Acquisition pace and developmental path of early second language learners of German. A longitudinal study on acquisition of morphosyntax and semantics

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1. Introduction

Leyla is 5;8 and has been attending kindergarten for two years. At home, she speaks Moroccan Arabic with her parents and siblings. Thus, her systematic and regular exposure to German began at age three with attending the kindergarten. Next year, she is going to change to a primary school. Although Leyla acquires German very fast, she performs poorer than her monolingual peers on language tests. This poorer language performance is due to her later exposure to German. Leyla is a typical example of a child, who acquires German as her early second language (eL2). These so called eL2 learners have their first regular exposure to the second language between age two and four (Genesee, Paradis & Crago, 2004; Meisel, 2009; Rothweiler, 2015; Schulz & Grimm, 2012). eL2 children have already acquired substantial lexical and grammatical knowledge in their first language when they have their first exposure to their second language. Moreover, their cognitive development is more progressed in comparison to monolingual children when they are first exposed to their second language (Schwartz, 2003; Unsworth, 2005). However, mechanism that are responsible for first language acquisition are still active in eL2 learners (Meisel, 2009; Unsworth, 2005). Based on these assumptions, several case studies on eL2 acquisition of German sentence structure have reported that eL2 learners show the same developmental patterns as monolingual children. In addition, eL2 children develop faster comparing to monolingual children (Schulz, Tracy & Wenzel, 2008; Rothweiler, 2006; Thoma & Tracy, 2006; Tracy & Thoma, 2009)

eL2 acquisition, its pace, and developmental patterns allow to investigate mechanisms that are responsible for acquisition of grammatical skills. Moreover, knowledge on unimpaired eL2 acquisition is important for distinction between typically developing and language impaired eL2 learners, so that language therapy can be provided if necessarily. Diagnosis of Specific Language Impairment (SLI) (Grimm, 2003; Leonard, 1998; Schwartz, 2009) mostly occurs around age five in Germany when first language screenings for monolingual, bilingual, and eL2 children are carried out in kindergarten. Therefore, it is important to know, which language phenomena typically developing eL2 children have already acquired and which not at this age, and what kind of errors are expected at this age. Moreover, a detailed look at developmental patterns is relevant since some studies reported similar error patterns for typically developing and SLI children (see Armon-Lotem, 2010; de Jong, 2010; Håkansson, 2001; Paradis, 2004, 2005; Paradis & Crago, 2000, 2004, for eL2 unimpaired children and monolingual SLI children; Schulz & Schwarze, 2017; Lemmer, 2018, for eL2 unimpaired and SLI children).

To date, the most studies on eL2 acquisition focused on language production. Based on mostly longitudinal spontaneous speech data of only small number of children, they investigated acquisition of sentence structure, subject-verb-agreement, and case marking. Their findings suggest that eL2 learners acquire sentence structure and subject-verb-agreement faster than monolingual children (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy, 2006), whereas the acquisition of case marking causes them more difficulties (Marouani, 2006; Lemke, 2009; Schönenberger, Rothweiler & Sterner, 2012; Schönenberger, Sterner & Rothweiler, 2013). Moreover, similar developmental paths of eL2 learners to those of monolingual children are claimed (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006). Comprehension abilities in eL2 learners were examined in only several, overwhelmingly cross-sectional studies on telicity and wh-questions. Their results indicate that eL2 children acquire target-like interpretation of wh-questions and telicity faster than monolingual children (Schulze, 2012; Schulz, 2013; Schulz & Ose, 2007). The same acquisition stages towards target-like interpretation as in monolingual acquisition are assumed as well (Schulz, 2013). Taking together, to date, no study exists, that examines comprehension and production abilities in a large group of eL2 learners of German in a longitudinal design.

Thus, the present thesis closed this research gap, and extended the previous findings. The aim of this thesis is to characterize the acquisition pace and the typical developmental sequences in eL2 acquisition of selected aspects of German morphosyntax and semantics. In addition, I compare the acquisition pace and the developmental paths of eL2 learners of German with those of monolingual children. Moreover, I investigate whether 'Age of Onset' and selected external factors (gender, non-verbal IQ, and parental educational background) affect eL2 children's language development. Based on this goal, three main research questions are examined in this thesis:

(Q1) Pace of acquisition
How fast do eL2 children reach the typical milestones in the acquisition of German compared to monolingual children?

(Q2) 'Age of Onset' and external factors
How do 'Age of Onset' and selected external factors affect eL2 children's language performance compared to monolingual children?

(Q3) Individual developmental path
Which developmental paths and error patterns are characteristic for eL2 children compared to monolingual children?

To investigate these questions language data of 29 eL2 learners of German and 45 monolingual German-speaking children were analyzed. At the first test round, the eL2 children were 3;7 years old and had ten months of exposure to German. The monolingual children were age-matched, and thus 3;7 years old at the first test round as well. The eL2 learners were tested in six test rounds across three years and were 6;9 years old at the last test round. The monolingual children were tested in five test rounds across two years, and were 5;7 years old at their last test round. Children's language abilities were assessed with the standardized test LiSe-DaZ (Schulz & Tracy, 2011). This test examines selected morphosyntactic, semantic, and to some degree pragmatic and lexical abilities in comprehension and production. Additionally, children's non-verbal intelligence was assessed via the non-verbal scales of the K-ABC (Kaufman et al., 2009). Children's language biography and parents' educational background were collected via telephone interviews with parents. This longitudinal design allows to investigate the acquisition pace in eL2 children compared to monolingual children, and to characterize developmental paths and error patterns in eL2 acquisition. Moreover, by including 'Age of Onset' and the external factors into the analysis, it is possible to make predictions whether these factors affect children's language acquisition.

Two methodological approaches are used to give responses for the three research questions. Multilevel analyses were conducted for the analyses of children's pace of acquisition (Q1) and of impact of external factors (Q2). For descriptions of children's individual developmental paths (Q3) qualitative analyses were conducted that considered the linguistic properties of a particular structure. Since these two approaches give different views on children's language acquisition, they are assumed to be of the same relevance and to complement each other.

The thesis is organized as follows. Section 2 focuses on eL2 acquisition. It describes main characteristics of eL2 acquisition, discusses timing effects in (eL2) acquisition, and summarizes studies that had investigated the impact of external factors on eL2 acquisition. Section 3 presents the goal, the general research questions, and research design of the present study on eL2 acquisition of German. The following six chapters deal with selected phenomena of German morphosyntax and semantics: telicity (Chapter 4), wh-questions (Chapter 5), sentential negation (Chapter 6), case marking (Chapter 7), word classes (Chapter 8), and sentence structure (Chapter 9). All these sections are structured in the same way. They begin with theoretical description of the selected phenomenon. Then, previous research on monolingual and eL2 acquisition of the selected phenomena is summarized and discussed. Next, the design of the current study is

presented. Thus, the hypotheses presented in Section 3 are specified with respect to the selected structure; the participants, the method, the task, and the data analysis are described. Finally, the results regarding the acquisition pace, the impact of external factors, and the individual developmental paths are presented and discussed for each phenomenon. The thesis finishes with a general discussion (Section 10) and a summary (Section 11). The aim of Section 10 is to connect the findings reported on each phenomenon, and to discuss them in a more overarching way with respect the three research questions.

2. Early second language acquisition

The aim of this chapter is to give some backgrounds on eL2 acquisition. It is organized as follows. In Section 2.1, eL2 acquisition is distinguished from other acquisition types, and its main characteristics are described. Section 2.2 focuses on timing in monolingual development and its effects on eL2 acquisition. Finally, Section 2.2 summarizes and discusses studies that had investigated the impact of external factors on eL2 acquisition.

2.1. Main characteristics of eL2 acquisition

Age of Onset to the second language (L2) is a crucial factor for pace and success of acquisition. Various ages have been proposed for distinction between simultaneous and successive bilingual acquisition. In this thesis, the most common distinction of different language acquisition types is assumed. Simultaneous bilingual children acquire two or more languages from birth or soon afterwards (de Houwer, 2009; Meisel, 2004, 2007). These children distinguish the two (or more) language systems from early on, and show the same developmental and error patterns as monolingual children (de Houwer, 2009; Meisel, 2001, 2004; Tracy & Gawlitzek-Maiwald, 2000, but see Grimm & Schulz, 2016; Tsimpli, 2014). Children whose first exposure to the second language occurs between age two and four are classified as early second language learners, sometimes also called successive bilingual children (Genesee, Paradis & Crago, 2004; Meisel, 2009; Rothweiler, 2015; Schulz & Grimm, 2012; Unsworth, 2016a). Children who start to acquire their second language at age six or later are classified as late second language learners (Dimroth, 2007; Haberzettl, 2005). Adult second language learners belong to this second language acquisition type as well (Parodi, 1998; White, 2003). It is uncontroversial that the transitions between these acquisition types are more continuous than categorical (Unsworth, 2013).

The different language acquisition types are based on studies comparing monolingual and simultaneous bilingual children on the one hand, and monolingual and eL2 children on the other hand. Some studies also compared early and late second language learners. To date, research focused on acquisition pace, similarities and differences in developmental stages and acquisition patterns, and transfer effects between first and second language. Whereas several studies found many parallels between monolingual and simultaneous bilingual children (see Unsworth, 2016b for an overview), and monolinguals and eL2 learners (Rothweiler, 2006; Schulz, 2013; Thoma & Tracy, 2006; Tracy & Thoma,

2009), strong differences between early and late second language learners were reported (Dimroth, 2007; Haberzettl, 2005; Meisel, 2009; Parodi, 1998; Thoma & Tracy, 2006).

The similar developmental stages and patterns in eL2 and monolingual acquisition are explained with the accessibility of Universal Grammar (UG) (Meisel, 2009; Schwartz, 1992). Following Meisel (2009) I assume that the optimal phase during which rule-based phenomena are acquired successfully by exposure to the target language begins to fade out around the age of four. Thus, until this age, acquisition is driven by UG, and language-specific learning mechanisms are fully accessible. This assumption is supported by the fact that eL2 learners acquire their second language very successfully and can ultimately attain a target-like level of grammatical competence.

In the following the main characteristics and findings regarding the eL2 acquisition are summarized. eL2 learners differ from monolingual children in their age of onset and length of exposure to the second language. Whereas their age of onset to the second language is higher, their length of exposure to this language is shorter than that of age-matched monolingual children. Due to shorter exposure to the second language, eL2 children perform poorer on language tests than their age-matched monolingual peers. This was reported for several second languages such as English (Paradis, 2005), Dutch (Unsworth, 2005) and German (Grimm & Schulz, 2014). However, these differences between eL2 and monolingual children decrease and eventually disappear as the length of exposure of eL2 learners to the second language increases (Paradis, 2010, for English, Unsworth, 2008, for Dutch, Schulz et al., 2008, and Schulz, 2013, for German). It is remarkable that the results of several studies indicate that eL2 learners have a faster acquisition pace compared to monolingual children. This means that eL2 children catch up very fast with their monolingual peers and perform similarly to them despite essential shorter length of exposure to their second language. Faster acquisition pace was overwhelmingly shown for rule-based phenomena such as the production of sentence structure (Rothweiler, 2006; Thoma & Tracy, 2006; Tracy & Thoma, 2009) or the comprehension of wh-questions (Schulz, 2013). It seems that children receive sufficient evidence in the input for these structures, which allows them to derive the rule. Importantly, these results indicate that eL2 learners can reach the same ultimate attainment as monolingual children.

Additionally, similar developmental stages and patterns in acquisition of rule-based phenomena are claimed for eL2 and monolingual children. These stages describe to what degree a structure is acquired, and what error types can be expected at a particular stage. An example of developmental pattern are three stages in the acquisition of

comprehension of wh-questions (Penner, 1998; Siegmüller, Herzog & Herrmann, 2005; Schulz, 2013). At first stage, children do not distinguish between *yes*/*no* questions and wh-questions, and response to wh-questions with *yes* or *no*. In the next developmental step, children correctly recognize wh-questions as such, so distinguish them from *yes*/*no* questions, but not necessarily know which constituent is asked about. This results in responses with a false constituent. Finally, in the third stage, target-like interpretation of wh-questions is acquired. Similar developmental stages in monolingual and eL2 children were reported for the acquisition of sentence structure (Rothweiler, 2006; Thoma & Tracy, 2006; Tracy & Thoma, 2009) and comprehension of wh-questions (Schulz, 2013). Note however, that all findings concerning the acquisition pace and patterns in eL2 learners overwhelmingly rest on studies investigating the acquisition of morpho-syntax. Thus, a broader picture of these aspects in eL2 acquisition including other language phenomena is still missing.

2.2. Timing effects in acquisition

Generally, it is assumed that children acquire rule-based phenomena such as verb placement or the interpretation of wh-questions earlier than phenomena that do not rely on the application of rules such as plural forms or gender in German. However, looking at the acquisition of different rule-based structures differences in their age of acquisition in monolingual children were found as well. Tsimpli (2014) argues that the time of acquisition of a language phenomenon depends on linguistic nature of the structure that is to acquire. Thus, she distinguishes between domains that monolingual children acquire (very) early between age two and three, or (very) late about the age of five or even later. This distinction reflects interplay of syntax with other linguistic domains. Whereas early phenomena are core, parametric and narrowly syntactic, the acquisition of (very) late phenomena involves syntax-external or even language-external resources. In other words, core grammatical properties are products of narrow syntax, and do not include semantic effects. In contrast, (very) late phenomena are not narrowly syntactic, and may involve increased semantic complexity and/or discourse properties as well as language-external cognitive resources such as working memory. In each language, there are certain grammatical phenomena which are acquired surprisingly early, i.e. between age two and three. Among these phenomena are word order, head-complement ordering in the verb phrase, verb placement in matrix clauses and subject-verb agreement (Clahsen, 1986; Tracy, 1991). Early phenomena seem to require only brief exposure to input since monolingual children produce them almost exclusively target-like. Among (very) late

phenomena are comprehension of relative clauses and wh-questions (Friedmann, Belletti & Rizzi, 2009), exhaustivity in multiple wh-questions (Schulz & Roeper, 2011) as well as sentential negation (Wojtecka et al., 2013). In the following, I provide a classification of phenomena as early and (very) late for German. This classification is based on previous findings regarding acquisition age in monolingual German-speaking children and considers only phenomena which were investigated in the present thesis. Table 1 summarizes the classification for production and Table 2 for comprehension.

Table 2.1. Classification of selected phenomena in early and late for production in monolingual acquisition.

	Acquisition age	**Phenomenon**	**Selected studies**
Early phenomena	3	V2 in matrix clauses	Clahsen, 1986; Tracy, 1991
	3	Subject-verb agreement	Clahsen, 1986; Tracy, 1991
	3	Subordinate clauses	Clahsen, 1986; Rothweiler, 1993; Tracy, 1991
(Very) late phenomena	5	Conjunctions	Grimm & Schulz, 2016; Schulz & Tracy, 2011
	5	Prepositions	Grimm & Schulz, 2016; Schulz & Tracy, 2011
	6	Case marking	Clahsen, 1992; Eisenbeiss et al., 2005/06; Tracy, 1986

Table 2.2. Classification of selected phenomena in early and late for comprehension in monolingual acquisition.

	Acquisition age	**Phenomenon**	**Selected studies**
Early phenomena	3	Subject wh-questions	Schulz, 2013; Siegmüller at al., 2005
	4	Object wh-questions	Schulz, 2013; Siegmüller at al., 2005
	4	Telicity	Penner et al., 2003; Schulz, 2018; Schulz & Wittek, 2003
(Very) late phenomena	6	Adjunct wh-questions	Schulz, 2013; Siegmüller at al., 2005
	6	Negation	Wojtecka et al. 2011, 2013

Following Tsimpli (2014) I assume that the classification in early and late phenomena depends on whether there is an interaction between syntax and other language modules such as semantics and pragmatics or whether language-external cognitive resources are involved. However, I am not convinced that phenomena referred to as early must belong to core syntax as proposed by Tsimpli (2014). An important issue that Tsimpli (2014) has not considered is grammatical complexity of a structure. It is possible that formal complexity i.e. the degree of generality of a grammatical description affect timing in acquisition. Thus, irregularity, exceptionality and idiosyncrasy contribute to greater complexity (Culicover, 2014), which results in later acquisition. Moreover, it was claimed that derivational complexity affects timing in acquisition as well (Hamann, 2006; Jakubowicz, 2005, 2010; Rizzi, 1990; van Kampen, 1997). According to the Derivational Complexity Hypotheses, less complex derivations are input convergent before more complex ones during language development (Jakubowicz, 2005). Put differently, children first master constructions that require less movement, and initially use the more economical structure if the language they are acquiring allows different options. Whether complexity is comparable with the distinction between core and not-core is beyond the scope of the present thesis.

Following Tsimpli (2014), timing in monolingual development interact with age of onset and input in bilingual acquisition. She argues that whereas early phenomena are sensitive to age of onset in bilingual acquisition, late phenomena show effect of input. The prediction is that simultaneous bilingual and eL2 children differ from late L2 children in the process of acquisition of early phenomena. For late phenomena Tsimpli suggests that "input alone rather than age of onset is the factor determining the process and outcome of the acquisition of late phenomena" (Tsimpli 2014:286). Thus, differences in their acquisition between simultaneous bilingual, eL2 and late L2 children are not expected if the children are matched for length of exposure to the target language.

Moreover, Tsimpli (2014) claims that the time of acquisition in simultaneous and successive bilinguals can be derived from the acquisition time in monolingual children. Early phenomena should be acquired in bilingual children at similar ages as in monolingual children, whereas for (very) late phenomena the age of acquisition in bilingual children should be comparable to the acquisition age of eL2 learners. Grimm & Schulz (2016) investigated this prediction comparing the performance of four-year-old simultaneous bilingual children with the performance of their monolingual peers and four-year-old eL2 learners of German in the standardized language test LiSe-DaZ (Schulz & Tracy, 2011) (see Section 3.3 for a detailed description of the test). Simultaneous bilingual children

performed like monolinguals in early phenomena (subject-verb-agreement, interpretation of telic and atelic verbs, production of modal and auxiliary verbs, production of lexical verbs, and production of conjunctions). Regarding late phenomena (case marking, interpretation of negation) bilingual children performed like eL2 learners.

However, it remains unclear whether the distinction between early and late phenomena with respect to timing in monolingual acquisition applies to eL2 acquisition as well. The results of several studies indicate that eL2 learners acquire early phenomena such as verb placement or subject-verb-agreement very fast around age four (Schulz & Tracy, 2011; Tracy & Thoma, 2009) whereas late phenomena such as case marking need more exposure to L2 and are not acquired till age seven (Lemmer, 2018). Despite these findings the question remains whether early phenomena are generally acquired faster than late phenomena by eL2 learners. Therefore, the present thesis focuses on pace in eL2 acquisition.

2.3. Internal and external factors in eL2 acquisition

Various factors have been claimed to affect eL2 acquisition in recent research. They may influence the pace, developmental stages, and ultimate attainment of eL2 acquisition. Mostly two groups of factors are distinguished. The so-called internal factors include Age of Onset, knowledge of another language(s), cognitive maturity represented by chronological age, and language learning aptitude. External factors are factors that determine the quantity and the quality of the input the learner receives in the target language. They include the socio-economic status, maternal education and L2 proficiency, number of siblings, length of exposure, input quantity and quality, and language use or output (see Unsworth, Hulk & Marinis, 2011, for an overview). Whereas the role of internal factors is strongly emphasized in generative approaches to language acquisition, the role of external factors becomes important for usage-based theories (Behrens, 2008; Eisenbeiss, 2009; Paradis, 2011; Paradis et al., 2017). As was already mentioned, Age of Onset and other internal factors can determine whether the UG and language-learning mechanisms are still accessible for a second language learner. In contrast, approaches, which assume the role of input properties as the most important, predict that variations in external factors would explain individual differences in language development. In the following, main findings on the role of factors on the acquisition of early and (very) late phenomena in monolingual and eL2 children are summarized. Note that the results are presented only for factors which were considered in the present

thesis. These factors are gender, non-verbal intelligence, and the parental educational background.

The findings from studies examining gender as a factor are clear. Gender is a predictor for language abilities only in children until the age of two. For older children, no significant effects of gender were reported (Grimm & Aktas, 2001; Glück, 2007). Therefore, it is expected that gender do not affect the acquisition of phenomena under consideration in the present thesis.

The role of non-verbal intelligence on children's language performance has been investigated in several studies. Their results differ depending on language phenomena under investigation. Paradis (2011) examined eL2 children's performance on English verb morphology including 3SG *–s*, past tense *–ed*, irregular past tense, and copula and auxiliary *be*. Her analysis revealed that the eL2 learners' non-verbal intelligence predicted their performance in this language domain. The results for the monolingual German-speaking sample of the standardized test LiSe-DaZ (Schulz & Tracy, 2011) show only a slight correlation for the subtest *Interpretation of Negation* and the non-verbal scales of the K-ABC (Kaufman et al., 2009). For the eL2 sample, correlations between the non-verbal intelligence and following subtests *Verb Meaning*, *Interpretation of Wh-questions*, *Conjunctions* and *Case* were found. The authors suggest that some non-verbal scales from the K-ABC require language skills to solve the tasks, and that these skills are not yet in place especially in the group of thee-year-old eL2 learners. These findings were not confirmed in the study by Schulz (2013). She examined the interpretation of wh-questions in three- to five-year-old monolingual and eL2 children using the same task and found no correlations between the performance in the task and children's non-verbal IQ. Schulze (2012) investigated whether the non-verbal intelligence can predict children's performance in all three comprehension subtests of LiSe-DaZ: *Verb Meaning*, *Interpretation of Wh-question*, and *Interpretation of Negation* (Schulz & Tracy, 2011). Her analyses revealed that the non-verbal intelligence predicted the performance of three-year-old monolingual children in the subtest *Interpretation of Negation*, confirming the results of LiSe-DaZ (Schulz & Tracy, 2011). Regarding three-year-old eL2 children, non-verbal intelligence predicted their performance in all three comprehension subtests. These findings are partially in line with the results from LiSe-DaZ (Schulz & Tracy, 2011).

In sum, results from previous studies indicate that non-verbal intelligence is not a significant predictor for acquisition of early and late phenomena in monolingual children. Regarding eL2 acquisition, the previous findings suggest that non-verbal intelligence may

affect eL2 learner's performance. More specifically, non-verbal intelligence emerged as significant predictor of almost exclusively performance in (very) late phenomena such as case marking or interpretation of negation. These phenomena have not yet been acquired in eL2 children at age of testing. Additionally, it is important to note that although the tasks measuring the intelligence are solved non-verbally, language skills are required to comprehend the instruction of the task. As proposed by Schulz & Tracy (2011) the majority of young eL2 learners have not yet acquired these comprehension skills. Based on these results non-verbal intelligence should not affect eL2 children's performance on early phenomena. However, some effects of non-verbal intelligence can be expected for (very) late phenomena.

A lot of studies have examined parental education background as a factor affecting language acquisition. The factor is mostly measured in terms of highest diploma/degree awarded. In more current studies especially with second language learners, parental education is also measured in years since it is difficult to compare degrees from different school systems. The findings on the role of this factor differ with respect to the language domain that was investigated as well. Maternal educational background is a robust predictor of vocabulary development in monolingual children (Glück, 2007; Hoff, 2006; Kiese-Himmel, 2005), bilingual children (Oller & Eilers, 2002; Paradis 2009), and L2 learners (Armon-Lotem, Walters & Gagarina, 2011; Chondragianni & Marinis, 2011; Golberg, Paradis & Crago, 2008; Paradis, 2011). Children whose mothers had a higher education had consistently larger vocabularies. The findings vary regarding the influence of parental educational background on the children's performance on tense morphology and morpho-syntax as well as on children's comprehension skills (Chondragianni & Marinis, 2011; Paradis, 2011; Schulz, 2013; Schulz & Tracy, 2011; Schulze, 2012). Paradis (2011) investigated eL2 children's performance on English verb morphology and found no effects of maternal education for this language domain. Chondragianni & Marinis (2011) examined how Turkish-English successive bilingual children performed on various standardized language assessments including verb morphology and phenomena of complex morpho-syntax (comprehension of wh-questions, comprehension of passives, production of definite and indefinite articles). Their analysis revealed similar results for verb morphology as reported by Paradis (2011), i.e., no effects of maternal education for this domain. In contrast, the parental educational background affected the performance on complex morpho-syntactic phenomena in this study. Chondragianni & Marinis (2011) conclude from these results that the acquisition of verb morphology seems to be less susceptible to external factors compared to the acquisition of complex morpho-syntax or vocabulary. However, the children in this study had their first exposure to English

between 2;6 and 5;0. Thus, not all of them can be classified as eL2 learners what may affect the results.

For German, the role of the mother's educational background was investigated for the monolingual and eL2 sample of the standardized test LiSe-DaZ (Schulz & Tracy, 2011). The factor was measured in years. No correlations between the children's performance and the mother's educational background were found for all production and comprehension subtests although mothers of eL2 learners had visited school significantly shorter than mothers of monolingual children. These results were corroborated by other studies that also investigated monolingual and eL2 children's language skills using LiSe-DaZ (Schulz & Tracy, 2011) (Schulze, 2012 for comprehension subscales, Schulz, 2013 for *Comprehension of wh-questions*).

In sum, the previous findings suggest that parental educational background affects children's performance on vocabulary and on complex language structures. The structures referred to as complex are wh-questions, passives, and definite and indefinite articles. They belong to phenomena that are generally acquired late in monolingual acquisition (see Friedmann et al., 2009; Schulz, 2013, for wh-questions, Armon-Lotem at al., 2015, for passives, and Ose & Schulz, 2010, for production of definite and indefinite articles). This indicates that parental educational background may only affect the acquisition of late phenomena. However, Chondragianni & Marinis (2011) note that there is mostly a relationship between parental educational background and parental proficiency in second language and socio-economic status. In their study, mothers had a mean of 7.6 years of education, and both parents' proficiency in English was quite low. Moreover, the sample belongs to a population largely representative of low socio-economic status which was measured based on the mother's educational level. Thus, it is possible that the mothers in the sample did not use complex form in the second language due to their low proficiency in English. The low social-economic status may also affect children's performance since it has been suggested that higher educated mothers talk more to their children and tend to use longer and more complex sentences (Hoff, 2003).

Taking together, the previous findings on the impact of external factors on monolingual language acquisition indicate that both early and late phenomena are scarcely affected by these factors. Regarding the role of external factors on eL2 acquisition, the results suggest that early structures are less susceptible to be affected by children's non-verbal intelligence or parental educational background than late phenomena.

3. General research questions and research design

This Section presents the goal, the general research questions, and research design of the present study on eL2 acquisition of German. It is organized as follows. In Section 3.1, research questions are formulated. In Section 3.2, the MILA-project in which the analyzed data were collected is described. Section 3.3 gives an overview of the method, and Section 3.4 presents the participants. Finally, Section 3.5 describes and justifies data analyses that were conducted.

3.1. Research questions

The goal of this thesis is to characterize the acquisition pace and the typical developmental path in eL2 acquisition of selected phenomena of German morpho-syntax and semantics. Moreover, the developmental sequences of eL2 learners are compared with those of monolingual children. Based on this goal, three main research questions arise:

(Q1) Pace of acquisition
How fast do eL2 children reach the typical milestones in the acquisition of German compared to monolingual children?

(Q2) 'Age of Onset' and external factors
How do 'Age of Onset' and selected external factors influence eL2 children's language performance compared to monolingual children?

(Q3) Individual developmental path
Which developmental paths and error patterns are characteristic for eL2 children compared to monolingual children?

In the following, the general hypotheses derived for these three research questions are presented. These general hypotheses are specified with respect to the phenomena under consideration in the following sections. Regarding the first question, that concerns the pace of acquisition, three-year-old eL2 children should perform worse than age-matched monolingual children since they had less exposure to German than monolingual children at the first test round. However, several studies reported that eL2 children develop faster than monolingual children do (Rothweiler, 2006; Schulz, 2013; Schulze, 2012; Thoma & Tracy, 2006; Tracy & Thoma, 2009). Therefore, eL2 children should show a greater rate of change compared to the rate of change of monolingual children. Thus, the following two hypotheses are formulated:

(H1.1) eL2 children perform significantly worse than monolingual children at the first test round at age three.
(H1.2) eL2 children show a significantly greater rate of change than monolingual children.

The second question addresses the influence of Age of Onset as a language factor and external factors on the eL2 children's language performance. Age of Onset was considered for the eL2 group only. As described in the following Section 3.4, the Age of Onset to German was very homogenous in the eL2 group. eL2 children had their first exposure to German between ages 2;0 and 3;4 (mean: 2;9). Based on this very low range, it was assumed that Age of Onset does not influence children's language performance. The statistical analyses revealed no effects of Age of Onset in any scale that was tested. Therefore, this factor is not going to be considered in the results' sections anymore.

The impact of external factors was investigated for eL2 and monolingual children. The following factors were taken into consideration: gender, parental educational background, and non-verbal intelligence. The previous research did not find any influence of gender on children's language performance at age three or older. Moreover, the previous findings on eL2 acquisition, which were reported in Section 2.3, indicate that early acquired phenomena are less susceptible to be affected by children's non-verbal intelligence or parental educational background than (very) late acquired structures. However, since almost no correlations between performance in LiSe-DaZ (Schulz & Tracy, 2011) and external factors have been found, the following hypotheses are stated:

(H2.1) External factors do not affect the eL2 and the monolingual children's performance at the first test round at age three.
(H2.2) External factors do not affect the rate of change of monolingual and of eL2 children.

The last research question aims at the description of the individual developmental path and the error patterns in eL2 acquisition. The previous findings suggest that eL2 children follow the same acquisitional path as monolingual children (Schulz, 2013 for comprehension of wh-questions; Thoma & Tracy, 2006; Tracy & Thoma, 2009 for production of sentence structure). In addition, regarding the error types, it was reported that the errors of eL2 children are very similar to the errors found in monolingual children. Therefore, the following two hypotheses are formulated:

(H3.1) eL2 children pass through the same developmental stages as monolingual children.

(H3.2) Error patterns found in eL2 children are similar to error patterns of monolingual children.

3.2. The MILA-project

Participants of this study are part of sample of the project MILA (The Role of Migration Background and Language Impairment in Children's Language Achievement) which was part of the Research Centre IDeA (Centre for Individual Development an Adaptive Education of Children at Risk) in Frankfurt/Main from 2008 to 2014. MILA was a combined cross-sectional and longitudinal study of monolingual and eL2 acquisition of German. The main goal of the project was to investigate when eL2 children reach the typical milestones in the acquisition of German compared to monolingual children, and which developmental paths are characteristic for eL2 children. In addition, MILA examined which developmental paths (in production and comprehension) could be used as diagnostic indicators to distinguish between typically developing eL2 children from eL2 children with the risk for Specific Language Impairment (SLI).

In the project, typically developing children and children with SLI participated what results in four subgroups: typically developing monolingual children, typically developing eL2 children, language impaired monolingual children, and language impaired eL2 children. The four groups were tested in six test rounds. There was an approximately six months interval between the first five test rounds; the interval between the fifth and the sixth test round accounted one year. The typically developing children aged between 3;6 and 3;11 in the first test round. The age of language impaired children was more varying (4;4 – 9;3). Children were included in the study if they showed an overall age-appropriate development and if there was no history of hearing impairment. Additionally, eL2 children were included if they started to acquire German between ages 2;0 and 4;0.

Repeated measures took place with standardized language tests (LiSe-DaZ, Schulz & Tracy, 2011; SETK 3-5, Grimm et al., 2001), psycholinguistic experiments (comprehension of exhaustive wh-questions, non-word repetition, elicited production of relative clauses), and with spontaneous speech in German and in L1 of eL2 learners. In addition to the longitudinal investigations, in the second test round (age: 4;0-4;5) the non-verbal intelligence was assessed using the non-verbal scales of the *Kaufman Assessment Battery for Children* (K-ABC, Kaufman et al., 2009). In the fifth test round children were tested with five subtests of *Arbeitsgedächtnistestbatterie für Kinder von 5 bis 12 Jahren* (AGTB 5-12, Hasselhorn et al., 2012) to examine their abilities in executive functions. An overview of the applied assessments is given in Table 3.1.

Table 3.1. An overview of applied assessments in MILA (based on Grimm & Schulz, 2012).

Test round	Standardized tests		Psycholinguistic experiments			Spontaneous speech
	LiSe-DaZ	SETK 3-5	Exhaustive wh-questions	Non-word repetition	Relative clauses	
T1	X	X				X
T2	X		X			
T3	X			X	X	
T4	X					
T5	X	X	X	X	X	X
T6	X		X			

Telephone interviews with parents were conducted to collect more specific information about children's language biography and their parents' language and educational background. The child's language biography was assessed with questions about the child's age at the onset of first words and at the onset of multi-word utterances in L1 or German, and about assignment to speech-language intervention. For the eL2 learners, the questions about the child's first language and the age at onset to German were additionally included. Information about the parents' background were assessed with questions about first degree relatives with language impairments, language use at home, their length of residence in Germany, and their educational background which was measured via years of schooling.

The combined cross-sectional and longitudinal design of MILA makes several comparisons possible. On the one hand, children's development over time in one selected language phenomenon can be considered. On the other hand, children's performance in different language tasks, and in language and non-language tasks can be compared cross-sectional. Furthermore, the influence of different internal and external factors can be investigated.

3.3. Method

This section gives an overview of the assessments whose results were analyzed in this thesis. To examine children's language abilities the standardized test LiSe-DaZ (Schulz & Tracy, 2011) was used. LiSe-DaZ assessed morpho-syntactic, semantic, and to some

degree pragmatic and lexical abilities in comprehension and production. LiSe-DaZ is the only language test for German that is standardized for monolingual children and for eL2 learners of German. Thus, the test contains separate standardized values for monolingual children aged 3;0 – 6;11 and eL2 children aged 3;0 – 7;11. The comprehension tasks including three phenomena: telicity, wh-questions, and sentential negation. The detailed description of the tasks is given in Section 4.3, Section 5.3, and Section 6.3, respectively. Regarding children's language production, three subscales examined core areas of morpho-syntax in German: sentence complexity, subject-verb-agreement, and case. Lexical abilities are assessed with five subscales, which examine children's production of different word classes (main verbs, auxiliary and modal verbs, prepositions, focus particles and conjunctions). Language production is assessed with an elicited production task, which is described in Section 7.3.3, Section 8.3.3, and Section 9.3.2 for each phenomenon.

Importantly, all phenomena tested by LiSe-DaZ are rule-based (Schulz & Tracy, 2011). Thus, the (no)mastery of these structures can give a reliable assessment of a child's language competence and can predict her next developmental stage. This distinguishes these structures from irregular forms such as gender, plural of nouns or irregular verb forms, which must be learned item by item. Furthermore, the phenomena in focus are very frequent in input. This implicates that children receive sufficient evidence in input what allows them to derive the rules. Thus, difficulties in their acquisition are not expected, and a reliable assessment is possible. Moreover, some of the phenomena are acquired early in monolingual children and some (very) late as was presented in Section 2.2. This distinction makes possible to investigate the timing effects in acquisition in this thesis.

LiSe-DaZ was administrated in the first (T1), second (T2), third (T3), and fifth test round (T5) to monolingual and to eL2 children. In the sixth test round (T6) only language abilities of eL2 learners were assessed since monolingual group showed at ceiling performance in the fifth test round already. In the fourth test round (T4) only the subscale *Comprehension of wh-questions* was administrated to both participant groups.

