>5.9</td>
<td>8.8</td>
<td>3.8</td>
<td>5.1</td>
</tr>
<tr>
<td>GenderError 4 (N for F)</td>
<td>6.8</td>
<td>8.1</td>
<td>3.4</td>
<td>4.7</td>
</tr>
<tr>
<td>GenderError 5 (M for N)</td>
<td>5.9</td>
<td>6.7</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>GenderError 6 (F for N)</td>
<td>9.6</td>
<td>9.8</td>
<td>4.8</td>
<td>5.1</td>
</tr>
<tr>
<td>Total GenderError</td>
<td>48.5</td>
<td>49.9</td>
<td>24.4</td>
<td>25.5</td>
</tr>
</tbody>
</table>

As is clear from Table 5.12, mistakes in the gender comprehension task were highly frequent in both bilingual groups. The mistakes of the Russian-Dutch participants were more evenly distributed over error types than those of the Polish-Dutch children. The Polish bilinguals most often replaced masculine and neuter with feminine (GenderErrors 1 and 6), and least often overused the masculine gender (GenderErrors 3 and 5). For Russian, as expected, the replacement of neuter by feminine was the most frequent error followed by the unexpected replacement of feminine with masculine. The Russian bilinguals used error type 5 (masculine for neuter) less often than the other error types that all occurred with approximately the same frequency. Compared to the errors the monolingual participants made (see Table 5.10), both bilingual groups showed a preference for substitution with feminine nouns.

The errors in stem-stressed items were compared to errors in end-stressed items. Highly similar patterns were discovered. Like the monolingual Russian children, the bilingual Russian-Dutch participants did not show large differences in the distribution of mistakes over error types between stem-stressed and end-stressed nouns.
Dominancy groups and gender comprehension
As has been mentioned earlier (see also Section 4.2.3), each bilingual participant was allocated to one of three dominancy groups based on his/her scores on the Polish/Russian SRT and the Dutch SRT. Below, the results of the gender comprehension task will be discussed in the light of the three dominancy groups. See Figures 5.3 and 5.4 for the accuracy per dominancy group per gender for both Polish-Dutch and Russian-Dutch children.

![Box plot showing accuracy on gender comprehension per dominancy group]

**Figure 5.3 Average accuracy on gender comprehension per dominancy group for the Polish-Dutch bilinguals**

As Figure 5.3 shows, the scores across groups were relatively close to each other. Whereas the group with Polish-dominant children scored higher on feminine than on the other two genders, the Dutch-dominant group scored higher on neuter and feminine than on masculine.
As follows from Figure 5.4, the scores across the three groups scarcely differ, as was also the case in the Polish groups (Figure 5.3). For the Russian-Dutch bilinguals who are Russian-dominant, masculine was a little more difficult than the other two genders. For the other two groups, the scores of all three genders were fairly similar. Due to small group numbers, no significance could be tested.

Predictors for gender comprehension

Multiple regressions were carried out to explore the independent variance in gender comprehension in all bilingual participants according to language (Polish or Russian), input related measures and the dominancy groups. The predictors ‘language proficiency in Polish/Russian’, ‘language proficiency in Dutch’ and ‘age’ were entered in a first separate block, the predictors ‘AoO of Dutch’, and ‘AoI in Polish/Russian’ were entered in block two, ‘Polish vs. Russian’ was entered in block three and in order to test for the dominancy groups, two dummy variables were created. In the fourth block, the two dummy variables were entered (baseline: balanced bilinguals; Dummy 1: Polish/Russian dominant vs. balanced bilinguals; Dummy 2: Dutch dominant vs. balanced bilinguals). Table 5.13 presents the results of the regression analysis.
## CHAPTER 5. RESULTS OF GENDER TASKS

### Table 5.13 Multiple regression analysis of factors related to gender comprehension in bilinguals

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.115</td>
<td>.175</td>
<td>.659</td>
<td></td>
<td>ns.</td>
</tr>
<tr>
<td>Age</td>
<td>.003</td>
<td>.003</td>
<td>.147</td>
<td>1.123</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.226</td>
<td>.072</td>
<td>.363</td>
<td>3.151</td>
<td>.002</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>.027</td>
<td>.090</td>
<td>.040</td>
<td>.301</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.117</td>
<td>.207</td>
<td>.567</td>
<td></td>
<td>ns.</td>
</tr>
<tr>
<td>Age</td>
<td>.003</td>
<td>.003</td>
<td>.146</td>
<td>1.073</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.226</td>
<td>.072</td>
<td>.363</td>
<td>3.121</td>
<td>.003</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>.027</td>
<td>.092</td>
<td>.040</td>
<td>.298</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.001</td>
<td>.043</td>
<td>-.002</td>
<td>-.018</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.257</td>
<td>.230</td>
<td>1.118</td>
<td></td>
<td>ns.</td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.003</td>
<td>.099</td>
<td>.698</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.201</td>
<td>.087</td>
<td>.322</td>
<td>2.305</td>
<td>.025</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>.037</td>
<td>.098</td>
<td>.055</td>
<td>.382</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.008</td>
<td>.044</td>
<td>-.022</td>
<td>-.185</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>.003</td>
<td>.002</td>
<td>.164</td>
<td>1.191</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO Russian/Polish</td>
<td>-.136</td>
<td>.144</td>
<td>-.120</td>
<td>-.949</td>
<td>ns.</td>
</tr>
<tr>
<td>Model 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.297</td>
<td>.230</td>
<td>1.293</td>
<td></td>
<td>ns.</td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>.003</td>
<td>.057</td>
<td>.409</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>-.109</td>
<td>.147</td>
<td>-.175</td>
<td>-.741</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>.368</td>
<td>.163</td>
<td>.538</td>
<td>2.266</td>
<td>.027</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>.003</td>
<td>.042</td>
<td>.009</td>
<td>.081</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>.004</td>
<td>.002</td>
<td>.208</td>
<td>1.555</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO Russian/Polish</td>
<td>-.142</td>
<td>.141</td>
<td>-.125</td>
<td>-.1005</td>
<td>ns.</td>
</tr>
<tr>
<td>Po/Ru dominant vs. balanced bilinguals</td>
<td>.164</td>
<td>.092</td>
<td>.330</td>
<td>1.785</td>
<td>ns.</td>
</tr>
<tr>
<td>Du dominant vs. balanced bilinguals</td>
<td>-.200</td>
<td>.082</td>
<td>-.499</td>
<td>2.448</td>
<td>.017</td>
</tr>
</tbody>
</table>

Note $R^2=.174$ (p=.006) for model 1, $\Delta R^2=.000$ (p=.986) for model 2, $\Delta R^2=.028$ (p=.352) for model 3, $\Delta R^2=.080$ (p=.044) for model 4.

Although all four regression models were significant, only the initial and final regression caused a significant change in $R^2$ (model 1: $F(3,67)=4.497, p=.006$; model 2: $F(8,67)=2.898, p=.009$). Model one explained 17% of the variance, model four explained 28%. ‘Language proficiency in Polish/Russian’ was the only significant predictor in gender comprehension in model one, but in model four,
‘language proficiency in Polish/Russian’ no longer significantly predicted gender comprehension, but ‘language proficiency in Dutch’ and ‘Dutch dominancy vs. balanced bilinguals’ did.

Finally, to explore the independent variance in gender comprehension in all participants accounted for by language (Polish or Russian), bilingual status (monolingual or bilingual), language proficiency and age, a multiple regression analysis was carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate block, and the predictors ‘language’ and ‘bilingual status’ were entered in block two. The results of the regression analysis with input related measures are presented in Table 5.14.

| Table 5.14 Multiple regression analysis of factors related to gender comprehension in monolinguals and bilinguals |
|---|---|---|---|---|---|
| Model 1 | B | SE B | β | t | p |
| (Constant) | .010 | .121 | .085 | ns. |
| Age | .005 | .002 | .198 | 2.659 | .009 |
| LP Polish/Russian | .305 | .059 | .386 | 5.173 | .000 |
| Model 2 | B | SE B | β | t | p |
| (Constant) | .080 | .155 | .517 | ns. |
| Age | .005 | .002 | .219 | 2.758 | .007 |
| LP Polish/Russian | .258 | .074 | .326 | 3.468 | .001 |
| Polish vs. Russian | -.002 | .033 | -.004 | -.049 | ns. |
| Bilingual mode | -.044 | .042 | -.102 | -1.061 | ns. |

Note $R^2=.186$ ($p<.001$) for model 1, $\Delta R^2=.006$ ($p=.569$) for model 2.

The initial and final regression models were both significant (model 1, $F(2,148)=16.720$, $p<.001$; model 2 $F(4,148)=8.594$, $p<.001$), the step from the first to the second model did not result in a significant change in $R^2$. ‘Age’ and ‘language proficiency’ are both significant predictors in gender comprehension: an older child is predicted to be more accurate than a younger child. Contrary to expectations, gender comprehension cannot be predicted by ‘Polish vs. Russian’ or by ‘bilingual status’.

In sum, the bilinguals did not score significantly worse than the monolinguals. Only on masculine, the Polish bilinguals were outperformed by their monolingual peers. The Russian-Dutch bilinguals did, however, outperform their Polish-Dutch
peers on masculine. As in the monolingual groups, there were no significant differences between the two bilingual groups on the gender comprehension task as a whole. Within the Polish-Dutch group, accuracy on masculine nouns was significantly worse than on the other two genders. Within Russian, there were no differences between stem-stressed and end-stressed nouns. The pairwise comparison of Polish and Russian stem-stressed and end-stressed items indicated that the performance on Russian stem-stressed neuters was worse than on Polish neuters. This was expected. The Polish bilinguals most often overused the feminine gender, and the most frequent mistake for the Russian bilinguals was the use of feminine for neuter, as was also predicted. Contrary to expectations, there were no large differences in gender comprehension across the three dominance groups. Furthermore, a regression analysis for the bilingual participants demonstrated that language, AoO of Dutch and AoI in Russian did not significantly predict gender comprehension. Language proficiency (in Polish/Russian in the first model, and in Dutch in the fourth model) and Dutch dominancy vs. balanced bilinguals were significant predictors in bilingual children. When predicting gender comprehension for all children involved in this study, we can argue that only age and language proficiency in Polish/Russian were significant predictors. Unexpectedly ‘Polish vs. Russian’ and bilingual status were not significantly related to gender comprehension.

5.3 Summary

It was predicted that Polish monolinguals and Russian monolinguals would not score significantly differently on gender production and comprehension due to their being too old. The prediction for comprehension was tentative. This turned out to be the case for gender comprehension, but not for gender production. Here the Russian monolinguals were outperformed by the Polish monolinguals on the task as a whole as well as on feminine and neuter gender. The scores for gender comprehension were lower than expected.

For the bilingual groups, it was predicted that the Polish-Dutch participants would outperform Russian-Dutch bilinguals on comprehension and production. The Polish-Dutch indeed outperformed the Russian-Dutch children in gender production (on the task as a whole and on masculine and neuter), but in gender
comprehension the only significant difference between the bilingual groups was found in masculine items, where the Russian-Dutch unexpectedly outperformed the Polish-Dutch children.

For both monolingual and bilingual Russian children it was predicted that accuracy on end-stressed items would be better than on stem-stressed items. In both production and comprehension this was not the case. Apparently, the stress pattern of an item has no impact on gender production or comprehension, neither for monolinguals nor for bilinguals.

The dominancy groups did show the expected distribution of accuracies for both Polish and Russian dominancy groups on gender production. In gender comprehension, however, there were no large differences between the three dominancy groups. Unexpectedly, AoO of Dutch and AoI in Russian/Polish were not significant predictors for gender production or comprehension in bilinguals. Language (Polish/Russian) was a significant predictor for monolingual and bilingual gender production, but not for gender comprehension.
CHAPTER 6
RESULTS CASE TASKS

Having examined the results of the gender tasks in the previous chapter, we will now consider the acquisition of the case system. This chapter is divided into three sections, each of which presents the results related to one of the experimental tasks on case. There were two production tasks related to two different cases: the results of the genitive production task will be presented and discussed in Section 6.1, followed by the accusative production task in Section 6.2, and then the case comprehension task; Section 6.3.1 deals with the accusative, and 6.3.2 with the dative case. These sections will also explore the relation between case acquisition and language proficiency as measured using the sentence repetition tasks (SRTs), the age of onset of Dutch (AoO), and language dominancy. Finally, Section 6.4 will summarise the main results for all case tasks.

6.1 Results genitive production task
Following the pattern of the previous chapter, first the results of the monolingual participants will be introduced (Section 6.1.1), followed by the results of the bilingual participants (Section 6.1.2). Section 6.1.2 will also explore the relation between the performance on the genitive production task, on the one hand, and age and language proficiency for all participants, on the other hand, and input related measures for bilingual participants. Furthermore, for the bilingual participants it will consider language dominancy as measured by the SRTs.

In Section 2.4, it was hypothesised that Polish monolingual children will be faster at sorting out the case system than Russian monolingual children of the same age. However, due to the early age of acquisition of gender and case in both Polish and Russian (Section 2.3), no differences between Polish and Russian monolinguals will probably be found in the children studied here since they are older. Differences between the two groups of bilingual participants were expected: the Polish-Dutch children should show more accuracy in using the genitive case
endings than the Russian-Dutch children (Section 2.3). It was also hypothesised that an early AoO of Dutch would negatively influence children’s ability to produce genitive case endings.

It must be remembered that for both Polish and Russian all genders take a genitive case ending that is different from the nominative case ending but that for Russian stem-stressed neuter nouns, the genitive case ending sounds the same as the nominative (see Section 2.2). The number of errors on Russian neuter (stem-stressed and end-stressed taken together) will therefore be an underestimation of the actual number of errors. For the comparison with Polish neuter, only end-stressed Russian nouns can be used.

The genitive case production tasks for both Polish and Russian were checked with an item-analysis and turned out to have a good internal reliability (for Polish: $\alpha=.974$, for Russian: $\alpha=.966$). No outliers in items were observed; all items were therefore included in the analysis. Moreover, as an extra check on the construction of the test, it was administered to adult monolingual speakers. Native speakers were expected to be able to score at ceiling, and this was indeed the case (Polish: accuracy 99%; Russian: accuracy 100%).

### 6.1.1 Results genitive production task: monolinguals

All Polish monolingual children ($n=40$) and all Russian monolingual children ($n=41$) completed this task. The maximum number of analysable items was 960 for Polish and 1476 for Russian (see Section 3.4.1). Of those, 1% of the responses from the Polish participants had to be disregarded (1 missing response and 7 unanalysable items). For the Russian participants, this was 9% (49 items were not responded to and 87 items were unanalysable). Two monolingual children contributed 59 of the missing and unanalysable items and were excluded from the analysis for this task. Without those participants, 5% had to be disregarded. This difference in unanalysable responses between Polish and Russian was mainly due to the fact that the Russian children used more lexical alternatives than the Polish children, as mentioned in Section 5.1.1. All other items were scored as correct ‘1’ or incorrect ‘0’. The results in terms of accuracy for the monolingual Polish and Russian participants are set out in Table 6.1.
Table 6.1 Percentage accuracy (mean, standard deviation, range) on the genitive production task for Polish and Russian per gender: monolinguals

<table>
<thead>
<tr>
<th></th>
<th>MoPo* Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
</tr>
<tr>
<td>Total</td>
<td>n=40</td>
<td>n=39</td>
<td>n=39</td>
<td>n=39</td>
</tr>
<tr>
<td></td>
<td>97 (5)</td>
<td>94 (6)</td>
<td>96 (5)</td>
<td>91 (9)</td>
</tr>
<tr>
<td></td>
<td>75-100</td>
<td>74-100</td>
<td>82-100</td>
<td>63-100</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=40</td>
<td>n=39</td>
<td>n=39</td>
<td>n=39</td>
</tr>
<tr>
<td></td>
<td>93 (10)</td>
<td>93 (7)</td>
<td>93 (9)</td>
<td>93 (10)</td>
</tr>
<tr>
<td></td>
<td>50-100</td>
<td>75-100</td>
<td>67-100</td>
<td>67-100</td>
</tr>
<tr>
<td>Feminine</td>
<td>n=40</td>
<td>n=39</td>
<td>n=39</td>
<td>n=39</td>
</tr>
<tr>
<td></td>
<td>99 (3)</td>
<td>98 (4)</td>
<td>98 (5)</td>
<td>97 (7)</td>
</tr>
<tr>
<td></td>
<td>88-100</td>
<td>83-100</td>
<td>80-100</td>
<td>80-100</td>
</tr>
<tr>
<td>Neuter</td>
<td>n=40</td>
<td>n=39</td>
<td>n=40</td>
<td>n=39</td>
</tr>
<tr>
<td></td>
<td>98 (7)</td>
<td>90 (12)</td>
<td>97 (9)</td>
<td>84 (20)</td>
</tr>
<tr>
<td></td>
<td>63-100</td>
<td>42-100</td>
<td>67-100</td>
<td>17-100</td>
</tr>
</tbody>
</table>

*MoPo=monolingual Polish participants; MoRu=monolingual Russian participants.

Visual inspection of the data in Table 6.1 shows that both the Polish and Russian monolingual participants performed at ceiling on this task, except for the end-stressed neuter nouns in Russian. The scores for the Polish and Russian groups were highly similar for masculine and feminine genitives, but differed on neuter. An independent samples Mann-Whitney U test showed that there were significant differences between the Polish and Russian monolinguals on the test as a whole ($U=475; p=.002$). A series of independent samples Mann-Whitney U tests showed that the Polish monolinguals were significantly better than the Russian children on feminine genitives ($U=646, p=.029$) and neuter genitives ($U=471.5, p<.001$), but not on masculine ($U=742, p=.689$). As in the gender production tasks (Section 5.1.1), no differences were expected between the Polish and Russian monolingual children due to the ceiling effect. Due to the fact that Russian has stem-stressed and end-stressed endings, feminine and neuter were
expected to be more challenging for the younger Russian children (see Section 2.2).

A related samples Friedman’s two-way analysis of variance by ranks showed that both within the Polish and the Russian task, there were significant differences between the genders: for Polish, \( \chi^2(2)=17.464, p<.001 \); for Russian, \( \chi^2(2)=12.133, p=.002 \). Post hoc analysis with Wilcoxon signed-rank tests was conducted with a Bonferroni correction applied, resulting in a significance level set at \( p<0.0125 \). This showed that in Polish performance on the masculine genitive was significantly worse than on the feminine (\( Z=-3.401, p=.001 \)) and neuter (\( Z=-2.624, p=.009 \)); the Russian performance on the masculine (\( Z=-3.131, p=.002 \)) and the neuter was significantly (\( Z=-3.489, p<.001 \)) worse than on the feminine.

In a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language as between-subjects factor, main and interaction effects were explored. Language proficiency and age were entered as covariates.¹ There was no significant main effect for gender, but there was a significant interaction effect for gender and language with a Greenhouse-Geisser correction (\( F(2,150)=4.933, p=.009, \eta^2=.062 \)). Age and language proficiency were non-significant.

As in the previous chapter, it is necessary to consider stem-stressed and end-stressed items separately in order to determine the role of transparency of the ending on the genitive production in Russian. Due to no clear audible differences in endings between the neuter nominative, genitive and accusative, performance on Russian neuter stem-stressed nouns can be expected to be more accurate in genitive case production than on end-stressed nouns.

As is clear from Table 6.1, for all gender*stress combinations, the Russian monolinguals performed at ceiling with the exception of end-stressed neuter nouns. A related samples Wilcoxon signed rank test for all genders taken together indicated a significant difference between the stem-stressed and end-stressed genitives for Russian (\( Z=-3.074, p=.002 \)), and this was clearly due to the neuter nouns. There were no differences between the masculine stem-stressed and end-

¹ Please note that gender and case – next to other grammatical measures – contribute considerably to the total score in the language proficiency tasks. Therefore, the language proficiency and gender and case scores are not totally independent.
stressed nor between the feminine stem-stressed and end-stressed nouns. Neuter stem-stressed nouns had a significantly higher accuracy than neuter end-stressed nouns \((Z=-3.576, p<.001)\). This result confirmed our expectations. Exploring main effects and interaction effects in a two-way mixed factorial ANOVA, with gender and stress as within-subjects factor, and with language proficiency and age as covariates, we found no significant main effects, nor interaction effects. The effects of the covariates were also non-significant.

As was mentioned in Section 3.6.5, ideally a three-way comparison between Polish, Russian stem-stressed and Russian end-stressed should be made. Since this is not possible, Polish, Russian stem-stressed and Russian end-stressed nouns were compared pairwise. Exploring the differences between Polish and Russian stem-stressed and between Polish and Russian end-stressed with a series of independent samples Mann-Whitney U tests, we see that, for the total scores, there were no significant differences between Polish and Russian stem-stressed nouns \((U=666, p=.225)\), but that the performance on the Polish items was significantly better than on the Russian end-stressed genitives \((U=490, p=.003)\). This difference was due to the Polish neuter items being produced significantly better than the Russian neuter end-stressed nouns \((U=472.5, p<.001)\). Neuter is thus confirmed as being more difficult in Russian than in Polish (see Section 2.4).

Subsequently, to explore the independent variance in genitive production accounted for by language (Polish or Russian), language proficiency and age in monolingual participants multiple regressions were carried out. The predictors ‘language proficiency in Polish/Russian’ and ‘age’ were entered in a first separate model, the predictor for language, ‘Polish vs. Russian’, was entered in model two. The results of the significant regression are presented in Table 6.2.
Table 6.2 Multiple regression analysis of factors related to the genitive production task in monolinguals

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>(\beta)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.818</td>
<td>.051</td>
<td>16.139</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>.001</td>
<td>.125</td>
<td>1.055</td>
<td>ns</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.102</td>
<td>.053</td>
<td>.227</td>
<td>1.917</td>
<td>ns</td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.880</td>
<td>.055</td>
<td>15.906</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.000</td>
<td>.001</td>
<td>.054</td>
<td>.458</td>
<td>ns</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.115</td>
<td>.052</td>
<td>.255</td>
<td>2.212</td>
<td>.030</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.030</td>
<td>.012</td>
<td>-.265</td>
<td>-.242</td>
<td>.018</td>
</tr>
</tbody>
</table>

Note: \(R^2=.088\) (\(p=.030\)) for model 1, \(\Delta R^2=.066\) (\(p=.018\)) for model 2.

The regression model was significant, \(F(3,78)=4.568, p=.005\), but explained only 15% of the variance in genitive production in the monolingual groups. ‘Language proficiency’ was not a significant predictor in model 1, but in combination with ‘Polish vs. Russian’ it became significantly related to genitive production. ‘Polish vs. Russian’ was also significantly related to genitive production: Polish has an advantage over Russian.

An error analysis can inform the interpretation of the results (Table 6.3).