Non-verbal intelligence was assessed via the non-verbal scales of the Kaufman Assessment Battery for Children (K-ABC, Kaufman et al., 2009). K-ABC is a standardized test that assesses intelligence and achievement in children aged 2;6 to 12;6. It is intended for use with monolingual, bilingual, and eL2 children, or children who do not speak at all. The non-verbal scale for four-year-olds includes three subtests: facial recognition, reproducing of hand taps on a table, and reproducing of a presented design by using

rubber triangles. The test was administrated with monolingual and eL2 children aged 4;0 to 4;5 at the second test round (T2). All children performed age-appropriate (see Table 3.3 in Section 3.4).

Additionally, the information from telephone interviews with parents were used, which were conducted shortly before the first test round. The relevant information for this thesis was 'Age of Onset' to German of the eL2 learners, and parents' educational background, which was measured via years of schooling, as one of the external factors.

Table 3.2 summarized the assessments across the six test rounds, which were analyzed in this thesis.

Table 3.2. Analyzed assessments across the six test rounds.

	T1	**T2**	**T3**	**T4**	**T5**	**T6***
Age	3;4-4;1	4;0-4;5	4;4-5;0	5;0-5;6	5;5-6;3	6;5-7;3
LiSe-DaZ	X	X	X	wh-questions	X	X
K-ABC		X				
Interview	X					

*only eL2 children

3.4. Participants

Participants of this study are two subgroups from MILA-sample: the typically developing monolingual children and the typically developing eL2 learners of German. The children were assigned as typically developing based on their performance in the standardized test LiSe-DaZ (Schulz & Tracy, 2011). As already pointed out, LiSe-DaZ offers separate norms for monolingual children (ages 3;0-6;11) and for eL2 learners (ages 3;6-7;11), what allows to evaluate an eL2 child's language abilities relative to children of the same acquisitions type. The children were classified as typically developing if they performed in at least seven out of nine subscales of LiSe-DaZ providing T-values age-appropriate. In sum, 45 monolingual and 29 eL2 children were identified as typically developing. Most of the children was classified based on their performance in the third test round (age: 4;4-5;0). For three monolingual children the results from the second test round were used since they did not participate in the study after this test round anymore. One eL2 learner was also classified as typically developing based on her T-values in the second test round

because her data from the third test round were not complete. In the monolingual group, 28 out of 45 children (62%) performed age-appropriate on all subscales; 17 children (38%) scored below T=40 in one subscale of LiSe-DaZ. In the eL2 group, 21 out of 29 children (72%) performed age-appropriate on all subscales, and eight children (28%) scored below T=40 in one subscale. The T-values, on which the children were classified as typically developing, are given in Table A.1 for monolingual children and in Table A.2 for eL2 learners in Appendix.

The monolingual group consisted of 20 girls and 25 boys. In all families, German was the only home language. The eL2 group consisted of 13 girls and 16 boys. The children had 16 different first languages. The most frequent L1 of eL2 children was Turkish (8 out of 29, 28%). Three children (10%) had Arabic or Bosnian as their first language, respectively. Two children acquired Croatian, Panjabi, Persian, or Russian as L1, respectively. Afghan, Greek, Italian, Jugoslav, Kotocoli, Serbian, and Tchamba were first languages of each one child, respectively. At the time of telephone interview, all families predominantly used their first language with each other. Eight out of 29 families (28%) also used German at home. Table 3.3 summarizes the remaining relevant information about monolingual and eL2 children's language biography and their parents' background.

Table 3.3. Sample characteristics: means and ranges of child and parental variables.

	Monolingual children (n=45)		**eL2 children** (n=29)	
	Mean	Range	Mean	Range
Age at first test round in months	3;7	3;5-4;1	3;7	3;4-4;1
Months of exposure to German at T1	-	-	10	5-19
Age of Onset to German in months	-	-	2;9	2;0-3;4
Non-verbal intelligence	91	66-120	85	61-113
Mother's educational background in years	12	9-13	10	0-14
Father's educational background in years	11	0-13	10	5-13

As typical for a longitudinal design, there was a drop-out rate of participants over the six test rounds. Table 3.4 summarizes the size of the monolingual and the eL2 groups for each test round and their age.

Table 3.4. Number of monolingual and eL2 children and their ages across six test rounds.

	Monolingual children			**eL2 children**		
	n	Age		n	Age	
		mean	range		mean	range
T1	45	3;7	3;5-4;1	29	3;7	3;4-4;1
T2	44	4;2	4;0-4;5	29	4;2	4;0-4;4
T3	42	4;7	4;4-5;0	28	4;7	4;4-4;9
T4	39	5;2	5;0-5;6	29	5;2	5;0-5;5
T5	36	5;7	5;5-5;9	27	5;8	5;4-6;3
T6	-	-	-	15	6;9	6;5-7;3

The relevant language biography information for each eL2 child are summarized in Table A.3 in Appendix. Table A.4 in Appendix gives an overview of age of each monolingual child at each test round, and Table A.5 in Appendix summarizes age and length of exposure to German of each eL2 learner at each test round.

3.5. Data analysis

This section gives an overview on data analyses that were conducted to answer the research questions of this thesis. Different methodological approaches are required to reach these goals. Multilevel analyses were conducted for the analyses of children's pace of acquisition (Q1) and of impact of external factors (Q2). For descriptions of children's individual developmental paths (Q3) quantitative analyses were conducted that considered the linguistic properties of a particular structure. Thus, these two approaches give different views on children's language acquisition, and their usage gives responses on different questions. Consequently, they are assumed to be of the same relevance, and to complement each other. Table 3.5 summarizes the conducted analyses across investigated phenomena. Analyses that investigated pace of acquisition and impact of external factors were carried out for all language structures excluded production of matrix and subordinate clauses since these data do not allow a multilevel analysis.

Analyses concerning individual developmental paths were conducted for selected phenomena in comprehension and in production.

Table 3.5. Overview of conducted analyses across investigated language phenomena.

Language phenomenon	Q1 Pace of acquisition	Q2 External factors	Q3 Individual developmental paths
Comprehension of telicity	X	X	X
Comprehension of wh-questions	X	X	
Comprehension of negation	X	X	X
Production of case marking	X	X	
Production of word classes	X	X	
Production of matrix clauses			X
Production of subordinate clauses			X

The following sections introduce both methodological approaches in more details. Section 3.5.1 deals with multilevel modelling approach. Section 3.5.2 justifies the quantitative analyses.

3.5.1. Multilevel analysis

In this thesis, longitudinal data of monolingual and of eL2 children are compared regarding their pace of acquisition and impact of external factors. In following, multilevel modelling approach as a statistical method for longitudinal data analysis is presented. Then, the statistical analyses conducted in this study are described.

For analyzing longitudinal data, a statistical model that represents change processes is needed. Longitudinal data are an example of a hierarchical structure with repeated observations over time at level-1 nested within individuals at level-2 (Singer & Willet, 2003; Steele, 2008). Thus, a statistic model for longitudinal data should embody two types of questions: questions about within-person change (level-1) and questions about between-person differences in change (level-2). A multilevel modelling approach meets

these criteria (Rogosa & Willet, 1985; Singer & Willet, 2003). In this approach, components at two levels are included. The level-1 component of the multilevel model is also known as the individual growth model and represents the change that each individuum of a sample experiences during the time period under study (Singer & Willet, 2003). Thus, the goal of level-1 component is to describe the shape of each person's individual growth trajectory. Adopting the view that change is a linear function of 'Age', the level-1 submodel is written as follows:

(1) $Y_{ij} = \Pi_{0i} + \Pi_{1i} AGE_{ij} + E_{ij}$ (Singer & Willett, 2003:50)

In Equation (1), *i* indicates level-1 unit (e.g., individual), and *j* level-2 unit (e.g., group). For each individual *i* in group *j*, Y_{ij} indicates dependent variable. Equation (1) stipulates that each person's true trajectory of change is linear with age (AGE_{ij}), and has individual growth parameters, Π_{0i} and Π_{1i}, that characterize its shape for the *i*th individual in the sample. The first growth parameters, Π_{0i}, is intercept of the true change trajectory for individual *i* in the sample. In data of this thesis, intercept represents the performance of each child at the first test round. The second growth parameter in equation (1), Π_{1i}, represents the slope. The slope represents the rate at which each individual *i* changes over time, and thus it is the most important parameter in a level-1 linear change submodel. As already mentioned, change is assumed as a linear function of 'Age' in level-1 submodel in (1). Note, that in (1) a special representation for the predictor 'Age' was used (AGE_{ij}). In this submodel the predictor 'Age' is recentered. This means that a constant is subtracted from 'Age' in its raw form. By doing this, the intercept in level-1 submodel refers to the true value of Y at that particular age - X. For data analyses in this thesis, the age of monolingual and of eL2 children at first test round was centered. For this practice, the lower value of age at first test round (41 months) was subtracted from value of each child's age. In addition, in submodel in (1) it is assumed that "a straight line adequately represents each person's true change over time and that any deviations from linearity observed in sample data result from random measurement error (E_{ij})" (Singer & Willett, 2003:50). Each of these level-1 residuals represents that part of individual *i*'s value at time *j* that is not predicted by her age.

The level-2 component represents the relationship between interindividual differences in the change trajectories and time-invariant characteristics of the individual. The goal of this component is to detect heterogeneity in change across individuals and to determine the relationship between predictors and the slope of each person's individual growth trajectory (Singer & Willett, 2003). The level-2 submodel is written as follows:

(2) $\Pi_{0i} = \gamma_{00} + \gamma_{01}\, Predictor_i + \zeta_{0i}$ (Based on Singer & Willett, 2003)

$\Pi_{1i} = \gamma_{10} + \gamma_{11}\, Predictor_i + \zeta_{1i}$

As typical for level-2 submodels, equation (2) consists of more than one component, each resembling a regular regression model. In this submodel, "the two components treat the intercept (Π_{0i}) and the slope (Π_{1i}) of an individual's growth trajectory as level-2 outcomes that may be associated with the predictor" (Singer & Willett, 2003:60). The level-2 submodel contains four level-2 parameters (γ_{00}, γ_{01}, γ_{10}, γ_{11}). These parameters represent the fixed effects. Two of these fixed effects (γ_{00}, γ_{01}) are level-2 intercepts, and two (γ_{10}, γ_{11}) are level-2 slopes. The fixed effects capture systematic interindividual differences in change trajectory according to values of the level-2 predictor(s). Each part of level-2 submodel contains a residual (ζ_{0i}, ζ_{1i}). These residuals represent those portions of the individual growth parameters that remain unexplained by the level-2 predictor(s). Like for most residuals, not their specific values are important but their variances and covariance (Singer & Willett, 2003; Steele, 2008). The variance of intercept, the variance of slope, and their covariance represent the so-called random effects.

Based on observed data, the regression coefficients and the variance components must be estimated in the multilevel regression model. There are two estimators in multilevel regression analysis: maximum likelihood (ML) and restricted maximum likelihood (REML). ML estimator is the most popular approach since it works excellent in large random samples from well-defined target populations (Snijders & Bosker, 2012; Singer & Willett, 2003). ML estimates have three properties (Singer & Willett, 2003). The estimates converge on the unknown true values of population parameters, their sampling distributions are approximately normal with known variance, and their standard errors are smaller than those derived by other methods. In addition, growth trajectories that are predicted are ML estimates of the true trajectories. From the conceptual point of view, ML estimates are those parameter estimates that maximize the probability of observing a particular sample of data (Snijders & Bosker, 2012; Singer & Willett, 2003). REML estimates are computed differently. They "are those values that maximize the likelihood of observing the sample residuals" (Singer & Willett, 2003:89). In small samples with balanced data, REML is generally preferable to ML since it is unbiased (Snijders & Bosker, 2012). Thus, REML estimator was used in the analyses conducted in this thesis.

In this study, the data were analyzed with a linear mixed model using PROC MIXED in SAS 9.3 (Littell, Milliken, Stroup, Wolfinger & Schabenberger, 2006). A linear mixed model provides a robust statistical method for analyzing longitudinal experimental data with unequal numbers of observation. Each language structure was analyzed separately. For

each phenomenon, a model was obtained that was both as simple as possible and as precise as possible. To achieve it a backward elimination procedure was used, in which predictors that did not reach significance were removed. To compare models, likelihood ratio tests were performed, that compared the goodness of fit, while taking the costs of extra parameters into account. The first step in the analysis was to examine an unconstrained model. In subsequent model 'Age' was added as predictor of change. Next, the predictor 'Group' was added to test whether the language acquisition type (monolingual vs. eL2) has an effect of children's intercept. If there was a significant effect of 'Group' on intercept, this predictor was added at the level of slope. Finally, the external factors variables (gender, mother's educational background, father's educational background, nonverbal IQ) were added separately to investigate whether they predict children's intercept. Only these variables, for which a significant effect on intercept was found, were added at the level of slope. Additionally, the analyses with 'Age of Onset' as predictor were carried out for the eL2 group.

3.5.2. Quantitative analyses

To describe individual developmental paths toward target-like acquisition of a phenomenon it is not sufficient to consider this particular structure as a whole. Here fore it is required to regard its specific linguistic properties since they can predict the developmental stages. More importantly, it is assumed that these specific linguistic properties guide the acquisition of a particular structure. Thus, investigating acquisition of a particular phenomenon under consideration of its linguistic properties makes possible to assume what knowledge of this phenomenon a child already has. Qualitative analyses, that were conducted in this thesis, consider these linguistic properties and the complexity of a particular phenomenon.

To determine eL2 children's developmental paths, tasks from the standardized language test LiSe-DaZ (Schulz & Tracy, 2011) were treated as psycholinguistic experiments. This means that for each task, different conditions were determined based on linguistic properties of a phenomenon. In the next step, children's performance in these conditions were described and compared. Individual developmental paths were investigated for selected phenomena: comprehension of telicity, comprehension of sentential negation, production of matrix clauses and production of subordinate clauses (cf. Table 3.5).

Regarding the two selected comprehension tasks (*Verb meaning*, *Comprehension of Negation*), different conditions were assessed separately, and children's performance in these conditions were compared. As statistic method, analysis of variance (ANOVA) was selected since a multilevel model did not fit the data. In addition, individual performance of each eL2 child at each condition at each test round was examined to describe the developmental stages towards a target-like acquisition of a particular phenomenon. In this term, mastery of each condition was calculated for each child at each test round. Mastery was defined as performance above chance. The analyses are described in more details in Section 4.3.3 for *Verb meaning* and in Section 6.3.4 for *Comprehension of Negation*.

Concerning acquisition of sentence structure, the data that were gathered with the elicitation production task from LiSe-DaZ (Schulz & Tracy, 2011) were treated as a corpus. The utterances were analyzed regarding the acquisition of finiteness and verb placement in matrix clauses, and regarding the acquisition of subordinate clauses. The detailed procedures of data analyses are given in Section 9.4.3 and in Section 9.5.3, respectively.

4. Acquisition of telicity

This chapter deals with acquisition of telicity in eL2 children in comparison to monolingual children. It is organized as follows. Section 4.1 presents Pustejovsky (1991) model of event structure and gives an overview of the telicity marking in German. Section 4.2 presents previous research on the acquisition of telicity. Section 4.2.1 concentrates on the monolingual acquisition of telicity. First, the early production of verb particles is described; next, the studies on comprehension of inherent and compositional telicity are reported and discussed. Section 4.2.2 summarizes the findings on the acquisition of telicity in eL2 learners. Section 4.3 presents the telicity task used in this study. In Section 4.3.1 the acquisitional hypotheses are formulated. Section 4.3.2 gives an overview of the participants. The results with respect to children's pace of acquisition, the impact of the external factors, and individual developmental paths are described in Section 4.3.4. Section 4.4 provides a discussion of the findings.

4.1. Event structure and telicity marking in German

Verbs are generally used to refer to events including situations and actions. According to Pustejovsky (1991, 1995) any verb can be classified as one of three basic types of events they designate: states (S), processes (P) and transitions (T). According to Pustejovsky (1991), an event *e* may be represented as [e_1,e_2]. This representation is interpreted such that the subevent e_1 temporally precedes the subevent e_2. In addition, other events may be locally contained in event *e*. States like *be sick* or *love* are defined as a single event as illustrated in their structural representation in (1). Processes such as *run* or *push* are determined as a sequence of events identifying the same semantic expression as depicted in (2). Transitions are complex events consisting of two subevents. They involve a transition from one subevent to another. Two types of transitions are distinguished: endstate-oriented transitions like *give* or *open*, in which a state is the head of the event (marked by a star within the representation in (3a)), and process-oriented transitions like *build*, where a process is the head of the event as illustrated in the structural representation in (3b).

(1) Structural representation of a state (Pustejovsky, 1991)

(2) Structural representation of a process (Pustejovsky, 1991)

(3) Structural representations of transitions (Pustejovsky, 1991)

a. b.

In addition to the type of event, verbs differ regarding their temporal make-up of the event they refer to (cf. Comrie, 1976), and can be classified into telic and atelic verbs. Telic verbs, on the one hand, designate events with a terminal endpoint built into them leading to a natural culmination point. Atelic verbs, on the other hand, designate events without such an endpoint. The event described by an atelic verb can be continued indefinitely or stopped at any moment in time.

States and processes as defined by Pustejovsky (1991) are always atelic since they do not refer to any terminal endpoint of an event. *Being sick* or *drinking* can be in principle continued for an unlimited amount of time. In contrast, transitions can be telic. Telicity arises in endstate-oriented transitions as represented in (3a) in which the subevent describing the endpoint is more prominent than the subevent describing the process. In *arrive* or *open* the way one arrives at a destination or opens something is not important to the meaning of these verbs. However, the terminal endpoint of the event must be reached, therefore these verbs can only refer to a completed event. Put differently, the endstate of the event, that a telic verb refers to, is not cancellable, i.e., we cannot say 'She opened the door, but it is not open'. In process-oriented transitions as in (3b), in contrast, the endpoint subevent is not prominent. The endstate can be implicated by the atelic verb, but it is not entailed. *Sweep*, for example, describes an activity in which its

manner is more relevant than the resulting state. For instance, one can sweep a floor without ever reaching the point that the floor is clean. In this case the endstate is not reached.

One important property that distinguishes telic and atelic events is their ability to be counted. According to Bach (1986) telic predicates specify an inherent endpoint for their events. Therefore, those events can be naturally counted in terms of how many endpoints were achieved (4a). Atelic predicates, in contrast, lack such an endpoint specification, and cannot be counted at all (4b).

(4) a. John fell asleep three times during the night. (Bach, 1986:5)
b. # John slept three times last night. (Bach, 1986:5)

Wagner (2006) notes however that atelic predicates are countable as well. According to her, the difference between telic and atelic predicates is that telic predicates provide a specific criterion for counting (an inherent endpoint) whereas atelic predicates do not provide such a criterion. Nevertheless, she argues that criteria for counting of atelic predicates can be found outside of the description itself, in the form of classifier phrases or even from general contextual knowledge as illustrated in (5a) and (5b), respectively.

(5) a. Paula and Simon had 3 bouts of fighting. (Wagner, 2006:53)
b. Ali and Foreman fought 2 times. (Wagner, 2006:53)

Languages differ as to how telicity is marked in syntax and morphology. Whether a verb is telic or atelic is either determined inherently via its lexical semantics or compositionally via its interaction with the morpho-syntactic context the verb appears in (van Hout, 1998, 2000, 2013; Penner, Schulz & Wymann, 2003; Schulz, Wymann & Penner, 2001; Schulz & Penner, 2002). In German like in English or Dutch, telicity can be marked in both ways. *Aufmachen* 'open' is a typical example of an inherently telic verb. Example (6) demonstrates that the endstate of the event [BE OPEN] is entailed by the verb meaning and cannot be canceled.

(6) Sie hat die Tür aufgemacht, # aber sie ist noch zu.
'She opened the door, but it is still closed.'

As in English and Dutch, in German verbs referring to processes can shift their event-type from atelic to telic. Compositional telicity is achieved by adding a resultative verb particle, a quantized object, a directional phrase, or a resultative phrase to an atelic

process verb. Resultative verb particles such as *aus* 'up' or *auf* 'up' are examples of strong telicity markers. Their adding always shifts the event-type of a process verb from atelic to telic as shown in Examples (7) and (8) (Schulz & Penner, 2002:241).

(7) a. Atelic
Sie hat getrunken.
'She drank.'
b. Telic
Sie hat ausgetrunken.
She has AUS-drunk.PART
'She drank it up.'

(8) a. Atelic
Er hat gegessen.
'He ate.'
b. Telic
Er hat aufgegessen.
He has AUF-eat.PART
'He ate it up.'

The event-type shift from atelic to telic also occurs if an object is added to a transitive simplex verb (Krifka, 1992; Verkuyl 1972, 1993). Some objects such as mass nouns or bare plurals, however, do not quantify specific amounts, and thus their adding does not result in a telic interpretation, see Example (9a). In contrast, adding a quantized object, i.e. an object that refers to a specific and bounded quantity, to a process verb contributes to a telic interpretation as demonstrated in example (9b).

(9) a. Atelic (Schulz et al., 2001:408)
Er hat Käse gegessen.
He has cheese eat.PART
'He ate cheese.'
b. Telic (Schulz et al., 2001:408)
Er hat den Käse gegessen.
He has the cheese eat.PART
'He ate the cheese.'

The addition of a quantized object, however, only may but does not necessarily result in a telic meaning. Therefore, quantized objects belong to weak telicity markers. Whether the event-type shift occurs or not, depends on the relation between the

transitive verb and its object (van Hout, 2000; Schulz & Penner, 2002). “Only if the activity expressed by the verb affects the entity denoted by the direct object in an incrementally developing way, is the transitive verb telic” (van Hout, 2000:244). Whereas verbs such as *push*, *pull* or *carry* remain atelic as these activities do not affect the object in the relevant way, cf. Example (10a), verbs such as *drink* or *write* become telic via adding a quantized object, cf. Example (10b).

(10) a. Atelic (van Hout, 1998:398)
She pushed the cart for hours.
b. Telic (Schulz & Penner, 2002:241)
He drank the tea.

Jeschull (2007) proposed a pragmatic explanation for the difference between the compositional telicity via adding a resultative verb particle (cf. Example (9)) and the compositional telicity via adding a quantized object to a transitive simplex verb (cf. Example (10)). She holds the view that whereas particle verbs entail telicity, the corresponding transitive simplex verbs conversationally implicate telicity. This means that a telic interpretation is obligatory if a resultative verb particle is added to a transitive verb. In contrast, in the case of a quantized object, the implicature may or may not arise. Therefore, a transitive simplex verb with a quantized object is felicitous on both a telic and an atelic interpretation. More importantly, the particle verb is more informative than the simplex verb with a quantized object. From this assumption follows that the context, in which a particle verb is felicitous, forms a proper subset of the contexts, in which the corresponding transitive simplex verb with a quantized object is felicitous, but not the other way round. In addition, if a telic interpretation is required, the particle verb, as the stronger expression, is preferred to the corresponding transitive simplex verb with a quantized object. In cases in which both, a particle verb and a transitive simplex verb with a quantized object, are available, the particle verb is preferred for the telic events, whereas the transitive simplex verb with a quantized object is felicitous only on the atelic interpretation. Consequently, the conversational implicature of the transitive simplex verb with a quantized object does not arise in such contexts.

To summarize, telic verbs designate events with their terminal endpoint reached while atelic verbs refer to events with the implicated endstate reached or not reached. In German, telicity is marked either inherently by the lexical semantic properties of the verb itself, or compositionally by adding strong telicity markers such as resultative

particles or weak telicity markers like quantized objects. According to the approach proposed by van Hout (1998, 2000) and Schulz & Penner (2002), and to the pragmatic approach by Jeschull (2007), adding a resultative particle to a transitive simplex verb always results in a telic interpretation. The approaches differ however with respect to the explanation why a telic interpretation is not obligatory if a quantized object is added to a transitive simplex verb. According to van Hout (1998, 2000) and Schulz & Penner (2002), whether the event-type shift occurs, depends on the process verb. Jeschull (2007) on the other hand argues that transitive simplex verbs with a quantized object conversationally implicate telicity and depending on whether the implicature is cancelled or not, they are felicitous on both a completion and a non-completion interpretation.

4.2. Previous research on acquisition of telicity

The language learner faces a challenging task regarding the acquisition of telicity. She must learn to distinguish between telic and atelic verbs. This means that she must discover for each verb individually whether it entails the endpoint of the event, or whether the endstate is only implicated or even lacking. Moreover, the child must learn how telicity is marked in the target language. To put it differently, she has to find out whether telicity is determined by the lexical semantic properties of the verb itself (inherent telicity) or whether a verb can become telic by adding a specific telicity marker (compositional telicity). This section is structured as follows. First, a brief overview on the production of verb particles in monolingual acquisition is given. Next, studies on the acquisition of telicity in monolingual children are reported and discussed (4.2.1). In the following, Section 4.2.2 summarizes previous research on the acquisition of telicity in eL2 learners. In both sections, special focus is given to studies that investigated the acquisition of telicity in German.

4.2.1. Monolingual acquisition of telicity

Production of telic and atelic verbs. Children seem to use their knowledge of telicity already in their early production of verbs and verbs particles. Children that acquire different languages have been found to distribute their verbal morphology according to the telicity value of the verb (Berman, 1983; Bloom, Lifter & Hafitz, 1980; Bronckart & Sinclair, 1973; Shirai & Andersen, 1995; Weist, Wysocka, Witkowska-Stadnik et al., 1984). For example, Bloom et al. (1980) and Shirai & Andersen (1995) showed that very young English-speaking children restricted their past tense marking to telic verb, whereas they used the progressive marking to atelic verbs. Similar patterns have been documented for a variety of languages such as Italian (Antinucci & Miller, 1976), French (Bronckart &

Sinclair, 1973), Hebrew (Berman, 1983), or Polish (Weist et al., 1984) although the particular morphology differs between these languages. In the following, those studies investigating the production of telic and atelic verbs and verb particles in German are presented in more detail (Penner et al., 2003; Tracy, 1990; Schulz et al., 2001; Penner et al., 2003).

Verb particles play a very important role for early verb acquisition and acquisition of sentence structure in German. Isolated verb particles occurred in child spontaneous speech already during the single-word stage (Penner et al., 2003; Szagun, 2006; Tracy, 1990; Tracy, 1991) as illustrated in Example (11).

(11) Ab (Tracy, 1991:158)
'off'

(12) brille AUF (Tracy, 1991:164)
'glasses on'

In multi-word utterances, verb particles occurred between age 1;6 and 2;0. At this stage verb particles are always produced at the end of utterances as shown in Example (12), and have function and meaning of the whole verb. At the same age, children produced utterances with infinite verb forms in verb end position. A detailed description of acquisition of German sentence structure is given in Section 9.2.

Kauschke (2000) investigated spontaneous speech data of 32 German-speaking children aged between 13 and 36 months. The children produced their first verbs around the age of 15 months. At age 3;0 verbs were the most frequent word class (23%). Behrens (1998) compared usage of simplex and complex verbs in spontaneous speech data of ten children acquiring German, Dutch, or English. Their age range was between ages 1;9 and 4;0. Her analysis revealed that simplex verbs occurred earlier than complex verbs, but both verbs types were produced frequently already before age two. Moreover, in a case study of Simone-Corpus Behrens (1998) found out that *aufmachen* 'open', *kaputtmachen* 'break', and *abmachen* 'take off' were among the most frequent particle verbs.

Schulz et al. (2001) and Penner et al. (2003) proposed a model of event structural bootstrapping that explains how a child logs into the verb lexicon (see Schulz (2018a) and Schulz (2018b) for an overview). The model is based on a longitudinal analysis of spontaneous speech data that examined the production of verb particles in five one- and two-year-old typically developing (TD) children, and six one- and two-year-old children with language impairment (SLI). The TD children produced their first verb particles

between age 1;2 and 1;6. More importantly, all five TD children used resultative verb particles *auf* and *zu* first in isolation which unambiguously mark the endstate of an event and are therefore the head-of-event as defined by Pustejovsky (1991). A few weeks after the emergence of these bare verb particles, the light verb *machen* 'make' occurred in combination with the particles; i.e. the children extended their event structure representation such that it included not only the endstate, but the process subevent as well. The SLI children showed a different pattern. They produced their first particles later than the TD children between age 2;0 and 2;4. More crucial is that they started out with the deictic prefixes such as *runter* 'R-down' or *rauf* 'R-up' instead of the resultative verb particles. These prefixes do not refer to a specific subevent and consequently do not mark a given event as telic or atelic. Based on these results the authors proposed that in the initial stage, the TD children focused on the event structure, and not on the verb's core meaning or argument structure. To put it more specifically, children first assess whether the verb denotes a telic or an atelic type of event. The more successful strategy for a child is therefore to log into the verb lexicon with a verb that has an unambiguous event structure in terms of its event type. In German, particle verbs such as *auf-machen* 'open' or *zu-machen* 'close' are obligatory interpreted as telic, and consequently meet this requirement best. Additionally, the internal hierarchy of the transition type event is optimally transparent in these verbs: the prefix unambiguously marks the endstate as the head-of-event, and the light verb lexically marks that the process subevent is less prominent. According to Schulz et al. (2001), the TD children are expected to profit from the event structural bootstrapping strategy in the comprehension of the particle verbs since they should recognize that particle verbs entail telicity, and consequently should be rejected for events in which the endstate is not achieved. The remainder of this section focusses on studies investigating the comprehension of telicity.

Comprehension of telicity. Previous comprehension studies in German, Dutch and English on the acquisition of telicity in monolingual children have focused on inherent telicity and compositional telicity by adding resultative particles or quantized objects. In the following, the studies investigating the inherent telicity are reported (Wittek, 1999; Schulz et al., 2001; Penner et al., 2003; Schulz & Wittek 2003; see also Schulz (2018b) for an overview). Then, the studies on the comprehension of compositional telicity are summarized (van Hout, 1998; Schulz & Penner 2002; Schulz & Penner, 2002; Jeschull, 2007; Wagner, 2006; see also Schulz (2018b) for an overview).

The study by Wittek (1999) investigates the interpretation of inherently telic verbs in 20 four- and five-year-old German-speaking children. Two types of inherently telic

verbs were tested: particle verbs and simplex verbs with telic verb semantics. Examples of verbs tested are given in (13) (Wittek, 1999:295). Since the particles like *zu* or *auf* make the telic meaning of the verb more transparent, Wittek (1999) expected children to show better performance in the particle verb condition than in the condition with simplex verbs.

(13)	Particle verbs	Simplex verbs
a.	die Tür zumachen	die Tür schließen
	the door ZU-make	the door close
	'close the door'	'close the door'
b.	die Nuss aufmachen	die Nuss knacken
	the nut AUF-make	the nut crack
	'crack the nut'	'crack the nut'

A truth-value-judgment task was used to investigate children's interpretation of verbs. Each child saw eight short movies depicting an event. The event was completed in half of the movies, and the endpoint of the event was not reached in the other half of them. The child's task was to judge whether a hand puppet correctly predicted the outcome of the event. A typical test item is given in (14) (Wittek, 1999:285-286).

(14) Hand puppet: Ich glaube, dass das Mädchen gleich einen Mann weckt.
'I think that the girl will wake up a man in a moment.'

Movie's presentation

Test question: Und, stimmt das? Hat das Mädchen den Mann geweckt?
'And, is it right? Did the girl wake up the man?'

The results show that four- and five-year-old children correctly accepted the inherently telic verbs for completed events in both conditions in all items. Regarding the events without a depicted endstate, children rejected the inherently telic verbs in only 70% of the cases. Interestingly, there was no difference between particle verbs and simplex verbs. This suggests that the presence of resultative particles does not necessarily make the telic meaning more transparent for children as was expected by Wittek (1999). Regarding the 30% of the non-target-like responses, the children responded incorrectly with *yes*, however, they correctly described what had happened at the end of the video as illustrated in Example (15) (Wittek, 1999:291).

(15) Hat das Mädchen den Mann geweckt?
'Did the girl wake up the man?'
a. Ja, aber der hat's gar nicht gehört.
'Yes, but he had not heard it.'
b. Ja, aber der tut nich aufwachen.
'Yes, but he is not getting awake.'

Based on these responses, Wittek (1999) proposed that children associated subject's intention to reach an endstate with some inherently telic verbs such as *wake*. This assumption is supported by Talmy (1991). According to him the meaning of some verbs such as *wash* implicates the endstate, in this case *clean*. However, in contrast to the telic verbs, this endstate has not to be reached as shown in Example (16).

(16) I had washed my shirt, but it is not clean.

Therefore, Talmy (1991) concludes that these verbs lead to a lexical implicature. Following Talmy (1991), Wittek (1999) suggests that children may interpret telic verbs like verbs such as *wash*. This means that the verbs implicate that the endstate will be reached.

Schulz et al. (2001) and Penner et al. (2003) focused on the interpretation of only one telic verb *aufmachen* 'open' in typically developing German-speaking children and children with SLI. In the following only the findings for the TD children between the ages two and four are reported. Children's comprehension was tested with a truth-value-judgment task. 32 picture sequences were used. The first picture depicted a closed container and a hand moving towards it, the second picture showed the outcome of the action, either an opened or a still closed container. A child who knows that the meaning of *aufmachen* entails the endstate should response *yes* to the test question in the first case and *no* in the second case. A typical test item is given in (17) (Schulz et al., 2001:412).

(17) Experimenter: Diese Mutter wollte mit ihrem Kind spielen. Guck, da siehst du ihre Hand, und hier ist die Schachtel. Und dann…
'This mother wanted to play with her child. Look, there you can see her hand, and here is the box. And then…'
Test question: Hat sie aufgemacht?
Has she her AUF-made.PART
'Did she open it?'

With respect to the condition in which the endstate was reached, the two-year-old and the three- and four-year-old children correctly accepted the inherently telic verb *aufmachen* giving 100% and 97% of correct responses, respectively. For events in which the endpoint was not reached, children correctly rejected *aufmachen* in 78% of the cases already at the age of two. The three- and four-year-old children performed better than the two-year-olds; they rejected *aufmachen* for events in which the endstate was missing in 89% of the items. The analysis of individual responses revealed that already 75% of two-year-old children (12 out of 16), and 94% of three- and four-year-olds (15 out of 16) mastered the target-like interpretation of *aufmachen*. In sum, these results indicate that inherent telicity expressed by this particle verb is acquired very early in monolingual acquisition. The authors conclude that children identify the specific event type expressed by a verb using the event structural bootstrapping procedure that was already proposed for production (cf. *Production of verb particles* at the beginning of this section). According to this strategy, children focus on the endstate component of events first. Consequently, children who follow this strategy interpret telic verbs target-like from early on. Furthermore, there should also be an acquisitional stage, in which the children overgeneralize atelic verbs as telic before they understand these verbs correctly. However, atelic verbs were not tested in this design.

Schulz & Wittek (2003) extended the previous studies and focused not only on the interpretation of telic particle verbs, but also on children's comprehension of atelic verbs. Four- to six-year-old TD and SLI children were tested with an act out version of the truth-value-judgment task. Sixteen scenes acted out by a puppet were presented to each child. In half of the items, telic particle verbs (*aufmachen* 'open', *zumachen* 'close', *abmachen* 'take off', *anmachen* 'turn on') were used The other half of items tested atelic verbs (*fegen* 'sweep', *malen* 'draw', *wischen* 'wipe', *bauen* 'build', *schneiden* 'cut', *bürsten* 'brush', *pusten* 'blow', *puzzeln* 'do a puzzle'). In half of the test trials the event was completed, in the other half the event was acted out without reaching the endstate. After each scene, the child was asked a yes/no question to test whether she accepted (a)telic verb as an accurate description of the presented event. The following example (18) illustrates a typical item testing with a telic verb in the incomplete event condition (Schulz & Wittek, 2003:732).