Table 6.3 Distribution of mistakes over error types (onto total number of items) on the genitive production task: monolinguals

<table>
<thead>
<tr>
<th>GenError type</th>
<th>MoPo Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenError 1 (M: no ending)</td>
<td>0.4</td>
<td>1.4</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>GenError 2 (M: {-i})</td>
<td>0</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>GenError 3 (M: other)</td>
<td>1.9</td>
<td>0.1</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>GenError 4 (F:{-a})</td>
<td>0.2</td>
<td>0.4</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>GenError 5 (F: {-э}/{-а})</td>
<td>0</td>
<td>0.1</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>GenError 6 (F: other)</td>
<td>0</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>GenError 7 (N:{-o})</td>
<td>0.7</td>
<td>1.9</td>
<td>0</td>
<td>1.9</td>
</tr>
<tr>
<td>GenError 8 (N: {-i})</td>
<td>0</td>
<td>0.7</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>GenError 9 (N: other)</td>
<td>0.1</td>
<td>0.3</td>
<td>0</td>
<td>0.3</td>
</tr>
<tr>
<td>Total GenError</td>
<td>3.3</td>
<td>5.6</td>
<td>1.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

As Table 6.3 shows, errors in genitive production were relatively rare in both the Polish and Russian monolinguals. The most frequent mistake in the Polish monolinguals was the use of another ending with masculine nouns. This was
mainly due to the fact that Polish allows for an optional genitive partitive (as shown by the responses of the Polish adult group, see also Section 2.2 on variation in genitive endings in Polish), but that was not the default case for the lexical items tested here. In the Russian children, the most frequent error type was failing to use a genitive ending with the neuter and masculine nouns. For neuter, this could be observed only in the end-stressed nouns; in stem-stressed nouns that mistake is not noticeable. Apparently, the monolingual Russian children occasionally make mistakes in neuter genitives. Moreover, there were a few masculine nouns that were produced without an ending as if they were frozen nominatives (see Section 2.3).

In sum, contrary to expectations and despite the fact that both groups scored at ceiling, there were significant differences between the Polish and Russian monolinguals on the task as a whole. The Polish group outperformed the Russian group on feminine and neuter genitives. Considering each language separately we saw that the Polish children were worse with masculine nouns, and the Russian children were worse with masculine and neuter. Due to the fact that neuter stem-stressed items in the genitive sound identical to the nominative, very few errors could be detected. This probably results in an inflation of the scores in this category. Therefore, the fact that apparently performance on stem-stressed nouns was significantly more accurate than on end-stressed nouns has to be treated with caution. In the Polish monolinguals, the most frequent error was applying another ending to masculine nouns, whereas for Russian applying no genitive ending to masculine or neuter nouns was the most frequent error. Accuracy on the genitive production task can be predicted by ‘Polish vs. Russian’ and ‘language proficiency’: the Polish children and the children with higher language proficiency scored higher than the Russian children and the children with lower language proficiency.

6.1.2 Results genitive production task: bilinguals

All bilingual Polish-Dutch and Russian-Dutch children completed the genitive production task. The maximum number of analysable items was 912 for Polish and 1404 for Russian (see Section 3.4.1). For the Polish-Dutch participants, 2% of the responses had to be excluded from analysis (6 missing responses and 13
unalysable items). For the Russian-Dutch participants, this was 10% (96 missing responses and 42 unanalysable). From the 96 missing responses for the Russian-Dutch participants, 83 were due to three participants. They were subsequently excluded due to the low number of analysable responses. Disregarding those three participants, 4% of the responses had to be excluded. All other items were scored as correct ‘1’ or incorrect ‘0’. The results in terms of accuracy for the Polish-Dutch and Russian-Dutch participants are set out in Table 6.4.

Table 6.4 Accuracy (mean, standard deviation, range) on the genitive production task for Polish and Russian per gender: bilinguals

<table>
<thead>
<tr>
<th>Language</th>
<th>BiPo*</th>
<th>BiRu</th>
<th>BiRu</th>
<th>BiRu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
</tr>
<tr>
<td></td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
</tr>
<tr>
<td></td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
</tr>
<tr>
<td>Total</td>
<td>n=38</td>
<td>n=36</td>
<td>n=35</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>52</td>
<td>63</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>(39)</td>
<td>(26)</td>
<td>(24)</td>
<td>(32)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>18-100</td>
<td>29-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=38</td>
<td>n=35</td>
<td>n=35</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>49</td>
<td>47</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>(38)</td>
<td>(39)</td>
<td>(41)</td>
<td>(45)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Feminine</td>
<td>n=38</td>
<td>n=35</td>
<td>n=35</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>49</td>
<td>56</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>(43)</td>
<td>(40)</td>
<td>(41)</td>
<td>(39)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Neuter</td>
<td>n=38</td>
<td>n=35</td>
<td>n=35</td>
<td>n=35</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>62</td>
<td>89</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>(40)</td>
<td>(18)</td>
<td>(19)</td>
<td>(27)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>17-100</td>
<td>33-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

*BiPo=Polish-Dutch participants; BiRu=Russian-Dutch participants.

As is clear from Table 6.4, the Polish-Dutch and Russian-Dutch bilingual groups did not perform at ceiling on this task. The scores for the task as a whole were very comparable across groups. An independent samples Mann-Whitney U test showed that there were no significant differences between the Polish and Russian bilinguals on the test as a whole ($U=671.5, p=.892$), and no significant differences

A related samples Friedman’s two-way analysis of variance by ranks showed that within the Polish task there were marginally significant differences between genders ($\chi^2(2)=6.007$, $p=.048$). Unexpectedly, no differences between the genders were found for the Russian task ($\chi^2(2)=4.984$, $p=.083$). Post hoc analysis with Wilcoxon signed-rank tests with a Bonferroni correction (significance level was set at $p<.0125$) resulted in there no longer being significant differences between the three genders in Polish.

In a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language as between-subjects factor main and interaction effects were explored. Language proficiency and age were entered as covariates. There was no significant main effect for gender, and no significant interaction effects. However, there was a significant interaction between gender and language proficiency with a Greenhouse-Geisser correction ($F(2,132)=4.390$, $p=.023$, $\eta^2=.062$).

The comparison of stem-stressed and end-stressed items for Russian (see Table 6.4) showed a different pattern for the Russian-Dutch bilinguals compared to the Russian monolinguals on genitive production (cf. Table 6.1). Unlike the results from the monolinguals, the mean accuracy of stem-stressed and end-stressed nouns for bilinguals differed for the test as a whole as well as for the feminine and neuter items (with stem-stressed genitives being better than end-stressed genitives). A Wilcoxon signed rank test confirmed that there were significant differences between the stem-stressed and end-stressed items for Russian ($Z=-4.298$, $p<.001$). A Bonferroni adjustment was applied and the significance level was set at $p<.0125$. Comparing Russian stem-stressed and Russian end-stressed genitives across genders, we see no significant differences between the masculine stem-stressed and end-stressed nouns ($Z=-1.497$, $p=.134$), and the feminine stem-stressed and end-stressed ($Z=-2.400$, $p=.016$), but there were significant differences between the neuter stem-stressed and neuter end-stressed items ($Z=-4.929$, $p<.001$). As was found for the monolinguals, the expected advantage of end stress over stem stress was also not confirmed for the bilinguals. In fact, the opposite was found (this will be further explored in Section 7.2).
Exploring main effects and interaction effects in a two-way mixed factorial ANOVA, with gender and stress as within-subjects factors, and with language proficiency and age as covariates, there were no main effects of gender or stress, but there was a significant interaction effect of stress and gender \( (F(2,62)=6.063, p=.005, \eta^2=.164) \), as well as significant interactions between gender and language proficiency \( (F(2,62)=7.842, p=.004, \eta^2=.202) \) (due to the high scores in neuter stem-stressed), and gender, stress and language proficiency \( (F(2,62)=5.031, p=.012, \eta^2=.14) \).

When the results of genitive case production in the Russian monolinguals and the bilinguals are taken together, a significant main effect of gender emerged with a Greenhouse-Geisser correction \( (F(2,138)=3.492, p=.050, \eta^2=.048) \). There was also a significant interaction effect of stress and gender \( (F(2,138)=9.702, p<.001, \eta^2=.123) \). Furthermore, there were significant interactions between stress and language proficiency \( (F(1,69)=4.755, p=.033, \eta^2=.064) \), gender and language proficiency \( (F(2,138)=10.782, p>.001, \eta^2=.135) \), stress, gender and language proficiency \( (F(2,138)=6.668, p=.002, \eta^2=.088) \), and stress, gender and bilingual status \( (F(2,138)=6.975, p=.002, \eta^2=.092) \).

As mentioned above, looking at the results of both neuter end-stressed and neuter stem-stressed items in Russian could lead to a vast overestimation of the accuracy with neuter nouns since the spoken form of the neuter stem-stressed genitive sounds the same as the nominative. The comparison of Polish, on the one hand, and Russian end-stressed nouns, on the other, will be most informative. Exploring the differences in genitive production between Polish and Russian stem-stressed and between Polish and Russian end-stressed pairwise with a series of independent samples Mann-Whitney U tests (see Section 3.6.5), we see that, for the total scores, there were no significant differences between Polish and Russian stem-stressed \( (U=743.5, p=.386) \), and no significant differences between Polish and Russian end-stressed nouns \( (U=574.5, p=.236) \). Looking at individual genders, we see that the Russian bilinguals outperformed the Polish bilinguals on the stem-stressed neuter items \( (U=1001, p<.001) \), which is probably due to the fact that the most frequent mistake in Russian (a bare nominative) is undetectable.
Finally, the scores on the genitive production task of the bilingual groups were compared to those of the monolingual groups (see Table 6.1). Mann-Whitney U tests showed that the monolingual groups outperformed their bilingual peers on the test as a whole (Polish: $U=196$, $p<.001$; Russian: $U=97.5$, $p<.001$), as well as on each gender (Polish: masculine: $U=226.5$, $p<.001$; feminine: $U=277$, $p<.001$; neuter: $U=261.5$, $p<.001$; Russian: masculine: $U=201.5$, $p<.001$; feminine: $U=180.5$, $p<.001$; neuter: $U=142.5$, $p<.001$).

After bilingual mode was added to a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language and bilingual mode as between-subjects, and with language proficiency and age as covariates, there was no significant main effect of gender. There was, however, a significant interaction with a Greenhouse-Geisser correction between gender and language proficiency ($F(2,286)=5.565$, $p=.008$, $\eta^2=.037$), and between gender, language and bilinguals status ($F(2,286)=5.988$, $p=.006$, $\eta^2=.040$).

Even though there were no main effects for gender in the bilinguals groups, it is still interesting to see what types of error were most frequent. The distribution of the errors over the error types (see Section 3.6.4) is set out in Table 6.5.

<table>
<thead>
<tr>
<th>GenError type</th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>GenError 1 (M: no ending)</td>
<td>14.3</td>
<td>15.1</td>
<td>8.1</td>
<td>7.0</td>
</tr>
<tr>
<td>GenError 2 (M: [-i])</td>
<td>0.0</td>
<td>0.6</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>GenError 3 (M: other)</td>
<td>2.4</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>GenError 4 (F: [-a])</td>
<td>12.3</td>
<td>13.6</td>
<td>5.9</td>
<td>7.7</td>
</tr>
<tr>
<td>GenError 5 (F: [-ę]/[-u])</td>
<td>1.0</td>
<td>0.9</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>GenError 6 (F: other)</td>
<td>0.4</td>
<td>0.6</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>GenError 7 (N: [-o])</td>
<td>14.8</td>
<td>8.3</td>
<td>0.1</td>
<td>8.2</td>
</tr>
<tr>
<td>GenError 8 (N: [-i])</td>
<td>0.2</td>
<td>1.9</td>
<td>1.4</td>
<td>0.5</td>
</tr>
<tr>
<td>GenError 9 (N: other)</td>
<td>0.1</td>
<td>0.9</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>Total GenError</td>
<td>45.5</td>
<td>42.0</td>
<td>16.6</td>
<td>0.254</td>
</tr>
</tbody>
</table>

Compared to the monolinguals, both bilingual groups had a more substantial number of errors in genitive production and also the types of mistakes were different. For both the Polish-Dutch and Russian-Dutch children, the most frequent errors were those in which the child erroneously used a bare nominative...
form in all three genders (GenErrors 1, 4, and 7). Of the three genders, the Polish-Dutch bilinguals most often used a nominative form with neuter words; the Russian-Dutch children most frequently used a nominative form with masculine items. The Polish-Dutch children applied other erroneous endings to masculine nouns in 2.4% of the items. The Russian-Dutch children applied the feminine {-i} ending to neuter in 1.9% of the items (GenError 8). This very small percentage is contrary to expectations (see Section 2.4). There were also some instances of use of case endings of the wrong gender. The Polish bilinguals hardly ever used the wrong case endings for feminine and neuter, but more often for masculine items. The Russian bilinguals more often applied a different case ending to neuter nouns than to the other genders. The usage of case endings of another gender was less frequent than hypothesised.

As expected, in Russian stem-stressed items compared with end-stressed items we see that GenError 7 is only observed in end-stressed nouns (unless the child made a stress mistake too). The reanalysis of stem-stressed neuter nouns as feminine and therefore declined with a feminine {-i} as in GenError 8 was not as frequent as expected. Possibly, those children who interpreted neuter stem-stressed nouns as feminine were those who did not apply case endings in general. This will be further discussed in Chapter 7.

**Dominancy groups and genitive production**

As has been elaborated upon in Section 4.2.3, each bilingual participant was put in one out of three dominancy groups based on the scores on the Polish/Russian SRT and the Dutch SRT. Below, the results of the genitive production task will be discussed in the light of those three dominancy groups. See Figure 6.1 and 6.2 for the accuracy per dominancy group per gender for both Polish-Dutch and Russian-Dutch children.
As becomes clear from Figure 6.1, the dominancy groups in Polish bilinguals showed a clear pattern: as expected, Polish dominant bilinguals achieved the highest accuracy, balanced bilinguals had the largest within-group variation, and the Dutch dominant bilinguals were almost at floor. The Russian-Dutch bilinguals, however, showed much less variance across dominancy groups, but larger variance within the dominancy groups (see Figure 6.2). Neuter had a much smaller variation than the other genders. This was expected, since in the stem-stressed neuter condition, there are no noticeable differences between a correct
genitive ending (in {-a}[ə]) and a frozen nominative (a nominative (or accusative) in {-o} [ə] (see Section 2.2)).

**Predictors for genitive production**
To explore the independent variance in genitive production in all bilingual participants according to language (Polish or Russian), input related measures and the dominancy group, multiple regressions were carried out. The predictors ‘language proficiency in Polish/Russian’, ‘language proficiency in Dutch’ and ‘age’ were entered in a first separate model, the predictors ‘AoO of Dutch’, and ‘AoI in Polish/Russian’ were entered in model two, ‘Polish vs. Russian’ was entered in model three. In order to test for language dominancy, two dummy variables were created and entered in the fourth model (baseline: balanced bilinguals; Dummy 1: Polish/Russian dominant vs. balanced bilinguals; Dummy 2: Dutch dominant vs. balanced bilinguals). Table 6.6 presents the results of the regression analysis.

**Table 6.6 Multiple regression analysis of factors related to genitive production task in bilinguals**

<table>
<thead>
<tr>
<th>Model 1</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.069</td>
<td>.234</td>
<td>.295</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.004</td>
<td>.056</td>
<td>.591</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.855</td>
<td>.095</td>
<td>.764</td>
<td>9.040</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.235</td>
<td>.118</td>
<td>-.192</td>
<td>-1.986</td>
<td>ns.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.134</td>
<td>.275</td>
<td>.485</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.004</td>
<td>.045</td>
<td>.452</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.856</td>
<td>.095</td>
<td>.764</td>
<td>8.989</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.228</td>
<td>.120</td>
<td>-.187</td>
<td>-1.903</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.025</td>
<td>.056</td>
<td>-.039</td>
<td>-.452</td>
<td>ns.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 3</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.162</td>
<td>.305</td>
<td>.531</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.001</td>
<td>.004</td>
<td>.025</td>
<td>.236</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.813</td>
<td>.112</td>
<td>.726</td>
<td>7.250</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.201</td>
<td>.128</td>
<td>-.165</td>
<td>-1.577</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.027</td>
<td>.057</td>
<td>-.041</td>
<td>-.468</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>.002</td>
<td>.003</td>
<td>.071</td>
<td>.719</td>
<td>ns.</td>
</tr>
<tr>
<td>AoI Russian/Polish</td>
<td>.036</td>
<td>.191</td>
<td>.017</td>
<td>.187</td>
<td>ns.</td>
</tr>
</tbody>
</table>
Although all four models were significant, the step from model one to model two and further did not lead to a significant change in $R^2$. The first regression was significant ($F(3,67)=27.407, p<.001$). The only significant predictor for genitive production in bilinguals was ‘language proficiency in Polish/Russian’ that explained 56% of the variation. Contrary to expectations, none of the input related factors or language contributed significantly to explaining the variation (this will be further explored in Section 7.4).

Finally, to explore the independent variance in genitive production in all participants, which might be accounted for by language (Polish or Russian), bilingual status (monolingual or bilingual), language proficiency or age, multiple regressions were carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate model, and the predictors ‘Polish vs. Russian’ and ‘bilingual status’ were entered in model two. The results of the regression analysis with input related measures are presented in Table 6.7.

### Table 6.6 (continued)

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.103</td>
<td>.319</td>
<td>.322</td>
<td>ns.</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.005</td>
<td>.037</td>
<td>.348</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.826</td>
<td>.207</td>
<td>.737</td>
<td>3.989</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.182</td>
<td>.227</td>
<td>-.149</td>
<td>-.803</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.023</td>
<td>.058</td>
<td>-.036</td>
<td>-.401</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>.002</td>
<td>.003</td>
<td>.072</td>
<td>.708</td>
<td>ns.</td>
</tr>
<tr>
<td>AoI Russian/Polish</td>
<td>.003</td>
<td>.198</td>
<td>.001</td>
<td>.015</td>
<td>ns.</td>
</tr>
<tr>
<td>Po/Ru dominant vs. balanced bilinguals</td>
<td>.057</td>
<td>.124</td>
<td>.067</td>
<td>.459</td>
<td>ns.</td>
</tr>
<tr>
<td>Du dominant vs. balanced bilinguals</td>
<td>.036</td>
<td>.113</td>
<td>.048</td>
<td>.316</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.562 (p<.001)$ for model 1, $\Delta R^2=.001 (p=.653)$ for model 2, $\Delta R^2=.004 (p=.747)$ for model 3, $\Delta R^2=.004 (p=.764)$ for model 4.
Table 6.7 Multiple regression analysis of factors related to genitive production task in monolinguals and bilinguals

<table>
<thead>
<tr>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.371</td>
<td>.114</td>
<td>3.256</td>
<td>.001</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>-.004</td>
<td>.002</td>
<td>-.113</td>
<td>-2.328</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.914</td>
<td>.055</td>
<td>.801</td>
<td>16.519</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.730</td>
<td>.131</td>
<td>5.560</td>
<td>.000</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>-.002</td>
<td>.002</td>
<td>-.065</td>
<td>-1.381</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.718</td>
<td>.063</td>
<td>.630</td>
<td>11.358</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.042</td>
<td>.028</td>
<td>-.068</td>
<td>-1.493</td>
</tr>
<tr>
<td>Bilingual status</td>
<td>-.180</td>
<td>.035</td>
<td>-.293</td>
<td>-5.161</td>
</tr>
</tbody>
</table>

Note: $R^2 = .654$ (p < .001) for model 1, $\Delta R^2 = .059$ (p < .001) for model 2.

The final regression model was significant ($F(4,149) = 90.076$, $p < .001$), and explained 71% of the variance in genitive production in all groups taken together (65% was explained with the predictors from step one only). Although ‘age’ was a significant predictor in model one, it no longer was when ‘Polish vs. Russian’ and ‘bilingual status’ were added.

In sum, compared to the monolinguals, both bilingual groups performed significantly worse on the task as a whole and on each of the individual genders. Contrary to expectations, the bilingual Polish-Dutch and Russian-Dutch children did neither differ significantly on the genitive production task as a whole, nor on the individual genders. Within each language, there were no differences between the genders. Within Russian, performance on the stem-stressed neuter items was significantly better than on the end-stressed neuter items. This was expected, however, since mistakes cannot be easily detected there. For both groups, the most frequent mistakes in genitive production were those in which a nominative form was used. The dominancy graphs showed that for Polish, the three groups scored approximately as predicted. For Russian, there were fewer differences between the three groups than for Polish. Within the bilingual groups, genitive production could be predicted by language proficiency in Polish/Russian only, not in Dutch. Genitive production in all participants taken together could be predicted by language proficiency in Polish/Russian and bilingual status.
6.2 Results accusative production task

Following the pattern of the previous section, first the results of the monolingual participants will be introduced (Section 6.2.1). Subsequently, in Section 6.2.2, the results of the bilingual participants will be elaborated upon. The relation between the performance on the accusative production task and age and language proficiency for all participants, and input related measures for the bilingual participants will be explored. Furthermore, for the bilingual participants language dominancy as measured by the sentence repetition tasks (SRTs) will be taken into account.

For the accusative production task, roughly the same general hypotheses hold as for the genitive production task. No differences were expected between the monolingual groups due to the early age of acquisition of the accusative case (see Section 2.3). The bilingual Polish-Dutch children were expected to outperform the Russian-Dutch children on accusative case production because of the differences in the linguistic systems (see Section 2.4). The predictions differed with respect to the various genders, since animacy is still being acquired up to age 4;0-4;6 in Polish and Russian (see Section 2.3). The youngest monolingual children in both monolingual groups were therefore expected to make mistakes in animacy, reflected in a slightly lower score for masculine. Unlike the monolinguals, the bilinguals were expected to have problems with animacy (based on past research, see Section 2.3). Please note that, in this section, responses for masculine nouns are given for animate and inanimate items separately.

The accusative production tasks for both Polish and Russian were checked with an item analysis and turned out to have a good internal reliability (for Polish \( \alpha = .786 \); for Russian \( \alpha = .923 \)). No outliers in items were observed; all items were therefore included in the analysis. Moreover, as an extra check to determine whether the test was constructed well, it was administered to adult monolingual speakers. Native speakers were expected to be able to score at ceiling, and this was the case for Russian (accuracy: 100%). However, the Polish monolingual adults gave an optional genitive partitive as response to the masculine items balon ‘balloon’ and pomidor ‘tomato’. This not the default form for those nouns (see
Therefore, for the children both the optional genitive partitive and the normal accusative ending were regarded as correct.

6.2.1 Results accusative production task: monolinguals

All 40 monolingual Polish children and 40 monolingual Russian children completed this task (one Russian child did not complete this task). The maximum number of analysable items was 960 for Polish and 1440 for Russian (see Section 3.4.2). Of those, 1% of the responses from the Polish participants had to be disregarded (0 missing responses and 10 unanalysable items). For the Russian participants, this was 5.8% (5 missing responses and 78 unanalysable). The difference in unanalysable responses between the Polish and Russian children was mainly due to the fact that Russian children more often used lexical alternatives. All other items were scored as correct ‘1’ or incorrect ‘0’. The results in terms of accuracy for the Polish and Russian monolingual participants are set out in Table 6.8.