(18) Experimenter: Guck, hier ist die Tür. Mal sehen, was das Mädchen jetzt macht.
'Look, here is the door. Let us see what the girl does now.'
Act out: Girl closes door halfway
Test question: Hat das Mädchen 'se zugemacht?

Has the girl it ZU-made.PART
'Did the girl close it?'

In the following, only the results of TD children are reported here. In the incomplete event condition with atelic verbs children's performance was at ceiling (100%). Thus, children had no difficulties to accept atelic verbs as descriptions of incomplete events. In addition, children correctly rejected telic verbs for incomplete events in 78% of the cases. The difference between atelic and telic verbs in this condition was not significant. The analysis of individual responses confirmed that four- to six-year-old children interpreted both telic and atelic verbs target-like. Mastery was reached if a child gave at least three out of four correct responses to each of the verb types. All children met this criterion in the incomplete event condition with atelic verbs; the telic verbs in the incomplete event condition were mastered by 80% of children (12 out of 15). The authors concluded from these results that children can interpret telic and atelic verbs adult-like at age four. One question that needs to be explained, however, is why not all children did perform at ceiling in the endstate condition with telic verbs as predicted by the strategy of endstate orientation.

Summarizing, the findings from the comprehension studies on the acquisition of inherent telicity show that telic particle verbs like *aufmachen* 'open' are interpreted correctly even at age two. Four- to six-year-old children correctly reject telic verbs for incomplete events, and mostly correctly accept atelic verbs for events without an endstate. It is still an open question whether there is a stage of overgeneralizing telic interpretation as predicted by the strategy of endstate orientation by Schulz et al. (2001) and Penner et al. (2003).

In the following, studies concerning the question whether children are sensitive to compositional telicity markers are reported (van Hout, 1998); Schulz & Penner, 2002; Schulz & Penner, 2002; Jeschull, 2007; Wagner, 2006). Van Hout (1998) investigated the acquisition of compositional telicity in monolingual English- and Dutch-speaking children aged three to five. Four different sentence types were tested: atelic sentences (cf. Example (19)), atelic sentences with a bare object (cf. Example (20)), weak compositional telic sentences with a quantized object (cf. Example (21)), and strong compositional telic sentences with the resultative particle *up* (cf. Example (22)).

(19) Did the red mouse eat? (van Hout, 1998:402)
(20) Did the red mouse eat cheese? (van Hout, 1998:402)
(21) Did the red mouse eat his cheese? (van Hout, 1998:402)

(22) Did the red mouse eat up his cheese? (van Hout, 1998:402)

The prediction was that children in both languages first interpret transitive sentences with a resultative particle as in (22) target-like, before they acquire the difference between transitive and intransitive verb frames, as well as between bare and quantized objects. As in the studies already reported, a truth-value-judgment task was used. The material consisted of eight stories and sequences of pictures. Each story had two substories with similar characters, but with different outcomes: one character reaches the natural endpoint of her action (telic event type), whereas the other one stops somewhere in the middle of the action so that she does not reach the natural endstate (atelic event type). An example story is presented in (23a) for an atelic event and in (23b) for a telic event (van Hout, 1998:401). After the child heard a story, she was asked one of the questions given in (19) to (22) above about each of the characters.

(23) a. Here's a white mouse. He just found a piece of cheese. Look, here he is eating. He takes a couple of bites, but his cheese is too big for him for now. He leaves a piece for later.

b. And here's a red mouse. He also found a piece of cheese. Look, there he is eating. The red mouse likes his cheese very much. You can see that here: his cheese is all gone.

One of the main findings of this study is that the verbs in combination with the resultative particle *up* were correctly taken as strong telicity markers in about 90% of cases by four- and five-year-old Dutch-speaking children. Three-year-olds, in contrast, interpreted questions with resultative particles half of the time as telic and half of the time as atelic. Three- and four-year-old English-speaking children recognized the resultative particle *up* in only about 60% of cases. At the age of five, however, they interpreted it correctly in 91% of items. Concerning the sentences with quantized objects, which are weak telicity markers, Dutch- and English-speaking children up to the age of five still interpreted them as atelic in about 50% of cases. However, also adults did not exclusively go for a telic reading for this sentence type as well. Dutch-speaking adults preferred a telic reading (78%), and English-speaking adults interpreted sentences with quantized objects in only 25% of cases as telic. Van Hout (1998) suggests that the difference between Dutch-speaking and English-speaking adults is due to the different checking of event-semantic features in syntactic configurations. In particular, a telic feature must be checked in Agreement Object Phrase (AgrOP) via strong object Case.

However, English does not have overt movement to AgrOP, and the telicity is checked at LF. Dutch, in contrast, has overt movement to AgrOP, but it is not obligatory. Consequently, there are two possibilities for on object that does not move out overtly: It can receive a weak Case in its base position, and yield atelicity, or it can move out covertly, get a strong Case, and give telicity. Regarding the performance of the Dutch children, they did not show the adult patterns even at the age of five. According to van Hout (1998), this different performance comes from the fact that they still have to acquire further details of the syntax and semantics of objects to get the adult-like interpretation of compositional telic sentences with a quantized object.

For German, the interpretation of compositional telicity was examined by Schulz & Penner (2002). Like van Hout (1998), the authors expected that four- to six-year-old children interpret strong telicity markers such as resultative particles correctly from early on, whereas weak telicity markers such as quantized objects are acquired later. Like other studies on telicity a truth-value-judgment task was used. Each child saw eight picture sequences depicting different events of eating and drinking. In half of the items the event depicted was completed, while in the other half the event was depicted as not reaching the endpoint. Each child was asked two yes/no questions about each event. The first question used the verb *eat* or *drink* in their atelic meaning. In the second question, the verbs were combined either with a resultative particle *aus* or *auf* 'up' or with a quantized object, which resulted in a telic meaning. Example (24) illustrates a test item in the completed event condition with the three possible questions (Schulz & Penner, 2002:243).

(24) Experimenter: Hier ist eine rote Maus. Sie hat ein Stück Käse auf dem Boden gefunden. Guck, hier isst sie. Schau, sie ist fertig.
'Here is a red mouse. She found a piece of cheese on the floor. Look, here she is eating. See, she's finished it all.'

a. Atelic
Hat die Maus gegessen?
Has the mouse eat.PART
'Did the mouse eat?'

b. Compositional telic with a resultative particle
Hat die Maus aufgegessen?
Has the mouse AUF-eat.PART
'Did the mouse eat up?'

c. Compositional telic with a quantized object
Hat die Maus den Käse gegessen?
Has the mouse the cheese eat.PART
'Did the mouse eat the cheese?'

The target response depended on the depicted event and on the event-type of the predicate (atelic or telic). When asked to match a telic predicate with an incomplete event, the expected correct response was *no*, while in all other cases the target answer was *yes*.

Schulz & Penner (2002) found that all children accepted the resultative particles *auf* and *aus* for completed events only. Children rejected telic verbs with resultative particles in incomplete events in 96% of items. This indicates that four- to six-year-olds correctly recognized these particles as strong compositional telicity markers. Regarding the quantized object as a weak telicity marker the results differ from the expectation. Children interpreted verbs with a quantized object referring to incomplete events in half of the items as telic and in the other half as atelic. The same response pattern was found in an adult control group. The authors suggest that quantized objects as weak telicity markers are ambiguous. They can refer to the object as a whole and yield the telic interpretation, or they can refer to the specific object mentioned previously in the discourse, which lead to an atelic reading. Already four- to six-year-old children have knowledge about this ambiguity. These results are in line with van Hout (1998) findings for Dutch and English.

Jeschull (2007) remarked that the accounts proposed by van Hout (1998) and by Schulz & Penner (2002) did not fully explain why adults treated compositional telicity resulting from adding of a resultative particle and via adding of a quantized object to a transitive simplex verb differently. She proposed a pragmatic account of telicity that was already described in more details in Section 4.1. According to Jeschull (2007), particle verbs entail telicity, whereas transitive simplex verbs with a quantized object conversationally implicate telicity. Jeschull (2007) tested these assumptions with a group of 22 English-speaking adults, and a group of 50 English-speaking children between the ages of three and six. Videos stories followed by questions were used as method. Each story showed two characters involved in parallel events of the same kind such as drinking a coke. One of them reached the endpoint of the action, in this case finished drinking his bottle of coke, while the other one did not. The experimenter then asked the participant one question in one of the two experimental conditions: particle verb or transitive simplex

verb with a quantized object as illustrated in Example (25) and Example (26), respectively.

(25) Who drank his coke up? (Jeschull 2007:181)

(26) Who drank his coke? (Jeschull 2007:181)

Each participant saw eight stories in total; two each involved an eating event, a drinking event, a folding event, and a wrapping event. Four of the questions were presented in the condition with the particle verb and four in the condition with the transitive simplex verb with a quantized object. There were three possible responses depending on the interpretation of the question. The participant could relate a question to the complete event and answered with the character who finished drinking his bottle of coke. She could also relate it to the incomplete event and responded with the character who did not finish drinking. Finally, she could relate the question to the process of drinking or to the mere occurrence of the drinking event regardless of whether the endpoint was reached or not. Crucially, in contrast to the truth-value judgment task used in the studies by van Hout (1998) and Schulz & Penner (2002) reported above, the participants were asked for their preferred interpretation for the particle verbs and the transitive simplex verbs with a quantized object.

The results show that adults clearly differentiated between the particle verbs and the transitive simplex verbs with a quantized object. They interpreted the particle verbs in almost 100% of cases as telic, the transitive simplex verbs with a quantized object in only 50% of cases. These results indicate that they preferred particle verbs to denote completed events. Jeschull (2007) concludes that these findings support her pragmatic account of telicity. Children interpreted the particle verbs more often than the transitive simplex verbs as telic. However, the difference between the two conditions was not significant for any of the age groups. More importantly, the children interpreted the particle verb as telic more often with the increasing age. While the three-year-old children interpreted the particle verbs in only about 30% of cases as telic, the six-year-old children gave about 65% of completion responses on questions with particle verbs. Thus, even the six-year-old children had not performed adult-like yet. Therefore, Jeschull (2007) assumed that the children did not fully know that the telic interpretation is obligatory for the particle verbs. Regarding children's interpretation of the transitive simplex verbs with a quantized object, the three-year-olds gave about 25% of telic responses and the six-year-old children almost 60%. Except the three-year-olds, none of the other age groups performed differently from adults. Jeschull (2007) concluded from

these results that children started to compute conversational implicatures of telicity for transitive simplex verbs with a quantized object at age four.

According to Jeschull (2007), her results are in line with the findings by van Hout (1998) and Schulz & Penner (2002). Adult's performance in these studies was similar to the response pattern found by Jeschull (2007) since all studies reported that adults treated particle verbs and transitive simplex verbs with a quantized object differently from each other. With respect to the children's results, all studies observed the same developmental tendency of telicity since the percentage of telic interpretation increased across the two conditions with age. However, the proportion of telic interpretation was higher in the studies that used a truth-value-judgment task than in the study with a preference task. Jeschull (2007) suggests that this difference may be due to the different designs. Asking a *who*-question as in the study by Jeschull (2007) integrates pragmatic cues and gives the participants the possibility to provide their preferred interpretation of an event. Regardless of whether the question contains a transitive simplex verb with a quantized object (*Who ate his cake?*) or a particle verb (*Who ate his cake up?*) four responses are equally likely for each of these questions: one of the characters, the other one, both or none. Participant's response depends on which question is interpreted as telic. In contrast, in a truth-value-judgment task, the participants have only two possible responses: *true* or *false* depending on whether they interpret the event as completed or incomplete. In a situation in which an event took place, but was not completed, *yes* and *no* are both felicitous responses on a yes/no question with a transitive simplex verb with a quantized object. The answer depends on whether this verb is understood as telic or atelic. Since particle verbs are more informative on a completion interpretation, the simplex transitive verbs may receive an atelic interpretation more often. As there are only two possible responses in a truth-value-judgment task, the probability of a completion interpretation is higher in this design compared to the design with a *who*-question. Therefore, the contrast between the particle verbs and the transitive simplex verbs with a quantized object was more clearly in these studies.

According to Wagner (2006), transitivity is importantly connected to telicity semantics. Although not all transitive structures receive a telic reading, according to her transitivity is a viable structural cue for determining semantic meaning in terms of syntactic bootstrapping. Wagner (2006) argues that transitive structures are easy to find since a child has only to count arguments and identify one as a direct object. Therefore, she investigated whether children used transitivity as a structural cue to interpret telicity in an event-counting task. As was pointed out in Section 4.1, telic predicates allow events

to be counted in terms of their endpoints, whereas atelic predicates require some contextual specification to determine the individual units for counting. In the study, the participants were shown short movies that contained a salient goal. This goal was achieved by two or more actions separated by a spatiotemporal pause. The participants were given a telic or an atelic description of the movie and were asked to count what happened. Four conditions were tested: canonical, all-transitive, all-intransitive, and mass-count structures as shown below. The canonical condition matched a transitive structure to a telic meaning and an intransitive structure to an atelic meaning, cf. Example (27). The all-transitive condition kept the structural cue constant since all structures were transitive, but varied the telicity value, cf. Example (28). In the next condition, all verbs were intransitive, but telic or atelic, cf. Example (29). In the mass-count condition all verbs were transitive but depending on whether the direct object was a count noun or a mass noun, the interpretation was telic or atelic, respectively, cf. Example (30).

(27) Examples for the canonical condition (Wagner, 2006:59)

a. The girl painted a flower. → transitive, telic

b. The girl painted. → intransitive, atelic

(28) Examples for the all-transitive condition (Wagner, 2006:59)

a. The bird popped the balloon. → transitive, telic

b. The bird poked the balloon. → transitive, atelic

(29) Examples for the all-intransitive condition (Wagner, 2006:59)

a. The door closed. → intransitive, telic

b. The door slid. → intransitive, atelic

(30) Examples for the mass-count condition (Wagner, 2006:59)

a. The girl drank a glass of juice. → transitive, telic

b. The girl drank juice. → transitive, atelic

Wagner (2006) predicted that the children performed well in the canonical condition since there was a direct link between transitivity and telicity in this condition: the transitive sentence was telic, and the intransitive one atelic. In contrast, children were expected to give more non-target-like responses in the other three conditions because in these sentences the transitivity cues lead to the incorrect interpretation. Three groups of English-speaking children were tested: two-year-olds, three-year-olds, and five-year-olds. In addition, there was an adult control group. Since the two-year-olds were not tested in the mass-count condition, only the results in the three other conditions are reported below.

The analysis revealed that telic descriptions of the movies led significantly more often to the expected response pattern than the atelic descriptions in children and adults. However, whereas the rate of goal-based individuation for adults was almost 100%, it was about 50% for the three- and five-year-old children. Interestingly, the rate of goal-based individuation for two-year-old children (80%) did not differ from the adults, but they performed significantly differently from the older children. This effect can be explained with a transitivity bias of the two-year-olds. This transitivity bias led to the following response pattern. When the transitivity cue led to the correct response, i.e. when the transitive sentence was telic, the two-year-olds performed better than the older children did. However, when the transitivity bias led to a non-target-like answer, the two-year-olds performed significantly worse than the tree- and five-year-olds. In cases in which an intransitive description was presented to the participants, the two-year-old children and the three- and five-year-old children showed a spatiotemporal bias, i.e. they interpreted sentences in this condition more often as atelic.

Taking together, the results of Wagner's study (2006) indicate that already two-year-old children use the transitivity of a description to choose their individuation strategy and demonstrate that they already have some knowledge about marking telicity. Moreover, Wagner (2006) concluded that children initially use the transitivity as a structural cue to telicity semantics, and that the usage of this strategy wanes with age. In addition, the results suggest that telicity is not fully acquired at the age of five since children at this age showed non-target-like interpretations as well. However, the errors of the older children were conformed to a spatiotemporal bias, which occurred when the presented descriptions were intransitive.

The studies on compositional telicity reported above indicate that the knowledge that transitivity can signal telicity is available already to two-year-old children. However, all these studies used real lexical verbs that were familiar to the children. Thus, in a subsequent study Wagner (2010) used nonsense verbs to ensure that children's performance reflects links they may have made between the structure itself and telicity. A group of three-year-old children was tested with a match-to-sample task. The task worked as follows. First, a child watched a movie described with a transitive or an intransitive sentence with a nonsense verb. The movie depicted a distinctive goal such as arriving at an X achieved by a distinctive process such as hopping. Next, the child was presented with two so-called match movies in sequence. The process match movie showed the same action, but used to achieve a different result (e.g., departing from X). The result match movie showed the same result achieved by a different process (e.g.,

cartwheeling). The participants were asked to make their judgment about whether each of the match movies depicted the same think as the movie watched first. Wagner (2010) predicted that children should generalize a verb in a transitive structure to the result match movie and the intransitive structure to the process match movie if they were able to link transitivity and telicity. The three-year-olds accepted the process match movies more often when the first movie was described with an intransitive sentence than with a transitive sentence (37% vs. 19%), whereas they accepted the result match movies more frequently with the transitive sentences than with the intransitive sentence (34% vs. 21%). Wagner (2010) concludes from these data that the individual structures of transitive and intransitive sentences led children to focus on different dimensions of these events. Note, however, that there was a high rate of rejection for both match movies (72%). Therefore, the two-year-old children were tested with a different method: the inter-modal preferential looking task. As the three-year-olds, the children watched a movie described with a transitive or an intransitive sentence using a nonsense verb. At test, the children chose between a result match movie and a process match movie. Unlike in the study with the three-year-old children, the two match movies were presented simultaneously side by side, and the dependent measure was the time children spend looking at the movies. The analysis revealed that the two-year-olds looked longer to the result match movie if the described sentence in the first movie was transitive, and to the process match movie if the described sentence was intransitive. This suggests that two-year-old children can correctly form a link between transitivity and telicity even if the presented sentences contain a nonsense verb. In sum, the studies by Wagner (2006, 2010) indicate that children as young as two years can link transitivity and telicity.

Taken together, the studies on compositional telicity reveal that strong telicity markers were accepted for completed events starting at the age of four. Weak telicity markers such as quantized objects seem to be ambiguous. Children accepted sentences with quantized objects for completed and incomplete events as well. This response pattern was also found in adults. However, even at the age of six, children differed from adults in their rate of telic interpretation. Thus, it can be assumed that children at age six do not have a fully target-like interpretation of telicity. In addition, it was shown that children as young as two years can link transitivity and telicity, and initially use the transitivity as a structural cue to telicity semantics. However, the usage of this strategy wanes with age.

To sum up, the comprehension studies on telicity show that monolingual children distinguish between telic and atelic verbs very early. Consequently, children interpret

inherently telic verbs target-like from early on. Compositional telicity is mastered later, and children do not show an adult-like interpretation even at age six depending on the telicity marker and the given context.

4.2.2. eL2 acquisition of telicity

To date only few studies have examined the interpretation of telicity in eL2 learners of German (Penner, 2003; Schulz & Ose 2007; Schulze, 2012). Moreover, previous research only focused on the interpretation of inherent telicity.

Penner (2003) reported that typically developing eL2 children up to age seven performed at chance in the incomplete event condition with inherently telic verbs. The percentage of correct rejections in this condition increased to 81% at age eight. However, months of exposure to German were not considered in his study, and the exact design used was not reported.

The interpretation of inherent telicity in eL2-lerners of German was investigated in a more detailed way by Schulz & Ose (2007). The goal of the study was to find out whether eL2 children use the endstate orientation strategy in the acquisition of telicity as it was proposed for monolingual children in Schulz et al. (2001) and Penner et al. (2003). The eL2 children tested were between three- and five-years-old (mean age: 4;7). They started to acquire German between age two and three and their length of exposure to German ranged between seven and 39 months (mean: 19 months). Their performance was compared to the results of the typically developing children from Penner et al. (2003), which were reported in Section 4.2.1. The design was the same as in Schulz et al. (2001) and Penner et al. (2003). Children's interpretation of the particle verb *aufmachen* 'open' was investigated with a truth-value-judgment task consisting of eight items, each accompanied by a sequence of two picture. Four of the depicted events were completed and the other four were incomplete.

The eL2 children performed at ceiling in the completed event condition. Looking at the incomplete event condition, the three- to five-year-old eL2 children rejected the telic verb *aufmachen* as a group in 65% of cases. This performance was not significantly different from the two-year-old monolingual children but differed significantly from the rejection rate of the three-year-old monolinguals. An analysis of individual responses revealed that eL2 learners performed better with increasing age, and eight out of 17 children gave only target-like responses. In sum, this study shows that eL2 children acquire telicity like monolingual children and are sensitive to the telic meaning of particle

verbs like *aufmachen* in German. Nevertheless, the age range of the 17 eL2 learners was quite large in this study. Consequently, it remains open at what age eL2 children master the interpretation of telicity in the incomplete event condition.

In a pilot study, Schulze (2012) investigated the interpretation of telicity, wh-questions, and sentential negation in eL2 learners of German in a longitudinal design. The data were collected in the MILA-project that is described in Section 3.2. A subgroup of the MILA participants (47 monolingual children and 35 eL2 learners) was included in her analysis. The eL2 children started to acquire German around the age of three. All children were typically developing. The participants were tested in three test rounds. The mean age at the first test round was 3;7 for monolingual children and for eL2 children, at the second test round 4;2, and at the third test round 4;6. The standardized test LiSe-DaZ (Schulz & Tracy, 2011) was administered to the children. As in the studies reported above also here a truth-value-judgment task was used to examine children's interpretation of telic and atelic verbs. A total of 12 test items were presented to each child. The items varied regarding the verb type (6 x telic, 6 x atelic). In the sentences with telic verbs the correct response was *yes* in the completed event condition, and *no* in the incomplete event condition. The method is described in detail in Section 4.3.3.

In the following only the results for telicity are presented. For the results on wh-questions and negation see Section 5.2.2 and Section 6.2.2, respectively. The monolingual children performed significantly better than the eL2 children at age 3;7. However, the variance of performance at the first test round is larger in the eL2 group than in the monolingual group. This indicates that the individual percentage of correct responses in the eL2 group is more variable than in the monolingual group. Concerning the developmental path towards target-like interpretation of telicity, the rate of change of the eL2 learners was significantly greater than that of the monolingual children. This means that eL2 children's performance was getting better to a higher extent during the three test rounds than monolingual children's performance. Note however that the monolingual children already performed almost at ceiling at the first test round (92%). Looking at the results at the age of 4;6, the difference between the percentage of correct responses of the monolingual group differed significantly from the percentage of correct responses of the eL2 group (98% vs. 86%). This indicates that the eL2 children still did not catch up with their monolingual peers although their percentage of correct responses increased by almost 20% over one year.

Although Schulze (2012) investigated longitudinal data of a large group of eL2 children, her study has some limitations. The used subtest from LiSe-DaZ (Schulz & Tracy,

2011) tested telic and atelic verbs in two conditions: completed event and incomplete event. However, Schulze (2012) did not analyze these conditions separately. This makes it difficult to explain why four-year-old eL2 children still did not show a target-like interpretation of telicity.

Taking together, previous research on telicity in eL2 learners indicates that even after about 20 months of exposure to German eL2 children still have some difficulties in the interpretation of telic verb meanings. When confronted with telic verbs describing incomplete events, most children did not show target-like comprehension. Thus, two questions remain open: first, when do eL2 learners of German catch up with monolingual German-speaking children, and second, how do eL2 learners acquire different types of telic and atelic structures.

4.3. Telicity task

This section reports the findings from the telicity task. It is organized as follows. In Section 4.3.1 research hypotheses are formulated. Section 4.3.2 gives an overview of the participants, and Section 4.3.3 describes the telicity task from LiSe-DaZ (Schulz & Tracy, 2011). Section 4.3.4 presents the results on comprehension of telicity in monolingual and eL2 children regarding pace of acquisition, impact of external factors, and individual developmental patterns.

4.3.1. Research hypotheses

In this section, the research hypotheses formulated in Section 3.1 are specified with respect to telicity. Let us focus first on the hypotheses related to the pace of acquisition. As was pointed out in Section 3.1, it is expected that the eL2 children generally perform significantly worse than the monolingual children at the first test round. This holds for the interpretation of telic and atelic verbs since the eL2 children have had less exposure to German than the monolingual group. In addition, previous research on the eL2 acquisition of telicity (Schulz & Ose, 2007; Schulze, 2012) indicates that the eL2 learners perform poorer than the monolingual children at the age of three. Looking at the eL2 children's development over time, based on the study by Schulze (2012), it can be predicted that eL2 children show a greater rate of change than the monolingual children. Therefore, the following hypotheses are formulated:

(H1.1) eL2 children interpret telic and atelic verbs significantly poorer at the first test round than monolingual children do.

(H1.2) eL2 children show a significantly greater rate of change regarding the target-like interpretation of telic and atelic verbs than monolingual children do.

An additional goal of this study is to investigate the role of external factors (gender, the non-verbal intelligence, mother's educational background, and father's educational background) for children's language performance. For children up to age two no significant effects of gender were reported (Grimm & Aktas, 2001; Glück, 2007). No effects of mother's educational background on the monolingual and eL2 children's interpretation of telicity were found for LiSe-DaZ (Schulz & Tracy, 2011). Regarding the non-verbal IQ, no significant correlation between monolingual children's language performance and their non-verbal intelligence was reported in LiSe-DaZ (Schulz & Tracy, 2011). For eL2 learners, however, a weak correlation was found. According to Schulze (2012), non-verbal IQ can only partially explain eL2 children's language performance. More importantly, telicity belongs to the group of phenomena that are acquired early in monolingual German-speaking children (see Section 2.2). Thus, the following hypotheses are formulated:

(H2.1) External factors do not affect the eL2 and the monolingual children's interpretation of telic and atelic verbs at the first test round.
(H2.2) External factors do not affect the rate of change towards target-like interpretation of telic and atelic verbs of monolingual and eL2 children.

The only study that investigated the interpretation of telic verb *aufmachen* 'open' in eL2 children (Schulz & Ose, 2007) indicates that they acquire telicity as their monolingual peers. Moreover, Schulz & Ose (2007) show that the eL2 children correctly rejected 'open' in the incomplete event condition more frequently with increasing age. Thus, the hypotheses regarding the children's individual developmental paths towards the target-like comprehension of telic and atelic verbs are as follows:

(H3.1) eL2 children correctly reject telic verbs in the incomplete event condition at least at age five.
(H3.2) eL2 children correctly accept atelic verbs in the incomplete event condition at least at age five.

4.3.2. Participants

To investigate the children's pace of acquisition the data of the whole monolingual group (n=45), and the whole eL2 group (n=29) were analyzed. For a detailed description of both groups see Section 3.4. The analysis of the individual responses was performed only with

the eL2 children since the monolingual group performed at ceiling already at age 3;7. Only eL2 children whose data were complete across the four test rounds were included in this analysis. 24 eL2 learners met this criterion. Their age and their length of exposure to German across the four test rounds are summarized in Table 4.1.

Table 4.1. Description of the eL2 children (n=24) analyzed individually regarding comprehension of telicity.

	T1	**T2**	**T3**	**T4**
Age range	3;4 – 4;1	4;0 – 4;4	4;4 – 4;9	5;4 – 6;3
Mean age	3;7	4;2	4;7	5;8
SD in months	2.2	1.6	1.7	2.4
Exposure to German in months	5 – 19	10 – 27	16 – 32	29 – 45
Mean exposure to German in months	10	16	21	34
SD in months	3.9	4.4	4.2	4.5

4.3.3. Task

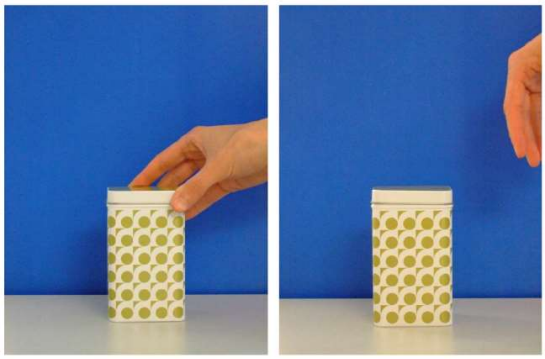
The comprehension of telic and atelic verbs is tested in LiSe-DaZ (Schulz & Tracy, 2011) using a truth-value-judgment task. The experimenter shows the child a sequence of two pictures depicting an action. The second picture depicts the outcome of this action. While the child is looking at the second picture, a hand puppet asks a yes/no question about the action like *Did she open it?*

Twelve test items were presented to each child. The items varied in the verb type; half of items contained a telic verb, the other half an atelic verb. In the items with telic verbs, the action shown was completed [+ endstate] in three of the items and incomplete [- endstate] in the other tree items. The correct response was *yes* if the depicted action reached an endstate, and *no* if the action was without an endstate. The examples for items with telic verbs are given in (31) for [+ endstate] and in (32) for [- endstate].

(31) Example item with a telic verb [+ endstate] (Item 1, *Verb meaning*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Diese Frau hatte eine Dose. Guck, da ist ihre Hand und hier ist die Dose. Und dann…*
'This woman had a box. Look, here is her hand and here is the box. And then…'
Hand puppet: *Hat sie aufgemacht?*
,Did she open it?'
Child: *Ja.*
,Yes.'

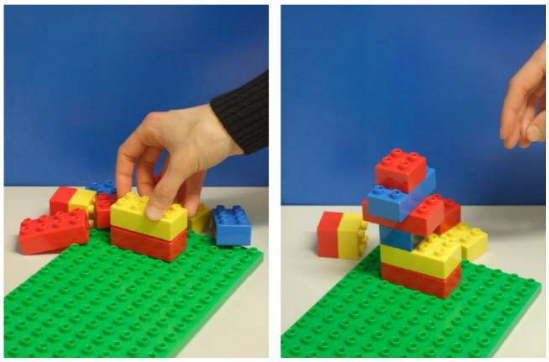
(32) Example item with a telic verb [- endstate] (Item 12, *Verb meaning*, LiSe-DaZ (Schulz & Tracy, 2011))



Experimenter: *Diese Frau wollte mit dem Kind Lego spielen. Guck, da ist ihre Hand und hier ist die Schachtel mit den Legos. Und dann…*
'This woman wanted to play Lego with the child. Look, here is her hand and here is the box with legos. And then…'
Hand puppet: *Hat sie aufgemacht?*
,Did she open it?'
Child: *Nein.*
,No.'

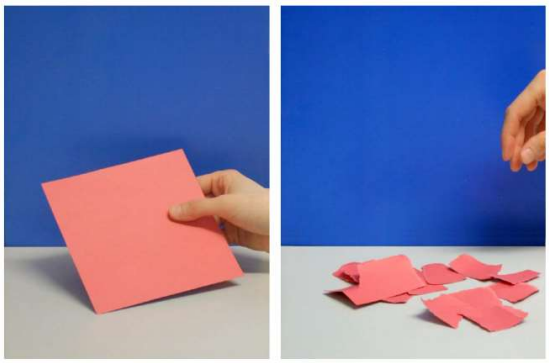
Concerning the items with atelic verbs, in the half of items the action was incomplete [-endstate], cf. Example (33). In the other three items, the action depicted on the picture was different from the action in question [different action], cf. Example (34). The target-like response was *yes* if the process that the hand puppet asked about was depicted on the picture. *No* was the correct response if a different action was depicted on the second picture than the action in question.

(33) Example item with an atelic verb [- endstate] (Item 11, *Verb meaning*, LiSe-DaZ (Schulz & Tracy, 2011))



Experimenter: *Diese Frau hatte viele bunte Legos. Guck, da ist ihre Hand und hier sind die Bausteine. Und dann…*
'This woman had many Lego bricks. Look, here is her hand and here are the Lego bricks. And then… '
Hand puppet: *Hat sie gebaut?*
,Did she build?'
Child: *Ja.*
,Yes.'

(34) Example item with an atelic verb [different action] (Item 2, *Verb meaning*, LiSe-DaZ (Schulz & Tracy, 2011))



Experimenter: Diese Frau hatte ein Blatt Papier. Guck, da ist ihre Hand und hier ist das Blatt Papier. Und dann…
'This woman had a sheet of paper. Look, here is her hand and here is the sheet. And then… '

Hand puppet: Hat sie gemalt?
,Did she paint?'

Child: Nein.
,No.'

For the analysis, it is crucial how children react if the action was incomplete. Therefore, the items with [- endstate] are referred to as test items, cf. Example (32) and Example (33). The items with telic verb [+ endstate] and the items with atelic verb [different action] are called control items, cf. Example (31) and Example (34).

4.3.4. Results

The following section describes the results regarding children's interpretation of telic and atelic verbs. Section 4.3.4.1 presents the results with respect to the pace of acquisition. In Section 4.3.4.2, the role of the external factors is examined. In Section 4.3.4.3 the individual developmental patterns of the eL2 learners toward the target-like interpretation of telic and atelic verbs are investigated.

4.3.4.1. Pace of acquisition

Figure 4.1 illustrates the proportion of correct responses across all items for the monolingual group across the four test rounds and for the eL2 group across the five test rounds. The monolingual children performed almost at ceiling already at age 3;7. Their performance was above chance at each test round ($p<.000$ for each test round, T-test). The eL2 children responded correctly in 66% of the cases at age 3;7. Their performance improved within one year by about 20%. At age 5;8, the eL2 children gave in 96% of the cases correct responses, and performed like the monolingual children at age 3;7. Their performance was above chance at each test round ($p<.000$ for each test round, T-test).

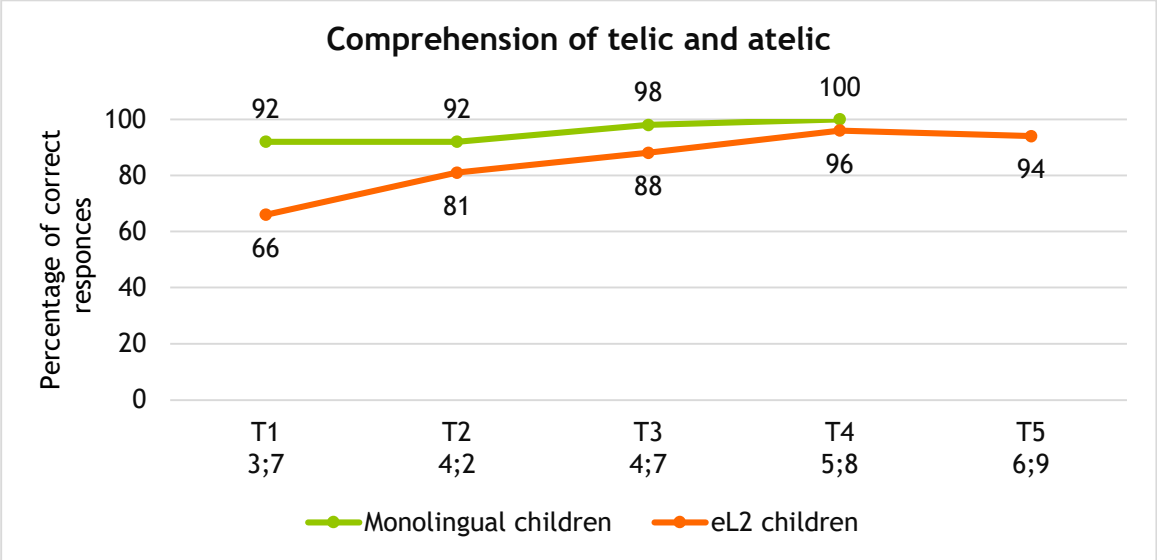


Figure 4.1. Proportion of correct responses in the monolingual and the eL2 group for comprehension of telic and atelic verbs (12 items).