Table 6.8 Percentage accuracy (mean, standard deviation, range) on the accusative production task for Polish and Russian per gender: monolinguals

<table>
<thead>
<tr>
<th></th>
<th>MoPo Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>range</td>
<td>mean (SD)</td>
<td>range</td>
</tr>
<tr>
<td>Total</td>
<td>n=40 98 (3)</td>
<td>n=40 95 (6)</td>
<td>n=40 97 (4)</td>
<td>n=40 93 (10)</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=40 95 (7)</td>
<td>n=40 99 (9)</td>
<td>n=40 97 (6)</td>
<td>n=40 96 (15)</td>
</tr>
<tr>
<td>Masculine animate</td>
<td>n=40 98 (11)</td>
<td>n=40 99 (8)</td>
<td>n=40 99 (8)</td>
<td>n=40 96 (13)</td>
</tr>
</tbody>
</table>

—

2 See also Dąbrowska (2001) for possible explanations.
Table 6.8 (continued)

<table>
<thead>
<tr>
<th></th>
<th>MoPo</th>
<th>MoRu</th>
<th>MoRu</th>
<th>MoRu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
</tr>
<tr>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td></td>
</tr>
<tr>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td></td>
</tr>
<tr>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Masculine</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
</tr>
</thead>
<tbody>
<tr>
<td>inanimate</td>
<td>94</td>
<td>94</td>
<td>97</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>(9)</td>
<td>(13)</td>
<td>(8)</td>
<td>(22)</td>
</tr>
<tr>
<td>80-100</td>
<td>38-100</td>
<td>75-100</td>
<td>0-100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feminine</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>99</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(8)</td>
<td>(8)</td>
<td>(11)</td>
</tr>
<tr>
<td>86-100</td>
<td>67-100</td>
<td>80-100</td>
<td>50-100</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neuter</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
<th>n=40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>95</td>
<td>98</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
<td>(6)</td>
<td>(6)</td>
<td>(11)</td>
</tr>
<tr>
<td>100-100</td>
<td>82-100</td>
<td>80-100</td>
<td>67-100</td>
<td></td>
</tr>
</tbody>
</table>

Visual inspection of the data in Table 6.8 shows that both the Polish and Russian monolingual participants perform at ceiling on this task, and that the Polish and Russian scores are highly similar. An independent samples Mann-Whitney U test showed that there are no significant differences between the Polish and Russian monolinguals on the test as a whole ($U=656; p=.114$). A series of independent samples Mann-Whitney U tests showed that the Polish monolinguals outperformed the Russian monolinguals on feminine ($U=607.5, p=.008$) and neuter nouns ($U=440, p<.001$), but not on masculine ($U=899, p=.262$). Although no differences were expected due to the ceiling effect, the higher performance of the Polish children on feminine and neuter was as expected (see Section 2.2).

A series of related samples Friedman’s two-way analysis of variance by ranks tests showed that within the Polish task there were significant differences between the genders ($\chi^2(2)=24.111, p<.001$), but no significant differences between the genders were found for the Russian task ($\chi^2(2)=.956, p=.620$). Post hoc analysis with Wilcoxon signed-rank tests were performed with a Bonferroni correction resulting in a significance level of $p<.0125$. It was found that for the Polish monolinguals, accuracy on masculine nouns was significantly worse than on feminine ($Z=-2.667, p=.008$) and neuter ($Z=-3.698, p<.001$).
For masculine, a division between animate and inanimate had to be made. Whereas animate masculine nouns get a case ending in the accusative, inanimate nouns have a zero ending (Section 2.2.2). The monolinguals were not expected to show problems with animacy. A related-samples Wilcoxon signed-rank tests showed however a marginal significant difference between masculine animate and masculine inanimate nouns for Polish ($Z=1.988, p=.047$) but no significant difference for Russian ($Z=1.223, p=.222$).

In a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language as between-subjects factor, main and interaction effects were explored. Language proficiency and age were entered as covariates. There was a significant main effect for gender with a Greenhouse-Geisser correction ($F(2,152)=5.428, p=.007, \eta^2=.067$), and a significant interaction between gender and language with a Greenhouse-Geisser correction ($F(2,152)=7.700, p=.001, \eta^2=.092$).

Further, the stem-stressed and end-stressed items for Russian were compared. In the accusative case, Russian neuter nouns take the same ending as in the nominative. Stem-stressed neuter nouns, moreover, are homophonous in the accusative with the genitive and nominative. Therefore, in the neuter stem-stressed, higher scores were expected compared to the neuter end-stressed condition, although this does not necessarily reflect accuracy. As is clear from Table 6.8, for all gender*stress combinations the Russian monolinguals performed at ceiling. The mean accuracy for the monolingual Russian children on stem-stressed and end-stressed feminine is identical. A related-samples Wilcoxon signed rank test showed that there were differences between the stem-stressed and end-stressed items for Russian on the test as a whole ($Z=-2.536, p=.011$), with the stem-stressed items being significantly better than the end-stressed items. In the individual genders, the performance on neuter stem-stressed items was significantly better than on the neuter end-stressed nouns ($Z=-2.530, p=.011$), as was expected.

Further, a two-way mixed factorial ANOVA was performed with gender and stress as within-subjects factor, and with language proficiency and age as covariates. There were no main effects of gender or stress, and there was no interaction between gender and stress. The covariates were also non-significant.
Exploring the differences in accuracy between Polish and Russian stem-stressed items and between Polish and Russian end-stressed items in a pairwise manner with a series of independent samples Mann-Whitney U tests, we see that for the total scores, there were no significant differences between Polish and Russian stem-stressed (U=722, p=.401), but there were significant differences between Polish and Russian end-stressed (U=602, p=.038). Concerning the individual genders, the Polish monolinguals outperformed the Russian monolinguals on the two neuter conditions (stem-stressed: U=720, p=.042; end-stressed: U=500, p<.001), and on the stem-stressed feminine nouns (U=645, p=.02). This confirmed that neuter, both for end-stressed and stem-stressed nouns, is more difficult in Russian than in Polish (see Section 2.4).

Subsequently, to explore the independent variance in accusative production accounted for by language (Polish or Russian), language proficiency and age in monolingual participants multiple regressions were carried out. As for the genitive production task, the predictors ‘language proficiency in Polish/Russian’ and ‘age’ were entered in a first separate model, the predictor ‘Polish vs. Russian’ was entered in model two. The results of the significant regression are presented in Table 6.9.

<table>
<thead>
<tr>
<th>Table 6.9 Multiple regression analysis of factors related to the accusative production task in monolinguals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
</tr>
</tbody>
</table>

Note $R^2=.046$ (p=.165) for model 1, $\Delta R^2=.054$ (p=.035) for model 2.

The regression model was significant ($F(3,79)=2.819$, p=.045), but explained only 10% of the variance in accusative production in the monolingual groups. The
only predictor that was significantly related to accuracy of accusative production in monolinguals was ‘Polish vs. Russian’.

An error analysis can inform the interpretation of these results further (Table 6.10).

<table>
<thead>
<tr>
<th>AccError type</th>
<th>MoPo</th>
<th>MoRu</th>
<th>MoRu</th>
<th>MoRu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
<td></td>
</tr>
<tr>
<td>AccError1 (M: no ending)</td>
<td>0.2</td>
<td>0.3</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>AccError2 (M: {-a})</td>
<td>0.6</td>
<td>1.0</td>
<td>0.3</td>
<td>0.7</td>
</tr>
<tr>
<td>AccError3 (M: {-ę}/{-u})</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>AccError4 (M: other)</td>
<td>0.8</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>AccError5 (F: {-a})</td>
<td>0.2</td>
<td>0.8</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>AccError6 (F: {-i})</td>
<td>0.1</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>AccError7 (F: other)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>AccError8 (N: {-a})</td>
<td>0.0</td>
<td>0.6</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td>AccError9 (N: {-ę}/{-u})</td>
<td>0.0</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>AccError10 (N: other)</td>
<td>0.1</td>
<td>0.8</td>
<td>0.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Total AccError</td>
<td>2.1</td>
<td>4.3</td>
<td>1.3</td>
<td>3.0</td>
</tr>
</tbody>
</table>

*Note, ‘no ending’ is correct for inanimate, but incorrect for animate nouns; masculine in {-a} is correct for animate, but not correct for inanimate nouns.

As is clear from Table 6.10, for both the Polish and Russian monolinguals, mistakes in accusative production were highly infrequent. However, the Russian children made more mistakes than the Polish children. Although mistakes were rare, we can see that for the Polish monolinguals, errors in accusative production were mainly in masculine items. For the Russian monolinguals, mistakes were almost evenly distributed.

Comparing stem-stressed and end-stressed patterns for Russian, we see that, as was the case for genitive production, in end-stressed nouns more errors were observed than in stem-stressed nouns: due to homophony in the endings, errors are not detectable in stem-stressed items. Performance on Polish is in-between Russian stem-stressed and end-stressed in terms of the amount of mistakes.

To summarise, as expected, there were no differences on accusative production between Polish and Russian monolinguals on the task as a whole. Considering the genders separately, we saw that performance was comparable on masculine accusatives, but that the Polish monolinguals outperformed the Russian
monolinguals on feminine and neuter ones. Within the languages, Polish children scored worse on masculine than on the other genders. Within Russian, there were no significant differences between the genders. Polish children were moreover slightly worse in inanimate than in animate masculine nouns but for Russian, there were no differences. Due to the fact that neuter stem-stressed items in the accusative sound identical to the nominative and genitive, very few errors could be detected leading to the performance on stem-stressed nouns being significantly more accurate than on end-stressed nouns. This result must be treated with caution therefore. In the Polish monolinguals, although mistakes were rare, most errors were in masculine nouns, whereas for Russian they were evenly distributed over the error types. Accuracy on the accusative production task could be predicted by ‘Polish vs. Russian’ only: the Polish children scored slightly higher than the Russian children.

6.2.2 Results accusative production task: bilinguals
All 40 bilingual Polish-Dutch and 38 Russian-Dutch children completed this task. The maximum number of analysable items was 912 for Polish and 1368 for Russian (see Section 3.4.2). Of those, 6.3% of the responses from the Polish participants had to be disregarded (26 missing responses and 31 unanalysable items). Of the Russian participants, this was 15.8% (137 missing responses and 79 unanalysable). Two participants were the source of 67 of the missing and unanalysable items and were both excluded from the analysis. Without those participants, the missing or unanalysable data was 10.9%. All other items were scored as correct ‘1’ or incorrect ‘0’. The results in terms of accuracy for the Polish and Russian bilingual participants are set out in Table 6.11.
Table 6.11 Percentage accuracy (mean, standard deviation, range) on the accusative production task for Polish and Russian per gender: bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo</th>
<th>BiRu</th>
<th>BiRu</th>
<th>BiRu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
</tr>
<tr>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
<td>mean</td>
</tr>
<tr>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
<td>(SD)</td>
</tr>
<tr>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
</tr>
<tr>
<td>Total</td>
<td>n=38</td>
<td>n=35</td>
<td>n=36</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>86</td>
<td>76</td>
<td>79</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>(14)</td>
<td>(16)</td>
<td>(15)</td>
<td>(20)</td>
</tr>
<tr>
<td></td>
<td>57-100</td>
<td>49-100</td>
<td>50-100</td>
<td>38-100</td>
</tr>
<tr>
<td>Masculine</td>
<td>n=38</td>
<td>n=36</td>
<td>n=36</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>79</td>
<td>74</td>
<td>73</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td>(16)</td>
<td>(16)</td>
<td>(16)</td>
<td>(19)</td>
</tr>
<tr>
<td></td>
<td>50-100</td>
<td>0-100</td>
<td>33-100</td>
<td>33-100</td>
</tr>
<tr>
<td>Masculine animate</td>
<td>n=38</td>
<td>n=36</td>
<td>n=36</td>
<td>n=35</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>39</td>
<td>36</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>(45)</td>
<td>(42)</td>
<td>(44)</td>
<td>(45)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Masculine inanimate</td>
<td>n=38</td>
<td>n=36</td>
<td>n=37</td>
<td>n=36</td>
</tr>
<tr>
<td></td>
<td>87</td>
<td>91</td>
<td>94</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>(11)</td>
<td>(12)</td>
<td>(12)</td>
<td>(19)</td>
</tr>
<tr>
<td></td>
<td>67-100</td>
<td>50-100</td>
<td>50-100</td>
<td>25-100</td>
</tr>
<tr>
<td>Feminine</td>
<td>n=38</td>
<td>n=35</td>
<td>n=35</td>
<td>n=35</td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>65</td>
<td>72</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>(29)</td>
<td>(34)</td>
<td>(34)</td>
<td>(38)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Neuter</td>
<td>n=38</td>
<td>n=34</td>
<td>n=36</td>
<td>n=34</td>
</tr>
<tr>
<td></td>
<td>97</td>
<td>88</td>
<td>93</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>(6)</td>
<td>(13)</td>
<td>(12)</td>
<td>(20)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>60-100</td>
<td>25-100</td>
</tr>
</tbody>
</table>

Visual inspection of the data in Table 6.11 shows that the Polish-Dutch children outperformed the Russian-Dutch children especially on feminine and neuter. An independent samples Mann-Whitney U test exhibited significant differences between the Polish and Russian bilinguals on the test as a whole ($U=432$, $p=.010$). A series of independent samples Mann-Whitney U tests showed that the Polish bilinguals outperformed the Russian bilinguals on feminine ($U=458.5$, $p=.019$) and neuter ($U=329$, $p<.001$), but not on masculine ($U=586.5$, $p=.289$).

A series related samples Friedman’s two-way analysis of variance by ranks revealed significant differences between the genders both within the Polish and
the Russian task, (Polish: $\chi^2(2) = 30.239, p < .001$; Russian: $\chi^2(2) = 16.267, p < .001$). Post hoc analysis with Wilcoxon signed-rank tests was performed with a Bonferroni correction resulting in a significance level of $p < .0125$. It was found that for the Polish-Dutch bilinguals performance on the neuter nouns was significantly better than on the masculine ($Z = -4.777, p < .001$) and feminine ($Z = -3.424, p = .001$). This was also true for the Russian-Dutch bilinguals: neuter was better than masculine ($Z = -3.489, p < .001$) and feminine ($Z = -3.203, p = .001$).

As was mentioned in Section 6.2.1, for masculine, a division between animate and inanimate nouns had to be made. The bilinguals were expected to show problems with animacy, that is a lower accuracy on animate nouns. This turned out to be the case. When investigating animate and inanimate masculine nouns separately, we see that the accuracy in animate masculine nouns was much lower than in inanimate nouns in both bilingual groups. The Polish children showed the reverse. A related-samples Wilcoxon signed rank test confirmed that for both bilingual groups: accuracy with animates was significantly worse than with inanimate nouns (for Polish ($Z = 3.459, p = .001$) and for Russian ($Z = 4.513, p < .001$)).

In a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language as between-subjects factors, main and interaction effects were explored. Language proficiency and age were entered as covariates. There was no significant main effect for gender, and no significant interaction effects. However, there was a significant interaction between gender and language proficiency with a Greenhouse-Geisser correction ($F(2,132) = 4.390, p = .023, \eta^2 = .062$).

Stem-stressed and end-stressed items for Russian were compared (see Table 6.11) with a related samples Wilcoxon signed rank test. There were significant differences ($Z = -3.2019, p = .001$), with performance on the stem-stressed items being significantly more accurate than on the end-stressed items. Moreover, when comparing performance on masculine, feminine and neuter stem-stressed nouns with end-stressed, we saw that only the feminine end-stressed items were produced significantly less accurately than the feminine stem-stressed items ($Z = -3.147, p = .002$). For masculine and neuter, there was no significant difference after a Bonferroni correction.
Exploring main effects and interaction effects in a two-way mixed factorial ANOVA, with gender and stress as within-subjects factor, and with language proficiency and age as covariates, we found no main effects of gender or stress, and no interaction between gender and stress. There was, however, a significant interaction between gender and language proficiency with a Greenhouse-Geisser correction ($F(2,60)=23.387, p<.001, \eta^2=.438$).

As mentioned in Section 6.2.1, looking at both end-stressed and stem-stressed items for neuter in Russian could lead to a vast overestimation of accuracy on neuter gender, since the form of the neuter accusative is not different from the nominative. Therefore, comparing Polish and Russian end-stressed items is the most useful approach. Exploring the differences between Polish and Russian stem-stressed nouns and between Polish and Russian end-stressed items pairwise with a series of independent samples Mann-Whitney U tests (see Section 3.6.5), we see that for the total scores, there were significant differences between Polish and Russian stem-stressed ($U=482.5, p=.029$), and between Polish and Russian end-stressed ($U=397, p=.002$). Looking at individual genders, we see that the Polish bilinguals outperformed the Russian bilinguals on the two neuter conditions (stem-stressed: $U=541, p=.04$; end-stressed: $U=386, p<.001$) as well as on the feminine end-stressed items ($U=411.5, p=.004$).

Finally, the scores on accusative production task of the bilingual groups were compared to those of the monolingual groups (see Table 6.8). A Mann-Whitney U tests showed that the monolingual groups outperformed their bilingual peers on the test as a whole (Polish: $U=280.5, p<.001$; Russian: $U=196.5, p<.001$), as well as on each gender (Polish: masculine: $U=303, p<.001$; feminine: $U=418.5, p<.001$; neuter: $U=640, p<.001$; Russian: masculine: $U=185, p<.001$; feminine: $U=287.5, p<.001$; neuter: $U=458, p<.001$).

When adding bilingual mode to a one-way mixed factorial ANOVA, with gender as within-subjects factor, and with language and bilingual mode as between-subjects effects, with language proficiency and age as covariates, a significant main effect of gender with a Greenhouse-Geisser correction ($F(2,286)=7.580, p=.001, \eta^2=.05$) was found. Moreover, there were a significant interaction between gender and language ($F(2,286)=5.875, p=.005, \eta^2=.039$). Furthermore, there was a significant interaction between gender and language...
proficiency ($F(2,286)=51.919$, $p<.001$, $\eta^2=.266$). An error analysis can help to interpret these results (Table 6.12).

**Table 6.12 Distribution of mistakes over error types (percentage of total amount of items) on accusative production task: bilinguals**

<table>
<thead>
<tr>
<th>AccError type</th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>AccError1 (M: no ending)$^a$</td>
<td>3.5</td>
<td>5.8</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>AccError2 (M: {-a})</td>
<td>0.4</td>
<td>1.2</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>AccError3 (M: {-ę} /{-u})</td>
<td>0.0</td>
<td>0.4</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>AccError4 (M: other)</td>
<td>2.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>AccError5 (F: {-a})</td>
<td>5.6</td>
<td>8.6</td>
<td>3.4</td>
<td>5.3</td>
</tr>
<tr>
<td>AccError6 (F: {-i})</td>
<td>0.1</td>
<td>0.4</td>
<td>0.0</td>
<td>0.4</td>
</tr>
<tr>
<td>AccError7 (F: other)</td>
<td>0.1</td>
<td>0.4</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>AccError8 (N: {-a})</td>
<td>0.5</td>
<td>0.7</td>
<td>0.1</td>
<td>0.6</td>
</tr>
<tr>
<td>AccError9 (N: {-ę} /{-u})</td>
<td>0.2</td>
<td>1.4</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>AccError10 (N: other)</td>
<td>0.0</td>
<td>1.0</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Total AccError</td>
<td>12.9</td>
<td>20.0</td>
<td>8.5</td>
<td>11.4</td>
</tr>
</tbody>
</table>

$^a$ Note, ‘no ending’ is correct for inanimate, but incorrect for animate nouns; masculine in -a is correct for animate, but not correct for inanimate nouns.

As is clear from Table 6.12, in both the Polish-Dutch and the Russian-Dutch bilinguals, errors most frequently involved items for which the nominative case was applied to nouns that take a distinct accusative case ending (AccError1: masculine zero ending for animates, and AccError5: feminine -a in the accusative). For both groups, the feminine gender was most often given a nominative case ending. Inanimate nouns did not cause problems for the Polish-Dutch bilinguals, and only minor problems for the Russian-Dutch bilinguals, who overgeneralised the animate ending to non-animate nouns in 1.2% of the items. Animate nouns were more difficult for both groups. Considering the fact that only one third of the masculine items were animate nouns, this is nevertheless a large amount of mistakes (AccError1). The monolinguals mainly replaced endings of one gender with endings of another gender, but did not omit endings. The bilinguals, on the contrary, most frequently omitted endings. As expected, the Russian-Dutch children compared to the Polish-Dutch children more often applied feminine endings to neuter nouns (AccError 9).

A comparison of stem-stressed and end-stressed items for Russian revealed that more errors were made with end-stressed items. This can be partially due to
the fact that mistakes in neuter stem-stressed were not all detectable. However, it was expected that especially for neuter stem-stressed items, a frequent mistake would be to apply feminine endings to the neuter stem (AccError 9). AccError 9 was equally frequent in stem-stressed and in end-stressed items. The distribution of mistakes over error patterns on end-stressed items for Russian resembled the distribution of mistakes made by the Polish-Dutch children.

**Dominancy groups and accusative production**

As was explained in Section 4.2.3, each bilingual participant was placed in one out of three dominancy groups based on the scores on the Polish/Russian SRT and the Dutch SRT. Below, the results of the accusative production task will be discussed in the light of the three dominancy groups. See Figure 6.3 for the accuracy per dominancy group per gender for the Polish-Dutch children and Figure 6.4 for the Russian-Dutch children.

![Figure 6.3 Average accuracy on the accusative production task per dominancy group for the Polish-Dutch bilinguals](image)

As Figure 6.3 illustrates, for the Polish-Dutch bilinguals, the results of the balanced bilinguals and the Polish-dominant children were alike: the balanced bilinguals scored at ceiling for neuter; the Polish-dominant bilinguals scored at ceiling on both feminine and neuter. For these two groups, masculine was the most challenging gender, whereas for the Dutch-dominant bilinguals, the
feminine items were the most difficult (feminine nouns always require a case ending change in the accusative, see Section 2.2).

Figure 6.4 Average accuracy on the accusative production task per dominancy group for the Russian-Dutch bilinguals

There was more variance in the results of the Russian-Dutch bilinguals (see Figure 6.4) than in the results of the Polish-Dutch bilinguals (see Figure 6.3). All three dominancy groups for the Russian-Dutch children scored similarly on masculine and neuter (with neuter being more accurate than masculine), but the scores on feminine showed a clear difference between the Russian-dominant group, on the one hand, and the other two groups, on the other. The large variation on feminine in the balanced bilinguals was expected: feminine nouns always require a case ending change compared to the nominative. Neuter was as expected the more accurately produced in all three dominancy groups.

Predictors for accusative production
Multiple regressions were carried out in order to explore the independent variance in accusative production in all bilingual participants accounted for by language (Polish vs. Russian), input related measures and dominancy group. As in the first regression analysis in Section 6.2, the predictors ‘language proficiency in Polish/Russian’, ‘language proficiency in Dutch’ and ‘age’ were entered in a first separate model, the predictors ‘AoO of Dutch’, and ‘AoI in Polish/Russian’ were entered in model two, ‘Polish vs. Russian’ was entered in model three, and in
order to test for language dominancy, two dummy variables were created and entered in the fourth model (baseline: balanced bilinguals; Dummy 1: Polish/Russian dominant vs. balanced bilinguals; Dummy 2: Dutch dominant vs. balanced bilinguals). Table 6.13 presents the results of the regression analysis.