This data description does not indicate how the group improvement comes about. It is possible that all participants improve over time. However, it can be taken into consideration that only a subgroup of participants improves their performance whereas the performance of other participants declines or does not change at all. Based on these considerations, spaghetti plots were plotted for each group separately. They depict individual developmental path of each child across all test rounds. The results are depicted in Figure 4.2 for the monolingual children and in Figure 4.3 for the eL2 children.

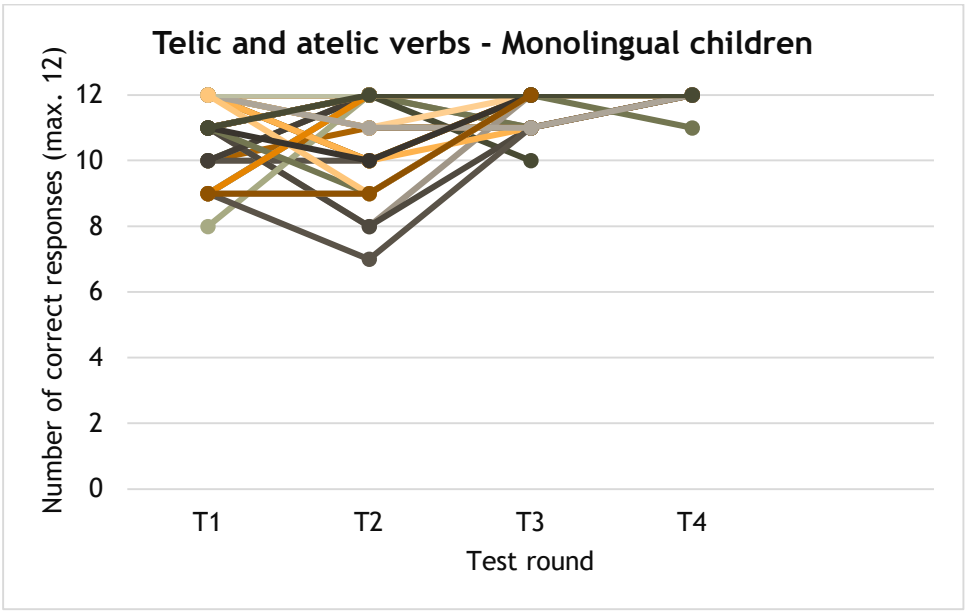


Figure 4.2. Individual development of the monolingual children in comprehension of telic and atelic verbs (12 items).

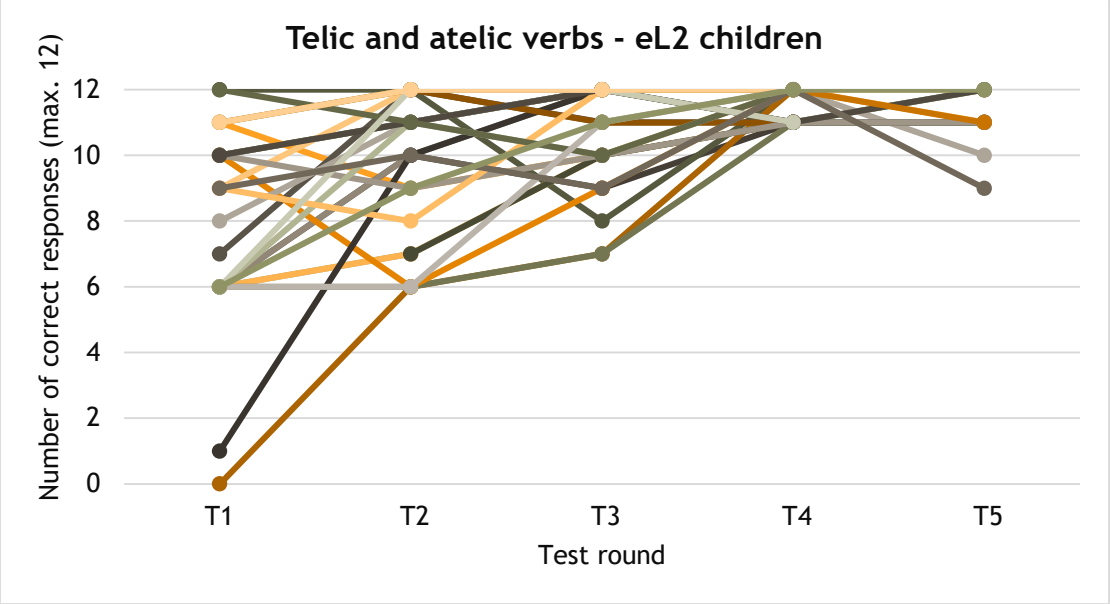


Figure 4.3. Individual development of the eL2 children in comprehension of telic and atelic verbs (12 items).

At the first test round, the spaghetti plots are more homogeneous for the monolingual children than for the eL2 children. Whereas the monolingual children responded to eight or more test items correctly, the majority of the eL2 children answered about six items correctly. On the one hand, there were also eL2 children who gave eight or more correct responses like the monolingual children. On the other hand, two eL2 children performed very poor responding to none or to only one item target-like. Moreover, these plots reveal that the starting point of the participants and their slopes differ. While some children showed a shallow slope, other children showed a steep one. Despite these interindividual differences between children's performance at the first test round and their slope, it can be concluded that on average all participants improved over time.

Children's pace of acquisition regarding telicity was analyzed with a mixed linear model since as pointed out in Section 3.5 this statistical method considers interindividual differences between the participants. First, the fixed effects are presented. Table 4.2 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for the comprehension of telic and atelic verbs.

Table 4.2. Fixed effects for comprehension of telic and atelic verbs.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	10.2356	0.2888	99	35.44	<.0001
Group	-2.7814	0.4260	76.4	-6.53	<.0001
Age	0.1566	0.02343	201	6.68	<.0001
Age*Age[1]	-0.00360	0.000637	191	-5.65	<.0001
Group*Age[2]	0.08961	0.01757	120	5.10	<.0001

[1] Quadratic effect of age

[2] Interaction between acquisition type and age

Regarding the intercept, all children responded on average to 10 out of 12 items correctly. The estimated difference in intercept between the monolingual children and the eL2 children was -2.7814 ($p<.0001$). This indicates that the eL2 children performed significantly poorer than the monolingual children at the first test round. The analysis also revealed a significant effect of age, i.e. that children's performance improved over time. In addition, the effect of age was not only linear but also quadratic. The estimated difference in the rate of change between the monolingual children and the eL2 children was 0.08961 ($p<.0001$). This indicates that the slope of the eL2 children was steeper than the slope of the monolingual children. From these results, it can be concluded that although the eL2 children initially performed significantly worse than the monolingual children, their performance improved significantly more with increasing age than that of the monolingual children did. However, the shallower slope of the monolingual children was almost certainly due to the ceiling performance already at the first test round.

Regarding the random effects, Table 4.3 summarizes the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of the individual intercept was significant. This significant variance between the participants can be explained by the group differences. The effect of random slope was not significant, what suggests that all children improved their performance over time. However, the covariance between the random intercept and the random slope was negative. This indicates that the children who had a high intercept showed a shallower slope than the children with a lower intercept.

Table 4.3. Random effects for comprehension of telic and atelic verbs.

Covariance parameter	**Estimate**	**Standard error**	***z* value**	***p* value**
Random intercept	1.9288	0.5277	3.66	0.0001
Covariance between random intercept and random slope	-0.05140	0.01821	-2.82	0.0048
Random slope	0.001083	0.000694	1.56	0.0593
Residual	1.4461	0.1479	9.78	<.0001

In sum, the analyses show that although the eL2 children performed significantly poorer than the monolingual children at the first test round, they had a significantly greater rate of change over time than the monolingual children had. Moreover, eL2 children performed like their monolingual peers in the comprehension of telicity after about two years of exposure to German at the age of five. This suggests that regarding telicity the eL2 children had a very fast pace of acquisition.

4.3.4.2. The role of external factors

In the following, the results are presented with respect to the role of the external factors on monolingual and eL2 children's interpretation of telicity. First, it was investigated whether each factor (gender, mother's educational background, father's educational background, and the non-verbal intelligence) separately influenced children's performance at the first test round. The analyses revealed that the external factors did not affect children's intercept of the comprehension of telic and atelic verbs. Since no significant effects were found for the first test round, the impact of the external factors on the rate of change could not be considered.

4.3.4.3. Comparing telic and atelic verbs

This subsection compares eL2 children's performance on telic and atelic verbs. Figure 4.4 depicts the mean percentage of correct responses for the eL2 learners across the four test rounds in the control items. In control items with telic verbs, the action was completed, and the response was *yes*. In the control items with atelic verbs, the action depicted on the picture was different from the action in question, thus children have to reject the atelic verb.

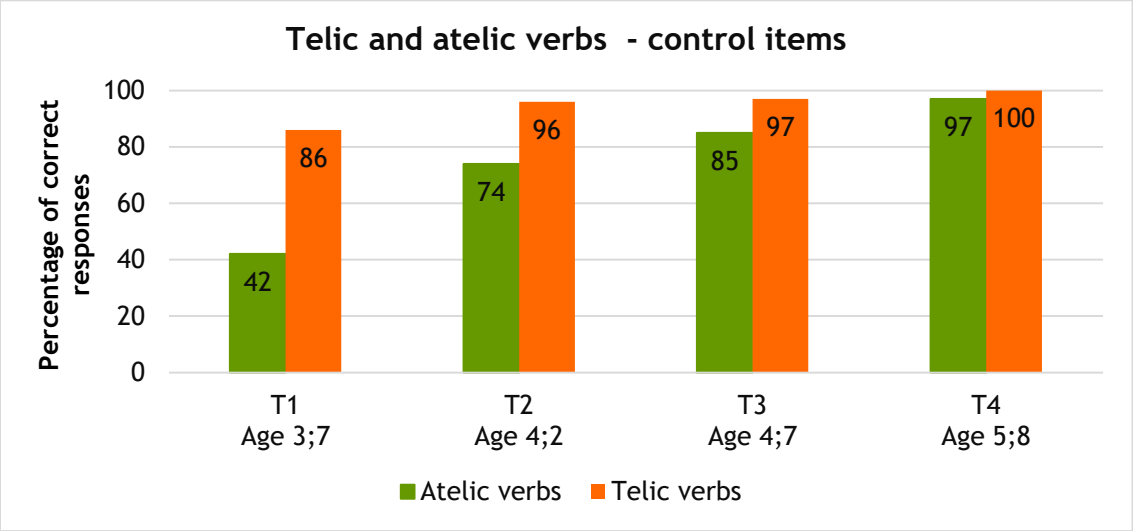


Figure 4.4. Mean percentage of correct responses for the eL2 children across four test rounds for the control items (6 items).

As can be seen, the eL2 children's performance on the telic verbs in control items was almost at ceiling already at age 3;7. Their performance on control items with telic verbs was above chance at each test round (p.<001, T-test). Interestingly, the percentage of correct responses on the controls with atelic verbs was very poor at age 3;7. This performance did not differ from change (p=.341, T-test). The performance however improved very fast, and reached 74% at age 4;2, 85% at age 4;7, and 97% at age 5;8. These results significantly differed from change (p<.05 for T2, p<.001 for T3 and T4, T-test). This indicates that the eL2 children accept telic verbs if the described event is complete already at age 3;7. However, they have some difficulties to reject the atelic verb if the presented action is different from its description.

Figure 4.5 shows the mean percentages of correct responses for the eL2 learners across the four test rounds in the incomplete event condition (test items). While telic verbs required *no* as a response for the question, atelic verbs should have been accepted in this condition. eL2 children's comprehension on atelic verbs was almost at ceiling across the four test rounds. This performance significantly differed from change at each test round (p<.000 for each test round, T-test). In contrast, their performance on telic verbs improved with age; whereas the three-year-old eL2 children rejected the telic verbs in only 47% of cases when the event was incomplete, the four-year-olds did it in 81% of the cases, and the five-year-olds in 93% of the cases. The performance at T1 and T1 was not different from change (p=.770 at T1, p=.201 at T2, T-test). At T3 and T4, the comprehension of telic verb in incomplete event condition differed from change (p<.000 for T3 and T4, T-test).

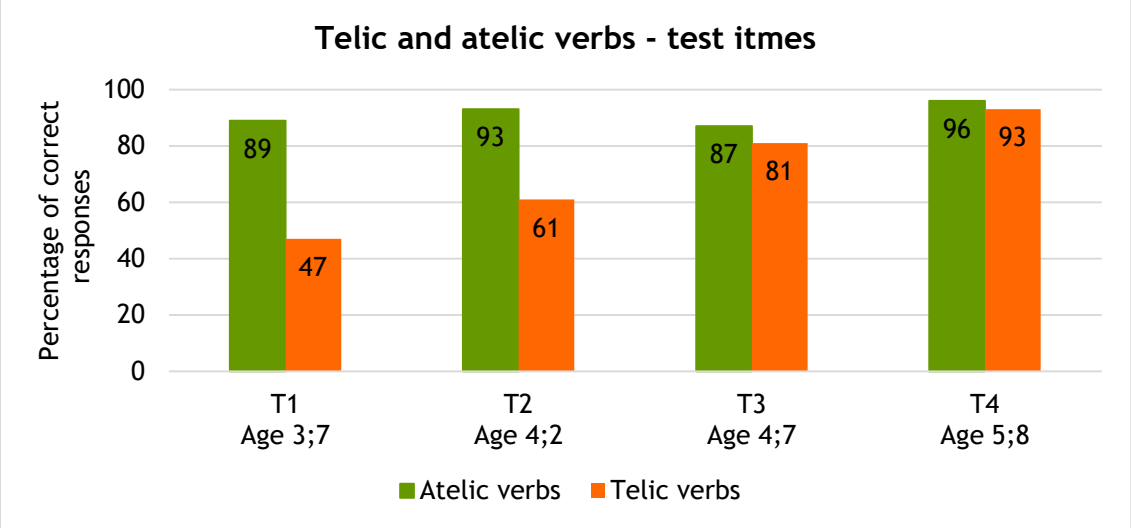


Figure 4.5. Mean percentages of correct responses for eL2 children across four test rounds in the incomplete event condition (test items).

An ANOVA was performed with condition and test round as the within subject factors. The analysis revealed a significant main effect of condition ($F(3)=17.05$, $p=.001$) and of test round ($F(3)=14.84$, $p=.001$). The interaction of condition and test round was significant as well ($F(9)=5.46$, $p=.001$). Post hoc comparisons of means were employed to examine possible differences between the condition and the test rounds.

The pairwise comparisons revealed that the eL2 children did not perform significantly better on atelic verbs than on telic verbs at age 4;7 and at age 5;8 in the incomplete event condition. No significant differences were found between the eL2 learner's performance on atelic verbs across the four test rounds. However, the performance on telic verbs improved significantly with age; the eL2 children rejected the telic verbs significantly more often at age 4;2 than at age 3;7 ($p=.002$), and at age 5;8 than at age 3;7 ($p=.049$).

In a next step, the analysis of the individual response patterns in the incomplete event condition across the four test rounds was performed for telic and atelic verbs, respectively. Mastery was defined as performance above chance. Based on binominal distribution, a child was considered to have mastered the comprehension of atelic and telic verbs, respectively in the incomplete event condition if she responded correctly to all three test items. Table 4.4 gives an overview of the number of eL2 children who mastered the interpretation of telic and atelic verbs across the four test rounds.

Table 4.4. Mastery (✓) and non-mastery (-) in interpretation of atelic and telic verbs in the incomplete event condition for the 24 eL2 children across four test rounds.

Age	T1 3;7	T2 4;2	T3 4;7	T4 5;8
(✓) Atelic (✓) Telic	7	9	12	20
(✓) Atelic (-) Telic	14	11	8	4
(-) Atelic (✓) Telic	1	1	4	0
(-) Atelic (-) Telic	2	3	0	0

Seven out of 24 eL2 children (35%) mastered telicity already at age 3;7. The number of children who reached mastery in comprehension of telic and atelic verbs increased with age. At age 5;8, 20 out of 24 children (83%) interpreted these verbs target-like. Only two eL2 children at age 3;7 (8%), and three children at age 4;2 (12%) did not reach mastery in the comprehension of any verb type. The individual developmental pattern in telicity for each eL2 child across the four test rounds is summarized in Table B.1 in Appendix.

Across all ages, there were more children, who only reached mastery in the comprehension of atelic verbs than in the comprehension of telic verbs suggesting that children acquire atelic verbs first. However, a more detailed look at response pattern of 14 children mastering atelic verbs at first test round revealed that nine of them showed a general yes-bias, answering with *yes* to all items of the task. Such a response pattern has been argued to occur if a child is not able to perform at task (Siegal 1997). Thus, it cannot be assumed that they mastered the atelic verbs at age 3;7. The other five out of the 14 eL2 children rejected telic verbs correctly in two out of three items in the incomplete event condition, and thus did not meet the mastery criterion. In the second test round, 4 out of these 14 children interpreted telic verbs in the incomplete event condition target-like. The other 10 children either showed a yes-bias again or missed the mastery criterion answering to two out of three items correctly. At age 4;7, 10 of them correctly rejected telic verbs in the incomplete event condition.

The analysis of individual responses indicates that the eL2 children have difficulties with interpretation of telicity at age 3;7. However, their performance improved over time. One year later, half of the eL2 children mastered the comprehension of telicity, and at age 5;8 almost all eL2 learners performed target-like in that task.

4.4. Discussion

This substudy investigated interpretation of telic and atelic verbs in monolingual and in eL2 children. Regarding the pace of acquisition of telic and atelic verbs it was found that the three-year-old eL2 learners of German performed significantly worse than their monolingual peers at the age of three (T1), confirming hypothesis (H1.1). eL2 children had a significantly greater rate of change than the monolingual children, what confirms hypothesis (H1.2). The eL2 learners performed at age 4;7 very similar to monolingual children at age 3;7, and they needed only about 21 months of exposure to German to interpret telic and atelic verbs target-like. This indicates that the eL2 learners acquired interpretation of telic and atelic verbs later than the monolingual children, but faster than they. Note, however, that the monolingual children performed almost at ceiling already at the age of three. These findings corroborate the results reported by Schulze (2012).

The next goal of this study was to investigate the role of the external factors for children's language performance. The results indicate that gender, mother's educational background, father's educational background, and non-verbal IQ did not influence children's performance at first test round, confirming hypothesis H2.1. Since no effects for the intercepts were found, the hypothesis H2.2 formulating for the role of the external factors on the rate of change was not tested. These results are in line with the findings from LiSe-DaZ (Schulz & Tracy 2011), where no correlations between children's language performance and their mother's educational background were reported. Regarding the non-verbal intelligence, the results of this study differ from the previous findings. A weak correlation between the non-verbal IQ and the eL2 children's interpretation of telic and atelic verbs was found in LiSe-DaZ. Schulze (2012) also found that non-verbal IQ partially predicted eL2 children's language performance. However, the results of the eL2 learners in the present study speak against such a correlation between the acquisition of telicity and non-verbal IQ.

Finally, the results concerning the comparison between the interpretation of telic and atelic verbs and eL2 children's individual developmental paths are discussed. The analysis revealed that majority of the eL2 children correctly accepted telic verbs for completed event at age 3;7. They also performed target-like on atelic verbs in the incomplete event condition at this age. Regarding the interpretation of telic verbs in the incomplete event condition, eL2 learners rejected them only in 47% of cases at age 3;7. Their performance improved with age, and eL2 children rejected them in 93% of cases at

age 5;8. Thus, Hypothesis 3.1 and Hypothesis 3.2 that predicted target-like interpretation of telic and atelic verbs, respectively in the incomplete event condition at least at age five can be confirmed.

These findings are only partially in line with the results of previous studies with eL2 children. Penner (2003) reported that eL2 children performed at chance in the incomplete event condition with inherently telic verbs even at age six. This finding was not corroborated by this study. The findings from this study are however in line with the results of Schulz & Ose (2007), who investigated the interpretation of telic verbs only. The three- to six-year old eL2 children in their study also interpreted telic verbs target-like in the complete event condition. Moreover, their analysis of individual responses revealed that the performance of eL2 children improved with age, and that about the half of them gave only target-like responses.

In addition, many parallels between the eL2 children's performance and the performance of the monolingual children from Schulz, Wymann & Penner (2001) and Schulz & Wittek (2003) can be found. As the monolingual children, the eL2 children accepted telic verbs in the completed event condition from early on. Moreover, both groups performed target-like in the incomplete event condition from early on if the presented sentences occurred with an atelic verb. Regarding the rejection of telic verbs in the incomplete event condition, the four-year-old eL2 learners from this study performed comparable to the four- to six-year-old monolingual children from Schulz, Wymann & Penner (2001) and Schulz & Wittek (2003). The only difference between the performance of the eL2 children and the monolingual children was found in the comprehension of atelic verbs if the depicted action differed from the action in question. Whereas four- to six-year-old monolingual children performed at ceiling in this condition, the three-year old eL2 learners gave only 42% of correct responses and the four-year old children 74%. This result indicates that in contrast to the monolingual children, the eL2 children had difficulties to reject the sentences presented in this condition. A closer look at the performance pattern revealed that one-third out of the 24 eL2 learners consistently responded with *yes* to all items in the task. Such a response pattern reflects a yes-bias which has been argued to occur if a child is not able to perform a task (Siegal 1997). In a truth-value-judgment task, the child must match a specific reading of a sentence to a presented picture. Thus, the child needs to understand the sentence to be able to evaluate whether the sentence correctly describes the picture. This seems to be too demanding for the three-year-old eL2 learners with only about ten months of exposure to German. These difficulties can also be due to lack of vocabulary knowledge. However,

with increasing age and consequently more exposure to German and larger lexicon, the eL2 children were able to perform target-like on the truth-value-judgment task.

Taking together, the results of this substudy indicate that comprehension of telic and atelic verbs belongs to phenomena, which are acquired early in eL2 children. This early acquisition of telicity was expected since also monolingual children develop target-like comprehension of inherent telicity already around the age of three. This is generally in line with Tsimpli's assumptions (2014) about acquisition pace. Note, however, that Tsimpli (2014) concerned only core syntactical structures, and telicity is a semantic phenomenon.

Since different results were reported for the interpretation of compositional telicity in monolingual children depending on the method used, future studies on inherent telicity should also employ different methods with the same children to examine whether the method affects children's performance. Additionally, further research is needed to explore how eL2 children acquire the compositional telicity in German and whether they also distinguish between the strong telicity markers such as resultative particles and weak telicity markers such as quantized objects.

5. Acquisition of wh-questions

Chapter 5 investigates the comprehension of wh-questions in eL2 and monolingual acquisition. It is organized as follows. In Section 5.1 the structure of wh-question in German is presented. Section 5.2 gives an overview of wh-questions acquisition in monolingual and eL2 children. Section 5.2.1 reviews the previous research on the production and the comprehension of the wh-questions in monolingual acquisition, and section 5.2.2 concentrates on the production and the comprehension of wh-question in eL2 acquisition. Section 5.3 describes the present substudy. Section 5.3.1 presents the acquisitional hypotheses. In Section 5.3.2, the participants are described. Section 5.3.3 gives an overview of the task and Section 5.3.4 of data analysis. The results regarding children's pace of acquisition and the impact of the external factors are reported in Section 5.3.5. In Section 5.4 the results are discussed.

5.1. Structure of wh-questions

Unlike assertions such as 'Lise is feeding the dog', that express one proposition, questions express several alternative propositions. Yes/no questions like 'Is Lise feeding the dog?' are compatible with a situation in which Lise is feeding the dog and in which Lise is not as well, and require *yes* or *no* as answer, depending on the situation. Wh-questions like 'Who is Lise feeding?' require as response an exhaustive list of individuals for which counts that Lise is feeding them, for example {squirrel, rabbit, duck}. In some cases, the exhaustive list consists of only one individual like {squirrel}; the response in these cases is called Singleton (cf. Schulz & Roeper, 2011). This section focuses on wh-questions that contain only one wh-pronoun and require a singleton-answer.

Rizzi (1996) formulated a well-formedness constrain on questions formation, the so called Wh-Criterion. According to it, there is an adjacency requirement between the wh-operator and the verb. More precisely, a wh-operator must be in a specifier-head configuration with a head carrying the wh-feature, and a head carrying the wh-feature must be in a specifier-head configuration with a wh-operator. The Wh-Criterion is a universal constrain that may be satisfied overtly or covertly. This aspect of crosslinguistic variation is encoded by two parameters. The first one governs whether an overt movement of the wh-pronoun is required or not. Whereas in some languages like Bulgarian or Polish fronting of all wh-words is required, in other languages like Chinese or Japanese the wh-words must be left in situ. German belongs to the group of languages that require

fronting of only one wh-word (Bošković, 2002; Grewendorf, 2002). The second parameter governs the application of I-to-C movement of the finite verb (Haegeman, 1994).

To satisfy the Wh-Criterion, the following operations are required in German (Haegeman, 1994). First, the wh-pronoun moves in the sentence initial no-argument position SpecCP leaving a trace in the position in which it was base-generated. Parallel, the finite verb moves to C since this is the position which can carry the wh-feature. The result of these operations is the required adjacency of the wh-operator and the verb. The derivation of a wh-question in German is illustrated in Figure 5.1.

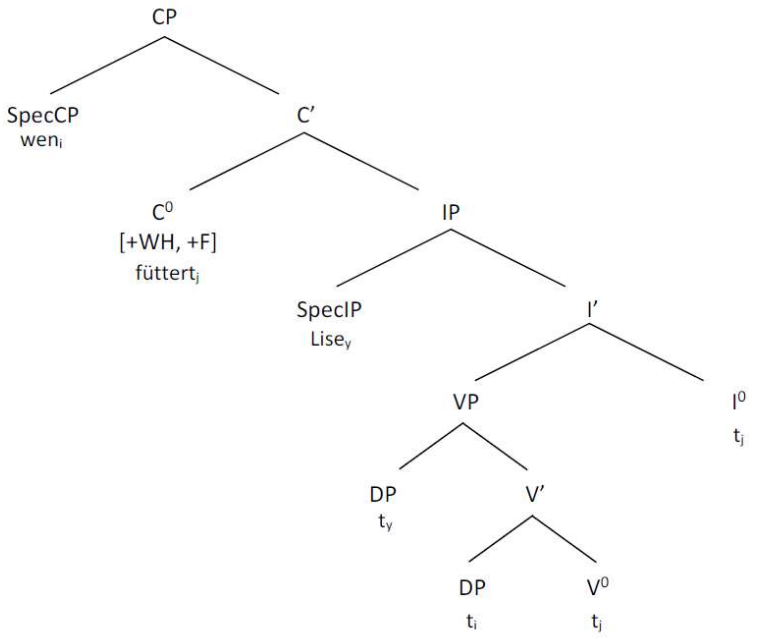


Figure 5.1. Syntactic structure of a wh-question in German (based on Grewendorf (1988)).

Wh-questions can be classified with respect to the position from which the wh-pronoun has moved. In this term, argument questions, cf. Example (1), and adjunct questions, cf. Example (2), are distinguished. In argument questions, the inquired constituent is obligatory since the verb assigns a thematic role to it. Depending on the position from which the wh-pronoun moves, subject questions (1a), accusative object questions (1b) and dative object questions (1c) are distinguished. Subject questions involve movement from a subject position, and object questions are derived by movement from an object position. The word order in the subject wh-questions remains canonical. In contrast, the order of arguments is non-canonical in the object wh-questions. In both question types, the moved constituent leaves a trace (marked by t_i in (1a) – (1c)) in its

base position, which is connected by a chain to its new position to enable the theta-role assignment.

(1) Argument questions (Schulz, 2013:321)

a. Subject question
   Wer$_i$ hilft t_i dem Hund?
   who$_i$ help-3SG t_i the-DAT dog
   'Who is helping the dog?'

b. Accusative object question
   Wen$_i$ füttert Max t_i?
   who$_i$-ACC feed-3SG Max t_i
   'Who is Max feeding?'

c. Dative object question
   Wem$_i$ hilft Max t_i?
   Whom$_i$ help-3SG Max t_i
   'Whom is Lise helping?'

Regarding adjunct questions as in Example (2), the inquired constituent is optional and gives only some additional information, which can be left without that the sentence becomes ungrammatical.

(2) Adjunct questions (Schulz, 2013:321)
   Wann$_i$ / wo$_i$ / warum$_i$ füttert Max den Hund t_i?
   when$_i$ / where$_i$ / why$_i$ feed-3SG Max the-ACC dog t_i
   'When / where is Max feeding the dog?'

In addition, non-referential, non-discourse-linked (D-linked) *who* questions, cf. Example (3), and referential, D-linked *which* questions, cf. Example (4) can be distinguished. In the D-linked wh-questions, there is a set of presupposed objects, to which the *which*-phrase refers. I.e., in the question (4) there is a presupposition that there are a few dogs, and one of them is biting the cat. In contrast, in the non-D-linked wh-questions, such as (3) there is no such presupposition. Thus, in the questions in (3) there is no previous information about someone who is biting (Pesetzky, 1987).

(3) Wer beißt die Katze?
   Who bit-3SG the-ACC cat
   'Who is biting the cat?'

(4) Welcher Hund beißt die Katze?
Which dog bit-3SG the-ACC cat
'Which dog is biting the cat?'

5.2. Previous research on acquisition of wh-questions

A child's task is multifold in the acquisition of wh-questions. In her first developmental stage, the child must learn how wh-questions are derived in the target language, and that they differ from yes/no questions. In other words, the learner must recognize that *yes* or *no* is not an appropriate response on a wh-question. After the child overcomes this stage, she must learn the distinction between subject, object, and adjunct questions. Put differently, the child must recognize which constituent is asked about. The following two sections review previous research on the production and comprehension of wh-questions in monolingual (5.2.1) and eL2 acquisition (5.2.2).

5.2.1. Monolingual acquisition of wh-questions

Production of wh-questions. Several studies investigated the production of wh-questions in monolingual acquisition in different languages (see Forner (1979), Penner (1993), Tracy (1991, 1994), Wode (1971) for German, Bloom, Merkin & Wootten (1982), Johnson (1981), Klima & Bellugi (1966), Stromswold (1995), Tyack & Ingram (1977), van der Lely & Battell (2003), Wilhem & Hanna (1992) for English, Stavrakaki (2006) for Greek, Jakubowicz (2010) for French, Clancy (1989) for Korean, Hansson & Nettelbladt (2006) for Swedish). In the following, first those studies investigating the structure of the produced wh-questions in German spontaneous speech are reported (Penner, 1993; Tracy, 1994, 1991; Wode, 1971; Forner, 1979; Bloom et al., 1982; Johnson, 1981; Klima & Bellugi, 1966; Tyack & Ingram, 1977; Clancy, 1989; Hansson & Nettelbladt, 2006). Finally, the findings from experimental studies that examined the production of wh-questions are summarized (Stromswold, 1995; Wilhem & Hanna, 1992; van der Lely & Battell, 2003; Stavrakaki, 2006; Jakubowicz, 2010). For the second issue studies on English, Greek, and French are reported since to date no experimental study for German exists that investigates production of wh-questions.

According to studies, which analyzed spontaneous speech data, children produced their first questions already about age two. At this age, the verb second position is not acquired yet, thus several non-target-like questions patterns were found. The gap formats also called zero questions, in which the overt wh-pronouns are missing as illustrated in

Example (5) although from the semantic point of view these utterances have the meaning of a wh-question (Tracy, 1994; Penner, 1993).

(5) a. der mann macht (Tracy 1994:13)
the man do-3SG
'(What) is the man doing?'
b. das bild is (Tracy 1994:13)
the picture is
'(Where) is the picture?'

The other pattern are the particle questions, in which the clause initial word is a short form of a wh-pronoun, mostly *wo* 'where', attached to a cliticized copula verb as in Example (6) (Penner, 1993). Tracy (1991) claimed that these structures are monomorphemic elements, which cannot be analyzed as wh-pronouns with inflected copula.

(6) Wo-de Zunge (Penner 1993:184)
Where-COP tongue
'Where is the tongue?'

The last pattern found in the early wh-questions is questions, in which the verb occurs in verb final position instead of in verb second position. The wh-phrase is optional in this developmental stage since in some questions the wh-pronoun is produced overtly as in Example (7), in some questions, there is a lack of the wh-phrase, cf. Example (5) above (Tracy, 1994; Penner, 1993).

(7) Warum der auch ein Keks isst? (Penner 1993:187)
Why he too a cookie eat-3Sg
'Why is eating a cookie too?'

About age 2;4, the wh-pronouns always occur in wh-questions. However, the verb placement is not established yet since verbs occur either in verb second position or in verb final position. The target-like questions with a wh-phrase and verb second are produced about the age of 2;6 years (Tracy, 1994).

Generally, monolingual children acquire different wh-pronouns before the age of three. Their first wh-pronouns are typically *where* and *what*. The following developmental order of the wh-pronouns were found for several languages: *where*/*what* < *who* < *how* < *why* < *when* (Wode (1971) and Forner (1979) for German, Bloom et al.

(1982), Johnson (1981), Klima & Bellugi (1966) and Tyack & Ingram (1977) for English, Clancy (1989) for Korean). The analysis of spontaneous speech samples of Swedish-speaking children aged between two and five years by Hansson & Nettelbladt (2006) revealed that the most frequent wh-pronouns used were *where*, *what,* and *why*. Moreover, whereas almost all wh-questions produced by the four- and five-year-olds were target-like, the two- and three-year-old children produced about 70% of questions correctly. Their most frequent error was the omission of the wh-pronoun as also reported for German-speaking children (Penner, 1993; Tracy, 1994).

Some studies investigated not only the structure of the early wh-questions, but also the type of the produced questions. Stromswold (1995) examined spontaneous speech data of 12 English-speaking children aged between 1;2 and 2;6 years at first recording session and 2;3 and 2;3 and 6;0 years at final recording session to determining the order of emergence of subject and object wh-questions. She did not find any asymmetry in the production suggesting that children started to produce subject and object questions at the same age. Some children used object questions even earlier than subject questions.

The production of subject and object wh-questions was investigated in experimental studies as well. Using an elicited production task Wilhem & Hanna (1992) examined the production of subject and object wh-questions in English-speaking children. They found a better performance on subject than on object wh-questions in four-year-old children (70% vs. 50%). However, the three-year-old children produced both types of questions in only about 40% of cases target-like. The most frequent error type was the production of a subject wh-question instead of an object wh-question what according to authors indicates a preference for subject questions.

The asymmetry in the production of subject and object wh-questions was confirmed in the study by van der Lely & Battell (2003). The authors investigated the production of subject and object wh-questions with *who, what* and *which* in six- and seven-year-old English-speaking children. An elicited production task was used in which the child's task was to find out who did what and where. The seven-year-olds performed at ceiling across all question types. The six-year-olds, in contrast, produced subject wh-questions more often target-like than the object wh-questions (83% vs. 69%). The most incorrect responses (46%) were given if an object *who*-question was elicited. The most frequent error type for subject and object questions were questions where the wh-phrase had overtly moved, but the Wh-Criterion was not satisfied. Examples for incorrect subject and

object wh-questions are given in Example (8) and Example (9), respectively (van der Lely, 2003:162-163).

(8) a. Who carry her bag?
b. Which telephone did ring?
(9) a. What did she spotted in the library?
b. Who Mrs. Brown see?

Stavrakaki (2006) examined the production of wh-questions for three- to five-year-old Greek-speaking children. D-linked (*which*) and non-D-linked (*who*) subject and object wh-questions were elicited with a game in which the child asked a puppet a question about a scenario acted out with toys. The results show a high level of correct performance on subject questions and object *who*-questions. The poorest performance was attested on object *which*-questions that were produced target-like in 81% of cases. The most frequent error types in *which*-questions was the omission of the nominal phrase which results in Greek in the production of *who*-questions since *who* and *which* are phonologically identic in Greek. These results suggest that the three- to five-year-old children had generally acquired the syntactic knowledge of wh-questions.

Better performance on subject than on object wh-questions were also found in French-speaking children (Jakubowicz, 2010). The question production was tested as in other studies with an elicited production task. Whereas the six-year-old children produced all subject and object wh-questions target-like, the three- and four-year-old children were slightly less successful in production of object questions (100% vs. 75%).

In sum, previous research on the production of wh-questions indicates that children started to use their first wh-questions very early. However, the first questions are mostly non-target-like. German-speaking children produce correct wh-questions already about age 2;6. Moreover, many similarities in the acquisition of wh-questions were found cross-linguistically. It seems that the acquisition order of the wh-pronouns is very similar across different languages. The earlier production on subject questions than on object questions were reported for many languages as well.

Comprehension of wh-questions. The comprehension of wh-questions in monolingual acquisition had been examined in several studies for different languages (Blume (2012), Penner & Kölliker Funk (1998), Schulz (2013), Schulz, Tracy & Wenzel (2008), Schulze (2012), Siegmüller et al. (2005), Wenzel, Schulz & Tracy (2009) for German, Avrutin (2000), Deevy & Leonard (2004), Hirsch & Hartman (2006), Tyack & Ingram (1977) for

English, Friedmann, Belletti & Rizzi (2009) for Hebrew). On the one hand, the studies investigated how comprehension of wh-questions develops over time. On the other hand, the research focused on the asymmetry between subject, object, and adjunct wh-questions. In the following, first the studies that examined how comprehension of wh-questions develops over time in German-speaking children are reported (Penner, 1998; Siegmüller et al., 2005; Schulz, 2013). Then the findings from studies on interpretation of different types of wh-questions are summarized. (Deevy, 2004; Hirsch, 2006; Tyack & Ingram, 1977; Friedmann et al., 2009; Avrutn, 2000; Siegmüller et al., 2005; Schulz, 2013; Blume, 2012). Finally, different accounts proposed for the asymmetry in comprehension of subject and object wh-questions are presented and discussed.

First, an overview of studies that focused on the developmental path towards target-like comprehension of wh-questions in German-speaking children is given. Studies by Penner & Kölliker Funk (1998) and Siegmüller et al. (2005) show that two-year-old children responded to a wh-question with *yes* or *no* very often. This indicates that children at the beginning of the acquisition do not distinguish between yes/no questions and wh-questions. Siegmüller et al. (2005) examined the interpretation of wh-question in monolingual German-speaking children between ages two and six. They used a subtest *Comprehension of wh-question* from a standardized test *Patholinguisitsche Diagnostik bei Sprachentwicklungsstörungen* (Kauschke & Siegmüller, 2002). The method was a question-after-story task, which works as follows: the experimenter showed the child a picture introduced by a short story, and then asked her a wh-question. Half of the test items were argument questions with different wh-pronouns (*wer* 'who', *was* 'what', *wem* 'whom', *wen* 'whom'), the other half adjunct questions (*wo* 'where', *wie* 'how', *wann* 'when', *womit* 'with what'). An example item is given in (10) (Kauschke & Siegmüller, 2002:115).

(10) Experimenter: Peter bekommt zu Weihnachten ein Kaninchen.
Das Kaninchen heißt Otto. Peter freut sich.
'Peter is getting for Christmas a rabbit. The rabbit's name is Otto. Peter is glad.'
wh-question: Wann bekommt Peter ein Kaninchen?
when get-3SG Peter a rabbit
'When is Peter getting a rabbit?'
Child: Zu Weihnachten.
'For Christmas.'

The results show that children's comprehension of wh-questions improved with age. Two-year-olds gave only 37.5% correct responses, whereas three-year-olds gave already 74% correct responses. Six-year-old children performed at ceiling. The analysis of incorrect responses revealed that an answer with an incorrect constituent was the most frequent error by two- and three-year-old children. This finding shows that in the next developmental step, children correctly recognize wh-questions as such, so distinguish them from yes/no questions, but not necessarily know what constituent is asked about.

The study by Schulz (2013) is the first one that investigated interpretation of wh-questions in German in a longitudinal design. Children included in her study were part of the sample of the MILA project (see Section 3.2 for the detailed description of the project). 32 monolingual German-speaking children and 17 eL2 learners were tested with a subtest *Comprehension on wh-question* from LiSe-DaZ (Schulz & Tracy, 2011) in five test rounds. The interval between each test round was six months. The monolingual children were 3;8 years in the first test round and 5;8 years in the fifth test round. Children's interpretation of wh-questions was administrated with a question-after-story task. At total of 12 wh-questions, 10 test items and two control items, were presented to each child. Test items comprise six argument questions (*wer* 'who', *wen* 'who-Acc', *wem* 'who-Dat') and four adjunct questions (*wann* 'when', *womit* 'with what'). For a detailed task description see Section 5.3.3.

Whereas the three-year-old monolinguals answered 74% of items target-like, the proportions of correct responses increased over time and reached 91% at the age of 5;8. The analysis of incorrect responses revealed that the answer with an incorrect constituent was the most frequent one as in the study by Siegmüller et al. (2005). For the results of eL2 learners see Section 5.2.2 below. Similar results for monolingual German-speaking children were also reported in other mostly cross-sectional studies that used the same subtest from LiSe-DaZ (Schulz & Tracy, 2011) (Schulz et al., 2008; Schulze, 2012; Wenzel et al., 2009).

The findings on children's performance on subject, object and adjunct wh-questions are inconsistent. Some studies found a similar performance on different question types. Deevy & Leonard (2004) for instance tested comprehension of subject and object wh-questions in English-speaking children ranging in age from two to six (mean age: 4;3). A picture-pointing task was used in this study. A picture depicting three animal characters who were engaged in an action was shown to a child, and a wh-question about one of them was asked. Only *who* was used as a wh-pronoun in subject and object wh-questions, respectively. In addition to the syntax of wh-questions, also their length was manipulated

i.e., for each question a long version was created by adding two adjectives. Question examples for a picture showed a monkey who is washing a dog who is in turn to washing a rabbit are given in (11) and (12) (Deevy & Leonard, 2004:806).

(11) a. Short subject question
Who is washing the dog?
b. Long subject question
Who is washing the happy brown dog?

(12) a. Short object question
Who is the dog washing?
b. Long object question
Who is the happy brown dog washing?

The children answered 91% of short and long subject wh-questions correctly. Regarding the object questions, the children gave 88% correct responses to short questions and 86% to long questions; the difference between short and long object questions was not significant. In addition, the analysis revealed that the scores for subject and object questions did not differ. Concerning the error pattern, the children responded to subject and object wh-questions with an incorrect constituent most frequently. These results are consistent with the findings reported for German by Siegmüller at al. (2005) and Schulz (2013).

Hirsch & Hartman (2006) also examined the comprehension of subject and object wh-questions in English-speaking children. The participants were divided by age into two groups; the younger group ranged in age from 3;1 to 4;4 (mean age: 3;10) and the older group ranged in age from 4;6 to 5;8 (mean age: 5;1). A picture-question task was conducted. For each item, the child was shown a set of three pictures depicting three figures. The characters were interacting such that each of them was both the agent and patient for a particular action. After showing the pictures, the experimenter asked a subject or an object wh-question about one interaction among the figures. As in the study by Deevy & Leonard (2004), only *who* was used as wh-pronoun. Both age groups performed well on subject and object wh-question, and the difference between the two question types was not significant.

Other studies found differences in performance on subject and object wh-questions, and on argument and adjunct wh-questions. Tyack & Ingram (1977) for example investigated interpretation of subject, object, and adjunct wh-questions in English-

speaking children whose age ranged from three to five. The task worked as follows: the experimenter showed a picture to the child and asked her six different wh-questions about it. Several characters and actions were depicted on every picture. Six different wh-pronouns were tested: *where*, *why*, *how*, *when*, *who*, and *what*. Children performed better on subject *who* questions than on object *who* questions (80% vs. 56%). However, if *what* was used as wh-pronoun, object questions were easier than subject questions (57% vs. 35%). These findings not only indicate that the question type (subject vs. object) has an impact on wh-questions comprehension, but they also raise the possibility that the type of wh-pronoun plays a role in the subject/object asymmetry. Regarding the other wh-pronouns tested, children performed well on *where* used with intransitive verbs (94%), and on *why* (83%). The percentage of correct responses on *when* increased across age groups and reached 75% by five-year-olds. The most difficult were adjunct *how* questions. Even five-year-old children responded to half of them target-like if presented with transitive verbs, and only to 32% if used with intransitive verbs. This suggests that also the verb type influences the interpretation of wh-questions.

Friedmann et al. (2009) tested wh-question comprehension in Hebrew-speaking children aged 3;7 to 4;10 (mean age: 4;3). A question-picture-selection task was used. Three characters were depicted on the picture, two of the same type, and one a different type. The first figure was performing an action on the second, and the second figure was performing the same action on the third one, which was of the same type as the first figure. Thus, all questions were reversible. In contrast to the studies reviewed above not only *who* but also *which* were used as wh-pronouns in subject and object wh-questions. This is illustrated in Example (13) for subject wh-questions and Example (14) for object wh-question (Friedmann et al., 2009:78).

(13) a. *who* subject
Who bites the cat?
b. *which* subject
Which dog bites the cat?

(14) a. *who* object
Whom does the cat bite?
b. *which* object
Which dog does the cat bite?

The results showed at ceiling performance on subject *who* and *which* questions. The comprehension of object *who* questions was significantly better than of object *which* questions. Whereas there was no significant difference between subject *who* and object

who questions (81% vs. 75%), subject *which* questions were comprehended significantly better than object *which* questions (78% vs. 58%). These findings are like the results by Tyack & Ingram (1977) and indicate that also the wh-pronouns used in questions influence children comprehension.

Difficulties in the comprehension of object *which* questions were also found in the study by Avrutin (2000). English-speaking children between age three and five were tested with a task like the one used by Friedmann et al. (2009). The only important difference was that figurines were used instead of pictures in the task. For each question, the experimenter placed three of them in front of the child and explained what was happened. Note that two out of three figurines were always of the same kind. Then a hand puppet asked a wh-question. The same question types as in the study by Friedmann et al. (2009) were used. Children's performance on object *which* questions was significantly worse than their performance on all other three types of questions. Moreover, the analysis revealed a significant difference between children's comprehension of object *who* and object *which* questions, whereas no difference was observed between subject *who* and subject *which* questions.

For German, the study by Siegmüller at al. (2005) is the first that shows the asymmetry between subject and object wh-questions, however only for two- and three-year-old children. The scores for subject and object wh-question did not differ for five-year-old children anymore. Comparing argument and adjunct wh-questions, differences in performance were found for three-, four-, and five-year-olds, but not for six-year-olds children.

Schulz (2013) also reported better interpretation of subject than object wh-questions, and object than adjunct wh-questions. Already at the age of 3;8 children performed at ceiling on subject questions. Defining mastery as 90% of correct responses, the monolingual children reached this criterion for object question at the age of 4;8. Adjunct question were however not mastered even at the age of 5;8 since children answered only 84% of items correctly.

Blume (2012) investigated whether the different tasks (question-after-story task and picture-selection task) have an impact on children's interpretation of wh-questions. The participants were 29 German-speaking children aged between three and five years. The question-after-story task used was the subtest *Comprehension of wh-questions* from Lise-DaZ (Schulz & Tracy, 2011) (see Section 5.3.3 for a detailed description). The picture-

selection task was adopted for German on the base of the task used by Friedmann et al. (2009). Four question types were tested: *who* subject questions (15), *which* subject questions (16), *who* object questions (17), and *which* object questions (18) (Blume, 2012:44). All questions were reversible.

(15) Wer füttert den Clown?
who-NOM feed-3SG the-ACC clown
'Who feeds the clown?'

(16) Welcher Junge füttert den Clown?
which-NOM boy feed-3SG the-ACC clown
'Which boy feeds the clown?'

(17) Wen füttert der Clown?
who-ACC feed-3SG the-NOM clown
'Whom does the clown feed?'

(18) Welchen Jungen füttert der Clown?
who-ACC boy feed-3SG the-NOM clown
'Which boy does the clown feed?'

The results are summarized only for the four- and five-year-old children since only two three-year-olds were tested. In the question-after-story task, the comprehension of subject wh-questions was at ceiling in both age groups. Object wh-questions were interpreted target-like in 88% of cases in the four-year-olds, and in 87% of cases in the five-year-olds. The four-year-old children performed significantly worse than the five-year-old children only in the comprehension of adjunct questions (77% vs. 94%). The comparisons between question types revealed that the four- and five-year-old children performed significantly better on subject than on object wh-questions. No differences were found between the comprehension of object and adjunct wh-questions.

Table 5.1 presents the results of the picture-selection task.

Table 5.1. Percentage of correct responses of monolingual children to wh-questions in picture matching task from Blume (2012).

	Subject *who* questions	Subject *which* questions	Object *who* questions	Object *which* questions
Age 4	89	87	52	56
Age 5	87	93	67	67

Four- and five-year-old children comprehended subject wh-questions significantly better than object wh-questions. This difference was independent of the wh-pronoun, meaning that the performance in subject *who* questions was better than in object *who* questions, and in subject *which* questions than in object *which* questions. In contrast to the results for Hebrew and English reported above, no significant difference was found between object *who* questions and object *which* questions. These results indicate that whereas Hebrew- and English-speaking children have only difficulty in comprehension of object *which* questions, German-speaking children comprehend both types of object questions worse.

Next, Blume (2012) compared children's performance in both tasks. This was possible for two question types: subject questions with *wer* 'who-NOM' and object wh-questions with *wen* 'who-ACC'. The analysis revealed that the four- and five-year-old children interpret these questions significantly better if the question-after-story task was used. The difference in performance is particularly noticeable in object questions. Whereas the children performed almost at ceiling if tested with the question-after-story task, the four-year-olds gave only 52% of correct responses and the five-year-olds 67% of correct responses if tested with the picture-selection task.

This different performance in both tasks can be explained with the question types used. The questions in the question-after-story task are overwhelmingly irreversible, whereas the questions from the picture-selection task are reversible. The irreversible wh-questions give some semantic cues about their interpretation that make their processing easier. Such cues are missing in the reversible wh-questions. Thus, for their target-like interpretation, the correct theta-role assignment is crucial. However, the object questions with *wen* 'who-Acc' from the question-after-story task are reversible as well, and the children performed well on them. According to Blume (2012) a closer look at the pictures used in the tasks can explain this difference. The pictures from the question-after-story task always depict the action in question and gave no cues for its reversibility. In contrast, the pictures used in the picture-selection task depict both, the action in question and the possible reversible action. It seems that this visualization of both possible actions makes the interpretation of reversible object wh-questions more difficult for children.

Biran & Ruigendijk (2015) investigate whether case and gender information affect comprehension and repetition of wh-questions and topicalization sentences for German- and Hebrew-speaking children with an age ranged between three to six years. In the

following, only the design and the results for the comprehension of wh-question are summarized. Biran & Ruigendijk (2015) used the adopted picture-selection task from Friedmann et al. (2009). Four types of questions were tested: subject *who* questions, subject *which* questions, object *who* questions, and object *which* questions. All questions were reversible. In contrast to the adopted version used by Blume (2012), in half of the questions both noun phrases were masculine, and in the other half, the gender of noun phrases differs. As expected, subject questions were comprehended better than object questions in German-speaking children. Moreover, as already found by Blume (2012), the difference between *who* and *which* questions was not stronger for object than for subject questions. This indicates that German-speaking children had generally more difficulties with object questions independent which wh-phrase is used. In addition, the performance on *which* questions was better if the gender of the noun phrases was the same. Note, that in same-gender questions the noun phrases were masculine and hence unambiguously marked for case. In different-gender questions, on the other hand, one of the noun phrases was neutral or feminine and thus ambiguous with respect to case marking. For Hebrew-speaking children, object *which* questions were most difficult to comprehend, what replicates the findings by Friedmann et al. (2009). The performance on object questions improved when a gender cue was provided. In sum, this study shows that children's comprehension of wh-questions is affected not only by the question type (subject vs. object), or wh-phrase (*who* vs. *which*), but also by language specific properties of wh-questions.

Several explanations for the subject-object asymmetry and for the differences in comprehension of *who* and *which* questions have been proposed. The difficulties in the interpretation of object wh-questions are often explained with their non-canonical world order. It has been argued also for the interpretation of other structures with a non-canonical world order such as object relative clauses that children used the so-called word-order-strategy (Caplan, 1983; Schlesiger, 2001). According to this strategy, the interpretation on the thematic roles of the arguments in the question is based solely on their linear order in the sentence. This results in the assignment of the agent to the first phrase and of the theme to the second. Canonic subject wh-questions can be interpreted target-like with this strategy. However, this strategy leads to an incorrect interpretation in cases of object wh-questions.

Other possible account for the subject-object asymmetry is the Syntactic Distance Hypothesis (Stromswold, 1995; O'Grady, 1997; Philip, Coopmans, van Atteveldt & van der Meer, 2001; Deevy & Leonard, 2004). According to this hypothesis, the difficulties in

object wh-questions reflect a processing effect of the syntactic distance between the wh-phrase and its gap. O'Grady (1997:136) argues that "a structure's complexity increases with the number of XP categories (S, VP, etc.) between a gap and the element with which it is associated". Under this assumption, the distance between the wh-phrase and its gap is larger in object wh-questions than in subject wh-questions. Thus, the object wh-phrase remains uninterpreted for longer. According to Deevy & Leonard (2004), this results in more processing cost since more verbal material must be maintained in working memory for a longer period till the object wh-phrase is interpreted.

With respect to the asymmetry between the interpretation of *who* and *which* questions, Avrutin (2000) argues that children have limited processing resources. This results in worse performance on *which* questions. The D-linked wh-phrases (*which*) as described by Pesetzky (1987) involved both syntactic and discourse related operations to be interpreted target-like. This means that for their interpretation, it is necessary to assign the thematic role to the wh-question correctly, and to introduce a set of presupposed objects to which *which*-phrase could refer. Thus, the comprehension of *which* questions requires additional resources. In contrast, *who* questions that are not discourse linked are less expensive since only syntactic operations are required to reach their correct interpretation. However, according to Friedmann et al. (2009:79) D-linking cannot explain the difference between *who* and *which* questions found in their study "because in the given experimental situation both the *who* and the *which* object question are D-linked in the same way, as the discourse context is provided by the picture."

Friedmann et al. (2009) explain the difference in comprehension between *who* and *which* questions within the Relativized Minimality approach (Rizzi, 1990, 2004). This approach states that a local relation between X and Y in the configuration as in (19) cannot hold if an element Z intervenes and is a potential candidate for the local relation.

(19) X … Z … Y

In subject dependencies there is no intervener between the target (i.e., the extracted element) and the trace, as the trace always is in subject position. Consequently, they do not make any difficulties for children. In object dependencies, in contrast, there is an intervener between the target and the trace. However, not all object dependencies seem to be difficult for children. If the target or the intervener is not lexically restricted (i.e., disjoint), as it is the case in *who* object questions, the structure is comprehended target-like by children. If both the target and the intervener are

lexically restricted (i.e., not disjoint) as in *which* object questions, the structure is problematic for children. Friedmann et al. (2009:84) argue that children have a stricter version of Relativized Minimality than adults, "requiring not just a distinct featural specification of the target with respect to the intervener but imposing the stronger requirement of a disjoint specification". This means that in child, disjointness may only be satisfied if the target and the intervener do not share any feature. This can explain the worse performance on *which* object questions in Hebrew-speaking children, but not the performance of German-speaking children in Blume (2012) and Biran & Ruigendijk (2015). Biran & Ruigendijk (2015) note that in Hebrew word order and the case marker indicate whether it is a subject or an object question. In German, however, only the case marker makes it possible to differentiate between a subject and an object wh-question. This can explain different performance in object questions in German- and Hebrew-speaking children.

In sum, previous research shows that monolingual children distinguish wh-questions from yes/no questions very early. Regarding different wh-question types, some studies reported similar performance on subject and object wh-questions, whereas other studies found differences in children's performance on different wh-question types. In general, it can be assumed that subject wh-questions are acquired at age of three, followed by the acquisition of object wh-questions at age of four. Adjunct questions cause difficulties for monolingual children even at age of five. Note however, that also the wh-phrase (*who* vs. *which*) used in wh-questions may affect children's performance.

5.2.2. eL2 acquisition of wh-questions

This section gives an overview of studies on comprehension of wh-question in eL2 acquisition of German. First, findings from cross-sectional studies are summarized (Penner, 2003; Schulz et al. 2008; Schulz & Wenzel, 2007; Wenzel et al., 2009). Then, two longitudinal studies on interpretation of wh-questions by eL2 learners of German are reported in more details (Schulze, 2012; Schulz, 2013).

Studies on interpretation of wh-question in eL2 acquisition reported inconsistent results. Penner (2003) examined wh-questions comprehension in monolingual German-speaking children and in eL2 learners of German. A question-after-story task with only four items from *Screeningverfahren zur Feststellung von Störungen in der Grammatikentwicklung* (Penner, 1999) was used. 88% out of 42 monolingual children with mean age of 3;6 answered the wh-questions correctly. In contrast, 42% out of 33 six- and seven-year-old eL2 children had difficulties with answering the wh-questions. Based on

these results, Penner (2003) suggests that eL2 learners are not able to interpret which constituent they were asked about.

Different findings were reported in cross-sectional studies by Schulz et al. (2008), Schulz & Wenzel (2007), and Wenzel et al. (2009). The interpretation of wh-questions in eL2 learners of German aged three to six was investigated using a pilot version of the subtest *Comprehension of wh-questions* from standardized test LiSe-DaZ (Schulz & Tracy, 2011). For a detailed description of the task see Section 5.3.3. The analysis revealed that at the age of three eL2 children answered only 15% of wh-questions correctly. However, their performance improved with increasing age very fast. Four-year-old eL2 learners responded to 73% of wh-questions target-like and performed like three-year-old monolingual children. At age seven, eL2 children performed at ceiling on the interpretation of wh-questions. This result completely differs from the findings reported in Penner (2003).

As mentioned in Section 4.2.2, the study by Schulze (2012) is the first one that investigated the pace of acquisition in eL2 learners using a longitudinal design. The participants were the same as for interpretation of telicity. They were tested in three test rounds with a subtest *Comprehension of wh-questions* from LiSe-DaZ (Schulz & Tracy, 2011) (see Section 5.3.3 for task description). Schulze (2012) found that monolingual children performed significantly better than eL2 children at the age of 3;7 (73% vs. 31%). However, the variance of performance at first test round was larger in the eL2 group than in the monolingual group. This indicates that the individual percentage of correct responses in the eL2 group was more variable than in the monolingual group. Regarding the developmental path, the rate of change of monolingual children was smaller than that of eL2 children. This means that eL2 children's performance improved significantly more within one year than monolingual children's performance. Looking at the results at the age of 4;6, eL2 children still did not catch up their monolingual peers. Whereas monolingual children mastered comprehension of wh-questions at this age (90% correct responses), eL2 children answered only about 75% of wh-questions target-like.

Schulz (2013) extended the data basis of study by Schulze (2012) and investigated not only the pace of acquisition but also acquisition patterns in eL2 learners. As mentioned in Section 5.2.1, the monolingual children and the eL2 learners were tested in five test rounds with a subtest *Comprehension of wh-questions* from LiSe-DaZ (Schulz & Tracy, 2011). The mean age of the eL2 children was 3;8 at the first test round and 5;8 at the fifth test round. They had between 5 and 19 months of exposure to German at the first

test round (mean: 10 months). The results of the eL2 learners and the monolingual children are presented in Figure 5.2. eL2 children performed significantly poorer than monolingual children even at the age of 5;2. At the age of 5;8 the difference between monolingual children and eL2 children was not significant anymore. Interestingly, the performance of eL2 children increased rapidly across the five test rounds. Whereas they were able to answer only about 30% of wh-questions at the age of 3;8 correctly, one year later at the age of 4;8 they responded to 75% of wh-questions target-like. Finally, at the age of 5;8, eL2 children performed almost as well as monolingual children.

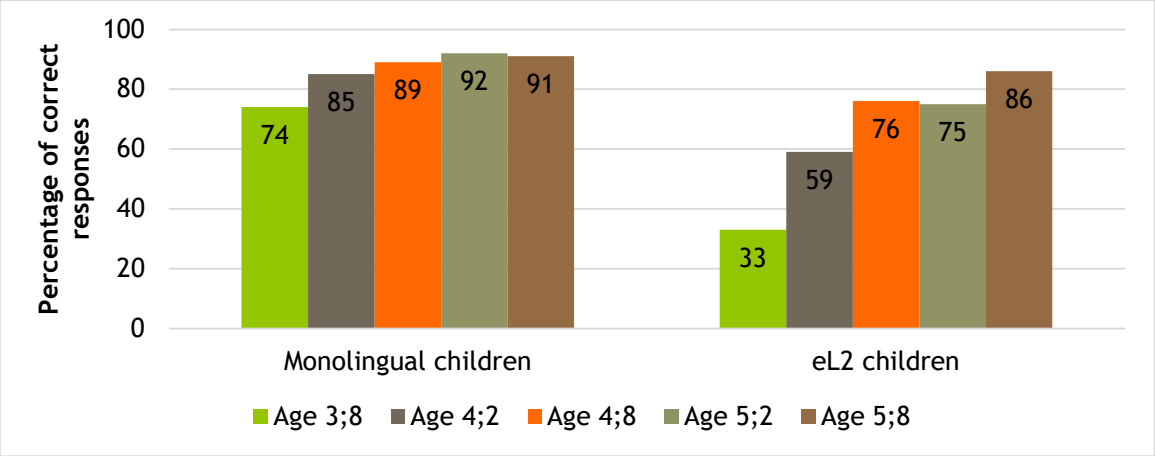


Figure 5.2. Percentage of correct responses in comprehension of wh-questions (Schulz, 2013).

Concerning the incorrect responses of eL2 children, 14% of errors were *yes/no* responses at the age of 3;8. Their amount decreased to 2.2% within one year. An answer with a wrong constituent was the most frequent error in eL2 learners across all ages. Altogether, the analysis of incorrect responses revealed that eL2 children show the same error pattern as monolingual children. The similarity between monolingual and eL2 acquisition is also supported by the results on different question types. eL2 learners mastered like monolingual children subject wh-questions first. Object wh-question were acquired next at the age of 5;8, one year later as by monolingual children. Comprehension of adjunct wh-question caused difficulties for eL2 children at the age of 5;8 in much the same way as for monolingual children at this age. These results confirm the findings from the cross-sectional studies with monolingual German-speaking children (Siegmüller et at., 2005) and with eL2 learners of German (Schulz et al., 2008; Schulz & Wenzel, 2007; Wenzel et al., 2009).

Summarizing, the previous studies show that eL2 children acquire interpretation of wh-question very similar to monolingual children. At the age of 5;8 and after about 30 months of exposure to German, they generally show a target-like questions

comprehension. Concerning the developmental path, subject wh-questions are acquired first, followed by object wh-questions. Adjunct wh-questions are not comprehended target-like in eL2 children and in monolingual children even at the age of five.

5.3. Wh-questions task

This section reports and discusses the results from the wh-question task. It is structured as follows. In Section 5.3.1 research hypotheses are formulated. Section 5.3.2 gives an overview of the participants, and Section 5.3.3 describes the subtest *Comprehension of Wh-questions* from LiSe-DaZ (Schulz & Tracy, 2011). Data analysis is described in Section 5.3.4. Section 5.3.5 presents the results on comprehension of wh-questions in monolingual and eL2 children regarding pace of acquisition and impact of external factors.

5.3.1. Research hypotheses

In this section, the research hypotheses regarding the acquisition of wh-questions are formulated. The previous findings on the eL2 acquisition of wh-questions indicate that until the age of five the eL2 children perform poorer than the monolingual children did (Schulz, 2013; Schulze, 2012). In addition, Schulz (2013) showed that the eL2 children performed worse on comprehension of subject, object, and adjunct wh-questions than the monolingual children at the age of three. However, the performance of eL2 children increased rapidly with age (Schulz, 2013; Schulze, 2012). Based on these findings, the following hypotheses are formulated regarding the pace of acquisition:

(H1.1) eL2 children interpret wh-questions significantly poorer at the first test round than monolingual children do.
(H1.2) eL2 children interpret each wh-question type (subject, object, adjunct) significantly poorer at the first test round than monolingual children do.
(H1.3) eL2 children show a significantly greater rate of change regarding the target-like interpretation of wh-questions than monolingual children do.
(H1.4) eL2 children show a significantly greater rate of change regarding the target-like interpretation of each wh-question type (subject, object, adjunct) than monolingual children do.

Concerning now the hypotheses that are formulated with respect to the external factors. The results of previous studies are contradictory. Whereas some studies report no correlation between children's non-verbal IQ and the comprehension of wh-questions (Schulz (2013) for eL2 children, Schulz & Tracy (2011) for monolingual children), in other

studies a correlation between this factor and children's performance was found (Schulze, 2012; Schulz & Tracy, 2011). For mother's educational background no correlations were reported for the eL2 learners (Schulz, 2013; Schulz & Tracy 2011), but for monolingual children (Schulz & Tracy, 2011). In this study, the view is adopted that wh-questions belong to rule-based structures of German and consequently their acquisition should not be affected by external factors. The formulated hypotheses are as follows:

(H2.1) External factors do not affect the eL2 and the monolingual children's interpretation of wh-questions at the first test round.
(H2.2) External factors do not affect the rate of change towards target-like interpretation of wh-questions of monolingual and eL2 children.

5.3.2. Participants

In this substudy the data of the whole monolingual group (n=45), and the whole eL2 group (n=29) were analyzed. See Section 3.4 for the detailed description of both groups.

5.3.3. Task

The interpretation of wh-question is tested in LiSe-DaZ (Schulz & Tracy 2011) using a question-after-story task. The experimenter shows the child a picture and describes the depicted situation shortly. Afterward she asks the child a question that refers to one element on the picture or to the depicted situation. Importantly, the question can only be answered if the child is able to interpret the structure of the question correctly. The child can answer the question verbally by naming the appropriate constituent or non-verbally by pointing to the appropriate element on the picture.

At total 12 wh-questions (10 test items and two control items) were presented to each child. The control items should make the child familiar to the task, and therefore they were excluded from the analysis. Test items comprise six argument questions (2 x subject: *wer* 'who', 2 x accusative object: *wen* 'who-ACC', 2 x dative object *wem* 'whom') and four adjunct questions (2 x *wann* 'when', 2 x *womit* 'with what'). Typical test items for a subject wh-question, an object wh-question and an adjunct wh-questions are given in Example (20), Example (21), and Example (22), respectively.

(20) Example of a subject wh-question (Item 3, *Comprehension of wh-questions*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Ibo schimpft mit dem Hund. Der Hund wollte weglaufen, weil er ein lautes Geräusch gehört hat.*
'Ibo is railing at the dog. It wanted to break away because it heard a loud noise.'

Question: *Wer schimpft mit dem Hund?*
Who-NOM rail-3SG with the-DAT dog?
'Who is railing at the dog?'

Child: Ibo. / Der Junge.
'Ibo.' / 'The boy.'

(21) Example of an object wh-question (Item 5, *Comprehension of wh-questions*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Ibo hilft dem Hund aus der Tonne. Er ist eingesperrt und kann nicht alleine raus.*
'Ibo is rescuing the dog from the rubbish bin. It is locked and can't get out by itself.'

Question: *Wem hilft Ibo aus der Tonne?*
Who-DAT rescue-3SG Ibo from the-DAT bin?
'Whom is Ibo rescuing from the bin?'

Child: *Dem Hund. / Hund.*
'The dog.' / 'Dog.'

(22) Example of an adjunct wh-question (Item 4, *Comprehension of wh-questions*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Abend kaufen die Kinder Luftballons. Sie sind müde und gehen nach Hause.*
'In the evening the children are buying balloons. They are tired and are going home.'

Question: *Wann kaufen die Kinder Luftballons?*
When buy-3PL the-NOM children balloons?
'When are the children buying balloons?'

Child: *Abends.*
'In the evening.'

5.3.4. Data analysis

Children's responses were classified as target-like and as non-target-like. Table 5.2 summarizes which responses were coded as target-like and which as incorrect for the three wh-question types. A response was target-like if the child answered with a correct constituent. Note that also responses with ungrammatical case marking or without article were counted as target-like if the child named the constituent in question. An answer was coded as incorrect if the child reacted as follows: no response, yes/no response, response with a different constituent or an additional response.

Table 5.2. Coding of correct and incorrect responses in comprehension of wh-questions.

		Non-target-like responses	
Wh-question	**Target-like responses**	Different constituent	Additional response
Subject Question 'Who is railing at the dog?'	*Ibo* 'Ibo' *der Junge* 'the boy'	*der Hund* 'the dog' *schimpfen* 'rail'	*Sie spielen gar nicht mehr* 'They are not playing any more'
Object Question 'Whom is Ibo rescuing from the bin?'	*dem Hund* 'the dog' *ein Hund* 'a dog' *Hund* 'dog' *dem* 'him'	*Ibo* 'Ibo' *Lise* 'Lise' *Tonne* 'bin'	*Und dann gehen sie spielen* 'Then they are going to play'
Adjunct Question 'When are the children buying balloons?'	*Abends* 'In the evening' *Jetzt* 'Now' *Gleich* 'In a moment' *Wenn sie nach Hause gehen* 'If they are going home'	*Luftballons* 'balloons' *die Kinder* 'the children'	*In einem Geschäft* 'In a shop'

5.3.5. Results

This section presents the results regarding children's comprehension of wh-questions. In 5.3.5.1, the pace of acquisition across all wh-questions is considered, then the pace of acquisition of subject, object, and adjunct wh-questions is examined separately. The role of the external factors is investigated in Section 5.3.5.2.

5.3.5.1. Pace of acquisition

The results across all items for comprehension of wh-questions for the monolingual and the eL2 group are depicted in Figure 5.3.

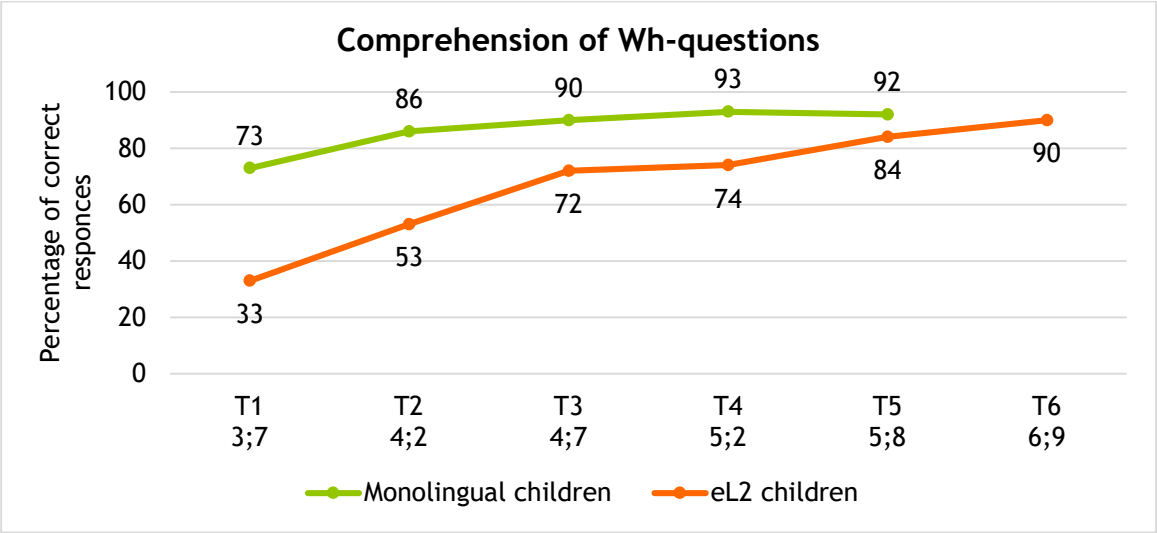


Figure 5.3. Proportion of correct responses of the monolingual and the eL2 group for comprehension of wh-questions.