Table 6.13 Multiple regression analysis of factors related to the accusative production task in bilinguals

<table>
<thead>
<tr>
<th>Model 1</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.556</td>
<td>.127</td>
<td>4.394</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.002</td>
<td>.002</td>
<td>.087</td>
<td>.813</td>
<td>.419</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.376</td>
<td>.050</td>
<td>.696</td>
<td>.7465</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.092</td>
<td>.063</td>
<td>-.159</td>
<td>-.146</td>
<td>.149</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.823</td>
<td>.130</td>
<td>6.312</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.000</td>
<td>.002</td>
<td>-.009</td>
<td>-.093</td>
<td>.926</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.381</td>
<td>.045</td>
<td>.704</td>
<td>8.447</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.065</td>
<td>.057</td>
<td>-.113</td>
<td>-.150</td>
<td>.254</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.107</td>
<td>.026</td>
<td>-.345</td>
<td>-.412</td>
<td>.000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 3</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.765</td>
<td>.142</td>
<td>5.389</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.000</td>
<td>.002</td>
<td>-.017</td>
<td>-.171</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.360</td>
<td>.052</td>
<td>.667</td>
<td>6.897</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.045</td>
<td>.060</td>
<td>-.078</td>
<td>-.761</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.105</td>
<td>.026</td>
<td>-.338</td>
<td>-.4003</td>
<td>.000</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>8.338E-005</td>
<td>.001</td>
<td>.006</td>
<td>.059</td>
<td>ns.</td>
</tr>
<tr>
<td>AoI Russian/Polish</td>
<td>.119</td>
<td>.088</td>
<td>.119</td>
<td>1.358</td>
<td>ns.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 4</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.710</td>
<td>.148</td>
<td>4.807</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.000</td>
<td>.002</td>
<td>.014</td>
<td>.130</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.397</td>
<td>.094</td>
<td>.735</td>
<td>4.220</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.063</td>
<td>.105</td>
<td>-.109</td>
<td>-.604</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.104</td>
<td>.026</td>
<td>-.333</td>
<td>-.3912</td>
<td>.000</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>4.274E-005</td>
<td>.001</td>
<td>.003</td>
<td>.030</td>
<td>ns.</td>
</tr>
<tr>
<td>AoI Russian/Polish</td>
<td>.093</td>
<td>.090</td>
<td>.093</td>
<td>1.035</td>
<td>ns.</td>
</tr>
<tr>
<td>Po/Ru dominant vs. balanced bilinguals</td>
<td>.030</td>
<td>.057</td>
<td>.075</td>
<td>.535</td>
<td>ns.</td>
</tr>
<tr>
<td>Du dominant vs. balanced bilinguals</td>
<td>.045</td>
<td>.051</td>
<td>.130</td>
<td>.890</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.475$ ($p<.001$) for model 1, $\Delta R^2=.112$ ($p<.001$) for model 2, $\Delta R^2=.013$ ($p=.395$) for model 3, $\Delta R^2=.012$ ($p=.404$) for model 4.
All four models were significant, but the only significant $F$ change was from model one to model two. Model two, $F(4,66)=22.0104, p<.001$, explained 59% of variation in accusative production (the explained variation in model one was 48%, with the only significant predictor being ‘language proficiency in Polish/Russian’). As expected, adding ‘Polish vs. Russian’ in model two led to significantly more variation being explained.

Finally, to explore the independent variance in accusative production in all participants accounted for by language (Polish or Russian), bilingual status (monolingual or bilingual), language proficiency and age, a multiple regression analysis was carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate model, and the predictors ‘Polish vs. Russian’ and ‘bilingual status’ were entered in model two. The results of the regression analysis with input related measures are presented in Table 6.14.

Table 6.14 Multiple regression analysis of factors related to accusative production task in monolinguals and bilinguals

<table>
<thead>
<tr>
<th></th>
<th>$B$</th>
<th>$SE$ $B$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.702</td>
<td>.056</td>
<td>.126</td>
<td>12.529</td>
<td>.000</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>-.001</td>
<td>.001</td>
<td>-.064</td>
<td>-1.143</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.368</td>
<td>.028</td>
<td>.733</td>
<td>13.117</td>
<td>.000</td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.918</td>
<td>.065</td>
<td></td>
<td>14.220</td>
<td>.000</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>-.001</td>
<td>.001</td>
<td>-.076</td>
<td>-1.389</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.315</td>
<td>.032</td>
<td>.628</td>
<td>9.804</td>
<td>.000</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.066</td>
<td>.014</td>
<td>-.246</td>
<td>-4.674</td>
<td>.000</td>
</tr>
<tr>
<td>Bilingual status</td>
<td>-.048</td>
<td>.018</td>
<td>-.180</td>
<td>-2.733</td>
<td>.007</td>
</tr>
</tbody>
</table>

Note $R^2=.541$ ($p<.001$) for model 1, $\Delta R^2=.080$ ($p<.001$) for model 2.

The final regression model was significant, $F(4,149)=59.378, p<.001$, and explained 62% of the variance in accusative production in all groups taken together (54% of the variance was already explained in model one, with ‘language proficiency in Polish/Russian’ being the only significant predictor). ‘Polish vs. Russian’, ‘bilingual status’ and ‘language proficiency in Polish/Russian’ were all significantly related to accusative production.

Pulling these results together we see, as expected, that the Polish-Dutch bilinguals outperformed the Russian-Dutch bilinguals on the task as a whole as
well as on feminine and neuter accusatives. Both the Polish-Dutch and the Russian-Dutch bilinguals performed significantly better on neuter than on the masculine and feminine. This is due to the fact that accusatives only in the neuter form have the same case ending as the nominative (the default) (see Section 2.2). For the same reason, the bilinguals in both languages were expected to show more problems with masculine animate than inanimate items. This turned out to be the case. Furthermore, there were significant differences between the stem-stressed and end-stressed items for Russian, however, the performance on the stem-stressed items were significantly more accurate than on the end-stressed items; an unexpected result. However, this was due to the fact that errors were not always detectable on neuter stem-stressed items.

The bilingual groups were outperformed by their monolingual peers on the task as a whole as well as on each individual gender. For both bilingual groups, most of the errors stemmed from applying a nominative case ending where a distinct accusative case ending was necessary (on feminine and animate masculine items). The Polish-dominant group was not significantly better than both other groups: also the balanced bilinguals performed at ceiling. For the Russian bilinguals, the dominancy groups showed a more expected pattern with the Russian-dominant bilinguals obtaining the highest scores, and the Dutch-dominant the lowest scores. Furthermore, accusative production in bilinguals could be explained by ‘language proficiency in Polish/Russian’ combined with ‘Polish vs. Russian’. Accusative production in all participants could be predicted by ‘language proficiency’, ‘Polish vs. Russian’ and ‘bilingual status’.

6.3 Results case comprehension task
Following the pattern of the previous sections, first the results of the monolingual participants will be introduced in Section 6.3.1. (6.3.1.1: accusative comprehension, 6.3.1.2: dative comprehension), followed by the results of the bilingual participants in Section 6.3.2 (6.3.2.1: accusative comprehension, 6.3.2.2: dative comprehension). Section 6.3.3 will explore the relation between performance on the case comprehension task, and age and language proficiency for all participants, on the one hand, and input related measures for the bilingual participants, on the other. Furthermore, for the bilingual participants language
dominancy as measured by the sentence repetition tasks (SRTs) will be considered. Unlike the previous two sections of this chapter, there will be no error analysis since this is not possible in a binary choice task.

On the basis of the linguistic system we predicted that the comprehension of the Polish case system would be acquired faster than the Russian case system (see Section 2.2). Since there have been very few studies on the comprehension of case in monolingual Polish and Russian children (see Section 2.3), we do not know whether differences between the Polish and Russian monolinguals will be observed in the ages studied. Like in monolinguals, there is no information available on how bilingual Polish-Dutch children interpret case, and very few studies have looked at case comprehension in Russian-Dutch children. Due to differences in the linguistic system, it is expected that the Polish-Dutch children will be better at case comprehension than the Russian-Dutch children (Section 2.2). As we do not know at what age monolingual children correctly interpret case, it is not possible to predict whether differences in the comprehension of the bilingual children will be observed. For example, if both bilingual groups turn out to be insensitive to case endings in comprehension, no differences will be detected between the Polish-Dutch and Russian-Dutch participants.

Within both Polish and Russian, masculine and neuter datives are more transparent than feminine datives, and Russian feminine accusatives are more transparent than masculine and neuter accusatives. Therefore, for Polish, in the accusative, the feminine items were expected to have the highest accuracy, whereas in the dative, they would have the lowest. Furthermore, in Russian stem-stressed items, neuter nominatives and accusatives can be interpreted as feminine nominatives (or masculine genitives), as their endings sound identical (see Section 2.2). In Russian, for end-stressed items, the same prediction as for Polish held, whereas for stem-stressed items, neuter and feminine accusatives were expected to be the most difficult.

As on the previous tasks on gender production and comprehension and case production (Sections 5.1, 5.2, 6.1 and 6.2), AoO was expected to be associated with bilingual children’s ability to process case cues: children with earlier AoO of Dutch were expected to show more profound problems than children with later AoO of Dutch. The Russian-Dutch children with an early AoO of Dutch could
have an enhanced/combined negative effect of AoO and Russian compared to early AoO of Dutch and Polish.

In order to test the extent to which children process and interpret case endings, the word order had to be manipulated to control for word order effects. Therefore, two word orders were used: SVO and OVS. Monolingual children were expected to have no problem with the comprehension of sentences and the relationship between arguments, and therefore, word order effects were not expected. In contrast to the monolinguals, the bilingual children were predicted to exhibit problems with case cue processing in sentences in the marked OVS word order, but not with sentences in SVO (since they were expected to follow a word order strategy in sentence processing, see Sections 1.2.3 and 2.3).

Unfortunately it must be reported that a problem emerged in the way the case comprehension task had been designed. For the dative condition in the Polish case comprehension task, the randomisation of the two verbs and two word orders was incorrect: all items with verb $a$ were in SVO, and all items with verb $b$ were in OVS. Although it probably did not create an advantage of any of the three genders in particular, it made the test as a whole slightly easier. Therefore, no comparisons between Polish and Russian datives could be made.

In order to check the test construction, it was administered to adult monolingual speakers. Native speakers were expected to be able to score at ceiling, and this was the case in both adult groups. However, one item for Polish (adult accuracy of 27%) and two items for Russian (both with an adult accuracy of 77%) scored below 90% in the adult groups and were therefore excluded from the analysis in the final version of the test for the children. These items were neuter OVS items for both Polish and stem-stressed Russian. Therefore, there were no analysable data available for Polish neuter OVS nor for Russian stem-stressed neuter OVS. After exclusion of the items that were below 90% in the adults, the Polish adult group obtained an accuracy of 96%, and the Russian group 99%.

In the results of the monolingual children one item had to be excluded from the analysis, since the monolingual Russian children had an average accuracy of

---

3 More information on word order on a part of the Russian data is provided in Janssen, Meir, Baker & Armon-Lotem (2015).
Moreover, after analysing the data of the monolingual Russian children, it turned out that one of three verbs (нравиться ‘to like’) for the dative condition was interpreted differently due to its different argument structure. Therefore, all items containing the verb нравиться had to be excluded from the analysis. The remaining items (n=29 for Polish, and n=38 for Russian) were checked with an item-analysis and turned out to have a reasonably good internal reliability (for Polish: α=.740, for Russian: α=.778).

### 6.3.1 Results case comprehension task: monolinguals

One Polish child and three Russian children did not complete this task due to technical problems with the test computer. As a result, there were data from 39 monolingual Polish children and 38 monolingual Russian children. The maximum number of analysable items was 1131 for Polish and 1444 for Russian (see Section 3.4.3). Of those, 1.8% of the responses from the Polish participants had to be disregarded (20 no responses). Of the Russian participants, this was 2.7% (40 no responses). All other items were automatically scored as correct ‘1’ or incorrect ‘0’ by E-prime.

#### 6.3.1.1 Results accusative comprehension: monolinguals

The results in terms of accuracy for the Polish and Russian monolingual participants are presented in Table 6.15 per gender and per word order.

<table>
<thead>
<tr>
<th></th>
<th>MoPo</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Stem-stressed</td>
<td>End-stressed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>mean</td>
<td>(SD)</td>
<td>mean</td>
<td>(SD)</td>
</tr>
<tr>
<td></td>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
</tr>
<tr>
<td>Masculine SVO</td>
<td>n=39</td>
<td>82</td>
<td>n=38</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>(31)</td>
<td>(32)</td>
<td>(43)</td>
<td>(42)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td>Masculine OVS</td>
<td>n=39</td>
<td>72</td>
<td>n=37</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>(36)</td>
<td>(28)</td>
<td>(46)</td>
<td>(34)</td>
</tr>
<tr>
<td></td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>
From the data in Table 6.15, it is clear that for both monolingual groups all scores on OVS were below ceiling. The Polish monolinguals scored at ceiling only on SVO feminine items in the accusative. The Russian monolinguals did not reach ceiling scores for any of the conditions. For both the Polish and Russian monolinguals, there seemed to be an advantage of SVO over OVS on at least some of the gender*case combinations. For the Polish monolinguals, comprehension of accusative was significantly better in the SVO order compared to OVS ($Z=-2.878$, $p=.004$). This was contrary to expectations: no differences were expected between canonical and non-canonical word orders, since monolingual children were expected to rely mostly on case cues and not on word order cues (see Section 2.4). For the Russian monolinguals, there were no significant differences on accusative comprehension between SVO and OVS ($Z=-1.377$, $p=.169$).

An independent samples Mann-Whitney U test showed that there were no significant differences between the Polish and Russian monolinguals on accusative SVO ($U=609.5$, $p=.168$). A series of independent samples Mann-Whitney U tests
showed that the Polish monolinguals outperformed the Russian monolinguals on feminine SVO ($U=514.5, p=.006$), but not on neuter ($U=703.5, p=.793$), nor on masculine ($U=681.5, p=.461$). In accusative OVS, there were no differences between the Polish and Russian monolinguals for all genders taken together ($U=718.5, p=.816$), nor for the genders individually (feminine, $U=782.5, p=.654$, and masculine, $U=800.5, p=.487$, no comparison possible for neuter).

A related samples Friedman’s two-way analysis of variance by ranks showed that there were no significant differences between the genders for SVO accusative comprehension in Polish or in Russian (Polish: $\chi^2(2)=.939, p=.625$; Russian: $\chi^2(2)=3.310, p=.191$). For accusative comprehension in OVS there were also no significant differences for Polish or Russian between masculine and feminine (Polish: $Z=-.269, p=.788$; Russian: $\chi^2(2)=3.624, p=.163$). It was not possible to run a two-way mixed factorial ANOVA (with gender and word order), since the neuter OVS were missing for Polish.

Stem-stressed and end-stressed items both for the accusative and the dative in Russian were compared with a related samples Wilcoxon signed rank test (see Table 6.15). For the SVO and OVS accusative, when comparing performance on stem-stressed nouns with end-stressed ones, we saw no significant differences between the two types of items.

As has been mentioned in the previous sections, ideally a three-way comparison between Polish and Russian stem-stressed items, on the one hand, and Polish and Russian end-stressed items, on the other, should be made. Since this is not possible, Polish items were compared to each of the two Russian conditions with a series of independent samples Mann-Whitney U tests (see Section 3.6.5). There were no significant differences between the Polish results and each of the Russian conditions for SVO or OVS for all genders taken together. For accusative comprehension in SVO, looking at individual genders we saw significant differences only on feminine stem-stressed, where the Polish monolinguals outperformed their Russian peers ($U=570, p=.026$). For accusative comprehension in OVS, looking at individual genders we saw that the Russian group outperformed their Polish peers on masculine end-stressed ($U=936.5, p=.012$).

Subsequently, to explore the independent variance in case comprehension accounted for by the predictor ‘Polish vs. Russian’, language proficiency and age in
monolingual participants multiple regressions were carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate model, and the predictor ‘Polish vs. Russian’ was entered in model two. The significant regression is presented in Table 6.16.

Table 6.16 Multiple regression analysis of factors related to accusative comprehension in monolinguals

<table>
<thead>
<tr>
<th>Model 1</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.167</td>
<td>.109</td>
<td>1.529</td>
<td>ns.</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>.007</td>
<td>.002</td>
<td>.408</td>
<td>3.891</td>
</tr>
<tr>
<td>LP Polish/ Russian</td>
<td>.291</td>
<td>.119</td>
<td>.256</td>
<td>2.442</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.180</td>
<td>.125</td>
<td>1.440</td>
<td>ns.</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>.006</td>
<td>.002</td>
<td>.402</td>
<td>3.689</td>
</tr>
<tr>
<td>LP Polish/ Russian</td>
<td>.293</td>
<td>.120</td>
<td>.258</td>
<td>2.437</td>
</tr>
<tr>
<td>Language</td>
<td>-.006</td>
<td>.029</td>
<td>-.022</td>
<td>-.224</td>
</tr>
</tbody>
</table>

Note $R^2$=.317 ($p<.001$) for model 1, $\Delta R^2=.000$ ($p=.824$) for model 2.

The first regression model was significant, $F(2,76)=17.163, p<.001$, and explained only 31% of the variance in accusative comprehension in the monolingual groups. Both age and language proficiency in Polish/Russian were significantly related to accusative comprehension. Adding language in model two did not lead to a significant change in the $R^2$.

6.3.1.2 Results dative comprehension: monolinguals

No comparison between Polish and Russian could be made for the dative comprehension, as set out in the previous section. See Table 6.17 for an overview of the results of the case comprehension task per gender.
Table 6.17 Percentage accuracy (mean, standard deviation, range) on dative comprehension per gender per word order: monolinguals

<table>
<thead>
<tr>
<th>Gender</th>
<th>Word Order</th>
<th>MoPo Total</th>
<th>MoRu Total</th>
<th>MoRu Stem-stressed</th>
<th>MoRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (SD)</td>
<td>range</td>
<td>mean (SD)</td>
<td>range</td>
<td>mean (SD)</td>
</tr>
<tr>
<td>Masculine SVO</td>
<td>n=39</td>
<td>90 (18)</td>
<td>33-100</td>
<td>n=37</td>
<td>86 (23)</td>
</tr>
<tr>
<td></td>
<td>n=38</td>
<td>(23)</td>
<td>50-100</td>
<td>n=38</td>
<td>(21)</td>
</tr>
<tr>
<td>Feminine SVO</td>
<td>n=39</td>
<td>79 (29)</td>
<td>0-100</td>
<td>n=38</td>
<td>70 (24)</td>
</tr>
<tr>
<td></td>
<td>n=38</td>
<td>(24)</td>
<td>0-100</td>
<td>n=38</td>
<td>(23)</td>
</tr>
<tr>
<td>Feminine OVS</td>
<td>n=39</td>
<td>93 (15)</td>
<td>0-100</td>
<td>n=38</td>
<td>77 (25)</td>
</tr>
<tr>
<td></td>
<td>n=38</td>
<td>(25)</td>
<td>0-100</td>
<td>n=38</td>
<td>(26)</td>
</tr>
<tr>
<td>Neuter SVO</td>
<td>n=39</td>
<td>90 (19)</td>
<td>0-100</td>
<td>n=38</td>
<td>80 (30)</td>
</tr>
<tr>
<td></td>
<td>n=38</td>
<td>(30)</td>
<td>0-100</td>
<td>n=38</td>
<td>(43)</td>
</tr>
<tr>
<td>Neuter OVS</td>
<td>n=39</td>
<td>76 (28)</td>
<td>0-100</td>
<td>n=38</td>
<td>65 (25)</td>
</tr>
<tr>
<td></td>
<td>n=38</td>
<td>(25)</td>
<td>0-100</td>
<td>n=38</td>
<td>(34)</td>
</tr>
</tbody>
</table>

For dative comprehension, there were significant differences between SVO and OVS for the Polish monolinguals ($Z=-3.324, p<.001$) as well as for the Russian monolinguals ($Z=-3.504, p<.001$). A series of related samples Friedman’s two-way analysis of variance by ranks showed that neither for Polish dative comprehension in SVO ($\chi^2(2)=2.279, p=.320$) and OVS ($\chi^2(2)=1.118, p=.572$), nor for Russian SVO ($\chi^2(2)=5.290, p=.071$) and OVS ($\chi^2(2)=2.297, p=.317$) were there differences within genders. For dative comprehension in Russian SVO and OVS, there were also no significant differences between stem-stressed and end-stressed datives for any of the genders separately.
In sum, contrary to expectations, there were significant differences between SVO and OVS in Polish accusative comprehension, and in Polish and Russian dative comprehension. In accusative comprehension, the only difference between Polish and Russian was on feminine SVO. Within both languages, there were no differences between genders on SVO and OVS accusative and dative comprehension. Moreover, there were no differences between stem-stressed and end-stressed items, for none of the cases*word order combinations. Accuracy on accusative comprehension in monolinguals could be predicted by age and language proficiency. ‘Polish vs. Russian’ was not a significant predictor.

6.3.2 Results case comprehension task: bilinguals
Of the bilingual children 38 Polish-Dutch children and 37 Russian-Dutch children completed the case comprehension task. Two Russian-Dutch children did not complete this task due to unforeseen absence on the scheduled testing date. The maximum number of analysable items was 1102 for the Polish participants and 1406 for the Russian participants (see Section 3.4.3). From the bilingual Polish participants, 27 items (2.5%) got no response, and for the Russian participants 32 items (2.3%). All other responses were either correct ‘1’ or incorrect ‘0’ and were taken into account for analysis. As there is an expected effect of word order in bilinguals, the results per gender are presented per word order.

6.3.2.1 Results accusative comprehension: bilinguals
Table 6.18 presents an overview of the results of the case comprehension task per gender per word order.
### Table 6.18 Percentage accuracy (mean, standard deviation, range) on accusative comprehension per gender per word order: bilinguals

<table>
<thead>
<tr>
<th></th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
<td>mean (SD)</td>
</tr>
<tr>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
<td>range</td>
</tr>
<tr>
<td><strong>Masculine SVO</strong></td>
<td>n=38</td>
<td>n=37</td>
<td>n=36</td>
<td>n=37</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>84 (26)</td>
<td>88 (25)</td>
<td>86 (35)</td>
<td>89 (31)</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td><strong>Masculine OVS</strong></td>
<td>n=38</td>
<td>n=37</td>
<td>n=36</td>
<td>n=37</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>46 (44)</td>
<td>42 (40)</td>
<td>31 (47)</td>
<td>51 (51)</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td><strong>Feminine SVO</strong></td>
<td>n=38</td>
<td>n=37</td>
<td>n=37</td>
<td>n=37</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>89 (18)</td>
<td>87 (20)</td>
<td>88 (25)</td>
<td>86 (26)</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td><strong>Feminine OVS</strong></td>
<td>n=38</td>
<td>n=37</td>
<td>n=37</td>
<td>n=37</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>45 (36)</td>
<td>51 (30)</td>
<td>54 (40)</td>
<td>49 (34)</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td><strong>Neuter SVO</strong></td>
<td>n=38</td>
<td>n=37</td>
<td>n=35</td>
<td>n=36</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>84 (37)</td>
<td>91 (23)</td>
<td>89 (32)</td>
<td>94 (23)</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
<tr>
<td><strong>Neuter OVS</strong></td>
<td>no analysable</td>
<td>no analysable</td>
<td>n=35</td>
<td>n=35</td>
</tr>
<tr>
<td>mean (SD)</td>
<td>29 (46)</td>
<td>29 (46)</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>range</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
</tr>
</tbody>
</table>

*These items had to be removed due to low scores in the adult groups.

Because of the problem in randomizing the dative items (see Section 6.3.1.2), the results for the accusative will be first discussed, followed by the dative. As is apparent from the data on the accusative case in Table 6.18, both groups scored higher on SVO sentences than on OVS sentences, as had been expected. There were significant differences in both groups (Polish: $Z=-4.716$, $p<.001$; Russian: $Z=-5.124$, $p<.001$). An independent samples Mann-Whitney U test showed that there were no significant differences between the Polish-Dutch and Russian-Dutch bilinguals on accusative SVO ($U=787$, $p=.353$) taking all genders together.
Nor was there a significant difference for masculine ($U=753$, $p=.484$), feminine ($U=678$, $p=.754$), and neuter ($U=715$, $p=.842$) separately. On accusative OVS, there were no differences between the Polish and Russian bilingual group for all genders taken together ($U=695.5$, $p=.936$). Nor were there differences on feminine ($U=772$, $p=.459$) or masculine ($U=670$, $p=.709$); for neuter, no comparisons could be made.