The monolingual children responded correctly in 73% of the cases at age 3;7. They performed better over time, and at age 5;8 they responded correctly in 92% of the cases. The performance of monolingual children was above chance at each test round ($p<.000$ for each test round, T-test). The eL2 learners gave target-like response in only 33% of the cases at age 3;7. This performance was below chance ($p<.005$, T-test). The performance of the eL2 children improved within one year by about 40%. At age 4;8, they performed like the monolingual children at age 3;9; and one year later at age 5;8, they responded to 85% of questions correctly. At age 6;9, the eL2 children performed like one year younger monolingual children responding target-like in 90% of the cases. The performance of eL2 learners was above chance from the third test round ($p<.000$ for each test round, T-test).

As for the interpretation of telic and atelic verbs, spaghetti plots were plotted in the next step to investigate children's individual developmental paths. Figure 5.4 presents individual scores of each monolingual child across the five test rounds, and Figure 5.5 presents individual scores of each eL2 learner across the six test rounds. Regarding children's performance at the first test round, Figure 5.4 and Figure 5.5 revealed that the monolingual children responded more homogeneous than the eL2 children did. Moreover, most of the monolingual children answered to six or more items correctly,

while the eL2 children performed more heterogenic. Some eL2 learners performed very poor and responded to no or almost no wh-question target-like. Others responded correctly in about 50% of the cases. Only three eL2 learners responded to seven or more wh-questions target-like. More importantly, these spaghetti plots show that children differed a lot in their rate of change. Generally, the rate of change of the eL2 learners was greater than that of the monolingual children. Despite these differences between the monolingual and the eL2 children, at average all children improved their performance over time.

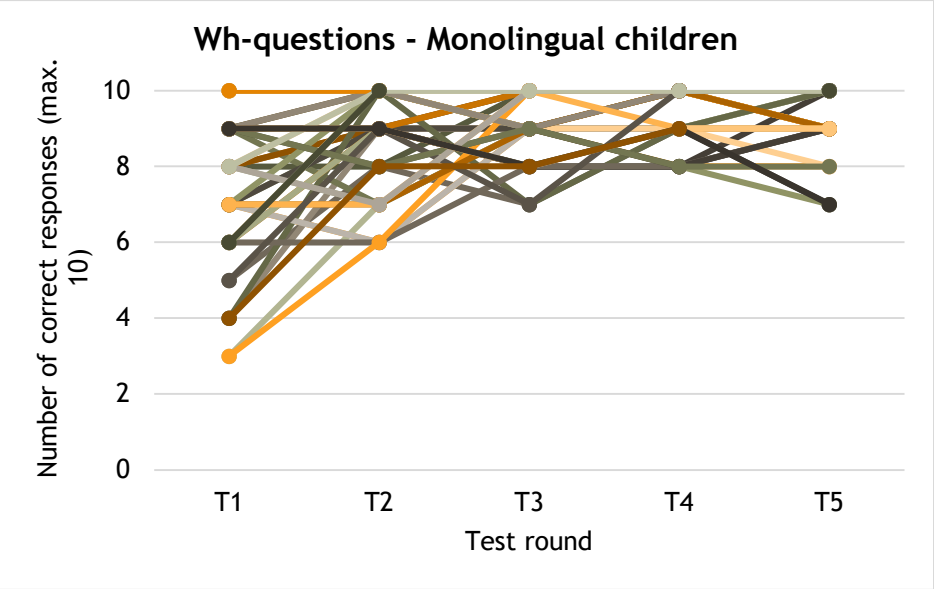


Figure 5.4. Individual development of the monolingual children in comprehension of wh-questions (10 items).

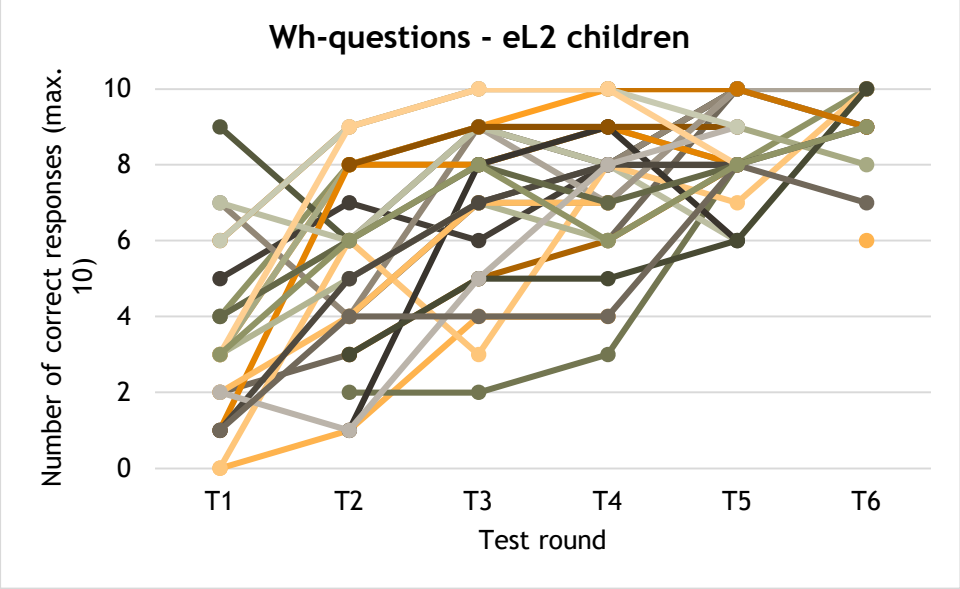


Figure 5.5. Individual development of the eL2 children in comprehension of wh-questions (10 items).

A mixed linear model analysis was performed over the number of correct responses to investigate children's developmental path toward target-like comprehension of wh-questions. The fixed effects are presented first. Table 5.3 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for comprehension of wh-questions.

Table 5.3. Fixed effect for comprehension of wh-questions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	6.6711	0.3120	86.1	21.38	<.0001
Group	-4.6930	0.4774	72.8	-9.83	<.0001
Age	0.2374	0.02233	235	10.63	<.0001
Age*Age[1]	-0.00520	0.000626	255	-8.31	<.0001
Group*Age[2]	0.1433	0.01739	89.9	8.24	<.0001

[1] Quadratic effect of age

[2] Interaction between acquisition type and age

With respect to the intercept, the children responded on average to about 7 out of 10 items correctly. The estimated difference in intercept between the monolingual group and the eL2 group was -4.6930 ($p<.0001$). This reveals that the eL2 children performed significantly poorer than the monolingual children at the first test round. In terms of children's development over time, there was a significant linear and quadratic effect of age. This indicates that the eL2 and the monolingual children improved their comprehension of wh-questions with increasing age. Compering the eL2 and the monolingual group, the analysis revealed that the estimated difference in the rate of change between the monolingual children and the eL2 children was 0.1433 ($p<.0001$). This means that the slope of the eL2 children was significantly steeper than the slope of the monolingual children. Thus, the eL2 learners had a significantly greater rate of change over time than the monolingual children had. Based on these results it can be assumed that the el2 learners' comprehension of wh-questions was significantly poorer than that of the monolingual children at age three. However, the eL2 children improved their performance significantly greater over time than the monolingual children did.

Turning now to the random effects, Table 5.4 summarized the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The

analysis revealed that the variance of individual intercept was significant. This significant variance between the participants can be explained by the group differences. The effect of random slope was not significant what indicates that the comprehension of wh-question improved in all children over time. However, the covariance between the random intercept and the random slope was negative. This means that the children who performed better at the first test round had a lower rate of change than the children with a poorer performance had.

Table 5.4. Random effects for comprehension of wh-questions.

Covariance parameter	**Estimate**	**Standard error**	***z* value**	***p* value**
Random intercept	2.5665	0.6697	3.83	<.0001
Covariance between random intercept and random slope	-0.05154	0.02104	-2.45	0.0143
Random slope	0.000968	0.000794	1.22	0.1115
Residual	1.4922	0.1426	10.46	<.0001

In summary, these analyses show that the eL2 learners comprehended the wh-questions significantly worse than the monolingual children did at the age of three. Moreover, the analyses revealed that despite this poorer performance at the first test round, the eL2 children had a significantly greater rate of change than the monolingual children had. This indicates that eL2 learners developed faster than the monolingual group toward the target-like comprehension of wh-questions.

In the following, the monolingual and the eL2 children's pace of acquisition is investigated with respect to the three question types (subject, object, adjunct) separately. First, the subject wh-questions are considered. Figure 5.6 summarizes the results for monolingual children across the five test rounds and for eL2 children across the six test rounds. The monolingual children performed at ceiling already at age 3;7. The eL2 learners responded to almost 60% of the subject wh-questions correctly at age 3;7. However, they improved on more than 30% within one year, and gave 90% target-like responses at age 4;7.

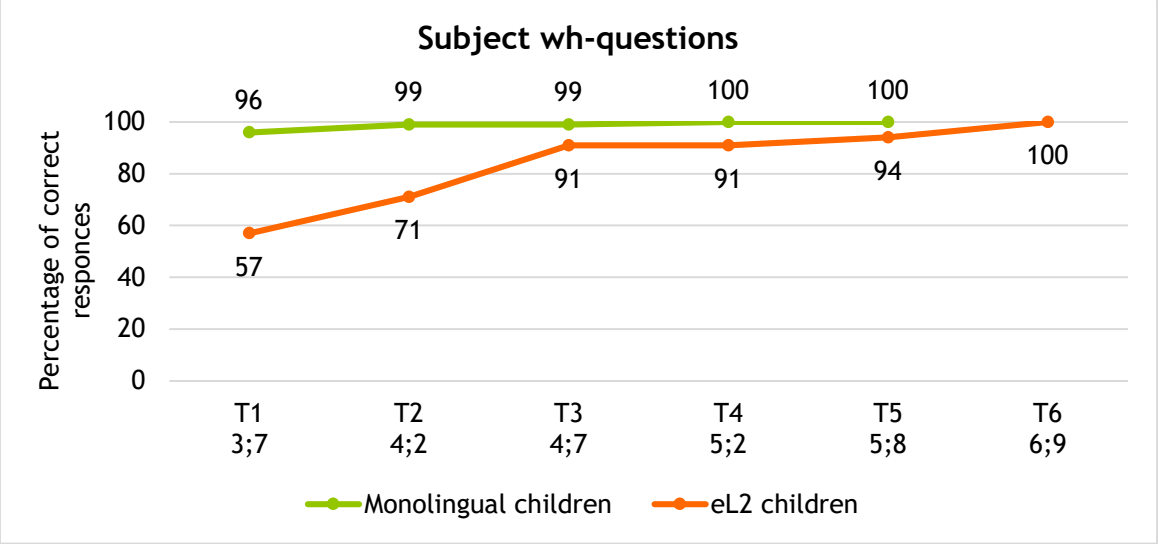


Figure 5.6. Proportion of correct responses of the monolingual and the eL2 group for comprehension of subject wh-questions (2 items).

The results of the mixed linear analysis regarding the pace of acquisition of subject wh-questions are presented in the following. First, the fixed effects are considered. Table 5.5 summarizes the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for the comprehension of subject wh-questions.

Table 5.5. Fixed effects for comprehension of subject wh-questions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	1.7889	0.06771	112	26.42	<.0001
Group	-0.8344	0,1010	86.1	-8.27	<.0001
Age	0.02878	0.005850	228	4.92	<.0001
Age*Age[1]	-0.00083	0.000166	216	-5.00	<.0001
Group*Age[2]	0.02982	0.004336	161	6.88	<.0001

[1] Quadratic effect of age

[2] Interaction between acquisition type and age

Regarding the intercept, the monolingual and the eL2 children responded on average to almost both subject wh-questions correctly. The estimated differential in intercept between the monolingual group and the eL2 group was -0.8344 (p<.0001). This indicates that the eL2 children performed significantly poorer than the monolingual children at the first test round. With respect to children's development over time, there was a significant linear and quadratic effect of age. This means that the eL2 learners and the monolingual

children improved their interpretation of subject wh-questions with increasing age. Compering the eL2 and the monolingual group, the analysis revealed that the estimated differential in the rate of change between the monolingual children and the eL2 children was 0.02982 (p<.0001). This means that the slope of the eL2 children was significantly steeper than the slope of the monolingual children. Thus, the rate of change of the eL2 children was significantly greater than that of monolingual children was. In sum, these results suggest that although the el2 learners comprehended the subject wh-questions significantly poorer than the monolingual children at age of three, they improved their performance over the time significantly greater than the monolingual children did.

With respect to the random effects, Table 5.6 lists the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of individual intercept was significant. This significant variance between the participants can be explained by the group differences. There was no effect of the random slope. This means that all children improved their comprehension of subject wh-question over the time. The covariance between the random intercept and the random slope was negative. This indicates that the children who had a high intercept showed a shallower slope than the children with a lower intercept did. This means that children who performed poor at the first test round improved their comprehension of subject wh-questions more than children with better performance at age three.

Table 5.6. Fix effects for comprehension of subject wh-questions.

Covariance parameter	**Estimate**	**Standard error**	***z* value**	***p* value**
Random intercept	0.06941	0.02737	2.54	0.0056
Covariance between random intercept and random slope	-0.00138	0.000875	-1.58	0.1149
Random slope	3.29866	0.000033	0.10	0.4600
Residual	0.1168	0.01037	11.26	<.0001

Figure 5.7 depicts the results regarding the object wh-questions for the monolingual and for the eL2 group. Whereas the monolingual children gave about 70% correct responses already at age 3;7, the eL2 children answered only about 30% of the object wh-questions target-like. The performance of the monolingual children improved, and at age 4;7, they gave more than 90% of correct responses. The scores of the eL2 children improved even more within one year since at age 4;7, they already responded in 80% of

the cases target-like. However, during the next two years, the improvement was not so steep anymore. At age 6;9, the eL2 learners answered about 90% of the object wh-questions correctly and performed very similar to one year younger monolingual children.

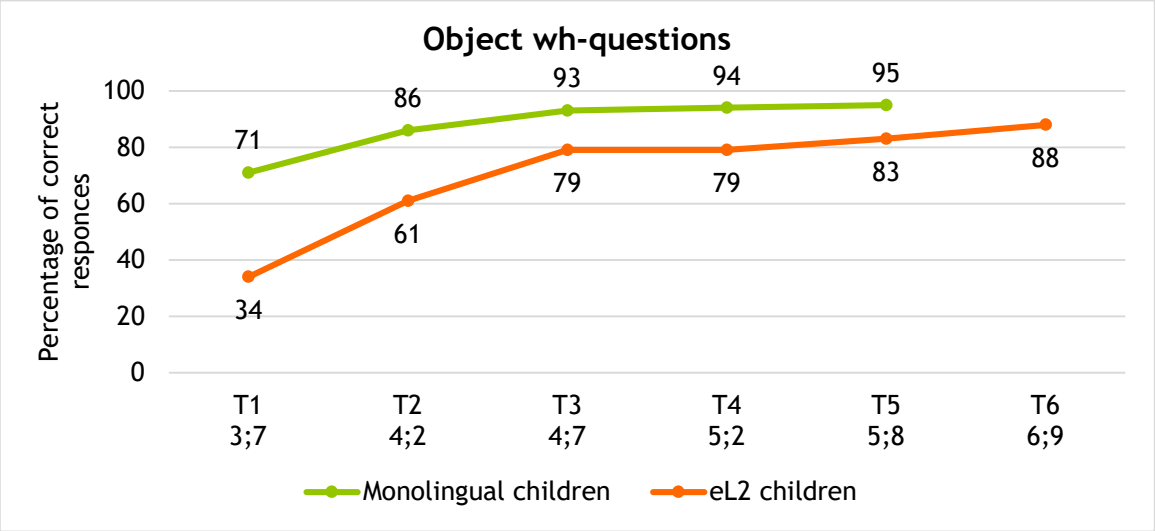


Figure 5.7. Proportion of correct responses of the monolingual and the eL2 group for comprehension of object wh-questions (4 items).

As for the subject wh-questions a mixed linear analysis was performed to investigate children's pace of acquisition. Regarding the fixed effects, Table 5.7 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for comprehension of object wh-questions.

Table 5.7. Fixed effects for comprehension of object wh-questions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	2.4671	0.1685	93.5	14.64	<.0001
Group	-1.6399	0.2551	75.9	-6.43	<.0001
Age	-0.00275	0.01313	258	-7.44	<.0001
Age*Age[1]	-0.00275	0.000370	256	-7.44	<.0001
Group*Age[2]	0.05049	0.009964	134	5.07	<.0001

[1] Quadratic effect of age

[2] Interaction between acquisition type and age

With respect to the intercept, the children responded in average to 2.5 out of four object wh-questions. There was a significant effect of group for the intercept. This

indicates that the eL2 children performed significantly poorer than the monolingual children did at the age of three. Moreover, there was a linear and a quadratic effect of age meaning that the children comprehended the object wh-questions better with the increasing age. Compering the eL2 and the monolingual children, the analysis showed that the estimated difference in the rate of change between the monolingual children and the eL2 children was significant. This indicates that the eL2 children had a significantly steeper slope than the monolingual children had. Thus, the comprehension of object wh-questions improved significantly more in eL2 learners over time than in monolingual children.

Table 5.8 summarized the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values for random effects. The analysis revealed that the variance of individual intercept was significant. This can be explained by the group differences. The effect of random slope was not significant what indicates that all children improved their comprehension of the object wh-questions with increasing age. The covariance between the random intercept and the random slope was negative, meaning that the children who had a high intercept showed a shallower slope than the children with a lower intercept did. Thus, children who performed better at first test round improved their comprehension of object wh-questions more than children with poor comprehension of object wh-questions did.

Table 5.8. Random effects for comprehension of object wh-questions.

Covariance parameter	**Estimate**	**Standard error**	***z* value**	***p* value**
Random intercept	0.6186	0.1857	3.33	0.0004
Covariance between random intercept and random slope	-0.01226	0.005724	-2.14	0.0321
Random slope	0.000167	0.000198	0.84	0.1992
Residual	0.5518	0.05029	10.97	<.0001

Finally, the children's performance on adjunct wh-questions is described. The results are depicted in Figure 5.8. Similar to subject and to object wh-questions, the eL2 learners performed worse than the monolingual children at age 3;7. Whereas the monolingual children responded to about 65% of adjunct wh-questions correctly, the eL2 children answered only 20% of them target-like. The eL2 children's performance improved very fast, and one year later, they responded to almost 60% of the questions correctly. The performance of monolingual children improved as well. At age 5;8, they responded in

about 85% of the cases correctly suggesting that adjunct wh-questions are not completely acquired at this age. The eL2 learners responded to 80% of the adjunct wh-questions target-like at age 5;8, and to 87% one year later. These results indicate that also el2 learners did not acquire adjunct wh-questions completely at the age of six.

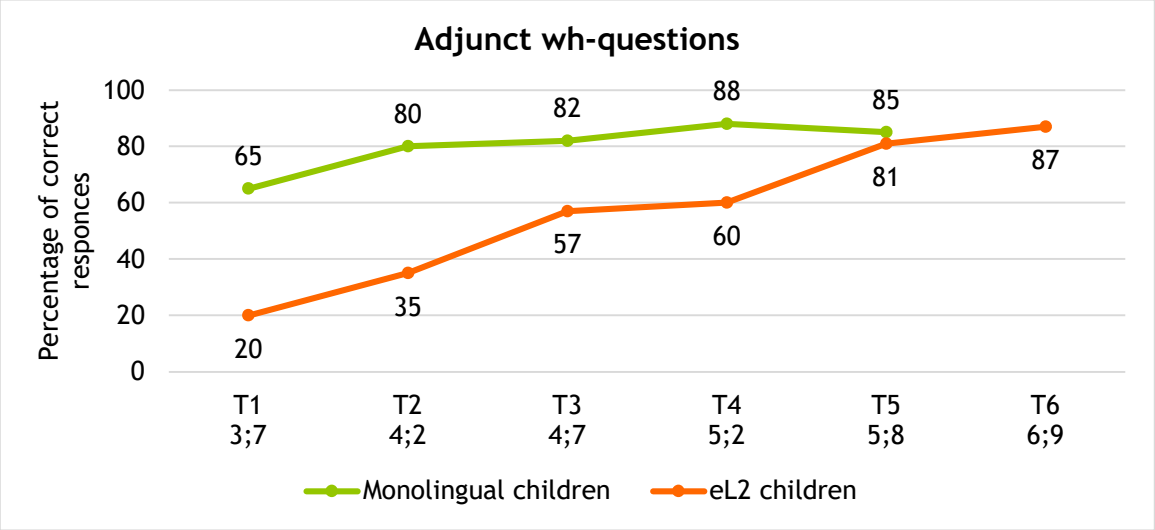


Figure 5.8. Proportion of correct responses of the monolingual and the eL2 group for comprehension of adjunct wh-questions (4 items).

Next, the results of the mixed linear analysis for the adjunct wh-questions are presented. Table 5.9 summarizes the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for comprehension of adjunct wh-questions.

Table 5.9. Fixed effects for comprehension of adjunct wh-questions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	2.4190	0.1654	89.1	14.62	<.0001
Group	-2.1614	0.2456	67.7	-8.80	<.0001
Age	0.08292	0.01489	233	5.57	<.0001
Age*Age[1]	-0.00157	0.000421	282	-3.72	0.0002
Group*Age[2]	0.06047	0.01133	65.4	5.34	<.0001

[1] Quadratic effect of age

[2] Interaction between acquisition type and age

The analysis showed that at average all children responded to 2.4 adjunct wh-questions target-like at the age of three. There was a significant effect of group for the

intercept. This indicates that the eL2 children performed significantly worse than the monolingual children at this age. Regarding the children's development over time, the effect of age was linear and quadratic significant meaning that children's comprehension of adjunct wh-questions improved with the increasing age. Moreover, the analysis revealed that the interaction of the group by the age was also significant. This result means that the slope of the eL2 children was significantly steeper than the slope of the monolingual children. Thus, eL2 learners had a significantly greater rate of change than the monolingual children had.

Concerning the random effects, Table 5.10 summarizes the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of individual intercept was significant. This significant variance between the participants can be explained by the group differences. The effect of random slope was not significant what indicates that all children comprehend adjunct wh-questions better with the increasing age. The covariance between the random intercept and the random slope was negative. This means that the children who had a high intercept showed a shallower slope than the children with a lower intercept did. Thus, children with poor comprehension of adjunct wh-questions at first test round improved more over time than children with good performance did.

Table 5.10. Random effects for comprehension of adjunct wh-questions.

Covariance parameter	**Estimate**	**Standard error**	***z* value**	***p* value**
Random intercept	0.4495	0.1861	2.42	0.0078
Covariance between random intercept and random slope	-0.01021	0.007967	-1.28	0.2000
Random slope	0.000396	0.000406	0.98	0.1646
Residual	0.6328	0.06381	9.92	<.0001

In summary, the analyses of subject, object, and adjunct wh-questions separately revealed that the eL2 learners comprehended the three question types significantly poorer than monolingual children at the age of three. Moreover, the results indicate that the eL2 children had a significantly greater rate of change than the monolingual children. This suggests that the eL2 children developed faster than the monolingual children toward the target-like comprehension of the different wh-question types. Moreover, children's development over time differed depending on wh-question type. The results indicate that the monolingual children acquired subject wh-questions first, and then object wh-

questions. Adjunct wh-questions made difficulties for some monolingual children even at the age of 5;8. The same developmental pattern was found in the eL2 learners. The adjunct wh-questions are difficult for the eL2 children as well and are not completely acquired at the age of six.

5.3.5.2. The role of external factors

In terms of the role of the external factors, first their impact on children's intercept was examined for each factor separately. The results showed that gender, mother's educational background, father's educational background, and children's non-verbal IQ did not influence the monolingual and the eL2 children's comprehension of wh-questions at the first test round. Since no significant effects for the intercept were found, the role of external factors on the development over time was not investigated.

5.4. Discussion

This substudy investigated the development of comprehension of wh-questions in monolingual and in eL2 children. Concerning the pace of acquisition, it was shown that eL2 learners interpreted wh-questions significantly poorer at the age of three than monolingual children did, what confirms hypothesis (H1.1). Additionally, the analyses of subject, object, and adjunct wh-questions separately revealed that the eL2 learners interpreted the three question types significantly poorer than monolingual children at the age of three, confirming hypothesis (H1.2). eL2 children had a significantly greater rate of change towards target-like interpretation of wh-questions than the monolingual children, what confirms hypothesis (H1.3). The greatest improvement in comprehension of wh-questions occurred between ages 3;7 and 4;7 when the performance of eL2 learners increased 40%. Significantly greater rate of changes was also found for each type of wh-questions as was predicted in hypothesis (H1.4). These findings are in line with the previous results from cross-sectional (Schulz et al., 2008) and from longitudinal studies (Schulz, 2013; Schulze, 2012). Faster development of eL2 children was expected for phenomena that are acquired early in monolingual children. Wh-questions belong only partially to early acquired structures since only subject and object wh-questions are acquired by the age of five by monolinguals. Thus, these results indicate that eL2 learners can faster acquisition of structures which generally need more time to be mastered in monolingual children.

The next goal of this substudy was to examine the role of the external factors on children's comprehension of wh-questions. The analyses revealed that gender, mother's educational background, father's educational background, and non-verbal IQ did not affect children's performance at the age of three, confirming hypothesis (H2.1). Since no effects for the intercepts were found, the hypothesis (H2.2) formulating for the role of the external factors on the rate of change could not be tested. These results correspond with previous findings (Schulz & Tracy, 2011; Schulz, 2013), where no correlations between children's language performance and their mother's educational background were reported. Concerning the non-verbal IQ, the results of this study partially differ from the previous findings. A correlation between the non-verbal IQ and the eL2 children's comprehension of wh-questions was found in LiSe-DaZ (Schulz & Tracy, 2011). Schulze (2012) also found that non-verbal IQ partially predicted eL2 children's comprehension of wh-questions. In contrast, Schulz (2013) did not report any correlation between eL2 children's non-verbal IQ and their performance in comprehension of wh-questions. The findings of the present study do not indicate that eL2 learners' non-verbal IQ can predict their interpretation of wh-questions. This supports the assumption that wh-questions belong to rule-based phenomena of German.

In addition, the present analyses show that the rate of change towards target-like interpretation of wh-questions differs with respect to question type. The comprehension of subject wh-questions was acquired first at age 4;7 when eL2 children responded to these questions correctly in 91% of cases. Object wh-questions are comprehended one year later target-like at age 5;7. However, the greater rate of change was observed between the age of 3;7 and the age of 4;7 when eL2 children's comprehension increased 45%. Adjunct wh-question caused the most difficulties to eL2 children and their comprehension is not fully acquired at age 6;9. The rate of change towards their target-like interpretation differed from the rate of change towards target-like interpretation of object wh-questions since children's performance in adjunct questions improved more constantly across ages. The same sequence of acquisition of question types was found in monolingual children (Siegmüller et al., 2005) what indicates that eL2 children have the same developmental pattern as monolingual children. The findings of this study are also in line with the results from Schulz (2013). Moreover, with respect to timing in L1 acquisition, the results show that eL2 learners had a faster development of early acquired wh-question types (subject, object) and for late acquired adjunct wh-questions.

Future studies on comprehension of adjunct wh-questions are needed since it still reminds unclear when eL2 learners reach their target-like interpretation. In addition,

further research should examine non-target-like responses of eL2 children in more details. Moreover, different method should be applied since as was shown by Blume (2012) for monolingual children, the task affects children's performance.

6. Acquisition of sentential negation

Chapter 6 focuses on acquisition of sentential negation. It is organized as follows. Section 6.1 summarizes syntactic, semantic, and pragmatic properties of sentential negation. Section 6.2 reviews previous research on the acquisition of negation. First, in Section 6.2.1 the production and the comprehension of negation in monolingual acquisition are described. Section 6.2.2 focuses on the acquisition of sentential negation in eL2 acquisition. In Section 6.3, the current study on comprehension of negation in monolingual and in eL2 children is presented. Section 6.3.1 contains the research hypotheses, and Section 6.3.2 gives an overview of the participants. Section 6.3.3 describes the subtest *Comprehension of Negation* from LiSe-DaZ (Schulz & Tracy, 2011), and Section 6.3.4 explains the data analysis. In Section 6.3.5, the results are presented in terms of pace of acquisition, impact of external factors, and individual developmental patterns of eL2 learners. The results are discussed in Section 6.4.

6.1. Theoretical aspects of sentential negation in German

Sentential negation is assumed to occur in all languages, but languages differ in the way they express negation lexically and syntactically (Dahl, 1993). In the following sections, syntactic, semantic, and pragmatic aspects of sentential negation in German are summarized and discussed.

6.1.1. Syntactic aspects of negation

Sentence negation belongs to the non-anaphoric negation (Bloom, 1970). Non-anaphoric negation is defined as denoting a "negative relationship [that] holds between *neg* and some part or the whole of the sentence or phrase with which *neg* occurs in construction" (Wode, 1977:90). In contrast, anaphoric negation corrects parts of an aforementioned utterance. In German, both negation types have in common that the negation is expressed by a free morpheme, *nein* 'no' as a sentence equivalent in anaphoric negation, *nicht* 'not', *kein* 'no' as a determiner, and *niemals* 'never' in the case of non-anaphoric negation.

Sentence negation is exclusively expressed by the negation particle *nicht* 'not' in German. The precise syntactic analysis of the sentential negator *nicht* is still a matter of debate. Pollock (1989) assumes that *nicht* projects a maximal phrase of its own (NegP). Haegeman (1995) formulated analog to the Wh-Criterion by Rizzi (1996), the Neg-Criterion. According to this criterion, a negation operator must be in a specifier-head

relation with a head carrying the Neg-feature and vice versa. Depending on language, the head or the negation operator must not be realized phonologically. Haegman (1995) argued that in German, the negation particle *nicht* 'not' is placed in the specifier and the head of NegP is empty (see also Meisel (1997) and Hamann (2000), but Haider (2004) for counterarguments). If *nicht* would be placed in the negation head, the finite verb must be cliticized at the negation head since the heads cannot skip any head position by movement. The adopted syntactic structure of negation in German in depicted in Figure 6.1.

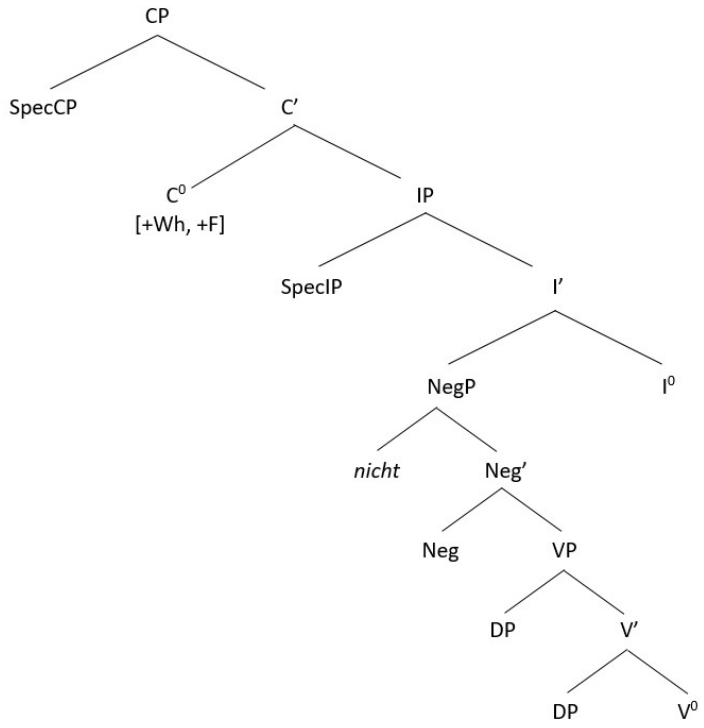


Figure 6.1. Syntactic structure of negation in German (based on Meisel (1997)).

With respect to the position of the negation element, there is a strong tendency for the negation element to be realized adjacent to the verb (Dahl, 1979). In German however, sentence negation may be realized either directly adjacent as in Example (1) or non-adjacent as in example (2) to the verb. Whether *nicht* occurs adjacent or non-adjacent to the verb depends on scrambling. Definite arguments and [+specific] indefinite arguments of the verb must be scrambled in front of the negator (Steube, 2006). Accordingly, to achieve an interpretation of *nicht* as sentence negation in Example (2) the scrambled constituents *dem Jungen* 'the-DAT boy' and *den Ball* 'the-ACC ball' have to be reconstructed within the scope of the negator (Sudhoff, 2008). Prepositional adjuncts like *mit dem Skateboard* 'with the-DAT skateboard' in Example (1a), on the

other hand, do not scramble over the negation particle *nicht*. The same restriction holds for example for the extended verbal complex consisting of constituents as predicates as in (1c), as well as for modal adverbials as in (1d) that cannot scramble over the sentence negation particle *nicht* (Steube & Sudhoff, 2007).

(1) Verb adjacent negation

a. *Die Ente schwimmt **nicht**.* (Schulz & Tracy, 2011:148)
The duck swim-3SG not
'The duck is not swimming.'

b. *Der Junge fährt **nicht** mit dem Skateboard.* (Schulz & Tracy, 2011:149)
the boy ride-3SG not with the-DAT skateboard
'The boy is not riding a skateboard.

c. *Die Studentin war nicht in der Universität.* (Steube, 2006)
The student was not in the-DAT university
'The student was not at the university.'

d. *Die Studentin tanzt nicht gut.* (Steube, 2006)
the student dance-3SG not good
'The student doesn't dance well.'

e. *Ich sehe, dass die Ente **nicht** schwimmt.*
I see that the duck not swim-3SG
'I see that the duck is not swimming.'

(2) Verb non-adjacent negation

*Das Mädchen gibt dem Jungen den Ball **nicht**.* (Schulz & Tracy, 2011:148)
the girl give-3SG the-DAT boy the-ACC ball not.
'The girl does not give the ball to the boy.'

In addition, the examples above show that the position of the negation particle *nicht* is closely related to the placement of the finite verb. Whereas sentence negation is placed in a fixed position within the sentence structure, the position of the finite verb varies with respect to sentence type. Since German is a V2 language, in a main clause the finite verb moves to the second position regardless of which constituent occurs in sentence initial position. In this case, the finite verb precedes *nicht* as shown in examples (1a) to (2d). In a subordinate clause on the other hand, the finite verb stays sentence final, and the negation particle precedes the finite verb as illustrated in Example (1e).

6.1.2. Semantic aspects of negation

Regarding the semantic properties of negation, sentential negation differs from contrastive negation, which is expressed by the phonologically identical particle *nicht* 'not' in German. Sentential negation denies the proposition of a sentence, while contrastive negation has scope only over the constituent it is adjoined to (Steube & Sudhoff, 2007). This constituent is focused and is marked with contrasting stress. Typically, contrastive negation offers an alternative to the negated constituent that is added by *sondern* 'but'. Examples for sentential and contrastive negation are given in Example (3) and Example (4), respectively. Focused constituents are marked by capital letters.