A related samples Friedman’s two-way analysis of variance by ranks showed that for SVO accusative comprehension in Polish and Russian, there were no significant differences between genders (Polish: ($\chi^2(2)=1.507$, $p=.471$); Russian: ($\chi^2(2)=3.307$, $p=.191$)). For accusative comprehension in OVS in Polish, there were no differences between masculine and feminine ($Z=-.246$, $p=.806$), and for Russian, there were differences between genders on OVS comprehension ($\chi^2(2)=6.294$, $p=.043$). It was not possible to run a two-way mixed factorial ANOVA (with gender and word order), since the data on neuter OVS were missing for Polish.

As was done with the data from the monolinguals (see Table 6.15), stem-stressed and end-stressed items for the accusative in Russian were compared separately for the bilinguals with related samples Wilcoxon signed rank tests. For the accusative SVO and OVS, there were no significant differences between stem-stressed and end-stressed items for each of the genders individually. Exploring main effects and interaction effects in a four-way mixed factorial ANOVA with gender, stress, word order and case as within-subjects factor, was not possible, since the data on stem-stressed neuter OVS were missing.

As has been mentioned in the previous sections, since it was impossible to make a three-way comparison between Polish and Russian stem-stressed items, on the one hand, and Polish and Russian end-stresses items, on the other, Polish items were compared to each of the two Russian conditions for accusatives in the SVO and OVS with a series of independent samples Mann-Whitney U tests (see Section 3.6.5). There were no significant differences between the Polish bilinguals and each of the Russian conditions for SVO or OVS for all genders taken together. Looking at individual genders in accusative comprehension in SVO, we saw no significant differences in any of the gender*stress combinations, and the same held for accusative comprehension in OVS.
Finally, the scores on accusative comprehension of the bilingual groups were compared to those of the monolingual groups (see Table 6.15). A Mann-Whitney U tests showed that the monolingual Polish groups outperformed their bilingual peers on all accusative OVS conditions (total, \( U=396, p<.001 \); masculine \( U=503, p=.009 \); feminine, \( U=405.5, p<.001 \); neuter could not be computed), but not on accusative SVO. Similarly, the Russian monolinguals also outperformed their bilingual peers on all accusative OVS items (total, \( U=286.5, p<.001 \); masculine \( U=350, p<.001 \); feminine, \( U=362.5, p<.001 \); neuter, 455, \( p=.030 \)), but not on SVO.

### 6.3.2.2 Results dative comprehension: bilinguals

An overview of the results of the dative comprehension task is presented per gender and per word order in Table 6.19.

<table>
<thead>
<tr>
<th></th>
<th>BiPo Total</th>
<th>BiRu Total</th>
<th>BiRu Stem-stressed</th>
<th>BiRu End-stressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean (SD)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Masculine SVO</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=38</td>
<td>87 (26)</td>
<td>83 (24)</td>
<td>88 (25)</td>
<td>75 (44)</td>
</tr>
<tr>
<td>0-100</td>
<td>33-100</td>
<td>0-100</td>
<td>0-100</td>
<td></td>
</tr>
<tr>
<td><strong>Masculine OVS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=38</td>
<td>85 (23)</td>
<td>38 (28)</td>
<td>47 (39)</td>
<td>31 (33)</td>
</tr>
<tr>
<td>33-100</td>
<td>0-80</td>
<td>0-100</td>
<td>0-100</td>
<td></td>
</tr>
<tr>
<td><strong>Feminine SVO</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=38</td>
<td>91 (17)</td>
<td>83 (20)</td>
<td>82 (24)</td>
<td>85 (29)</td>
</tr>
<tr>
<td>33-100</td>
<td>20-100</td>
<td>33-100</td>
<td>0-100</td>
<td></td>
</tr>
<tr>
<td><strong>Feminine OVS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n=38</td>
<td>86 (22)</td>
<td>47 (.33)</td>
<td>57 (50)</td>
<td>42 (36)</td>
</tr>
<tr>
<td>33-1.00</td>
<td>0-100</td>
<td>0-100</td>
<td>0-100</td>
<td></td>
</tr>
</tbody>
</table>
As has been mentioned in Section 6.3.1, no comparisons between Polish and Russian could be made for the dative case items. For dative comprehension, it was determined whether there were differences between SVO and OVS within both groups. For the Polish-Dutch bilinguals, there were no significant differences between SVO and OVS ($Z=-1.746, p=.081$). For the Russian-Dutch bilinguals, the performance on SVO was significantly better than on OVS ($Z=-5.206, p<.001$). A series of related samples Friedman’s two-way analysis of variance by ranks showed that for Polish dative comprehension in SVO, there were no differences between genders ($\chi^2(2)=.215, p=.898$); and for dative comprehension in OVS, there were differences between masculine and feminine ($Z=-.246, p=.806$). In SVO in Russian, there were no differences between genders ($\chi^2(2)=1.756, p=.416$), but there were significant differences in OVS word order ($\chi^2(2)=7.457, p=.024$).

As for the monolinguals, Russian stem-stressed and end-stressed items in the dative were compared for the bilinguals (see Table 6.19) with related samples Wilcoxon signed rank tests. For dative comprehension in SVO and OVS, there appeared to be no significant differences between stem and end-stressed items for each of the genders separately.

No significant differences between the Polish monolinguals and bilinguals were observed on the datives (SVO and OVS). For Russian, in contrast to SVO, the monolinguals outperformed the bilinguals on all dative OVS items (total, $U=280.5, p<.001$; masculine $U=281.5, p<.001$; feminine, $U=358.5, p<.001$; neuter, 285.5, $p<.001$).
Pulling these results together, as expected, there were significant differences between SVO and OVS for both languages on accusative comprehension. For dative comprehension, there were significant differences for the Russian-Dutch bilinguals, but not for the Polish-Dutch bilinguals. Within the languages, no significant differences were found between the genders for SVO and OVS accusative and dative comprehension.

### 6.3.3 Dominancy and predictors for case comprehension

#### Dominancy groups and accusative and dative comprehension

The results of the bilinguals were also interpreted in the light of the dominancy groups, as introduced in Section 4.2.3. Below, the results of the accusative comprehension task will be discussed with respect to the three dominancy groups. The results per dominancy group per gender for sentences in the accusative case are presented for SVO and OVS separately for Polish-Dutch participants (Figure 6.5) and for Russian-Dutch participants (Figure 6.6).

![Figure 6.5](image)

**Figure 6.5** Average accuracy on accusative comprehension per dominancy group for the Polish-Dutch bilinguals

As becomes clear from Figure 6.5 and as was expected, the gap between SVO and OVS was the largest for the Dutch-dominant Polish-Dutch bilinguals. They applied an SVO strategy, thereby achieving high accuracies on the SVO sentences, and very low scores on the OVS sentences. Unfortunately, as the neuter OVS measure is missing for Polish, the comparison between SVO and OVS could only be
made for masculine and feminine. For the Polish-dominant children, the performance on masculine SVO and OVS was similar, but the feminine OVS caused more problems. The main difference between the balanced bilinguals and the Polish-dominant bilinguals was in masculine gender: the balanced bilinguals performed at ceiling on SVO, but showed a large variation on OVS, suggesting that some balanced bilinguals applied a SVO strategy, while others, like the Polish-dominant children, used a case strategy (see Section 2.3).

Figure 6.6 Average accuracy on accusative comprehension per dominancy group for the Russian-Dutch bilinguals

From comparing Figures 6.5 and 6.6, it is clear that the Dutch-dominant and the balanced Russian-Dutch bilinguals more than the Polish-Dutch bilinguals followed a word order strategy with ceiling scores in SVO accusative comprehension for masculine and neuter, and high scores for feminine SVO, and low scores in OVS comprehension. The Russian-dominant bilinguals seemed to use a case strategy for feminine, and to some extent for masculine, but scored at floor for neuter OVS. Although the balanced bilinguals and the Dutch-dominant bilinguals performed similarly on SVO comprehension, the balanced bilinguals obtained higher scores than the Dutch-dominant bilinguals on masculine and feminine OVS. The fact that the Russian-dominant group scored at floor on neuter OVS was an unexpected result, as they were expected to score at a level closer to the monolingual Russians.
Dative comprehension per dominancy group will be discussed referring to Figure 6.7 for Polish and Figure 6.8 for Russian.

Figure 6.7 Average accuracy on dative comprehension per dominancy group for the Polish-Dutch children

There was very little difference between the dominancy groups in Polish. All three groups were at or close to ceiling, which might be due to the problems in constructing the task (see Section 6.3).

Figure 6.8 Average accuracy on dative comprehension per dominancy group for the Russian-Dutch children

In dative comprehension in Russian, there were differences between SVO and OVS in all three dominancy groups. In OVS, the neuter gender was performed worse than the feminine and masculine genders. The differences between SVO and OVS
were the largest in the Dutch-dominant bilinguals, and the smallest in the Russian-dominant bilinguals.

**Predictors for accusative comprehension**

Multiple regressions were carried out to explore the independent variance in case comprehension in all bilingual participants that could be accounted for by language (Polish or Russian), input related measures and the dominancy groups. As was done in the previous two sections, the predictors ‘language proficiency in Polish/Russian’, ‘language proficiency in Dutch’ and ‘age’ were entered in a first separate model, the predictors ‘AoO of Dutch’, and ‘AoI in Polish/Russian’ were entered in model two, ‘Polish vs. Russian’ was entered in model three and in order to test for the dominancy groups, two dummy variables were created and entered in the fourth model (baseline: balanced bilinguals; Dummy 1: Polish/Russian dominant vs. balanced bilinguals; Dummy 2: Dutch dominant vs. balanced bilinguals). Table 6.20 presents the results of the four regression models.

| Table 6.20 Multiple regression analysis of factors related to case comprehension in bilinguals |
|----------------------------------|----------------|----------------|--------|--------|
| Model 1                          | B      | SE B  | β     | t     | p     |
| (Constant)                       | .551   | .132  | 4.182 | .000  |
| Age                              | .000   | .002  | -0.01 | -0.086| ns.   |
| LP Polish/Russian                | .348   | .052  | .644  | 6.642 | .000  |
| LP Dutch                         | -.060  | .067  | -.101 | -.902 | ns.   |
| Model 2                          | B      | SE B  | β     | t     | p     |
| (Constant)                       | .543   | .152  | 3.563 | .001  |
| Age                              | .000   | .002  | -.007 | -.060 | ns.   |
| LP Polish/Russian                | .349   | .053  | .644  | 6.591 | .000  |
| LP Dutch                         | -.061  | .068  | -.103 | -.902 | ns.   |
| Polish vs. Russian               | -.003  | .031  | .010  | .106  | ns.   |
| (Constant)                       | .633   | .170  | 3.729 | .000  |
| Age                              | -.001  | .002  | -.026 | -.219 | ns.   |
| LP Polish/Russian                | .351   | .063  | .648  | 5.577 | .000  |
| LP Dutch                         | -.068  | .071  | -.115 | -.958 | ns.   |
| Polish vs. Russian               | -.001  | .032  | -.004 | -.040 | ns.   |
| AoO of Dutch                     | .001   | .002  | .074  | .642  | ns.   |
| AoI Russian/Polish               | -.117  | .106  | -.118 | -1.108| ns.   |
Table 6.20 (continued)

<table>
<thead>
<tr>
<th>Model 4</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.585</td>
<td>.176</td>
<td>3.320</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>4.010E-005</td>
<td>.003</td>
<td>.002</td>
<td>.016</td>
<td>ns.</td>
</tr>
<tr>
<td>LP Polish/Russian</td>
<td>.420</td>
<td>.113</td>
<td>.776</td>
<td>3.715</td>
<td>.000</td>
</tr>
<tr>
<td>LP Dutch</td>
<td>-.123</td>
<td>.126</td>
<td>-.207</td>
<td>-.976</td>
<td>ns.</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.002</td>
<td>.032</td>
<td>-.007</td>
<td>-.071</td>
<td>ns.</td>
</tr>
<tr>
<td>AoO of Dutch</td>
<td>.001</td>
<td>.002</td>
<td>.065</td>
<td>.560</td>
<td>ns.</td>
</tr>
<tr>
<td>AoI Russian/Polish</td>
<td>-.135</td>
<td>.108</td>
<td>-.135</td>
<td>-1.241</td>
<td>ns.</td>
</tr>
<tr>
<td>Po/Ru dominant vs. balanced bilinguals</td>
<td>.006</td>
<td>.068</td>
<td>.014</td>
<td>.086</td>
<td>ns.</td>
</tr>
<tr>
<td>Du dominant vs. balanced bilinguals</td>
<td>.062</td>
<td>.063</td>
<td>.177</td>
<td>.978</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note: $R^2=.404$ (*p < .001*) for model 1, $\Delta R^2=.000$ (*p = .916*) for model 2, $\Delta R^2=.014$ (*p = .477*) for model 3, $\Delta R^2=.012$ (*p = .525*) for model 4.

Although all four models were significant, adding more predictors after the first model did not lead to a greater amount of the variance being explained. The first model regression, $F(3,68)=14.713$, $p<.001$, explained only 40% of the variation in case comprehension in bilinguals. The only significant predictor was ‘language proficiency in Polish/Russian’. Contrary to expectations, input related measures and ‘Polish vs. Russian’ did not significantly predict performance on the accusative comprehension task in bilinguals.

Finally, a similar analysis was carried out for all participants: in order to explore the independent variance in case comprehension accounted for by language (Polish or Russian), bilingual status (monolingual or bilingual), language proficiency and age, multiple regressions were carried out. The predictors ‘language proficiency’ and ‘age’ were entered in a first separate model, and the predictors ‘Polish vs. Russian’ and ‘bilingual status’ were entered in model two. The outcome variable was accusative comprehension, since for the dative no comparisons between the groups could be made. Table 6.21 presents the results of the significant regression.
Table 6.21 Multiple regression analysis of factors related to accusative comprehension in monolinguals and bilinguals

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.316</td>
<td>.076</td>
<td></td>
<td>4.139</td>
<td>.000</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>.003</td>
<td>.001</td>
<td>.165</td>
<td>2.564</td>
<td>.011</td>
</tr>
<tr>
<td>LP Polish/ Russian</td>
<td>.355</td>
<td>.037</td>
<td>.610</td>
<td>9.508</td>
<td>.000</td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>.344</td>
<td>.097</td>
<td></td>
<td>3.548</td>
<td>.001</td>
</tr>
<tr>
<td>Age (in months)</td>
<td>.003</td>
<td>.001</td>
<td>.171</td>
<td>2.485</td>
<td>.014</td>
</tr>
<tr>
<td>LP Polish/ Russian</td>
<td>.341</td>
<td>.047</td>
<td>.587</td>
<td>7.272</td>
<td>.000</td>
</tr>
<tr>
<td>Polish vs. Russian</td>
<td>-.004</td>
<td>.021</td>
<td>-.014</td>
<td>-.209</td>
<td>ns.</td>
</tr>
<tr>
<td>Bilingual status</td>
<td>-.013</td>
<td>.026</td>
<td>-.040</td>
<td>-.476</td>
<td>ns.</td>
</tr>
</tbody>
</table>

Note $R^2=.398$ (p < .001) for model 1, $\Delta R^2=.001$ (p = .870) for model 2.

The first model was significant, $F(2,148)=28.342, p<.001$, and explained 40% of the variance in accusative comprehension in all groups. Both ‘age’ and ‘language proficiency in Polish/Russian’ were significantly related to accusative comprehension. The second model was also significant, but adding ‘Polish vs. Russian’ to the model did not lead to a significant change in $R^2$.

6.4 Summary

The Polish monolingual children were not expected to outperform the monolingual Russian children on case production, as ceiling scores were expected across the board, but the bilingual Polish-Dutch children were. In fact the Polish monolinguals did outperform the Russian monolinguals on feminine and neuter in both case production tasks. Within Polish, performance on masculine was lower than on the other genders in both production tasks. For Russian genitive production, masculine and neuter scored lower than feminine. For the bilinguals, this was only the case for the accusative production task as a whole and for feminine and neuter accusatives.

For Russian participants, stem-stressed items were expected to be worse than end-stressed items for neuter in genitive and accusative production. The stem-stressed nouns were more accurate than the end-stressed nouns. Because neuter stem-stressed items in the genitive and accusative sound identical to the nominative, very few errors could be detected.
No clear expectations could be formulated for comprehension, since very little was known about the age of case comprehension in monolinguals and bilinguals, particularly in Polish (see Section 2.3). If differences were found, we expected the Polish children to outperform their Russian peers. No differences were, however, observed.

Contrary to our expectations, no differences between Russian stem-stressed and end-stressed items were observed for the comprehension task. This will be further addressed in Chapter 7. Polish monolinguals were significantly better in SVO than in OVS. For Russian, this was the case only for datives. Bilingual children were apparently using a word order strategy.

The language factor (Polish vs. Russian) turned out to be a significant predictor for monolingual and bilingual genitive production and monolingual accusative production. Language proficiency was a significant predictor in genitive and accusative production for the bilinguals, and for monolinguals and bilinguals when taken together.

As for the input related measures, the effect of AoO and AoI could not be demonstrated, neither in case production, nor in case comprehension. The dominancy group graphs did show differences between the balanced and Polish/Russian-dominant and Dutch-dominant groups, but dominancy groups could not significantly predict accuracy on the dependent variables in the regression analysis.
CHAPTER 7
DISCUSSION AND CONCLUSION

The aim of this final chapter is to discuss the findings that emerged from the analyses presented in Chapters 5 and 6 with respect to the main research question on the relative speed and accuracy of acquiring case and gender in Polish and Russian. This discussion will focus on the features presented in Chapter 1 that may affect the acquisition process: transparency in language (Section 1.1), learner strategies (Section 1.2) and factors related to bilingualism (Section 1.3). The results will also be considered in light of the literature on child language acquisition in Polish and Russian (Section 2.3).

First, methodological considerations will be addressed in Section 7.1. Section 7.2 will deal with the interpretation and discussion of the results of the experimental tasks, and Section 7.3 will elaborate on production-comprehension asymmetries. Section 7.4 will deal with the factors related to individual learners, in particular, in bilingualism, and finally, Section 7.5 will discuss some recommendations for further research.

7.1 Methodological considerations
It is important to reflect on aspects of the methodology used in this study, since these can have an impact on the interpretation of the results but can also be useful for future research on Polish and Russian and other languages. First, the background measures will be considered (Section 7.1.1), followed by the experimental production tasks (Section 7.1.2) and comprehension tasks (Section 7.1.3) that had been developed in the context of this study.

7.1.1 Background measures
In this study, the background measure, the Odd-One-Out, for visual-spatial memory had the sole purpose of determining whether the groups were comparable in this regard, which turned out to be the case. However, since the
task was relatively difficult for many children, with most children not exceeding level 1 or 2, these scores turned out to be not very informative. Other studies that used this task with slightly older children have reported more differentiated scores (Duinmeijer, to appear; Jensen de Lopéz & Baker, 2015).

The sentence repetition tasks in Polish, Russian, and Dutch had only been developed just prior to this study (Section 3.2), following the recommendations of the Cost action IS0804 (see Section 3.2). It is therefore useful to consider how informative they were with the groups studied here (see Section 3.1). Their administration certainly did not lead to problems. Most children enjoyed participating in the tasks and were able to follow the instructions. At times, the bilingual children with low language proficiency in Polish/Russian or Dutch became frustrated. However, after having been encouraged and having received positive feedback, they continued and managed to finish the tasks in both languages. The scoring of the sentence repetition tasks was not difficult, since it was done quite globally, that is on the basis of correct/incorrect target repetition.

The scores were used as an inclusion criterion for the study; monolingual children that scored below two standard deviations of the monolingual mean score, or bilingual children that scored below 10% on target construction accuracy in both of the languages, were excluded because of being at risk for SLI (see Section 3.1.1). For those children included in the study, the scores were used as a measure for language proficiency and used to predict performance on the experimental tasks. We found that the SRT discriminated well between participants in all three languages. Since the tasks contained both easier and more difficult structures, they resulted in differentiated scores in both mono- and bilinguals. Although norms are not yet available, these tasks can nevertheless be used as a language background measure for other studies involving these languages. Norms should still be developed.

Most questions in the language background questionnaire (Section 3.2) were answered by the parents: on general developmental factors, the language background of the participants and their parents, and the language use within the families for monolingual and bilingual participants. However, the questions aimed at determining the relative amount of input (AoI) in each of the languages for the bilinguals were sometimes misinterpreted. One question regarding the
input, in which the parents were asked to give an estimation of input the child had received before age 3, and not of the current input (see Section 4.1.2), was filled out by all parents and was taken into consideration. The AoI turned out not to predict accuracy on the experimental tasks. It is plausible that this was due to the fact that the AoI variable measure was not sensitive enough, since it was based on an estimation of the input the children had received some years earlier. In future research these problems could be avoided by going through the questions personally with the parents.

7.1.2 Production tasks
The production tasks developed for this study (Section 3.3) contained lexical items taken from the basic lexicon. The great majority of items were included in the Polish and the Russian adaptations of the MacArthur-Bates Communicative Development Inventory (for Polish: Smoczyńska (1999); for Russian: Vershinina, Eliseeva, Lavrova, Ryskina & Cejtylin (2011)). In this respect the tests were therefore suitable for monolingual children as well as for bilingual children of the ages tested. For some of the older monolingual children, the test seemed a little childish, but they nevertheless enjoyed answering really quickly.

There were no problems with following the task instructions for the gender and the genitive production tasks. For the accusative production tasks, some children forgot the task instructions, that is, they were supposed to start their answer with “I see...”. They were therefore inclined to name the objects in the nominative case. After reminding them of the task, they no longer omitted the “I see” lead-in.

The gender task and both case production tasks were easy to administer and to score. They differentiated well between bilingual participants (for monolingual children, ceiling effects were observed as was expected for that age). They are therefore suitable for further use in research involving bilingual participants and younger monolingual children.

7.1.3 Comprehension tasks
As explained in Section 3.5.6, the comprehension tasks were more challenging than the production tasks, since they were cognitively more complex and involved
the integration of different linguistic and metalinguistic skills. Problems were therefore expected (see Section 2.4).

The gender comprehension task was clearly problematic, as previously discussed in Section 5.2. The results did not lead to better scores in monolinguals than in bilinguals. The children also seemed to use different strategies (e.g., selecting the picture that appealed to them most, see Section 5.2). The test relied heavily on cognitive and metalinguistic capacities of the participants. These capacities varied in the children tested, and seemed to be independent of the age of the participants (Section 5.2). However, since the adults were able to attain ceiling scores, we believe that the children tested were all too young, resulting in no age effect. This test has to be tried out with older children. Thus, as stated in Section 5.2, we suspect a task effect and cannot therefore take the results into account for the present discussion. These results do not truly reflect gender comprehension. Generally speaking, it appears to be very difficult to develop a reliable comprehension test for this aspect of grammar.

Unlike the gender comprehension task, the participants experienced no problems with the case comprehension task. The children participated as expected, and the task provided interpretable data. However, as mentioned in Section 6.3, there were a few issues. First of all, due to a mistake in the test design, specifically in the assignment of word order and verbs to the nouns in the dative (for Polish datives, there were two verbs, all Polish sentences with verb $a$ were in SVO order, and all items with verb $b$ were in OVS), Polish and Russian could only be compared for the accusative sentences. The results of the dative case could therefore not be taken into consideration for Polish. For Russian, the results of the datives could be analysed. In future studies, this mistake can easily be repaired.