(3) *Das Mädchen gibt dem Jungen den Ball nicht.*
the girl give-3SG the-DAT boy the-ACC ball not
'The girl does not give the ball to the boy.'

(4) *Das Mädchen gibt dem Jungen nicht den BALL, sondern den Schläger.*
the girl give-3SG the-DAT boy not the-ACC ball, but the-ACC racket
'The girl does not give the BALL to the boy, but the racket.'

In Example (3) the proposition 'the girl gives the ball to the boy' is negated, i.e., the sentence meaning is 'it is not the case that the girl gives the ball to the boy'. Example (4) means 'the thing that the girl gives to the boy is not the ball' or 'the girl gives something to the boy, and it is not a ball'.

6.1.3. Pragmatic aspects of negation

In general, negation is used to express deviations from expectations (Givón, 1978; Glenberg & Robertson, 1999; Horn, 1989; Wason, 1972). First, negated sentences occur if the negated proposition was explicitly mentioned before by the discourse partner as illustrated in Example (5). Furthermore, negated sentences occur if the proposition being negated can be inferred from the discourse context as can be seen in Example (6).

(5) A: I was told you went to Paris last month. (Kaup et al., 2007:261)
B: No, I did not.

(6) A to B: Guess what, my train was not late this morning. (Kaup et al., 2007:261)
Context: The speaker's train is usually late.

Like affirmative sentences, negated sentences are often used in situations where the actual context decides about truth or falsity of a negated statement. Thus, the interpretation of a negated sentence requires matching the negated proposition with the actual discourse context. True negatives are true in the given contexts, and false negatives provide an incorrect description of a situation. This is demonstrated in Examples (7) and (8) (Schulz & Tracy, 2011:148-149).

(7) True negative
Der Junge bringt Lise den Helm nicht.
'The boy is not giving the helmet away from Lise.'
Context: A boy is throwing the helmet away from Lise.

(8) False negative
Lise streichelt im Park den Hund nicht.
'Lise is not caressing the dog in the park.'
Context: Lise is caressing the dog.

The processing of negation was investigated in many studies in the 1960s and 1970s. Most of these studies employed a sentence verification tasks in which the participants were asked to verify sentences against background knowledge (Arroyo, 1982; Eiferman, 1961; Wales & Grieve, 1969; Wason, 1961a; Wason & Jones, 1963) or against a picture that was presented before or after the corresponding sentence (Carpenter & Just, 1975; Clark & Chase, 1972; Just & Clark, 1973; Trabasso, Rollins & Shaughnessy, 1971). Other studies employed sentence completion task (Donaldson, 1970; Wason, 1961a, 1961b, 1965). All these studies found that for adults negated sentences are more difficult to parse than affirmative sentences, as evidenced by longer processing times and mostly higher error rates for negative sentences compared with affirmative sentences. However, in most of the studies, the negative sentences were presented without a context that would have pragmatically legitimized the negation. Thus, the participants needed to infer such a legitimizing context retrospectively. It should be noted that even if a pragmatically felicitous context was given, negative sentences were often more difficult to process than the affirmative sentences (Glenberg & Robertson, 1999; Wason, 1965).

Moreover, studies overwhelming employed a picture verification task found an impact of the sentence's truth value on their processing. Whereas true affirmatives are easier to parse than false affirmatives, true negatives are more prone to errors than false negatives (Arroyo, 1982; Eiferman, 1961; Trabasso et al., 1971; Wason, 1972). Kaup, Lüdtke & Zwaan (2006, 2007) argue that this effect is caused by the strategy used to parse the sentences. For true affirmative sentences, the predicate in the sentence matches the

predicate depicted on the picture, whereas for false affirmative the two predicates mismatch. This explains why false affirmative take longer to verify than true affirmatives. In contrast, in false negative sentences, the picture matches the action that is being negated. In true negative sentences, the picture does not match the negated action. This explains why true negatives are more difficult to parse than false negatives.

In sum, the studies demonstrated that context and pragmatics of negated sentences crucially affect their interpretation for adults.

6.2. Previous research on acquisition of sentential negation

Sentential negation possesses complex syntactic, semantic, and pragmatic properties that all must be mastered by the language learner. The child must distinguish sentential negation from contrastive negation. To put it differently, she must learn that sentential negation denies the whole proposition of a sentence, and not only a specific constituent. Moreover, the child must recognize that the negation particle *nicht* 'not' may occur in different positions in a German sentence (i.e., verb adjacent and verb non-adjacent) and to learn constrains, which determine these possibilities. Additionally, child's task is to learn that negated sentence can be true or false in the given context. That is the child must acquire the difference between true and false negatives. In the following two sections an overview of the studies on the acquisition of negation in monolingual children (Section 6.2.1.) and in eL2 learners (Section 6.2.2.) is given.

6.2.1. Monolingual acquisition of sentential negation

Production of negation. Several studies have investigated the production of negation in monolingual language acquisition. For German, the study by Clahsen (1988) and the study by Wode (1977) are the most comprehensive ones. Based on spontaneous speech data of two monolingual children, Wode (1977) proposed four developmental stages toward the acquisition of negation. At Stage I, children use phonetic variant of *nein* 'no' in isolation. Around age 1;7, children enter Stage II realizing *nein* in a clause-external position. Following Wode (1977), this pre-sentential *nein* can either function as anaphoric negation or as a non-anaphoric negation that is established at the semantic level, but not fully acquired at the syntactic level. At Stage III, *nicht* 'not' is used sentence internally, gradually replacing the non-anaphoric structures with *nein*. Although main aspects of the syntactic realization of sentence negation are in place now, children still fail to obligatory scramble noun phrases. Thus, they realize the finite verb and the negator in adjacent

position resulting in a contrastive reading as in Example (9a), while actually intending the meaning to be a sentence negation in Example (9b).

(9) a. * Das Mädchen isst nicht den Bonbon.
The-NOM girl eat-3SG not the-ACC candy
'The girl is not eating the candy.'

b. Das Mädchen isst den Bonbon nicht.
The-NOM girl eat-3SG the-ACC candy not
'The girl is not eating the candy.'

Clahsen (1988) analyzed the spontaneous speech production of six children regarding their production of negation. He assumed that the acquisition of negation relates to the acquisition of verb placement and subject-verb-agreement in German, and thus cannot be investigated in isolation. At the developmental stage at which the verb second position and subject-verb-agreement are not acquired yet, *nicht* 'not' occurs in the pre-verbal and in the post-verbal position. If the negator occurs in the pre-verbal position, the verbs are always nonfinite. Importantly, the pre-verbal *nicht* occurs verb adjacent or verb non-adjacent as illustrated in Example (10). The post-verbal *nicht* is also found with finite verbs. In contrast to the pre-verbal *nicht*, the negator is always placed adjacent to the verb even if in the target-like structure the scrambling is required as shown in Example (11). Clahsen (1988) analyzed the structures with a verb and a post-verbal *nicht* as syntactic islands, which cannot be affected by movement operations at this stage. Scrambling takes place once the child masters the verb second and subject-verb-agreement. At the same time, the structures with a pre-verbal *nicht* disappear.

(10) a. Julia schere nich darf (2;9, Clahsen, 1988:13)
Julia scissors not is allowed
b. Mone nich das eis habe (2;0, Clahsen, 1988:12)
Mone not the ice-cream have
(11) a. mag nich kuche backe (1;10, Clahsen, 1988:12)
want-3SG not cake bake
b. brauche nich lala (=Schnuller) (2;0, Clahsen 1988:12)
need-1SG not dummy

Recent findings by Dimroth (2009) and Winkler (2006) provide further support for a close relationship between negation and finiteness in child language. More precisely, Dimroth's (2009) and Winkler's (2006) results show that the marking of finiteness is

realized significantly more frequent in negated contexts than in affirmative ones around the age of two. Both authors argued that sentential negation functions as a trigger for the establishment of the category of finiteness in the monolingual acquisition. Hamann (2000) however noted that there is some individual variation between the children with respect to the finiteness marking and negation. In the data she analyzed there were also children in which utterances the distribution of negation and finiteness marking was counterbalanced.

Taking together, the results on the production of negation indicate that the negation particle *nicht* 'not' occurs very early in the monolingual acquisition. The target-like production of negated sentence is acquired rapidly and is linked with the acquisition of finiteness and verb placement in German.

Comprehension of negation. Detailed research on the interpretation of negated sentences in children is still lacking. A few studies examined the interpretation of sentential negation only (Gilkerson, Hyams & Surtiss, 2004; de Villiers & Tager Flusberg, 1975; Wojtecka, Koch, Grimm & Schulz, 2011, 2013). Most comprehension studies have focused on older children and investigated the interaction of sentential negation and other structural phenomena, including definite and indefinite noun phrase (Rumain, 1988), scrambling of indefinite noun phrases (Krämer, 1998; Unsworth, 2005), and scope ambiguities caused by universal quantification (Gualmini, 2004; Musolino & Lidz, 2006).

Gilkerson et al. (2004) investigated how sentence negation is processed in 14- to 25-months-old monolingual English-speaking children. Using a preferential looking paradigm, they found that the children already had a basic understanding of sentential negation. When presented with a negated sentence, children looked for a shorter period at the picture that was negated than at the same picture accompanied with an affirmative sentence. To react this way, children had to identify the negator and possess at least some understanding of its negating properties. Accordingly, the authors concluded that children as young as 14 months can distinguish between sentences with and without the negation element *not*.

Replicating Wason's study (1965) with younger participants, de Villiers & Tager Flusberg (1975) used a sentence completion task with English-speaking children aged two to five. Sets of six or seven objects were presented to the child. Each set consists of similar or rule items and one item that was different (e.g., seven cars and one baby bottle). Then the experimenter pointed to one of the objects and asked 'This is a __?' or

'This is NOT a __?', thus eliciting true affirmatives or true negatives. De Villiers & Tager Flusberg (1975) hypothesized that responding a negative probe for the exceptional item is more plausible and therefore easier than responding a negative probe for one of the similar items. This hypothesis was confirmed for all age groups. The results show that the plausible negated sentences were understood before the implausible, and that children of all ages processed plausible negatives faster. If embedded in a plausible context, four-year-old children showed no differences in the interpretation of true negatives and affirmative sentences. However, false negatives were not tested with this design.

In a pilot study, Wojtecka et al. (2011) investigated how the syntax (i.e. structural position: verb adjacent vs. verb non-adjacent) and the pragmatics of sentence negation (i.e. context matching: true negatives vs. false negatives) influence children's interpretation of negated sentences. The comprehension of negated sentences was assessed in a small sample of German-speaking children (n = 34) using a truth-value-judgment task from LiSe-DaZ (Schulz & Tracy, 2011). A total of 12 negated sentences were presented to each child. Two test conditions varied the syntax (verb adjacent vs. verb non-adjacent), and two the pragmatics of the negated sentence (false negative vs. true negative), each comprising six test items. The children were tested twice at age 3;7 and at age 4;2. For a detailed description of the task see Section 6.3.3.

With respect to the syntactic factor, the results show that the order of negation particle *nicht* 'not' and the finite verb affect monolingual children's comprehension of negated sentences. Verb adjacent negation was easier to interpret than verb non-adjacent negation at age three to four. Regarding the pragmatic aspects of negation, German-speaking children - like adults - performed better on false than on true negatives at both test rounds. Based on these results, the authors proposed that false negatives are acquired before true negatives. Concerning the interaction between syntactic and pragmatic aspects of sentential negation, a regression analysis revealed that monolingual children's performance on negation comprehension can be better predicted by the pragmatic factor *context matching* than the syntactic factor *structural position*.

However, a limitation of this study was that it could not specify the acquisition sequences, since at the age of 4;2 half of the children still had not mastered either true or false negatives. Wojtecka et al. (2013) extended the data basis of the pilot study by Wojtecka et al. (2011) testing a larger group (n = 42) of German-speaking children at ages 3;7, 4;2 and 4;7 in a longitudinal design with the same task. As predicted monolingual children's performance on false negatives was significantly better than on true negatives

at ages 3;7 (85% vs. 63%), and 4;2 (90% vs. 66%). At age 4;7, no significant difference between the two conditions was found (91% vs. 81%).

Regarding the acquisition path for the interpretation of negated sentences, the results of Wojtecka et al. (2013) support the three-stage model, first suggested in Wojtecka et al. (2011). Monolingual children start without proper knowledge of either false negatives or true negatives. At the next stage, children master false negatives, and finally, they master true negatives as well resulting in target-like performance on both conditions. 32 out of 42 children (76%) follow this acquisitional sequence. No clear developmental path could be observed for ten out of 42 children (24%) for two reasons. These children either gave random responses, i.e., they guessed, or consistently responded with *yes* to all test items. Such a response pattern may reflect a yes-bias, which has been argued to occur if a child is not able to perform a task (Siegal, 1997).

In sum, the studies by Wojtecka et al. (2011) and by Wojtecka et al. (2013) show that German-speaking children perform significantly better on false negatives than on true negatives at ages 3;7, and 4;2. Furthermore, analysis of individual response patterns indicates that false negatives are acquired before true negatives for the majority of monolingual children.

6.2.2. eL2 acquisition of sentential negation

Production of negation. Generally, it is assumed that eL2 learners acquire negation in the same stages as monolingual children (Schulz & Tracy, 2011). Thus, they first produce sentence external negator *nein* 'no' before they used the negation particle *nicht* 'not'. To date, only one study examined the production of *nicht* 'not' in more detail. Kroffke & Rothweiler (2006) investigated spontaneous speech data of five eL2 children aged between three and four. The analysis revealed that the younger child used *nicht* 'not' already after three months of exposure to German. Moreover, the eL2 children placed from early on the negation particle target-like with respect to the finiteness of the verb. This means that *nicht* occurred postverbal if the verb was finite and in verb second position. In sentences with infinitivals in verb final position, the negation particle was used preverbally. Scrambling of object in front of the negator was acquired gradually. Kroffke & Rothweiler (2006) conclude that eL2 learners acquire negation similar to monolingual children, and correctly recognize the position of the negation particle in German.

Comprehension of negation. To date only the pilot study by Schulze (2012) investigated comprehension of sentential negation in eL2 children. The participants were the same eL2 learners and monolingual children as for verb meaning and wh-questions. Children's interpretation of negation was tested again using the subtest *Comprehension of Negation* from LiSe-DaZ (Schulz & Tracy, 2011) that is described in Section 6.3.3. The monolingual group performed significantly better than the eL2 group at the age of 3;7 (75% vs. 54%). However, the variance at T1 was larger in the eL2 group than in the monolingual group. This suggests that the individual percentage of correct responses in the eL2 group was more variable than in the monolingual group. Regarding the developmental path towards correct interpretation of sentential negation, eL2 children had a significantly greater rate of change than monolingual children did. This means that eL2 children's performance improved to a higher extent over the three test rounds than monolingual children's performance. Note however that the percentage of correct responses in the eL2 group increased only by 15% over one year (54% at 3;7 vs. 67% at 4;6). Moreover, the results indicate that even monolingual children do not master the comprehension of sentential negation at age 4;6 since they responded only to 86% of items target-like.

To sum up, previous research on the acquisition of sentential negation shows that monolingual children do not have a target-like interpretation of this structure at age four. Four-year-old German-speaking children performed better on false negatives than on true negatives. This suggests that the context in which a negated sentence occurs affects children's performance. Moreover, pragmatic properties of negation can better predict children's performance than the position in which the negation particle occurs in a sentence as shown by Wojtecka at al. (2011). Regarding the eL2-acquisition, the study by Schulze (2012) showed that the eL2 learners of German did not master the comprehension of sentential negation at age four. However, the syntactic and pragmatic aspects of negation were not considered in her study. Therefore, the following questions remain open: First, at what age do monolingual and eL2 children show target-like comprehension of sentential negation. Second, in which way do the position of the negation particle and the context matching influence eL2 children's interpretation of negated sentences.

6.3. Negation task

This section presents the results from the negation task. It is organized as follows. In Section 6.3.1, research hypotheses are formulated. Section 6.3.2 describes the participants, and Section 6.3.3 the subtest *Comprehension of Negation* from LiSe-DaZ (Schulz & Tracy, 2011). Section 6.3.4 explains the data analysis. In Section 6.3.5, the results are summarized regarding pace of acquisition, impact of external factors, and individual developmental patterns in eL2 learners.

6.3.1. Research hypotheses

In this section, the acquisitional hypotheses with respect to children's comprehension of negation are formulated. First the hypotheses related to the children's pace of acquisition are concerned. The results by Schulze (2012) indicate that eL2 children performed poorer on comprehension of negation than monolingual children at age three. Looking at eL2 children's development over time, their rate of change was greater than that of monolingual children. Therefore, the following two hypotheses are formulated:

(H1.1) eL2 children interpret negation significantly poorer at the first test round than monolingual children do.
(H1.2) eL2 children show a significantly greater rate of change regarding the target-like interpretation of negation than monolingual children do.

Turning now to the predictions that are formulated regarding the role of the external factors. Sentential negation belongs to rule-based structures of German. Adopting this view, external factors: gender, parents' educational background, and non-verbal IQ should not influence their acquisition. Moreover, the previous studies found only weak effects for non-verbal IQ (Schulz & Tracy, 2011; Schulze, 2012). Consequently, the following hypotheses are stated:

(H2.1) External factors do not affect the eL2 and the monolingual children's interpretation of negation at the first test round.
(H2.2) External factors do not affect the rate of change towards target-like interpretation of negation of monolingual and eL2 children.

In the following, the hypotheses regarding individual developmental path towards comprehension of sentential negation are presented. Recall that in German sentential negation may appear adjacent or non-adjacent to the finite verb. Therefore, the question

arises how these syntactic factor affects comprehension of negated sentences in eL2 learners of German. It is assumed that verb non-adjacent negation is more complex than verb adjacent negation because the former but not the latter requires object scrambling. Moreover, Wojtecka et al. (2011) found that verb adjacent negation was easier to interpret than verb non-adjacent negation for the monolingual German-speaking children at the age of four. Consequently, Hypothesis 3.1 is stated:

(H3.1) Verb adjacent negation is easier to understand than verb non-adjacent negation for eL2 learners.

The second prediction concerned the comprehension of false and true negatives by the eL2 learners of German. As a starting point, this study took findings from Wojtecka et al. (2013) for the monolingual German-speaking children that false negatives are easier to interpret by the children than true negatives. Since the eL2 children should show the same acquisitional patterns as the monolingual children, the Hypothesis 3.2 is as follows:

(H3.2) False negatives are easier to understand than true negatives for eL2 learners.

The next goal was to investigate whether the eL2 learners also acquire false negatives before true negatives, as found by Wojtecka et al. (2013) for the monolingual German-speaking children. The resulting acquisition sequence is taken from Wojtecka et al. (2013), and formulated as Hypothesis 3.3 for eL2 learners:

(H3.3) eL2 children acquire pragmatic aspects of negation in three stages:

A. No mastery of false and true negatives
B. Mastery of false negatives
C. Mastery of false and true negatives

The last question addressed the interaction of syntax (i.e. structural position) and pragmatics (i.e. context matching) of sentential negation in eL2 acquisition. The results of the regression analysis performed by Wojtecka et al. (2011) showed that monolingual children's performance on comprehension of negation was better predicted by the pragmatic factor. Based on these results Wojtecka et al. (2011) formulated developmental sequence for monolingual children towards target-like interpretation of negation. This acquisition path is formulated as Hypothesis 3.4 for eL2 learners of German:

(H3.4) Comprehension of sentence negation develops in three stages:

A. Target-like interpretation of false negatives with verb adjacent negation
B. Target-like interpretation of false negatives with verb non-adjacent negation
C. Target-like interpretation of true negatives

6.3.2. Participants

In the analysis regarding the pace of acquisition and the impact of external factors, all eL2 children (n = 29) and all monolingual children (n = 45) were included. Section 3.4 above gives the detailed description of both groups.

Individual developmental path toward acquisition of negation was examined only for the eL2 children. In the analysis only these eL2 learners were included whose data were complete across the four test rounds (T1, T2, T3, T4). 25 eL2 learners of German (11 girls, 14 boys) met this criterion. Children's age ranged from 3;4 to 4;1 (M = 3;7, SD = 2.4 months) at first test round, and from 5;4 to 6;3 (M = 5;8, SD = 2.4) at fourth test round. Their length of exposure to German at T1 ranged from five to 19 months (M = 10 months, SD = 2.4 months), and from 29 to 45 months (M = 34, SD = 4.5 months) at T4. eL2 children's age and exposure to German across all test rounds are given in Table 6.1.

Table 6.1. eL2 children's age and length of exposure to German for negation task across four test rounds.

	T1	**T2**	**T3**	**T4**
Age range	3;4 – 4;1	4;0 – 4;4	4;4 – 4;9	5;4 – 6;3
Mean age	3;7	4;2	4;7	5;8
SD in months	2.4	1.6	1.8	2.4
Exposure to German in months	5 – 19	10 – 27	16 – 32	29 – 45
Mean exposure to German in months	10	15	21	34
SD in months	3.8	4.4	4.2	4.5

6.3.3. Task

Children's comprehension of sentence negation is tested in LiSe-DaZ (Schulz & Tracy, 2011) with a truth-value-judgment task. The task works as follows: The experimenter shows the child a picture introduced by a short lead-in sentence. Then a hand puppet makes a statement about the picture, while the child is looking at the picture. The task

of the child is to decide whether the puppet's utterance is correct or incorrect with respect to the event depicted in the picture.

A total of 12 negated sentences were presented to each child in 2 x 2 design. An overview of the design is given in Table 6.2. Two test conditions varied the syntax, and two the pragmatics of the negated sentence, each comprising six test items. The order of presentation was fixed, with true and false negatives in a pseudo-randomized sequence. Note that affirmative sentences were not included in the test.

Table 6.2. Number of items in comprehension of negation by condition.

		Syntax		
		Verb adjacent	Verb non-adjacent	Total items
Pragmatics	True negative	3	3	6
	False negative	3	3	6
Total items		6	6	12

Regarding the factor Syntax, the position of the negation particle with respect to the finite verb was varied. Example (12) and Example (13) illustrate the verb adjacent position, and Example (14) and Example (15) the verb non-adjacent position of *nicht*.

(12) Example of a true negative with a verb adjacent position (Item 11, *Comprehension of negation*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Guck mal, hier ist ein Junge und ein Skateboard.*
'Look, there is a boy, and a skateboard.'

Hand puppet: *Der Junge fährt nicht mit dem Skateboard.*
The boy ride-3SG not with the-DAT skateboard.
'The boy is not riding a skateboard.'

Experimenter: *Stimmt das?*
'Is that right?'

Child: *Ja, das stimmt.*
'Yes, that's right.'

(13) Example of a false negative with a verb adjacent position (Item 5, *Comprehension of negation*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Guck mal, hier ist ein Junge und hier sind Bausteine.*
'Look, there is a boy, and there are bricks.'

Hand puppet: *Der Junge spielt nicht mit den Bausteinen.*
The boy play-3SG not with the-DAT bricks.
'The boy is not playing with the bricks.'

Experimenter: *Stimmt das?*
'Is that right?'

Child: *Nein, das stimmt nicht. / Doch.*
'No, that's wrong.' / 'Yes.'

(14) Example of a true negative with a verb non-adjacent position (Item 12, *Comprehension of Negation*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Guck mal, hier ist ein Junge, ein Helm und Lise.*
'Look, there is a boy, a helmet, and Lise.'

Hand puppet: *Der Junge bringt Lise dem Helm nicht.*
The boy bring-3SG Lise the-DAT helmet not.
'The boy is not bringing the Helmet to Lise.'

Experimenter: *Stimmt das?*
'Is that right?'

Child: *Ja, das stimmt.*
'Yes, that's right.'

(15) Example of a false negative with a verb non-adjacent position (Item 10, *Comprehension of negation*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Guck mal, hier sind Lise, ein Rucksack und Ibo.*
'Look, there are Lise, a backpack, and Ibo.'

Hand puppet: *Lise gibt Ibo den Rucksack nicht.*
Lise give-3SG Ibo the-ACC backpack not.
'Lise is not giving the backpack to Ibo.'

Experimenter: *Stimmt das?*
'Is that right?'

Child: *Nein, das stimmt nicht. / Doch.*
'No, that's wrong.' / 'Yes.'

Concerning the factor Pragmatics, the items were constructed so that visual context and the puppet's statement matched (true negative) or did not match (false negative). In Example (13) and Example (15) the puppet's statement confirms the situation depicted in the picture, and hence requires an affirmative response. In Example (12) and Example (14) the puppet's response must be denied. Note that the role of the context supplied by the pictures differs in the two pragmatic conditions. In false negatives, the picture depicts the agents, objects, and the activity, which are then referred to in the puppet's statement. In true negatives, however, the verb used in the puppet's statement is not given in the picture.

6.3.4. Data analysis

Children's responses were coded as correct and incorrect as summarized in Table 6.3. Note that the target response depends on pragmatic condition, and not on syntactic. Thus, the target response was *yes* to a true negative, and *no* in the case of a false negative.

Table 6.3. Types of correct and incorrect responses to test items for comprehension of negation.

Condition	Correct responses	Incorrect responses
True Negative	Yes.	No.
'The boy is not giving the helmet to Lise.'	That's right.	That's not right.
	No, he is not giving it to her.	He is giving it to her.
	She is throwing the ball away.	
False Negative	No.	Yes.
'Lise doesn't give the backpack to Ibo.'	That's not right.	That's right.
	She is throwing it to him.	No, she is not giving it to him.

6.3.5. Results

The following section presents the results regarding children's interpretation of sentential negation. Section 6.3.5.1 describes the results with respect to the pace of acquisition. In section 6.3.5.2, the role of external factors is examined. Section 6.3.5.3 gives a detailed analysis of eL2 children's developmental path toward the acquisition of sentential negation.

6.3.5.1. Pace of acquisition

This section presents the results with respect to the pace of acquisition. The results of the monolingual children across four test rounds and of the eL2 children across five test rounds for comprehension of sentential negation are depicted in Figure 6.2.

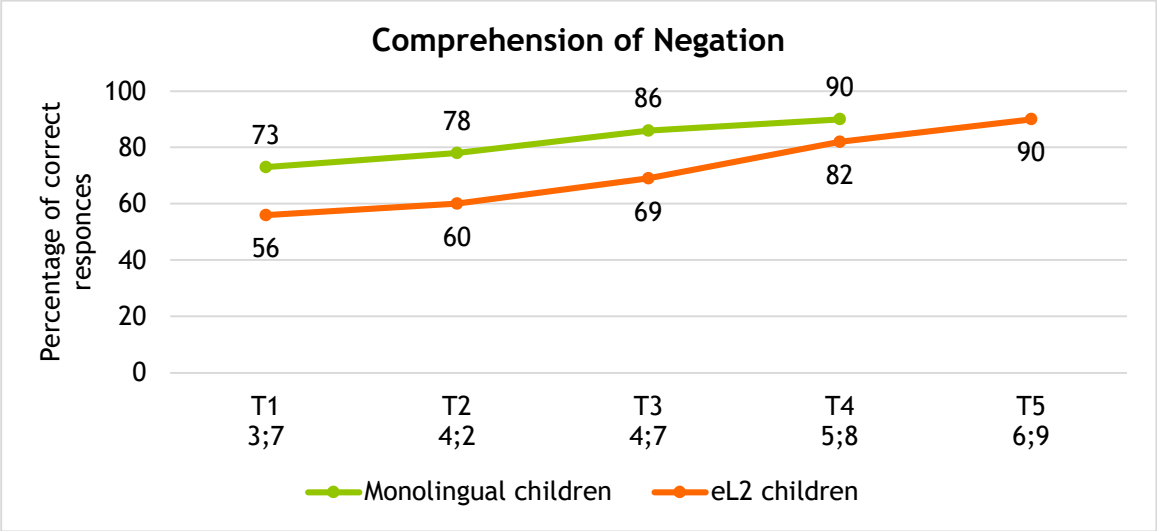


Figure 6.2. Proportion of correct responses of the monolingual and the eL2 group for comprehension of negation (12 items).

At age 3;7 the monolingual children comprehended about 70% of negated sentences correctly. Their performance improved over time, and at age 5;8 they performed in 90% of the cases target-like. Their performance was above chance at each test round ($p<.000$ for each test round, T-test). The eL2 learners comprehended almost 60% of negated sentences correctly at age 3;9. This performance did not differ from chance (T-test). Their percentage of correct responses increased very slowly with time. At age 4;7, they responded in 69% of the cases correctly. At age 6;9, the eL2 children interpreted 90% of negated sentences correctly, performing like one year younger monolingual children. The performance of eL2 was above chance from the second test round ($p<.05$ for T2, $p<.001$ for T3, T4, T5, T6, T-test).

In the next step spaghetti plots were plotted to investigate children's individual developmental paths. Figure 6.3 depicts individual scores of each monolingual child across four test rounds, and Figure 6.4 depicts individual scores of each eL2 learner across five test rounds. Concerning children's performance at the first test round, Figure 6.3 and Figure 6.4 reveal that the monolingual children and the eL2 children responded very heterogenic. More importantly, the spaghetti plots show that the children differed a lot in their slopes. Generally, the slopes of the monolingual children were shallower than the

slopes of the eL2 learners. This suggests that eL2 learners had a greater rate of change over time. Despite these differences, at average all children improved their performance over time.

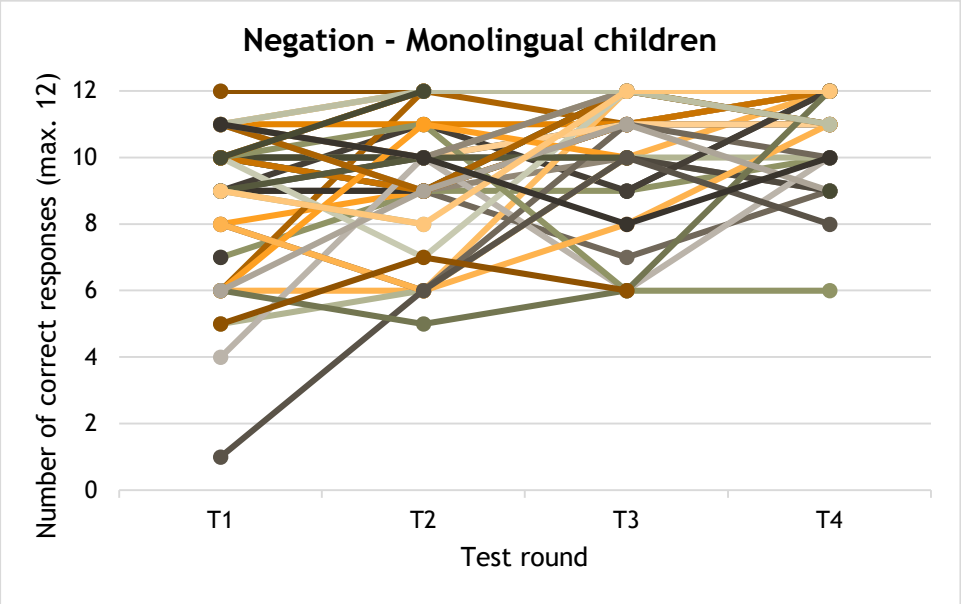


Figure 6.3. Individual development of the monolingual children in comprehension of sentential negation.

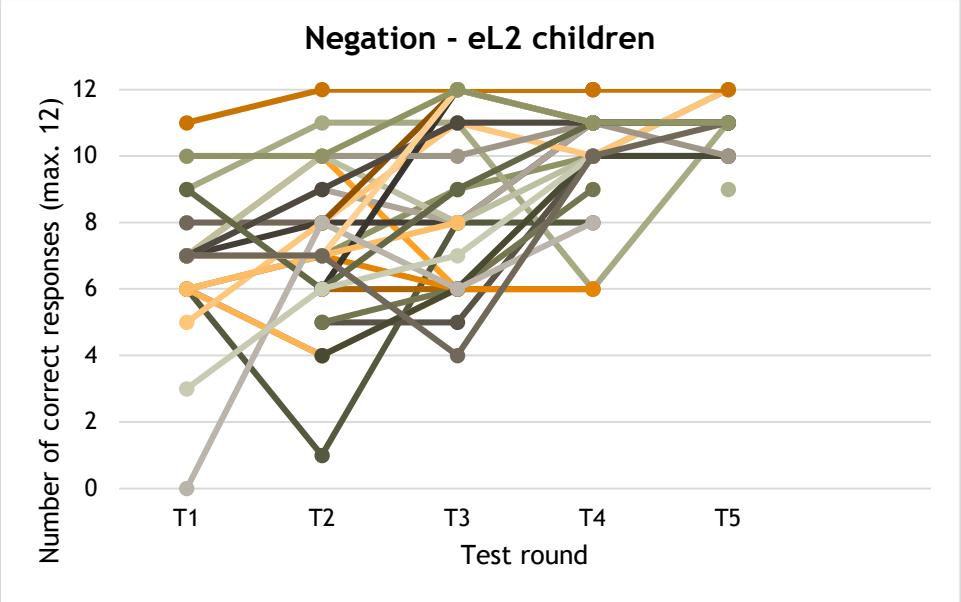


Figure 6.4. Individual development of the eL2 children in comprehension of sentential negation.

In the following, the monolingual and the eL2 children's pace of acquisition is investigated statistically. Children's pace of acquisition of comprehension of sentential negation was analyzed with mixed linear model over the number of correct responses. Consider first the fixed effects. Table 6.4 lists the estimated coefficients, their standard

errors, degree of freedom, *t* values and associated *p* values for the predictors that emerged as significant in the final model for comprehension of negation.

Table 6.4. The fixed effects for comprehension of sentential negation.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	4.2053	1.0613	12.7	3.96	0.0017
Group	-1.4510	0.2984	9516	-4.86	<.0001
Age	0.1003	0.009491	69.3	10.57	<.0001
Non-verbal IQ	0.04560	0.01138	12.1	4.01	0.0017

Looking at the intercept, all children responded on average to about four out of 12 items correctly. The estimated difference in intercept between the monolingual group and the eL2 group was -1.4510 (p<.0001). This reveals that the eL2 children performed significantly poorer than the monolingual children at the first test round. Concerning children's development over time, there was a significant effect of age. This means that the eL2 learners and the monolingual children improved their interpretation of negated sentences with increasing age. However, the interaction between age and group was not significant, and was therefore removed from the final model. This result indicates that the slope of eL2 children and the slope of monolingual children did not differ significantly. Thus, monolingual and eL2 learners had a similar rate of change towards target-like comprehension of negation.

Next, the random effects are discussed. Table 6.5 summarizes the covariance parameters, their estimates, standard errors, *z* values, and *p* values.

Table 6.5. Random effect for comprehension of sentential negation.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	3.1804	0.8900	3.57	0.0002
Covariance between random intercept and random scope	-0.06682	0.02632	-2.54	0.0111
Random scope	0.000721	0.000891	0.81	0.2092
Residual	2.5334	0.2699	9.39	<.0001

The analysis revealed that the variance of individual intercept was significant. This significant variance between the participants at age three is explained by the group differences. The effect of random slope was not significant. This suggests that all children interpreted negated sentences better with increasing age. The covariance between random intercept and random slope was negative, meaning that the children who had a high intercept showed a shallower slope than the children with lower intercept. Thus, children with poor comprehension of negation at first test round improved their performance more than children with good comprehension at age three did.

In sum, these results show that although the monolingual and the eL2 children distinguish in their intercepts, their slopes are very similar. This means that eL2 learners and monolingual children improved their comprehension of sentential negation over time, and that their rates of change were similar.