The adults, in both Polish and Russian, had difficulties interpreting the items that were in OVS order and those items that had a neuter object and a feminine subject (note that neuter objects can only be paired with feminine subjects: if they were paired with inanimate masculine or neuter subjects, there would be nominative-accusative neutralisation, see Section 2.2). Because the adults did not reach a ceiling score on those items, these items were excluded from the analysis. Despite the fact that the items were non-ambiguous, some adults made mistakes in OVS sentences with a neuter subject due to a processing bias: they appeared to
have listened only to the first word and then interpreted that as the subject. This led to there being no analysable data for the neuter subjects in OVS in Polish nor for the neuter subjects in stem-stressed OVS in Russian.

The case comprehension task was very easy to administer on a computer with E-prime. It was scored automatically and differentiated well between participants. Thus, future research could use the case comprehension tasks, but with a few improvements: correcting the word order+verb bias in Polish dative items, excluding the Russian items for the verb that was misinterpreted (see Section 6.3), and by excluding contexts that are not at ceiling in adults.

7.2 Is the acquisition of gender and case earlier in Polish than in Russian?
On the basis of the linguistic system (see Section 2.2) and the acquisition of gender and case as reported in the literature (see Section 2.3), it was predicted that Polish children (monolingual and bilingual) will be earlier in their acquisition of gender and case both in production and comprehension compared to their Russian peers (see Section 2.4). The aim of the discussion in the following subsections is first to give a summary of the results (Section 7.2.1), and then to discuss these results in the light of the linguistic factors relevant to transparency (7.2.2) and in the light of learner strategies (7.2.3).

7.2.1 Summary of the results
In this section, the results of the experimental tasks used in this study will be first discussed and compared to the results of previous studies for Polish and Russian separately (see Section 2.3). Then we will consider the results of the comparisons Polish vs. Russian for the tasks as a whole, which was the main aim of this study. Finally, the comparisons Polish vs. Russian stem-stressed and Polish vs. Russian end-stressed will be discussed.

According to the literature on gender acquisition in Polish and Russian (see Section 2.3.1), the distinction between feminine and masculine appears around age 2;0 in monolinguals, but neuter is acquired later. In bilinguals, at age 7;0, agreement errors for all genders still occur. Our results confirm that, in monolinguals, gender production is at ceiling before age 4;0 (see Section 5.1.1). In some bilinguals, gender production is correct by age 4;0, but in many bilingual
children, especially in the Dutch-dominant bilinguals, gender has not yet been acquired by age 6;6 (see Section 5.1.2).

For case acquisition, the literature indicates that both Polish and Russian children start acquiring the case system before age 2;0, and the accusative, genitive, and dative inflections and core functions are acquired before age 3;6. The full paradigm for neuter is acquired later than that for masculine and feminine in both Polish and Russian children. In our study, the monolingual children aged 4-6 years scored at ceiling, and no age effect was found in case production (on the genitive and accusative case). This result confirms that the basis of the case system, to which the genitive and accusative cases belong, is completed before age 4;0 (see Section 6.1.1 and 6.2.1). In general, as was also predicted in the literature, case production in monolinguals was better than in bilinguals. For the bilinguals, the results on case varied according to the type of bilingualism. Although Polish/Russian-dominant bilinguals showed target-like production, the Dutch-dominant bilinguals often adhered to bare nominative strategies and were unable to correctly apply case endings on genitives and accusatives resulting in low scores (despite the fact that they knew the lexical items).

Due to the lack of previous data it was not possible to predict at what age bilingual Polish-Dutch children would acquire case in Polish. From the available research on Russian-Dutch bilinguals we know that for bilinguals with Russian as the weaker language the case system has not been (fully) acquired by age 7. Cross-linguistic research has shown that especially in those bilinguals who acquire Russian in combination with a non-case language, case production is very poor (for example, Russian-Dutch (Peeters-Podgaevskaja, 2008), or Russian-English children (Polinsky, 2007a, 2007b)). Although our results confirm that the Russian-Dutch (and Polish-Dutch) children are not at the same level of performance as their monolingual peers, they performed better for example on the genitive of negation than the subjects tested by Polinsky (2007a).

In Section 1.1, arguments were presented for homophones forms slowing down the acquisition process. However, this was not supported by the case studies (e.g., Smoczyńska, 1985: 674). Our data also shows that the homophones forms are not acquired more slowly. For example, it was evident from the results of the bilingual children in our study (monolingual children at ceiling), that there were
more problems with feminine accusatives (that require a change in case ending compared to the nominative case) than with neuter accusatives (that do not require a change in case ending compared to the nominative), even though neuter accusatives are more homophonous than feminine accusatives.

In the literature it is generally accepted that L2 acquisition differs from L1 acquisition in terms of speed and accuracy (L2 acquisition is slower), but that it follows the same developmental path (e.g., Goldschneider & DeKeyser, 2001). Our study confirms that monolinguals outperform bilinguals of the same age on all production tasks and on the OVS condition in the comprehension task. However, on the basis of the results of this study, we argue that the developmental patterns in acquisition of gender and case differ between monolinguals and bilinguals at the ages tested. From our analysis, it is clear that bilinguals make different types of errors than monolinguals: where monolinguals provided an ending from another oblique case, bilinguals often did not change case endings at all. That is, they used the nominative form where another case form was appropriate. Bilinguals scored lower on those items where a change in case ending was obligatory.

This investigation thus confirms earlier findings with respect to the age of acquisition of gender and case in monolinguals and bilinguals. However, this study has added far more detail to the description of the developmental path in monolingual and bilingual acquisition and, importantly, indicates differences between the two.

**Polish vs. Russian**
The main aim of this study was to determine whether Polish children are better on gender and case acquisition than Russian children. When we compare the outcomes of several previous studies (Section 2.3.2), it seemed as if Polish monolinguals should be slightly more accurate in case production than Russians. In these studies this advantage of Polish over Russian might have been due to methodological differences, and differences in the definition of acquisition (as a process or as a result). An overview of the results of the comparison Polish vs. Russian is presented in Table 7.1. The relative performance (significantly better than, or no difference) between Polish and Russian is indicated in monolinguals
and bilinguals for the tasks as a whole for the gender and case production, and for SVO and OVS word order in the case comprehension separately. For the moment, in order to simplify the discussion, differences between masculine, feminine and neuter gender will be ignored as far as possible.

Table 7.1 Polish vs. Russian in gender and case production and case comprehension in monolinguals and bilinguals

<table>
<thead>
<tr>
<th></th>
<th>Monolinguals</th>
<th>Bilinguals</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender production</td>
<td>&gt;</td>
<td>&gt;</td>
<td>see Section 5.1</td>
</tr>
<tr>
<td>Genitive production</td>
<td>&gt;</td>
<td>=</td>
<td>see Section 6.1</td>
</tr>
<tr>
<td>Accusative production</td>
<td>=</td>
<td>&gt;</td>
<td>see Section 6.2</td>
</tr>
<tr>
<td>SVO Accusative comprehension</td>
<td>=</td>
<td>=</td>
<td>see Section 6.3</td>
</tr>
<tr>
<td>OVS Accusative comprehension</td>
<td>=</td>
<td>=</td>
<td>see Section 6.3</td>
</tr>
</tbody>
</table>

> Polish better than Russian; = no difference between Polish and Russian.
* Excluding neuter (see Section 6.3).

Gender production in Polish was predicted to be significantly better than in Russian (see Section 2.4) as a result of the differences between the linguistic systems of Polish and Russian (see Section 2.2). As is clear from Table 7.1, this turned out to be the case for both monolinguals and bilinguals (at least p<.05).¹

Again because of the differences between the linguistic systems of Polish and Russian, we predicted that in general, case production in Polish would also be better than in Russian. As Table 7.1 shows, this turned out to be only partially the case: the Polish monolinguals outperformed the Russian monolinguals on genitive production, and the Polish-Dutch bilinguals outperformed their Russian-Dutch peers on accusative production (see for a discussion Section 7.2.2).² It is unlikely that a ceiling effect is the explanation for the fact that no differences were observed between the monolinguals on accusative production (in genitive production the Polish children were better, even though both groups were at ceiling). A ceiling effect cannot explain the similar scores for the bilinguals on

¹ The differences for the monolinguals were significant even though both groups scored at ceiling (90%).
² Idem.
CHAPTER 7. DISCUSSION AND CONCLUSION

genitive production either, since their scores were below ceiling. In the next section (7.2.2), we will explore whether any linguistic features, as discussed in Section 1.1, can explain this unexpected result.

It was also predicted that Polish would be better than Russian in both types of sentence: OVS and SVO. As illustrated in Table 7.1, there were no significant differences between the two languages in either group. It was also predicted that monolinguals would show no difficulties with the OVS order, whereas in bilinguals problems were expected (this will be explored in Section 7.2.3). It is clear that in the comprehension of Polish and Russian monolinguals, case markings are noticed and, most of the time, correctly interpreted. In bilingual case comprehension, on the other hand, word order plays a large role, and to a much lesser extent, case marking. Furthermore, as predicted, the bilinguals were significantly outperformed by the monolinguals on OVS sentences.

Thus, from this study we can conclude that gender production is more difficult in Russian than in Polish, and that there are some indications that this is also true for case production. The results for case comprehension did not show this, and is possibly due to the greater role of learner strategies compared to the role of the proficiency level (to be explored in Section 7.2.3).

Polish vs. Russian stem-stressed and Russian end-stressed
It was hypothesised at the start of this study that any advantage of Polish compared to Russian would be mainly due to the vowel reduction of the stem-stressed items in Russian (see Section 2.4). Our assumption was that reduced endings were more difficult to acquire than transparent endings, and thus Polish would be better than Russian stem-stressed, but not better than Russian end-stressed, on all tasks. Table 7.2 presents an overview of the relative performance between Polish and Russian comparing Polish with Russian stem-stressed and Polish with Russian end-stressed for monolinguals and bilinguals. The effects of individual genders will again be ignored as far as possible.
Table 7.2 Polish vs. Russian stem-stressed and Polish vs. Russian end-stressed items for gender and case production and case comprehension in monolinguals and bilinguals

<table>
<thead>
<tr>
<th></th>
<th>Monolinguals</th>
<th>Bilinguals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Polish vs.</td>
<td>Polish vs.</td>
</tr>
<tr>
<td></td>
<td>Russian</td>
<td>Russian</td>
</tr>
<tr>
<td></td>
<td>stem-stressed</td>
<td>end-stressed</td>
</tr>
<tr>
<td>Gender production</td>
<td>&gt;</td>
<td>&gt;</td>
</tr>
<tr>
<td>Genitive production</td>
<td>=</td>
<td>&gt;</td>
</tr>
<tr>
<td>Accusative production</td>
<td>=</td>
<td>&gt;</td>
</tr>
<tr>
<td>SVO Accusative</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>comprehension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVS Accusative</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td>comprehension*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

> Polish better than Russian; = no difference between Polish and Russian.
* Excluding neuter (see Section 6.3).

As is clear from Table 7.2, the prediction was not supported for either gender or case production or for comprehension. For gender there was no difference in performance between Russian stem-stressed and end-stressed nouns, as was already shown in Section 5.2. The Polish groups significantly outperformed their Russian peers on both stress conditions for Russian. That means that the observed advantage of Polish over Russian cannot be directly connected to the difference in stress in Russian. Possible explanations for this finding will be considered in Section 7.2.2.

For case acquisition, as reported earlier, Polish was better than Russian in only a few instances, that is on end-stressed genitive and accusative production for monolinguals and on stem-stressed and end-stressed accusatives for bilinguals. In comprehension there were no differences. Any advantage found cannot be attributed to the Russian grammatical system. Explanations for these differences will be explored in Section 7.3.

To sum up, the hypothesis that Polish children would outperform the Russian children on the stem-stressed but not on the end-stressed condition was not confirmed for any of the tasks. Below, we will explore what alternative explanations there are for the Polish groups being more accurate on gender and case production.
7.2.2 The relative influence of linguistic features on acquisition

As was discussed in Sections 2.1 and 2.2, both Polish and Russian have a large amount of homophony in their endings. Nevertheless, Polish endings on the whole are more transparent than in Russian. While in Polish the gender and case endings are morphophonetically clear, in Russian, due to the phonetic reduction of unstressed vowels in the stem-stressed category of nouns, the amount of homophony in the endings is higher and the morphological analysability diminishes. Moreover, the total number of endings in Russian is higher (due to allomorphy, see Section 1.1.3), leading to a reduced morphophonological regularity of Russian as compared to Polish. As is clear, and as has been mentioned in Section 1.4, in the case of Russian stem-stressed nouns contrasted with end-stressed nouns, these three factors are all present simultaneously.

We hypothesised that, if differences were observed between Polish and Russian in this study (as was indeed the case for some of the tasks, see Section 7.2.1), they would be mainly caused by the fact that in Russian there are two stress conditions (stem-stressed and end-stressed items), which determine the phonetic transparency of endings.

In general, our results support the claim that Polish children were better than Russian children. As has been established, this was not due to morphophonetic clarity directly, because the predicted advantage of Polish over Russian stem-stressed was not observed (see Section 7.2.1). That means that morphophonetic clarity did not directly cause the observed differences between Polish and Russian. It is necessary to look elsewhere for an explanation; the role of morphological analysability, morphophonological regularity, and pattern frequency will now be considered for gender and case separately.

Gender

Gender, measured through agreement with a possessive pronoun, proved to be an ideal testing ground for the factors mentioned above. For gender, a Polish child receives fewer individual forms in the input than a Russian child: for the same category (gender), a Russian child has to learn five forms compared to three forms in Polish. Moreover, in Russian, two of the five forms for gender are homophonous (stem-stressed feminine and neuter). Due to this homophony, the
distinction between the genders is less clear: one form [ə] has two functions (feminine and neuter).

Furthermore, a higher frequency of a feature in the linguistic system can contribute greatly to its acquisition (see Section 1.1.4). For this study, the pattern frequency of stem-stressed endings compared to end-stressed endings was relevant. As was determined in the input, children hear approximately 87% stem-stressed forms (reduced), and 13% end-stressed forms (transparent). While the infrequent end-stressed endings in Russian are transparent for gender, the highly frequent stem-stressed endings are not.

The combination of these three factors (larger number of forms, increased homophony in Russian, and low pattern frequency of Russian end stress) can explain why we did not observe an advantage of end-stressed forms in Russian compared to Polish, but on the contrary, a general advantage of Polish over Russian.

It is interesting to note that the feminine gender was most frequently overgeneralised by Russian-Dutch children in both production and comprehension, and by all other three groups in comprehension, despite the fact that the masculine is the most frequent gender (see Sections 5.1 and 5.2). The feminine endings of possessive pronouns and adjectives (in Russian end-stressed), compared to the masculine and neuter forms, have a higher phonetic clarity: they have a syllable more in contrast to the masculine, and they are more sonorous than the neuter. Apparently, this phonetic saliency affects the preference in production and comprehension.

Case
Unlike gender acquisition, in case acquisition, the advantage of Polish over Russian was not always present, or observable. At first sight, the Polish and Russian systems for the genitive case are almost identical (see Section 2.2).³ Although in Russian, the stem-stressed genitive noun endings are reduced, this does not lead to a greater homophony within the genitive case paradigm

³ Of course, in Polish, there are two forms for the masculine genitive {\text{-a}} and {\text{-u}} (see Section 2.2). However, the choice for one of those forms is based on semantic differences (and not phonetic rules), and does not lead to a greater homophony within the Polish genitive.
(masculine and neuter endings are identical in both conditions, and feminine and masculine/neuter do not become homophonous). Therefore, we can rule out increased homophony as leading to an advantage for Polish here.

In the accusative case, Polish and Russian differ slightly from each other, as Russian has one form more: stem-stressed neuter in [ə], that sounds identical to the genitive and nominative forms. Although differences between Polish and Russian were mainly expected due to neuter, and to stem-stressed neuter in particular, that would be then misinterpreted as feminine, the predicted overgeneralisation of the feminine ending in {-u} was less frequent than expected. Furthermore, the other genders did not reveal differences between Polish and Russian. The scores on animate masculine nouns were also lower than on inanimate masculine nouns in both languages. This has to do with general developmental patterns: animacy is acquired later.

The differences found in this study between Polish and Russian end-stressed nouns on genitive and accusative production may be due to the problem of clearly determining a form as being erroneous. Due to homophony in the stem-stressed condition, several forms sound identical and errors in Russian cannot be detected (by a listener). In particular, in Russian stem-stressed neuters errors are often not observable: the nominative, genitive and accusative have the same phonetic realisation of the ending, which often leads to an apparent target-like language, that does not necessarily reflect the actual competence and mastery of the case system. Please note that case errors could be observable through agreement with adjective or verbs, but we did not test an agreement condition for case here. However, it is important to mention that since homophony is one of the basic features of the case system in Russian, it is almost impossible to design research paradigms that would disentangle errors from correct forms in the child’s underlying system. Since not all forms are perceivable, researchers, teachers, or parents also assume that the production is target-like, whereas that is not always the case (but not possible to check). This causes parents to give less corrective feedback.

Furthermore, as was mentioned for gender, a higher frequency of a feature in the linguistic system can contribute greatly to its acquisition. A study by Dąbrowska and Szczerbiński (2006) that examined case acquisition in Polish
monolinguals has shown that patterns with a low frequency are more challenging. Even though there is phonetic transparency in the neuter in Polish, because of the low pattern frequency of the neuter gender, it is more difficult to acquire than the other genders, especially in the relatively infrequent dative case. In our study, the transparent end-stressed forms in Russian are highly infrequent (13%), and in addition to that, the frequency of the neuter gender is much lower than other genders, especially in some of the oblique cases in the neuter gender in Russian. We find the combined effect of low morphological pattern frequency with low lexical pattern frequency. This supports the idea that a higher frequency favours acquisition, even for opaque gender and case endings. The system for neuter appears to be too opaque to facilitate acquisition.

In the genitive case, the Polish and Russian systems are parallel and the variability of endings is roughly the same. However, unlike in the monolinguals, we did not observe an advantage for Polish in the bilinguals. The fact that Russian children performed equally well on the genitive gender was most likely due to the relative advantage they experienced by using the bare nominative strategy: for stem-stressed neuter nouns, a bare nominative is indistinguishable from the target response. The bare nominative strategy therefore leads to a higher accuracy score than in the end-stressed condition. When considering the fact that this was a frequent strategy in the bilinguals (see Section 6.1 and 6.2), Russian children now had an advantage, since, for the Polish children, a bare nominative strategy on neuters led to a perceivably incorrect response. Thus, homophony of Russian favoured target-like production of genitives so that no difference between Polish and Russian could be observed.

Although it was expected that in young Russian bilinguals neuter stem-stressed would be interpreted as feminine (becoming visible through the {-i} genitive marker), this error was not frequent, since those children who would potentially interpret neuter stem-stressed nouns as feminine, were the ones who did not apply case endings in general. Unfortunately, it would not be possible to unravel this in a future study, since the most frequent error for the bilinguals (mainly caused by the Dutch-dominant bilinguals) was a ‘bare nominative strategy’. In monolinguals, these errors were not observed, probably because they were too old for this type of mistake (and perform at ceiling).
For accusative acquisition in bilinguals, we expected the Polish-Dutch children to outperform their Russian-Dutch peers based on the general advantage of Polish over Russian (see above). Unlike the genitive, in accusative production there are no factors that are of more advantage for the Russian-Dutch children compared to the Polish-Dutch children. In the accusative production task, the “bare nominative strategy” was equally helpful to both groups. Therefore, the expected difference was indeed observed. Furthermore, the reanalysis of stem-stressed neuter nouns as feminine nouns (visible through the feminine ending {-u}), was less frequent than predicted (see explanation mentioned for genitive acquisition).

Thus, the problem for Russian is that due to homophony a part of the Russian system is not transparent, and what is transparent (end-stressed), is infrequent. However, the fact that forms overlap does not mean that the underlying distinctions do not exist. We believe that the observed differences between Russian and Polish can at least be partially explained by the fact that the declination pattern for neuter is not completely acquired, since the transparent endings are too infrequent, and the frequent endings are non-transparent. Even monolinguals made more mistakes in the neuter, although their production as a whole was at ceiling. Stem-stressed neuter items were not interpreted as feminine as often as expected, which points to the fact that the children are aware of another paradigm, but individual endings have not been fully acquired. In Polish, the neuter gender is also infrequent and was performed worse than the other two genders. However, the fact that it is not split over two forms gives the Polish children an advantage.

In conclusion, the results of this study indicate that Polish has a general advantage, evident in the results for gender although less so for case. These observed differences between Polish and Russian are not directly due to the role of diminished phonetic clarity within Russian. Rather the smaller amount of morphophonological regularity, leading to a greater number of forms, including more homophonous forms, and the low pattern frequency of end-stressed in Russian favours gender and case acquisition in Polish. However, unlike gender acquisition, due to some instances of homophony in the oblique cases, these differences are not always observable (in the advantage of Russian stem-stressed) in case acquisition.
7.2.3 Learner strategies
In Section 1.2, three possible learner strategies were introduced with respect to the marking of case: a case strategy, a semantic-pragmatic strategy, and a word order strategy. As discussed in the previous section, we expected that Polish children would show a greater sensitivity for case endings than Russian children (both bilinguals and monolinguals (see Section 2.4)). This turned out to be partly true. This section will explore the role of the learner strategies as observable in the case comprehension results (see Section 6.3). As was mentioned in Section 3.4, in the case comprehension task, the semantic-pragmatic strategy was neutralised (and will not be further considered). The task was designed in such a way that a case strategy could lead to a correct interpretation in all sentences. A word order strategy, on the other hand, would lead to a correct interpretation of SVO sentences but an incorrect interpretation of OVS.

As was predicted, the monolingual children were able to process case (as indicated by a high percentage of correct responses in the OVS condition). However, even in some monolingual adults, a small percentage of items was below ceiling. Although for all sentences there was only one possible reading, some of the adults seemed to make an interpretation early on in their processing, and were then insensitive to information that could lead to a correction of their first reading. Nevertheless, we can conclude that case markings are relevant to some extent in the comprehension of young monolinguals.

Furthermore, error patterns as visible in the production of case seem to be related to comprehension. The large amount of bare nominatives in the genitive and accusative production tasks (see error analyses in Sections 5.1, 5.2, 6.1 and 6.2) shows that the bilingual children have not acquired case markings in Polish and Russian in production. That either means that the bilinguals do not notice and do not produce case endings, or that they do notice case endings in comprehension but cannot produce the appropriate case ending themselves. If the first explanation were true, a word order strategy would be the predominant strategy in comprehension. If the latter were true, a case strategy (as used by the monolinguals) would be evident from the absence of (large) differences between

---

4 The event probability of both SVO and OVS reading of the sentence was equally likely.
the accuracy of SVO and OVS. The results of this study indicate that bilingual Polish-Dutch and Russian-Dutch children at the age tested pay attention to case endings to a fairly limited extent. The word order strategy was used more frequently (reflected in a higher accuracy on SVO than on OVS sentences). This word order strategy was even more frequent in Dutch-dominant bilinguals than in Polish- or Russian-dominant bilinguals. Some of the Dutch-dominant bilinguals commented while performing the task that they had heard a particular item already, although, in fact, all items were used only once. This supports our interpretation that they did not pay attention to the case endings.

In sum, the expected learner strategies were observed in both monolingual (case strategy) and bilingual participants (word order strategy). However, we cannot conclude that Polish children rely relatively more heavily on the case strategy than Russian children, as was expected on the basis of the differences between the linguistic systems (Section 2.2). The expectation was that the Polish children would perform better and therefore would make more use of the case strategy. This was, however, not clear from the results. More research is needed on this topic (see Section 7.5).

### 7.3 Production/comprehension asymmetries

As was mentioned in Section 3.6.5, some studies comparing production and comprehension have found an asymmetry such that production tasks are performed better than comprehension tasks (e.g., Gagarina, 2011). In the literature, reasons are given for observed production-comprehension asymmetries (see Section 3.6.5). Since the tasks for this study were not designed to tap into this phenomenon, it was decided not to compare the results of the tasks in this study statistically. However, by inspection it is evident that there are large differences between production and comprehension, especially in monolinguals (ceiling effects for production, but not for comprehension).

The comprehension task used in this study only involved three-word sentences (and four-word sentences for Polish reflexive verbs), and were not a large burden for short-term memory. The ceiling effect in production strongly suggests that the monolingual children are sensitive to case endings in the input. However, in comprehension monolingual children, although exhibiting a
significant preference for a case strategy, used the word order strategy more often than might be expected on the basis of an almost total absence of mistakes in production. It is hard to believe that children who obtained high scores on the sentence repetition tasks (Polish or Russian) and who, for instance, correctly reproduced object relatives (in the SRTs), are not able to interpret simple noun-verb-noun strings. Obviously, in comprehension tasks, skills other than linguistic ones are tested compared to production tasks.

Another possible explanation for the lower results on the comprehension tasks could be that case in integration (i.e., where case is tested embedded in a sentence) is more difficult than case in isolation (i.e., where case is tested on individual nouns in isolation). The production tasks were very simple elicitation tasks: the target was a single noun with case information. In the comprehension task and the sentence repetition task, more lexical items and grammatical structures had to be memorised.

7.4 Learner factors
In Section 2.3, the influence of learner factors on the acquisition of gender and case as reported in the literature was discussed, leading to several predictions (Section 2.4). In the current section, these predictions will be evaluated in light of the results of the current study. The role of age and language proficiency will be explored first, followed by factors related to bilingualism as introduced in Section 1.3 (AoO, linguistic situation, quality and quantity of input, language interference).

7.4.1 Age and language proficiency
As predicted (see Section 2.4) in monolinguals, due to a ceiling effect no age effects could be found in the production tasks. In case comprehension, a small age effect was found: as might be expected, younger monolinguals were weaker in case comprehension than older ones. In bilinguals, age was a significant predictor neither in production nor in comprehension. Other factors contributed more to the individual variation as will be seen below.

The role of language proficiency in Polish/Russian was taken into account for all participants. Children with a higher proficiency in Polish/Russian were
expected to obtain higher scores on the production and comprehension tasks. In all tasks, this turned out to be the case: language proficiency seemed to be the most important predictor of monolingual and bilingual performance on the individual tasks. We argue that this is because case and gender are at the core of the nominal linguistic system. As was mentioned in Chapters 5 and 6, although there were more grammatical aspects in the sentence repetition tasks than only gender and case, gender and case still contributed considerably to the total score, since the repetition had to be completely correct. Therefore, the SRTs and the gender and case tasks are not totally independent.

7.4.2 Factors related to bilingualism
In Section 1.3, it was suggested that four extrinsic factors related to bilingualism cause individual variation in the acquisition of gender and case: language transfer, language status, quality and quantity of input, and age of onset (AoO). These four factors will now be explored in light of the results of the present study.

First of all, in bilingual acquisition, transfer (positive and negative) is always possible between the two languages. From previous studies we know that case in Russian is more difficult for children whose other language does not mark gender and case morphologically (e.g., Schwarz, Minkov, Dieser, Protassova, Moin, and Polinsky, 2014). Dutch has a sparser gender system compared to Polish and Russian, and no case system. Therefore, in bilingual acquisition where these languages are involved, negative transfer from Dutch is expected.

Goldschneider & DeKeyser (2001) did not include L1 influences in their predictors, since the measures for L1 in the studies they compared were not uniform. In this study, however, we have minimised the L2 variability by choosing children with only one L2 background (Dutch). Therefore, the type of interference and the role of transfer from L2 was expected to be the same for both the Polish and the Russian bilingual group. The results and the types of errors of both bilingual groups suggest that transfer was important. As was predicted, the most frequent mistake in the case production tasks was the use of a bare nominative instead of an oblique case. Monolinguals did not make this error. We therefore assume that negative transfer from the non-case language affected performance in the case language.
The language status was comparable for all bilingual participants in this study, since they acquired Polish/Russian as a minority language in the Netherlands. The great majority of bilinguals who participated in this study were recruited via Polish/Russian language schools. Parents who send their children to this type of school are very likely to have a positive attitude towards their children knowing the minority language (Polish/Russian). It was therefore assumed that the parental attitude was comparable across the groups and could not be the explanation for the variance observed.

From previous studies we know that it is very difficult to estimate the relative amount of input a bilingual child has received in each language. In the literature, several techniques for measuring this input have been reported. For example, in some studies parents were asked to provide an hour-by-hour estimate of the input on a weekly basis (e.g., Bedore, Peña, Summers, Boerger, Resendiz, Greene, Bohman, Gillam, 2012). Other studies have used the cumulative length of exposure in each of the languages to predict accuracy on tasks (e.g., Unsworth et al., 2014; Unsworth & Blom, 2010). It has also been reported that both the amount of input (Cornips & Hulk, 2008) and quality of input (Hulk & Cornips, 2006: 21) influence L2 success (these studies involved bilingual participants whose AoO of Dutch on average was later than that of the participants tested in our study). On the basis of those reports, we hypothesised that children with more input in Polish/Russian (a higher AoI) would perform better on the experimental tasks than those who had less input in Polish/Russian. Since the home language situation of the participants of this study was heterogeneous (some of the participants grew up in a mixed language family, while other participants had two Polish/Russian-speaking parents), the input the children received in Polish/Russian was also different. Surprisingly, in contrast to the literature, we found no effect for AoI: in this study, AoI in Polish and Russian was not related to the performance on gender and case production or case comprehension. This unexpected result is possibly due to the construction of the AoI (see Section 7.1.1) in this study and/or the heterogeneity of the groups studied (Section 3.1).

It was not possible to study the quality of input here. The questionnaire provided information on parents’ self-evaluation of their language abilities in Polish/Russian and Dutch (including native proficiency), in which language they
communicated with their children, and how often parents engaged in reading and story telling via the parental questionnaires (see Section 3.2), but gave no insights into the quality of the input.

The age of onset of Dutch (all participants acquired Polish/Russian from birth) was expected to predict success in the gender and case tasks in Polish and Russian in such a way that the older the children were when they started learning Dutch (thus a shorter length of exposure to Dutch), the better the performance in Polish/Russian. This was based on previous literature. For instance, it has been reported that children with a later AoO of Hebrew or English perform better in Russian than those with an earlier AoO (Schwartz & Minkov, 2014; Modyanova, 2006). However, in those studies the AoO of the L2 was older than in our study (see Section 4.1.2). Our hypotheses regarding the AoO were not confirmed: AoO was not a significant predictor for the acquisition of gender and case. The results of our study suggest that if the AoO of an L2 is very young (in the case of this study 7 months), its effect in 4- to 6-year-olds is not detectable.

In sum, the linguistic situation and attitude to the languages were highly comparable among participants and therefore did not emerge as factors affecting the results. Against expectations, the AoI was not a significant predictor for gender and case production and case comprehension in bilingual participants. Although no contrast could be made with a different L2 in this study, the fact that Dutch has no case marking could contribute through negative transfer to the results.

7.5 Recommendations for further research
This was the first study aimed at evaluating the acquisition of gender and case in Polish and Russian cross-linguistically, using the same method and highly similar test materials. Although valuable conclusions could be drawn from this study regarding the role of different aspects of transparency, several questions still remain unanswered.

First, as was mentioned in Section 7.3, asymmetries between production and comprehension would be an interesting research topic. A sentence repetition task could be a bridge between production, processing and comprehension.
Furthermore, a research design involving eye tracking could be useful to visualise decision patterns in comprehension.

Second, from the results of this study it is evident that there are many uncertainties about the interplay between word order and case marking in monolinguals (adults and children) and bilinguals. For monolinguals, although it is clear that case is important in production, it is unclear how much attention is paid to word endings in comprehension, and especially in sentences with a default word order (here SVO). The role of learner strategies in the comprehension of case needs therefore to be studied in more detail.

Related to the second point, it would be relevant to study whether there is a preference for a word order strategy in the comprehension of case in adults. Possibly, more contexts have to be tested. Nevertheless, the fact that adults did not all score at ceiling on some of the neuter OVS items indicates that this would be interesting for further research.

To tap into case comprehension and to evaluate whether or not case marking can be redundant for comprehension, sentence processing could be studied online. For example, a self-paced listening paradigm might be used (as in Chondrogianni and Marinis (2012)). Such a processing task should include different conditions, with case in redundant and non-redundant contexts, as well as with or without case violations, in which the strength of the cue can be tested – both in adults and in monolingual and bilingual children. Examples of redundant contexts are case endings after prepositions that take only one case.

Third, although it was suggested that pattern frequency plays a role in Russian, the roles of pattern frequency and noun frequency were difficult to tease apart in the current study. More research has to be conducted to investigate the role of noun frequency contrasted with pattern frequency in Russian. This could be realised by using a methodology involving novel nouns, and thereby minimalizing a possible noun-frequency effect. This has been done for Polish, for instance in Dąbrowska and Szczerbiński (2006), but for Russian, such a study has not yet been carried out.

Fourth, in the future, this study can be extended to other bilingual Polish and Russian groups with different rich case languages as L2, such as Hungarian, Finnish, etc. It will be interesting to explore the influence of positive language
transfer on case acquisition in such bilingual contexts. We expect that case in Polish and Russian is more difficult in both Polish-Dutch and Russian-Dutch bilinguals compared to bilinguals whose other language is also a case-rich language.

Fifth, although this study showed that phonetic clarity in Russian does not directly play a role in the production of gender and the genitive and accusative case and in case comprehension, more research on this topic needs to be undertaken before the association between phonetic clarity and the acquisition of nominal morphology is fully understood. This could also be studied using novel word paradigms. Furthermore, in future studies, other oblique cases with less homophony could be tested, for example the instrumental (although the usage and the frequency of the instrumental case differs between Polish and Russian).

In conclusion, this was the first study that has involved a research paradigm comparing two closely related languages, both on the production and comprehension of gender and case in monolinguals and bilinguals (with L2 Dutch). This study has shown that the reduced amount of phonetic clarity, the lower morphophonological regularity (expressed by the larger number of endings in Russian compared to Polish), and the low frequency of the end-stressed Russian pattern result in Russian children being slower in the acquisition of gender and case compared to their Polish peers. It is clear that this study makes it possible to make many other comparisons. For example, in future studies, this paradigm can be expanded for Polish and Russian (and other Slavic languages) by adding other cases, the plural or involving agreement with adjectives in the oblique cases and past tense verbs. Moreover, to investigate the role of specific types of bilingualism, bilingual groups can be recruited on basis of their L2, as well as linguistic situations with respect to the amount of input they receive. Furthermore, this paradigm can be adopted for studies that investigate minimal differences between closely related languages for other language pairs.
REFERENCES


COST Action IS0804 (2011). Questionnaire for Parents of Bilingual Children (PaBiQ).


REFERENCES


REFERENCES


REFERENCES


Appendix I. Background measures
I.I Language background questionnaire (English translation)

0. General information
0.1 Filled out by: ___________________________ Date: ___________________________

1. General information about the child:
1.1 Name __________________________________________
1.2 Gender: __________________________________________
1.3 Date of birth: __________________________________________
1.4 If place of birth is not in the Netherlands, date of immigration: ___________________________
1.5 All children in the family:

<table>
<thead>
<tr>
<th>Birth order</th>
<th>Date of birth</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Development of your child
2.1 At what age did your child first walk? __________________________
2.2a At what age did your child speak his/her first words? In Russian/Polish _________________
2.2b In Dutch __________________________
2.3 At what age did your child speak his/her first short sentence? __________________________
2.4 Can you given an example of such a sentence? Please write down how your child pronounced it, for example, “give candy”, “mommy juice”. __________________________
2.5a Were you ever concerned about the speech development of your child? When your child was between 3 and 4 years old, were you worried about the speech of your child in Polish/Russian? ________________
2.5b Were you ever concerned about the speech development of your child? When your child was between 3 and 4 years old, were you worried about the speech of your child in Dutch? ________________
2.6 Did your child ever have hearing difficulties? Does your child often suffer from colds or frequent middle-ear infections? Yes / No
2.7 Which languages does your child speak? __________________________
2.8 Which language does he/she prefer? __________________________
2.9 With which languages did your child have contact before his/her 3\textsuperscript{rd} birthday?

<table>
<thead>
<tr>
<th>Language</th>
<th>Never 0%</th>
<th>Rare 25%</th>
<th>Sometimes 50%</th>
<th>Often 75%</th>
<th>Always 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.10 At what age was your child exposed for the first time to the languages mentioned below?

<table>
<thead>
<tr>
<th>Language</th>
<th>Age (in months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
</tr>
</tbody>
</table>

2.11 Where and in which context was your child in contact with the different languages?

<table>
<thead>
<tr>
<th>Polish / Russian</th>
<th>Dutch</th>
<th>Other language</th>
<th>Polish / Russian</th>
<th>Dutch</th>
<th>Other language</th>
<th>Polish / Russian</th>
<th>Dutch</th>
<th>Other language</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Current language use

<table>
<thead>
<tr>
<th>Polish / Russian</th>
<th>Dutch</th>
<th>Other language</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 How well does your child speak compared to other children of the same age? 0 = worse; 1 = slightly worse; 2 = equally well; 3 = better.</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>3.2 Do you think your child speaks Polish/Russian at the same level of a monolingual child of that age? 0 = worse; 1 = slightly worse; 2 = equally well; 3 = better.</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>3.3 How well does your child make correct sentences? 0 = not good; 1 = so so; 2 = good; 3 = very good.</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>
3.4 Are you satisfied with how you’re your child understands Polish/ Russian? Always? 0 = very unhappy; 1 = not happy; 2 = happy; 3 = fully happy.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
</table>

3.5 Are you satisfied with how your child can express himself/ herself in Polish/ Russian? Always? 0 = very unsatisfied; 1 = not satisfied; 2 = satisfied; 3 = fully satisfied.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
</table>

3.6 Does your child get upset if he is unable express himself/ herself in Polish/ Russian? 0 = yes/ all the time; 1 = often; 2 =sometimes; 3 = (almost) never /no.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
</table>

4. Home language use (at home)

4.1 Parent-child interaction:

<table>
<thead>
<tr>
<th>Language</th>
<th>Mother ↔ Child</th>
<th>Father ↔ Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Does anyone regularly take care of your child? (Grandparent, babysitter) YES / NO

4.3 In which language do the following persons communicate with your child?

<table>
<thead>
<tr>
<th>Language</th>
<th>Grandmother/ grandfather ↔ Child</th>
<th>Nanny ↔ Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4 In which language does your child interact with his/her siblings? (Please, fill out a separate table for each sibling).

<table>
<thead>
<tr>
<th>Other adult ↔ Child</th>
<th>Other adult ↔ Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Never 0%</th>
<th>Rare 25%</th>
<th>Sometimes 50%</th>
<th>Often 75%</th>
<th>Always 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brother/sister 1 ↔ Child</td>
<td>Brother/sister 2 ↔ Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Never 0%</th>
<th>Rare 25%</th>
<th>Sometimes 50%</th>
<th>Often 75%</th>
<th>Always 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brother/sister 3 ↔ Child</td>
<td>Brother/sister 4 ↔ Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Never 0%</th>
<th>Rare 25%</th>
<th>Sometimes 50%</th>
<th>Often 75%</th>
<th>Always 100%</th>
</tr>
</thead>
</table>
5. Language use within the family

5.1 Which of the following activities does your child engage in during an ordinary week?

<table>
<thead>
<tr>
<th>Types of activities</th>
<th>Polish / Russian</th>
<th>Dutch</th>
<th>Other language</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Reading</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Watching TV/Movies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Retelling a story</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 In which language (which languages) speaks your child with his/her friends?

<table>
<thead>
<tr>
<th>Child ↔ Friends</th>
<th>Never 0%</th>
<th>Rare 25%</th>
<th>Sometimes 50%</th>
<th>Often 75%</th>
<th>Always 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Information about the parents

6.1 Information about the mother

6.1.1 Where did you live before you moved to the Netherlands?

6.1.2 When did you move to the Netherlands?

6.1.3 What is your profession?

6.1.4 Do you currently work? YES / NO

6.1.5 Educational background

<table>
<thead>
<tr>
<th></th>
<th>YES / NO</th>
<th>In which country</th>
<th>How many years</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.1.6 How well do you speak the following languages?

<table>
<thead>
<tr>
<th></th>
<th>A few words</th>
<th>Basic</th>
<th>Reasonable</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.2 Information about the father

6.2.1 Where did you live before you moved to the Netherlands?

6.2.2 When did you move to the Netherlands?

6.2.3 What is your profession?

6.2.4 Do you currently work? YES / NO

6.2.5 Educational background:

<table>
<thead>
<tr>
<th></th>
<th>YES / NO</th>
<th>In which country?</th>
<th>How many years</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.2.6 How well do you speak the following languages?

<table>
<thead>
<tr>
<th></th>
<th>A few words</th>
<th>Basic</th>
<th>Reasonable</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polish / Russian</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other language</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Problems

Please indicate in every field YES or NO:

<table>
<thead>
<tr>
<th></th>
<th>Siblings</th>
<th>Mother</th>
<th>Father</th>
<th>Fathers’ family</th>
<th>Mothers’ family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problems with school successes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not read or write well</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeated a class at school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does not always understand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>everything</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with speech</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I.II Sentence repetition tasks
Sentence repetition task Polish

BiCLCO1 Mama myła podłogę, a ojciec gotował zupę.
mama cleaned floor and father cooked soup
‘The mother cleaned the floor, and the father prepared soup.’

Ciotka upiekła ciasto, a my poszliśmy do parku.
auntie baked cake and we went to park
‘Auntie baked a cake, and we went to the park.’

Brat odrobił lekcje, a my poszliśmy do kina.
brother did homework and we went to cinema
‘The brother did his homework, and we went to the cinema.’

Oni jedli ciasto, a my piliśmy sok.
they ate cake and/but we drank juice
‘They ate cake, and/but we drank juice.’

BiCLSU Kotka zobaczyła, że pies zjadł kiełbasę.
little+cat saw that dog ate sausage
‘The little cat saw that the dog ate a sausage.’

On wrócił do domu, bo padał deszcz.
he returned home because fell rain
‘He returned home, because it was raining.’

Oni usłyszeli, że przyszedłem do domu.
they heard that I+came home
‘They heard that I came home.’

Wujek włożył czapkę, bo padał śnieg.
uncle put+on hat because fell snow
‘The uncle put on a hat, because it was snowing.’

Cond- Jeʃli będzię gorąco, pójdziemy nad morze.
itional if will +be hot we+will+go to sea
‘If it is hot, we will go to the sea.’

Kiedy on umyje ręce, będziemy jeść obiad.
when he washes hands we+will eat dinner
‘When he has washed his hands, we will go and have dinner.’

1 Abbreviations are to be found in the List of abbreviations.
Jeśli brat zje zupę, babcia kupi cukierki.
If brother will eat soup grandmother will buy candy
'If the brother eats the/his soup, the grandmother will buy candy.'

Kiedy deszcz się skończy, dzieci będą się bawić.
when rain ends children will play
'When it stops raining, the children will play.'

OVS
Lekarza zobaczyła siostra w szpitalu.
doctor saw sister in hospital
'The sister saw the doctor at the hospital.'

Rybkę złowiła kaczka w rzece.
fish caught duck in river
'The duck caught the fish in the river.'

Wilka znalazła sarnę koło drzewa.
wolf found deer near tree
'The deer found the wolf near a tree.'

Zając całował misia na górze.
little+hare kissed little+bear on hill
'The little hare kissed the little bear on the hill.'

PrWH
Na którego lekarza krzyknął tata?
at which doctor yelled daddy
'At which doctor did daddy yell?'

Od którego jeżyka wiewiórka wzięła jabłko?
from which hedgehog squirrel took apple
'From which hedgehog did the squirrel take an apple?'

Na którą królową był zły książę?
at which queen was angry prince
'With which queen was the prince angry?'

Od jakiej kury uciekła kotka?
from which chicken ran little+cat
'From which chicken did the little cat run?'

To jest dziewczynka, którą karmiła mama.
this is girl whom fed mother
'That is the girl whom the mother fed.'
APPENDICES

To jest kogut, którego złapała kura.
this is rooster that caught chicken
'This is the rooster that the chicken caught.'

To jest słoń, którego ugnął krokodyl.
this is elephant that bit crocodile
'That is the elephant that the crocodile bit.'

To jest niedźwiedź, którego zwiodła osa.
this is bear that tricked wasp
'That is the bear that the wasp tricked.'

SOV

Pingwin fokę pokałował w morzu.
penguin seal kissed in sea
'The penguin kissed the seal in the sea.'

Ptaszek kota szuka w ogrodzie.
birdie cat searches in garden
'The birdie looks for the cat in the garden.'

Matka córki karmiła w kuchni.
mama daughter fed in kitchen
'The mother fed her daughter in the kitchen.'

Krokodyl wilka ugnął w cyrku.
crocodile wolf bit in circus
'The crocodile bit the wolf at the circus.'

Subject relative

To jest baranek, który kocha wielbłąda.
this is lamb that loved camel
'The is the lamb that loved the camel.'

To jest delfin, który całował rekina.
this is dolphin that kissed shark
'This is the dolphin that kissed the shark.'

To jest norka, która popchnęła myszkę.
this is mink that pushed little mouse
'This is the mink that pushed the little mouse.'

To jest żyrafa, która widziała zebrę.
this is giraffe that saw zebra
'This is the giraffe that saw the zebra.'
Kotek znalazł kapcie na oknie.
‘The kitten found the slippers near the window.’

Książę był bardzo zły na królową.
‘The prince was very angry with the queen.’

Dzieci myją naczynia po obiedzie.
‘The children did the dishes after dinner.’

Ona jadła cukierkę na ulicy.
‘She ate candy on the street.’

Oni kupili mandarynki w sklepie.
‘They bought mandarin oranges at the store.’

Dziewczynki śmiały się z chłopca.
‘The girls laughed at the boy.’

Dziadek dał wnukowi ołówek.
‘The grandfather gave his grandson a pencil.’

Babcia dala wnuczce łopatkę.
‘The grandmother gave her granddaughter a beach spade.’

Tato przeczytał bajkę synowi.
‘The dad read a fairy-tale to his son.’
Braciszek malował kwiaty siostrze.
‘The little brother drew flowers for his sister.’

Jakiej rybki szukała kaczka?
‘Which little fish did the little duck look for?’

Jakiego pinguina karmił rekin?
‘Which penguin did the shark feed?’

Jaką małpę oszukał krokodyl?
‘Which monkey did the crocodile trick?’

Jakiego delfina ugrzyła foka?
‘Which dolphin did the seal bite?’

Sentence repetition task Russian

Mama myla pol, a papa varil sup.
‘The mother cleaned the floor, and the father prepared soup.’

Brat sdelal uroki, i my poexali v kino.
‘The brother did homework, and we went to cinema.’

Tëtja sdelala salat, i my pošli v park.
‘The aunt made salad, and we went to the park.’

Oni eli tort, a my pili limonad.
‘They ate cake, and we drank lemonade.’

Sobaka videla, čto kot el kolbasu.
‘The dog saw that the cat ate a sausage.’
Oni uslyšali, čto jah prišel domoj.
they heard that I came home
'They heard that I came home.'

On verhněja domoj, potomu čto šel dožď.
he returned home because fell rain
'He returned home, because it was raining.'

Djadja nadel šapku, potomu čto šel sneg.
uncle put on hat because fell snow
'The uncle put on a hat, because it was snowing.'

Cond-ional

Esli budet žarko, my poedem na more.
if will be hot we will go to sea
'If it is hot, we will go to the beach.'

Esli brat s'est sup, babuška kupit konfety.
if brother will eat soup grandmother will buy candy
'If the brother eats his soup, the grandmother will buy candy.'

Esli on pomoet ruki, my budem obedat'.
if he washes hands we will be lunching
'If has washed his hands, we will have lunch.'

Esli zakončitsja dožď', deti budut pryɡat'.
if ends rain children will jump
'If it stops raining, the children will start jumping.'

OVS

Vrača videla sestra v bolnice.
doctor saw sister in hospital
'Sister saw the doctor at the hospital.'

Volka našla lisa vozle dereva.
fox found the wolf near a tree
'The fox found the wolf in near a tree.'

Rybku pojmala utočka v reke.
little fish caught little duck in river
'The little duck caught a little fish in the river.'

Zajička celoval medved' na gorki.
little hare kissed bear on hill
'The hare kissed the bear on the hill.'
PrWH

*Na kakogo vrača kričal papa?*

‘At which doctor yelled dad’

*Na kakuju korolevu serdilsja princ?*

‘At which queen was the prince angry?’

*U kakogo ěžika belka vzjala jabloko?*

‘From which little+hedghog squirrel took apple’

*Ot kakoj sobaki ubežala koška?*

‘From which dog did the little cat run away?’

*Éto devočka,kotoruju kormila mama.*

‘This is the girl whom mother fed.’

*Éto slon, kotorogo ukusil krokodil.*

‘This is the elephant that the crocodile bit.’

*Éto petux, kotorogo pojmala kurica.*

‘This is the rooster that the chicken caught.’

*Éto medved’, kotorogo obmanula ptica.*

‘This is the bear that the bird tricked.’

SOV

*Pingvin akulu poceloval v mòre.*

‘The penguin kissed the shark in the sea.’

*Mama dočku kormila na kuxne.*

‘The mother fed her daughter in kitchen.’

*Ptica kota iskala v sadu.*

‘The bird looked for the cat in the garden.’
Krokodil volka ukusil v cirke.
'The crocodile bit the wolf at the circus.'

Éto žíraf, kotorý ljubil verbljuda.
This giraffe that loved camel
'This is the giraffe that loved the camel.'

Éto krysa, kotoraja tolknula myšku.
This rat that pushed mouse
'This is the rat that pushed the mouse.'

Éto del’fin, kotorý celoval akulu.
This dolphin that kissed shark
'This is the dolphin that kissed the shark.'

Éto lošadka, kotoraja videla zebra.
This little horse that saw zebra
'This is the little horse that saw the zebra.'

Kotěnok našel tapočki u okna.
The kitten found slippers at window
'The kitten found the slippers near the window.'

Deti myli posudu posle obeda.
The children washed dishes after lunch
'The children did the dishes after lunch.'

Ona ela konfetu na ulice.
She ate candy on street
'She ate candy at the street.'

Oni kupili ar buz v magazinu.
They bought a watermelon in store
'They bought a watermelon in the store.'

Princ serdilsja na korolevu.
The prince was angry at queen
'The prince was angry with the queen.'

Tigr nastupil na čerepaxu.
The tiger stepped on turtle
'The tiger stepped on the turtle.'
Zebra pobežala za medvedem.
'The zebra ran after the bear.'

Devočki smejal nad malčikom.
'Girls laughed at the boy.'

SVOO Deduška dal vnuku karandaš.
'The grandfather gave his grandson a pencil.'

Papa pročital skazku synu.
'Dad read a fairy-tale to his son.'

Babuška podarila vnucce kuklu.
'The grandmother gave her granddaughter a doll.'

Bratik risoval cvetok sestre.
'The little brother drew a flower for his sister.'

Wh-question Kakiju rybku iskala utka?
'Which little fish did the little duck look for?'

Kakiju obežjanu obmanul krokodil?
'Which monkey tricked the crocodile?'

Kakogo pingvina kormil popugaj?
'Which penguin fed the parrot?'

Kakogo del'fina ukusila akula?
'Which dolphin bit the shark?'
**Sentence repetition task Dutch**

**Adjunct**  
*De jongen* at *ontbijt* nadat *hij* was *gewassen*  
the boy ate breakfast after he was washed  
‘The boy had breakfast after he was washed.’

*Hij zal* de *koe* voeren voordat *hij* de *planten* verzorgt.  
he will the cow feed before he the plants takes+care+off  
‘He will feed the cow before taking care of the plants.’

**Auxiliary**  
*Ze volgen* het *konijn* in *het* park.  
they follow the rabbit in the park  
‘They follow the rabbit in the park.’

*Ze zijn* de *bananen* aan *het* eten in *de* auto.  
they are the bananas eating in the car  
‘They are eating the bananas in the car.’

**Auxiliary/Modal**  
*Ze heeft* niet lang *op* ons *gewacht.*  
she did not long for us wait  
‘She did not wait long for us.’

*De muis* ziet *de kaas* in *de* schaal *niet.*  
the mouse sees the cheese in the bowl not  
‘The mouse does not see the cheese in the bowl.’

*De koe* volgt *de* rest van *de* kudde *niet.*  
the cow follows the others of the herd not  
‘The cow does not follow the other [animals] in the herd.’

**Comp**  
*Ze wil* een *erg* groot *broodje* eten.  
she wants a very large sandwich eat  
‘She wants to eat a very large sandwich.’

*De kok* probeerde *de* soep in *de* keuken te *maken.*  
the cook tried the soup in the kitchen to make  
‘The cook tried to make soup in the kitchen.’

*Ze denkt dat* de *spin* heel *erg* klein *is.*  
she thinks that the spider very small is  
‘She thinks that the spider is very small.’

*De man* zei dat *hij* zijn *haar* had gekamd.  
the man said that the his hair had combed  
‘The man said he had combed his hair.’
Cond
it
De mensen krijgen een cadeau als ze het huis schoonmaken.
the people will receive a present if they the house clean
‘The people will receive a present if they clean the house.’

Als de kinderen zichgedragen gaan we de tuin in.
if the children behave will we the garden in
‘If the children will behave themselves, we will go into the garden.’

BiCLCO
Zijn zus rende en zijn vader liep.
his sister ran and his father walked
‘His sister ran, and his father walked.’

Hij ging naar de kust, maar hij heeft niet in de zee gezwommen.
he went to the coast but he did not swim in the sea
‘He went to the coast but he did not swim in the sea.’

Long
Hij werd door de vrouw meegenomen.
he was by the women taken
‘He was taken along by the women.’

De lunch werd door de postbode gegeten.
the lunch was by the mailman eaten
‘The lunch was eaten by the postman.’

Modal
Hij mocht niet naar de boot zwemmen.
he may not to the boat swim
‘He was not allowed to swim to the boat.’

Zij kan de fles meenemen naar de tafel.
she can the bottle take to the table
‘She can bring along the bottle to the table.’

Zij kan het meisje zien door het raam.
she can the girl see through the window
‘She can see the girl through the window.’

Het meisje moet het vliegtuig op het bord tekenen.
the girl has must the plane at the board draw
‘The girl has to draw the plane on the board.’

De jongen moet de vloer in de keuken vegen.
the boy must the floor in the kitchen sweep
‘The boy has to sweep the floor in the kitchen.’
Het paard rent de hele tijd achter het schaap aan.

The horse ran the whole time after the sheep.

De kat rent de hele tijd achter de rat aan.

The cat was running after the rat the whole time.

Het was de vrouw die de man natmaakte in zee.

It was the woman that made the man wet in the sea.

De kinderen proefden de snoepjes die ze kregen.

The children tasted the candy that they received.

De aap aaide de koe die de worm bang had gemaakt.

The monkey patted the cow that had scared the worm.

Hij moet de knuffel wassen waarmee het kind slaapt.

He has to wash the teddy with which the child sleeps.

De moeder bakte de patat die de jongen kreeg.

The mother baked the fries that the boy got.

Ze werd ’s ochtends door de dokter bezocht.

She was visited by the doctor in the morning.

De jongen werd bang gemaakt door de clown.

The boy was scared made by the clown.

De boeken werden in de kast gezet.

The books were put in the bookcase.
Bij de grote rode lampen werd ze gestopt.
She was stopped at the large red lights.

Ze werd hard tegen de grond geduwd.
She was roughly pushed to the ground.

De jongen in de snoepwinkel werd geholpen.
The boy in the candy store was helped.

De zwaan die het hert volgde gooide een plant omver.
The swan that followed the deer knocked down a plant.

De bij die de man inslikte had hem pijn gedaan.
The bee that the man swallowed had him hurt.

De jongen die de melkman hielp was verdwaald.
The boy who helped the milkman was lost.

De pony die de boer bekeek duwde hem opzij.
The pony that the farmer looked at pushed him aside.

Wie heeft de leraar vandaag huiswerk voorgedaan?
‘Whom did the teacher show the homework today?’

Wie heeft zij die prachtige roos gegeven?
‘To whom did she give that beautiful rose?’

Welke fles liet de jongen op de grond vallen?
‘Which bottle did the boy drop on the floor?’

Welke foto heeft hij gister gemaakt?
‘Which picture did he take yesterday?’
Wat hebben zij gisteren in de sneeuw gevonden?
'What did they find in the snow yesterday?'

Wat heeft de prinses vorige maand gekocht?
'What did the princess buy last month?'

Wie hebben zij bij de trap gezien?
'Whom did they see near the stairs?'

Wie heeft de aap nat gespetterd bij de zee?
'Who did the monkey splash near the sea?'
II. Items experimental tasks

II.I Production tasks

Polish items production tasks (n=24)

<table>
<thead>
<tr>
<th>Items</th>
<th>Translation</th>
<th>Gender production</th>
<th>Genitive prod.</th>
<th>Accusative prod.</th>
</tr>
</thead>
<tbody>
<tr>
<td>balon</td>
<td>‘balloon’</td>
<td>To jest mój balon.</td>
<td>Nie ma balona.</td>
<td>Widzę balon.</td>
</tr>
<tr>
<td>butelka</td>
<td>‘bottle’</td>
<td>To jest moja butelka.</td>
<td>Nie ma butelki.</td>
<td>Widzę butelkę.</td>
</tr>
<tr>
<td>drzewo</td>
<td>‘tree’</td>
<td>To jest moje drzewo.</td>
<td>Nie ma drzewa.</td>
<td>Widzę drzewo.</td>
</tr>
<tr>
<td>gruszka</td>
<td>‘pear’</td>
<td>To jest moja gruszka.</td>
<td>Nie ma gruszki.</td>
<td>Widzę gruszkę.</td>
</tr>
<tr>
<td>gwiazda</td>
<td>‘star’</td>
<td>To jest moja gwiazda.</td>
<td>Nie ma gwiazdy.</td>
<td>Widzę gwiazdę.</td>
</tr>
<tr>
<td>jabło</td>
<td>‘apple’</td>
<td>To jest moje jabło.</td>
<td>Nie ma jabłka.</td>
<td>Widzę jabło.</td>
</tr>
<tr>
<td>jajko</td>
<td>‘egg’</td>
<td>To jest moje jajko.</td>
<td>Nie ma jajka.</td>
<td>Widzę jajko.</td>
</tr>
<tr>
<td>jezioro</td>
<td>‘lake’</td>
<td>To jest moje jezioro.</td>
<td>Nie ma jeziora.</td>
<td>Widzę jezioro.</td>
</tr>
<tr>
<td>język</td>
<td>‘tongue’</td>
<td>To jest mój język.</td>
<td>Nie ma języka.</td>
<td>Widzę język.</td>
</tr>
<tr>
<td>kiełbasa</td>
<td>‘sausage’</td>
<td>To jest moja kiełbasa.</td>
<td>Nie ma kielbasy.</td>
<td>Widzę kielbasę.</td>
</tr>
<tr>
<td>kogut</td>
<td>‘rooster’</td>
<td>To jest mój kogut.</td>
<td>Nie ma koguta.</td>
<td>Widzę koguta.</td>
</tr>
<tr>
<td>kolano</td>
<td>‘knee’</td>
<td>To jest moje kolano.</td>
<td>Nie ma kolana.</td>
<td>Widzę kolano.</td>
</tr>
<tr>
<td>krokodyl</td>
<td>‘crocodile’</td>
<td>To jest mój krokodyl.</td>
<td>Nie ma krokodyla.</td>
<td>Widzę krokodyla.</td>
</tr>
<tr>
<td>krzesło</td>
<td>‘chair’</td>
<td>To jest moje krzesło.</td>
<td>Nie ma krzesła.</td>
<td>Widzę krzesło.</td>
</tr>
<tr>
<td>lalka</td>
<td>‘doll’</td>
<td>To jest moja lalka.</td>
<td>Nie ma lalki.</td>
<td>Widzę lalkę.</td>
</tr>
<tr>
<td>łyżka</td>
<td>‘spoon’</td>
<td>To jest moja łyżka.</td>
<td>Nie ma łyżki.</td>
<td>Widzę łyżkę.</td>
</tr>
<tr>
<td>mleko</td>
<td>‘milk’</td>
<td>To jest moje mleko.</td>
<td>Nie ma mleka.</td>
<td>Widzę mleko.</td>
</tr>
<tr>
<td>mydło</td>
<td>‘soap’</td>
<td>To jest moje mydło.</td>
<td>Nie ma mydła.</td>
<td>Widzę mydło.</td>
</tr>
<tr>
<td>ogórek</td>
<td>‘cucumber’</td>
<td>To jest mój ogórek.</td>
<td>Nie ma ogórka.</td>
<td>Widzę ogórek.</td>
</tr>
<tr>
<td>ołówek</td>
<td>‘pencil’</td>
<td>To jest mój ołówek.</td>
<td>Nie ma ołówka.</td>
<td>Widzę ołówek.</td>
</tr>
<tr>
<td>pomidor</td>
<td>‘tomato’</td>
<td>To jest mój pomidor.</td>
<td>Nie ma pomidora.</td>
<td>Widzę pomidora.</td>
</tr>
<tr>
<td>samolot</td>
<td>‘airplane’</td>
<td>To jest mój samolot.</td>
<td>Nie ma samolotu.</td>
<td>Widzę samolot.</td>
</tr>
<tr>
<td>truskawka</td>
<td>‘strawberry’</td>
<td>To jest moja truskawka.</td>
<td>Nie ma truskawki.</td>
<td>Widzę truskawkę.</td>
</tr>
<tr>
<td>żyrafa</td>
<td>‘giraffe’</td>
<td>To jest moja żyrafa.</td>
<td>Nie ma żyrafy.</td>
<td>Widzę żyrafa.</td>
</tr>
</tbody>
</table>
**Russian items production tasks (n=36)**

<table>
<thead>
<tr>
<th>Item label</th>
<th>Translation</th>
<th>Gender production</th>
<th>Genitive prod.</th>
<th>Accusative prod.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target response</strong></td>
<td><strong>Target response</strong></td>
<td><strong>Target response</strong></td>
<td><strong>Target response</strong></td>
<td><strong>Target response</strong></td>
</tr>
</tbody>
</table>
II.II Case comprehension task
Items Polish (n=30)

Krokodyl-∅ cała je koguta.
crocodile-MSG.NOM kisses rooster-M.AN.SG.ACC
'The crocodile kisses the rooster.'

Krokodyl-∅ cała je żyraf-∅.
crocodile-MSG.NOM kisses giraffe-F.SG.ACC
'The crocodile kisses the giraffe.'

Żyraf-a popycha kogut-∅.
giraffe-F.SG.NOM pushes rooster-
'The giraffe pushes the rooster.'

Żyraf-a popycha żyraf-∅.
giraffe-F.SG.NOM pushes giraffe-F.SG.ACC
'The giraffe pushes the giraffe.'

Lalk-∅ popycha kielbas-∅.
doll-F.SG.NOM pushes sausage-F.SG.ACC
'The doll pushes the sausage.'

Lalk-∅ popycha żyraf-∅.
doll-F.SG.NOM pushes giraffe-F.SG.ACC
'The doll pushes the giraffe.'

Kielbas-∅ popycha jajk-∅.
sausage-F.SG.NOM pushes egg-N.SG.ACC
'The sausage pushes the egg.'

Kielbas-∅ popycha jajk-∅.
sausage-F.SG.NOM pushes egg-N.SG.ACC
'The sausage pushes the egg.'

Lalk-∅ przegląda się kogut-owi.
doll-F.SG.NOM looks+at rooster-M.SG.DAT
'The doll looks at the rooster.'

Jajk-∅ przegląda się ogór-owi.
egg-N.SG.NOM looks+at cucumber-M.SG.DAT
'The egg looks at the cucumber.'

Jajk-∅ przegląda się ogór-owi.
egg-N.SG.NOM looks+at cucumber-M.SG.DAT
'The egg looks at the cucumber.'

Żyraf-∅ przegląda się krokodyl-owi.
giraffe-F.SG.NOM looks+at crocodile-M.SG.DAT
'The giraffe looks at the crocodile.'

Żyraf-∅ przegląda się krokodyl-owi.
giraffe-F.SG.NOM looks+at crocodile-M.SG.DAT
'The giraffe looks at the crocodile.'

Truskawk-∅ przegląda się kielbasi-∅.
strawberry-F.SG.NOM looks+at sausage-F.SG.DAT
'The strawberry looks at the sausage.'

Żyraf-e podoba się lalk-∅.
giraffe-F.SG.DAT loves doll-F.SG.NOM
'The doll loves the giraffe.'

Ogór-owi podoba się pomidor-∅.
cucumber-M.SG.DAT likes tomato-M.SG.NOM
'The cucumber likes the tomato.'

Pomidor-owi podoba się truskawk-∅.
tomato-M.SG.DAT likes strawberry-F.SG.NOM
'The tomato likes the strawberry.'

Pomidor-owi podoba się jabłk-∅.
tomato-M.SG.DAT likes apple-N.SG.NOM
'The tomato likes the apple.'

Żyraf-e podoba się lalk-∅.
giraffe-F.SG.DAT loves doll-F.SG.NOM
'The doll loves the giraffe.'
Jajk-o przygląda się truskawc-e.
egg-N.SG.NOM looks+at strawberry-F.SG.DAT
'The egg looks at the strawberry.'

Kielbas-i-e podoba się jabłk-o.
sausage-F.SG.DAT likes apple-N.SG.NOM
'The sausage likes the apple.'

Kogut-o przygląda się lalk-e.
rooster-M.SG.NOM looks+at doll-F.SG.DAT
'The rooster looks at the doll.'

Truskawc-e podoba się ogórek-o.
strawberry-F.SG.DAT likes cucumber-M.SG.NOM
'The strawberry likes the cucumber.'

Ogórek-o przygląda się jajk-u.
cucumber-M.SG.NOM looks+at egg-N.SG.DAT
'The cucumber looks at the egg.'

Jablk-u podoba się pomidor-o.
apple-N.SG.DAT likes tomato-M.SG.NOM
'The apple likes the tomato.'

Kielbas-a przygląda się jajk-u.
sausage-F.SG.NOM looks+at egg-N.SG.DAT
'The sausage looks at the egg.'

Jablk-u podoba się truskawc-a.
apple-N.SG.DAT likes strawberry-F.SG.NOM
'The apple likes the strawberry.'

Jablk-o przygląda się jajk-u.
apple-N.SG.NOM looks+at egg-N.SG.DAT
'The apple looks at the egg.'

Jablk-u podoba się jajk-o.
apple-N.SG.DAT likes egg-N.SG.NOM
'The apple likes the egg.'

Items Russian case comprehension task (n=52)

Kukl-a ljubit žiraf-a.
doll-F.SG.NOM loves giraffe-M.AN.SG.ACC
'The doll loves the giraffe.'

Žiraf-a vidit petux-o.
giraffe-M.AN.SG.ACC sees rooster-M.SG.NOM
'The rooster sees the giraffe.'

Zmej-a ljubit kukl-u.
snake-F.SG.NOM loves doll-F.SG.ACC
'The snake loves the doll.'

Grui-u tragaet jajc-a.
pear-F.SG.ACC touches egg-N.SG.NOM
'The egg touches the pear.'

Jablok-o ljubit grui-u.
apple-N.SG.NOM loves pear-F.SG.ACC
'The apple loves the pear.'

Kolbas-ã tragaet jablok-o.
sausage-F.SG.NOM touches apple-N.SG.ACC
'The sausage touches the apple.'

Jablok-o ljubit grui-ã.
apple-N.SG.ACC loves pear-F.SG.NOM
'The pear loves the apple.'

Žiraf-ã celget petux-ã.
giraffe-M.SG.NOM kisses rooster-M.AN.SG.ACC
'The giraffe kisses the rooster.'

Žiraf-ô celget zmej-ã.
giraffe-M.SG.NOM kisses snake-F.SG.ACC
'The giraffe kisses the snake.'

Žiraf-ô celget zmej-ô.
giraffe-M.SG.NOM kisses snake-F.SG.ACC
'The giraffe kisses the snake.'

Kolbas-u vidit jablok-o.
sausage-F.SG.ACC sees apple-N.SG.NOM
'The apple sees the sausage.'
‘The strawberry likes the tomato.’
‘The giraffe likes the rooster.’
‘The cucumber smiles at the tomato.’
‘The cucumber likes the tomato.’
‘The sausage calls the strawberry.’
‘The tomato likes the apple.’
‘The apple likes the tomato.’
‘The egg kisses the sausage.’
‘The doll touches the snake.’
‘The tomato likes the apple.’
‘The apple likes the tomato.’
‘The egg kisses the sausage.’
‘The doll touches the snake.’
‘The butter calls the tomato.’
‘The butter calls the tomato.’
‘The giraffe likes the rooster.’
‘The strawberry calls the tomato.’
‘The strawberry likes the tomato.’
‘The sausage calls the strawberry.’
‘The strawberry calls the apple.’
‘The sausage calls the strawberry.’
‘The sausage calls the strawberry.’
‘The egg kisses the sausage.’
‘The doll touches the snake.’
‘The butter calls the tomato.’
‘The butter calls the tomato.’
‘The giraffe likes the rooster.’
The egg likes the butter.

The milk smiles at the sausage.

The rooster likes the doll.

The cucumber smiles at the sausage.

The giraffe smiles at the snake.

The cucumber likes the egg.

The sausage calls the cucumber.

The butter calls the strawberry.

The milk smiles at the cucumber.

The doll calls the snake.

The giraffe smiles at the giraffe.

The milk calls the sausage.

The doll smiles at the milk.

The cucumber likes the sausage.

The tomato calls the cucumber.