6.3.5.2. The role on external factors

The following section presents the results regarding the role of external factors. First, it was investigated whether each factor separately influences children's performance at first test round. These analyses revealed that gender, mother's educational background and father's educational background did not affect children's comprehension of negation at first test round. There was a significant effect for non-verbal IQ (c.f. Table 6.4), suggesting that non-verbal IQ influences children's intercept. This means that children with a higher non-verbal IQ performed better in comprehension of negation than children with a lower non-verbal IQ did. Since only a significant effect for non-verbal intelligence was found, the impact of this factor on the rate of change was examined. The analysis revealed that non-verbal IQ cannot predict children's slope. This means that although non-verbal IQ predicted children's performance at age of three, this factor did not affect children's rate of change over time.

6.3.5.3. Developmental path toward the acquisition of negation

In this section, the individual developmental paths of eL2 children towards acquisition of sentential negation are described. First, a brief overview of the quantitative results of these eL2 children whose individual developmental pattern were analyzed is given. Then, children's individual performance regarding the comprehension of verb adjacent and verb non-adjacent negation is analyzed. Next, eL2 children's comprehension of false and true negatives is compared. Finally, it is investigated how the factor Syntax, or the factor Pragmatics interact with respect to eL2 children's interpretation of sentential negation.

General results

This section summarizes the quantitative results for the 25 eL2 learners whose individual developmental paths are analyzed. Figure 6.5 illustrates the proportion of correct responses across four test rounds.

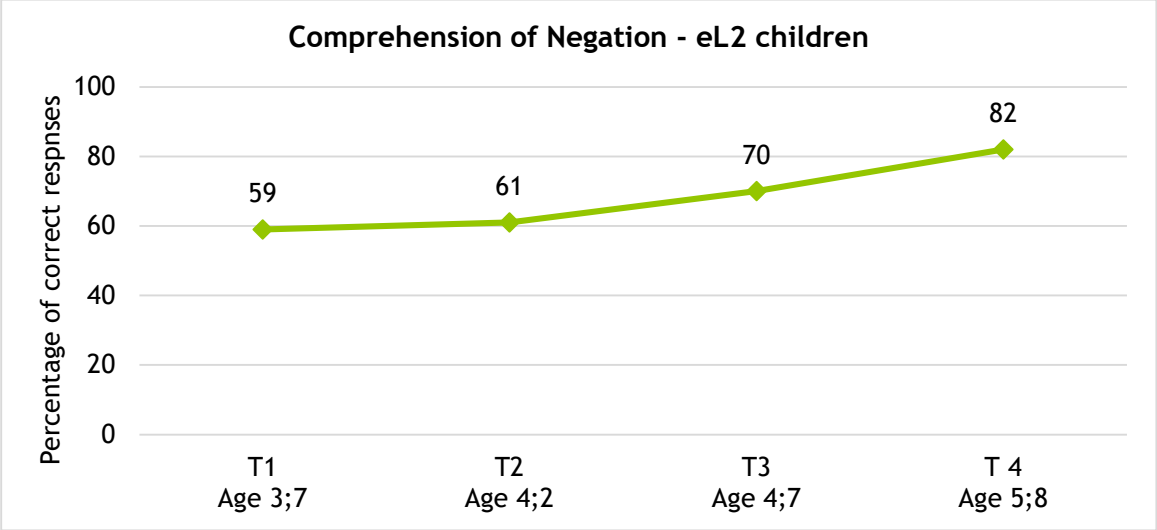


Figure 6.5. Proportion of correct responses in the subgroup of eL2 children (n=25) for comprehension of negation (12 items).

The performance of this subgroup of eL2 children is comparable with the performance of the whole eL2 group that was reported above. At age 3;7 and 4;2, the eL2 learners performed about chance giving about 60% of correct responses. Their comprehension of negation improved over time, and at age 5;8, they responded in 82% of the cases correctly.

Comparing verb adjacent and verb non-adjacent negation

In this section, the factor *Syntax* is investigated compering eL2 children's performance on verb adjacent and verb non-adjacent negation. The proportion of correct responses to items with verb adjacent and with verb non-adjacent sentence negation is depicted in Figure 6.6. eL2 learner's performance on verb adjacent and on verb non-adjacent negation was significantly different from chance at each test round ($p<.001$, T-test). The difference between the condition Verb adjacent and the condition Verb non-adjacent was not significant at T1, T2 and T3. Only at age 5;8 (T4), eL2 children performed significantly better on items with verb adjacent negation than on items with verb non-adjacent negation ($t(24) = -2.114$, $p = .034$, T-test). This suggests that the factor *Syntax* had not an essential impact on the interpretation of negated sentences during the first stages of acquisition.

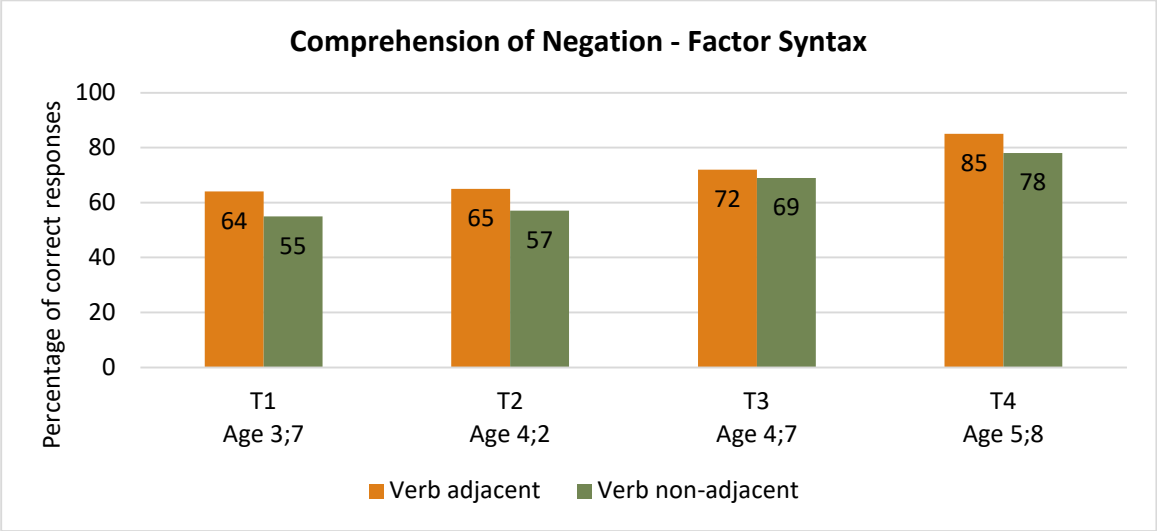


Figure 6.6. Proportion of correct responses of eL2 children to verb adjacent (6 items) and verb non-adjacent sentence negation (6 items).

To investigate the developmental stages in syntactic aspect of negation, mastery of verb adjacent and verb non-adjacent negation was calculated for each child at each test round. In both conditions, mastery was defined as performance above chance. Based on binominal distribution, mastery was reached if a child responded correctly to at least five out of six test items. Table 6.6 summarizes the distribution of mastery across the two conditions over four test rounds. Individual performance of each child across four test rounds is depicted in Table B.2 in Appendix.

Table 6.6. Mastery (✓) and non-mastery (-) of verb adjacent (Adj.) and verb non-adjacent (N-Adj.) negation by 25 eL2 children across four test rounds.

Age	T1 3;7	T2 4;2	T3 4;7	T4 5;8
No data	8	0	0	0
(✓) Adj. (✓) N-Adj.	1	4	9	16
(✓) Adj. (-) N-Adj.	3	5	3	5
(-) Adj. (✓) N-Adj.	1	1	2	0
(-) Adj. (-) N-Adj.	12	15	11	4

The number of eL2 learners who mastered verb adjacent and verb non-adjacent negation increased over time. At age 3;7 only one eL2 child reached the mastery in both

types of negation whereas 16 children mastered them at age 5;8. Compering the mastery in verb adjacent negation and in verb non-adjacent negation, there were more eL2 learners who mastered verb adjacent negation but verb non-adjacent negation across all four test rounds. This indicates that verb adjacent negation is easier to understand than verb non-adjacent negation for eL2 children.

Taking together, these results suggest that syntactic aspects of negation were not fully acquired by the eL2 learners of German even at the age of 5;8. Overall, the eL2 children mastered negation in the sentences in which the negation particle *nicht* is adjacent to the finite verb first. Then, mastery of verb non-adjacent negation requiring object scrambling was reached. This acquisition order is supported by the fact, that in all test rounds, more eL2 children mastered verb adjacent negation than verb non-adjacent negation. Nevertheless, note that in this analysis the factor *Syntax* was considered without taking into account the contribution of the factor Pragmatics.

Comparing true and false negatives

In the following, the role of the factor *Pragmatics* is examined. Recall that factor *Pragmatics* varied whether the negated sentence was true in the given context (true negative) or whether it was false (false negative). The results for these two conditions are depicted in Figure 6.7.

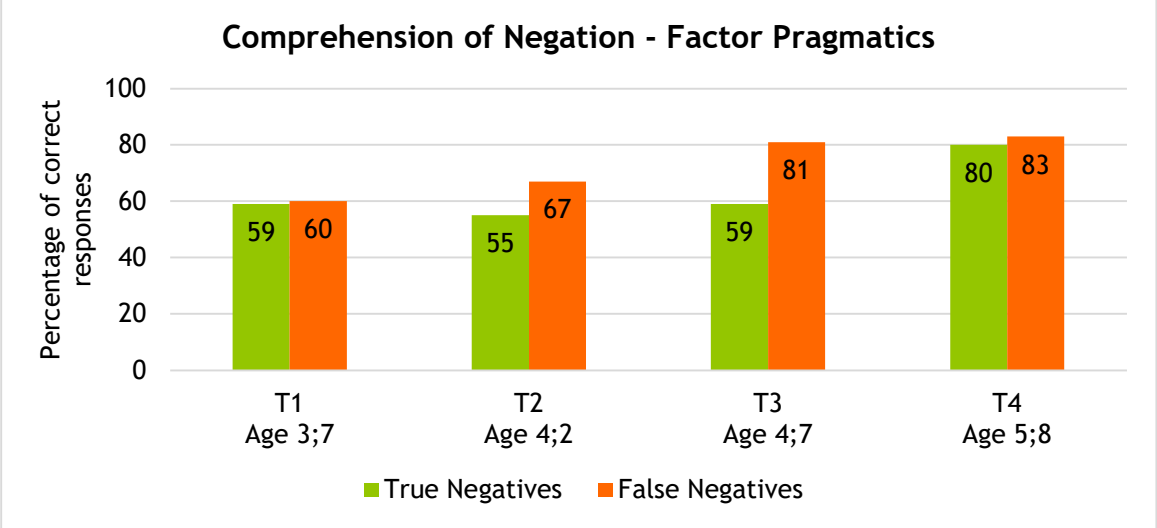


Figure 6.7. Proportion of correct responses to true negatives (6 items) and false negatives (6 items).

eL2 children's performance on true negatives and on false negatives significantly differed from chance at each test round ($p<.001$ at T1 and T2, $p<.002$ at T3 and T4, T-

test). No significant difference between false negatives and true negatives was found at age 3;7, at age 4;2 and at age 5;8. At age 4;7, however, there was a tendency indicating that eL2 children perform better on false negatives than on true negatives ($t(24) = -1.919$, $p = .055$, T-test). These results indicate that pragmatic aspects of negation have some essential impact on children's comprehension of negation already at the age of four, thus earlier than the syntactic aspects of negation.

To investigate the developmental stages in the acquisition of pragmatic aspects of negated sentences, mastery of true and false negatives was calculated for each child at each test round. As for factor *Syntax*, mastery was defined as performance above chance per condition. Based on binominal distribution, mastery was reached if a child responded correctly to at least five out of the six test items. In a second step, children were classified according to the three acquisition stages formulated in Hypothesis (H3.3). 11 out of 25 eL2 children (44%) followed the acquisitional sequence Stage A < Stage B < Stage C. 11 out of 25 eL2 learners (44%) followed a quite different acquisitional pattern. In only two out of 25 eL2 children (8%) any clear developmental pattern was found. One eL2 child out of 25 (4%) already reached the mastery in false negatives and in true negatives at the first test round and stayed constant in her performance.

Consider first these eL2 learners who adhere to the predicted developmental pattern. Table 6.7 summarizes the distribution of mastery across the two conditions for these 11 eL2 children.

Table 6.7. Number of eL2 children out of 11 with mastery (✓) and non-mastery (-) of true negatives (TN) and false negatives (FN) at each test round.

	T1 Age:3;7	T2 Age: 4;2	T3 Age: 4;7	T4 Age: 5;8
No data	5	0	0	0
(✓) TN (✓) FN	0	0	3	5
(✓) TN (-) FN	0	1	0	3
(-) TN (✓) FN	5	9	7	3
(-) TN (-) FN	1	1	1	0

The results show that the number of eL2 learners who mastered true and false negatives increased over time. However, only five out of 11 learners mastered both types

of negation at age 5;8. Comparing children's mastery of false and true negatives separately, there were more children, who mastered false negatives but not true negatives across the four test rounds. Individual performance of each child across four test rounds is depicted in Table B.3 in Appendix.

Consider now the 11 out of 25 eL2 learners who showed a little different developmental pattern as predicted by Hypothesis (H3.3) in Section 6.3.5. Table 6.8 summarizes the distribution of mastery across the two conditions for these 11 eL2 children. Individual performance of each child across four test rounds is depicted in Table B.4 in Appendix.

Table 6.8. Number of eL2 children out of 11 with mastery (✓) and non-mastery (-) of true negatives (TN) and false negatives (FN) at each test round.

	T1 Age:3;7	T2 Age: 4;2	T3 Age: 4;7	T4 Age: 5;8
No data	2	0	0	0
(✓) TN (✓) FN	0	1	4	5
(✓) TN (-) FN	7	7	4	2
(-) TN (✓) FN	0	1	2	4
(-) TN (-) FN	2	3	1	0

As in the other subgroup of the eL2 children, the number of children who reached the mastery in true and false negatives increased over time. In contrast to the subgroup described above, within these children more of them mastered true negatives but false negatives across the first three test rounds. It seems that these 11 eL2 children started with the mastery of true negatives, then failed in both conditions or mastered only false negatives, and then reached mastery in both conditions. However, the mastery of only true negatives in the first test rounds results from their noticeable response pattern. The majority of these eL2 learners (9 out of 11 children, 82%) consistently responded with *yes* to all or to above 80% of test items. Such a response pattern may reflect a yes-bias, which has been argued to occur if a child is not able to perform a task (Siegal, 1997). If this should be the case, these nine eL2 learners showed a developmental pattern that is predicted by Hypothesis (H3.3) since the mastery of true negatives was a result of children overload with the task, and did not reflect their linguistic knowledge about negation.

In sum, eL2 children's performance on false negatives was only in tendency better than on true negatives at age 4;7. However, the analysis of individual response patterns indicates that false negatives were acquired before true negatives in the majority of the eL2 learners. This suggests that eL2 children show the same developmental pattern in acquisition of pragmatic aspects of sentential negation as monolingual German-speaking children.

Comparing factor Syntax and factor Pragmatics

The results presented above show that the eL2 children performed better on verb adjacent than on verb non-adjacent negation, and that false negatives were easier to interpret than true negatives. In the next step, the question how the factor *Syntax* and the factor *Pragmatics* interact was investigated. Figure 6.8 depicts the eL2 children's performance on verb adjacent true negatives, verb non-adjacent true negatives, verb adjacent false negatives, and verb non-adjacent false negatives across the four test rounds.

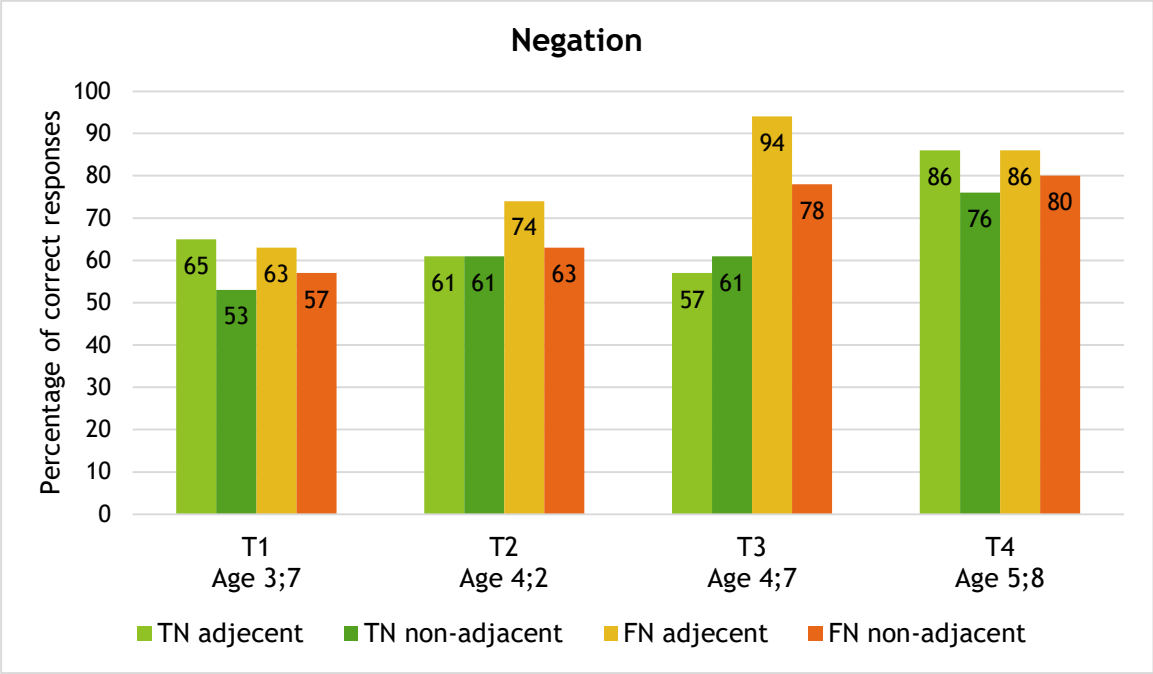


Figure 6.8. Proportion of correct responses to verb adjacent true negatives (3 items), verb non-adjacent true negatives (3 items), verb adjacent false negatives (3 items), and verb non-adjacent false negative (3 items).

An ANOVA was performed with condition and test round as the within subject factors. The analysis revealed a significant main effect of test round ($F(3)=7.780$, $p=.000$). No significant effect for condition was found ($F(3)=2.330$, $p=.086$) The interaction of condition and test round was not significant as well ($F(9)=1.042$, $p=.410$). Post hoc

comparisons of means were employed to examine possible differences between the condition and the test rounds.

The pairwise comparisons revealed no significant differences between the four conditions at age 3;7, at age 4;2, and at age 5;8. At age 4;7, eL2 learners performed significantly better on verb adjacent false negatives than on verb adjacent true negatives ($p=.035$), and on verb adjacent false negatives than on verb non-adjacent false negatives ($p=.017$). For test round, a significant difference was only found between first and third test round for verb adjacent false negatives ($p=.010$). These results indicate that pragmatic aspects of negation have more impact on children's comprehension of negation compared to syntactic aspects of negation.

6.4. Discussion

Focusing on syntactic and pragmatic aspects of negation this substudy investigated the comprehension of negated sentences in eL2 learners of German. Regarding the pace of acquisition, as expected in hypothesis (H1.1), the eL2 learners comprehended negated sentences significantly poorer than monolingual children at the age of three. However, although the performance of eL2 learners improved over time, their rate of change did not significantly differ from the rate of change of monolingual children. This result rejects hypothesis (H1.2). Notably, target-like comprehension of negation developed slower than comprehension of telic and atelic verbs or comprehension of wh-question in eL2 children. eL2 learners answered 90% of cases at age 6;9. Late comprehension of negation is also the case in monolingual acquisition (Wojtecka et al. 2011, 2013). This result indicates that the phenomena that are acquired later in monolingual acquisition developed slower in eL2 acquisition as well. Thus, it is in line with Tsimpli's assumption (2014) regarding the bilingual acquisition. Moreover, the rate of change towards target-like interpretation of negation is shallower in eL2 acquisition compared to rates of change of phenomena that are acquired fast in eL2 children.

The next goal of this substudy was to examine the role of the external factors for children's comprehension of negation (Q2). The analyses revealed that gender, mother's educational background, and father's educational background did not influence children's performance at the age of three. However, there was a significant effect for non-verbal IQ indicating that non-verbal IQ predicted children's comprehension of negated sentences. Therefore, hypothesis (H2.1) is partially confirmed. Since effect for non-verbal IQ for the intercepts was found, the role of this factor on the rate of change was tested.

This analysis revealed that non-verbal IQ did not affect children's development towards target-like interpretation of negation rejecting the hypothesis (H2.2). Regarding the mother's educational background, the result from this study is in line with the findings from LiSe-DaZ (Schulz & Tracy, 2011). Concerning the non-verbal IQ, the results only partially corresponds with previous findings, since whereas no correlation between the non-verbal IQ and the eL2 learner's comprehension of negation was found for the sample from LiSe-DaZ (Schulz & Tracy, 2011), Schulze (2012) reported that non-verbal IQ predicted eL2 children's interpretation of negation. The impact of non-verbal IQ on eL2 children's comprehension of negation may be due to lack of particular language skills that are required to comprehend the task, and that are not yet acquired in eL2 learners at age of three. This assumption is supported by the fact that the influence of non-verbal IQ on negation task was only found for the first test round, and not for eL2 children's development over time.

The third goal of this study was to describe eL2 children's developmental path towards target-like interpretation of sentential negation (Q3). Regarding the syntactic aspects of negation, the results suggest that the order of the negation particle and the finite verb affect eL2 children's comprehension of negated sentences. Verb adjacent negation was easier to understand than verb non-adjacent negation at age 5;8. Moreover, the analysis of individual responses revealed that there were more children who only mastered the target-like interpretation of verb adjacent negation but not verb non-adjacent negation than vice versa across all test rounds. This result confirms hypothesis (H3.1). The reason why eL2 learners perform better on verb adjacent negation than on verb non-adjacent negation may be that it is less complex than verb non-adjacent negation. Recall that only verb non-adjacent negation requires object scrambling. This derivation still seems to be difficult for eL2 learners at age five.

Concerning the pragmatic aspect of negation, this study provides evidence that eL2 children find false negatives easier than true negatives confirming hypothesis (H3.2). False negatives were understood significantly better than true negatives at age 4;7. In addition, across all test rounds, there were more eL2 learners, who mastered the target-like interpretation of false negatives, than eL2 children, who mastered the target-like interpretation of true negatives. These results corroborate previous findings from adults (Chase & Clark, 1971; Wason, 1972) and monolingual German-speaking children (Wojtecka et al. 2011, 2013). Moreover, the analysis of individual responses indicates that eL2 children acquire pragmatic aspects of negation in three stages, as formulated in hypothesis (H3.3). This acquisition path was first suggested in Wojtecka et al. (2011) for

monolingual children. A half of eL2 learners started without proper knowledge of either false negatives or true negatives. At the next stage, eL2 children mastered false negatives, and finally, they mastered true negatives resulting in target-like performance on both conditions. The other half of eL2 children responded with *yes* to most items at the first test round what resulted with the mastery of true negatives. Such a response pattern may however reflect a yes-bias, which has been argued to occur if a child is overload with the task (Siegal, 1997). In truth-value-judgment task, the child must match a specific reading of a sentence to a picture. To perform this task target-like, the child needs to understand the sentence, and then she needs to evaluate whether the sentence correctly describes the picture. Due to lack of vocabulary knowledge, this task caused difficulties for a subgroup of eL2 learners at age three. Therefore, their response pattern at the first test round did not reflect their linguistic knowledge about negation. After more exposure to German and thus larger vocabulary, yes-bias pattern disappeared in these eL2 children, and their individual response pattern corresponded with the proposed three-stage model. Taken together, these results indicate that eL2 learners of German show the same developmental path toward target-like interpretation of negated sentences as monolingual children.

Concerning the interaction between syntactic and pragmatic aspects of sentence negation, the results indicate that pragmatics has more impact on eL2 children's interpretation of negated sentences than syntax. Moreover, the results support the acquisition path for the interpretation of sentential negation as suggested for monolingual children by Wojtecka et al. (2011) and formulated in hypothesis (H3.4):

A. Correct interpretation of false negatives with verb adjacent negation
B. Correct interpretation of false negatives with verb non-adjacent negation
C. Correct interpretation of true negatives

These findings are in line with the previous findings for monolingual children (Wojtecka et al. 2011). As already suggested by Wason (1972) and de Villers & Tager Flusberg (1975), context plays a major role in the interpretation of negated sentence. If there is no context or if the given context does not license the negation, false negatives outperform true negatives. This is also the case if structural position of negation (verb adjacent vs. verb non-adjacent) is taken into consideration. This indicates that already young eL2 learners are sensitive to pragmatic aspects of their L2. In addition, these results indicate that syntactic aspects of negation are not fully acquired by the eL2 learners of German even at the age of 5;8. Especially the correct interpretation of sentences, in

which the negation particle *nicht* is not adjacent to the finite verb, is not mastered at this age. The comprehension of these sentences requires object scrambling, which eL2 learners have not acquired yet.

Future studies should employ a variety of methods with the same monolingual and eL2 children to reach converging evidence on children's interpretation of negation. Moreover, the task should give more context to better license the usage of negation. This could improve children's performance as was shown for comprehension of focus particle by monolingual children (Müller, 2012).

7. Acquisition of case marking

This section deals with acquisition of case marking in German. First, Section 7.1 gives the theoretical background on case assignment and on case marking in German. Then, Section 7.2 summarizes previous research on case production in monolingual German-speaking children and eL2 learners of German. In Section 7.3, the present study on elicitation of case marking is presented. In Section 7.3.1 research hypotheses are formulated. Section 7.3.2 describes the participants. Section 7.3.4 explains the case elicitation from LiSe-DaZ (Schulz & Tracy, 2011), and Section 7.3.5 gives an overview of the data analysis. In Section 7.3.5, the main findings on case marking production regarding pace of acquisition and impact of external factors are presented. Section 7.4 discusses the results of case marking elicitation.

7.1. Case in German

All languages have an abstract case system (Chomsky, 1981, 1995). This section gives theoretical background on case in German. Section 7.1.1 focuses on case assignment in German, and Section 7.1.2 explains case marking in German.

7.1.1. Case assignment in German

According to Chomsky (1981, 1995), all languages have an abstract case system. However, they differ in the realization of case. Whereas in some languages such as German, Polish, or Hungarian, the case is marked visible and morphologically, in other languages such as English, Dutch or French case is rarely realized visible. The Case Filter, as formulated by Chomsky (1981), states that every lexical noun phrase requires case (1).

(1) Case Filter

*NP if NP has phonetic content and no case (Chomsky 1981:49)

In Chomsky's analysis (1986), the noun is assumed to be the head of a nominal phrase (NP), with the determiner placed in its specifier position. Abney (1987) proposed an alternative analysis of the NP and postulated a determiner phrase (DP) instead of a NP. In his analysis, the determiner as a functional category is the head of the phrase, cf. Figure 7.1. The functional category D is assumed to be analog to the functional category I in a clause which carries the grammatical features since there is an agreement between the noun and its specifier in some languages.

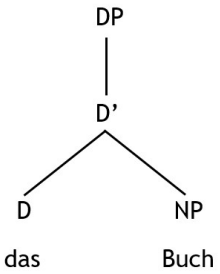


Figure 7.1. DP structure for German based on the English DP structure from Abney (1987).

Adopting the DP-analysis, Ouhalla (1993, 1994) argued that the Case Filter applies to DPs instead of NPs since the case is a property of DPs and not of NPs. A DP moves to a position in which it can receive case, whereas a NP must remain in its base-generated position since it does not need to be marked for case.

Three different ways of case assignment are distinguished: structural, lexical, and inherent, which differ in their behavior and manner of licensing. Whereas the term of structural case assignment is used consistently in the literature, lexical and inherent case assignment are mostly used interchangeably meaning non-structural case assignment (Chomsky, 1981, 1986; Czepluch, 1988; Dürscheid, 1999, but see Woolford (2006) for a different usage).

Structural case involves case assignment based on the syntactic structure of the construction and depends on specifier-head agreement. This means that the case of a DP can be derived from its structural position. According to Chomsky (1981), nominative case is assigned to a subject of a sentence by the finite verb that has moved to the head of Agreement Subject Phrase (AgrS). Transitive verbs assign accusative case to their objects as well. A transitive verb moves to the head of Agreement Object Phrase (AgrO) where it assigns accusative case to the object DP in the specifier of AgrOP. Nominative and accusative case assignment for the German clause in Example (2) is depicted in Figure 7.2. The verb *streichlt* 'stroke-3SG' is base generated in V and moves from V to AgrO to assign the accusative case to the object DP *den Hund* 'the-ACC dog'. Subsequently, the finite verb moves via T to AgrS, whereas the subject DP *das Mädchen* 'the-NOM girl' moves to the specifier of AgrSP. In this phrase, the nominative case is assigned.

(2) Lise streichelt den Hund.
Lise stroke-3SG the-ACC dog
'Lise is stroking the dog.'

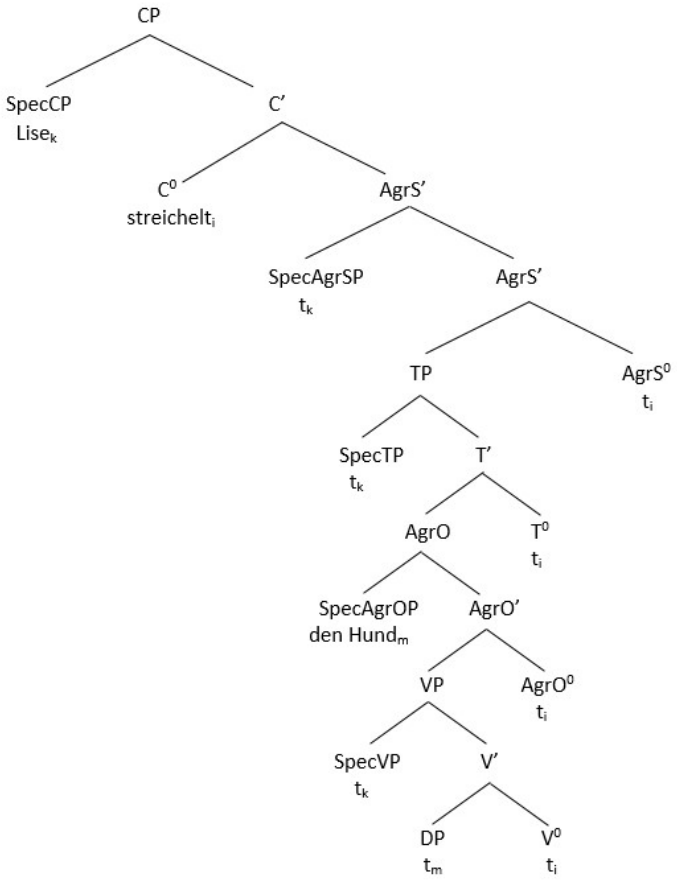


Figure 7.2. Sentence structure for structural case assignment in German (based on Dürscheid (1999)).

Lexical case assignment is assumed to depend on government of a lexical head and theta-role assignment. It is assigned to a DP before the structural case assignment takes place. A DP with a lexical case cannot undergo case alternation as caused by quantification, negation or passivization (Freidin & Sprouse, 1991; Haegeman, 1994). This is illustrated in Examples (3) and (4) for passivization in German. Whereas in case of the structural accusative, accusative alternates with nominative, cf. Example (3), the alternation does not generally take place in passive structures with dative, cf. Example (4).

(3) a. Das Mädchen sieht den Jungen.
The-NOM girl see-3SG the-ACC boy
'The girl sees the boy.'
b. Der Junge wird gesehen.
The-NOM boy is seen
'The boy is seen.'

(4) a. Das Mädchen hilft dem Jungen.
The-NOM girl help-3SG the-DAT boy
'The girl helps the boy.'
b. Dem Jungen wird geholfen.
The-DAT boy is helped
'The boy is helped.'
c. * Der Junge wird geholfen.
The-NOM boy is helped

For German, it is assumed that nominative subjects, accusative objects of transitive verbs, and the prenominal genitive are assigned structurally. In contrast, the lexical case is assigned by verbs, prepositions, and adjectives. Whether the case marking on indirect objects and complements of prepositions is assigned structurally or lexically is a matter of debate. Some researchers have argued that dative case assignment in German is structural as well (Czepluch, 1988; Gallmann, 1992; Schmidt, 1995; Wegener, 1990; Wunderlich, 1997). In Examples (3) and (4) was shown that generally the case alternation does not take place in German passivization. However, in the so-called recipient passive dative case marking alternates with nominative much like the accusative alternates with the nominative in passivization, cf. Example (5) vs. Example (6). Moreover, it was pointed out that dative case marking on direct object is fully predictable in German what also supported the classification of dative as a structural case.

(5) a. Der Affe klaut dem Clown den Hut. (Eisenbeiss et al., 2005/06:8)
The-NOM monkeysteal-3SG the-DAT clown the-ACC hat
'The monkey steals the hat from the clown.'
b. Der Clown kriegt den Hut geklaut.
The-NOM clown get-3SG the-ACC hat stolen
'(Someone) steals the hat from the clown.'

(6) a. Der Affe beißt den Clown. (Eisenbeiss et al., 2005/06:7)
The-NOM monkey bit-3SG the-ACC clown
'The monkey bites the clown.'
b. Der Clown wird gebissen.
The-NOM clown is bitten
'The clown gets bitten.'

Several analyses of case assignment by prepositions have been proposed as well. Whereas Haegeman (1994) and Heinz & Matiasek (1994) argued that prepositions always assign the case lexically, Bierwisch (1988) claimed that only accusative is assigned

lexically, and dative structurally. Eisenbeiss (2003) and Stiebels (2002) suggested an analysis of case marking in terms of categorical features. Following this analysis, accusative is assigned structurally by syntactic categories with the feature [-N], that is, by verbs and prepositions. Consequently, dative and genitive case on complements of prepositions are assigned lexically.

Woolford (2006) proposed a different approach to case assignment. She argued for a subdivision within the non-structural case. Thus, she distinguishes between the lexical case and the inherent case, which differ in their behavior and manner of licensing. The lexical cases are the truly irregular. In contrast, the inherent cases are relatively predictable. Moreover, there is a complementary distribution with respect to what kind of arguments can be marked with each type of non-structural case. Whereas the lexical case is restricted to the themes / internal arguments, the inherent case is only associated with external arguments and DP goals. The complementary distribution is illustrated in Example (7) and Example (8). In Example (7) the verb *hilft* 'help-3SG' assigns the dative lexically to the DP *dem Jungen* 'the-DAT boy', while in Example (8) the dative is assigned inherently to the DP goal *dem Jungen* 'the-DAT boy' by the verb *gibt* 'give-3SG'.

(7) Das Mädchen hilft dem Jungen.
The-NOM help-3SG the-DAT boy
'The girl helps the boy.'

(8) Das Mädchen gibt dem Jungen einen Ball.
The-NOM girl give-3SG the-DAT boy a-ACC ball
'The girl gives a ball to the boy.'

The complementary distribution of the lexical and the inherent case is also reflected in the syntactic structure. In general, the non-structural case is licensed in connection with θ-marking (Chomsky, 1986), and is assigned within the vP structure as proposed by McGinnis (1996, 2001) before the structural case is assigned. According to Woolford (2006) the two types of the non-structural case distinguish in the kind of head that licenses them. Whereas the inherent cases are licensed by little/light v heads in vP projections above the VP proper, the lexical cases are licensed only by lexical heads such as V or P. The assumed vP structure is depicted in Figure 7.3.

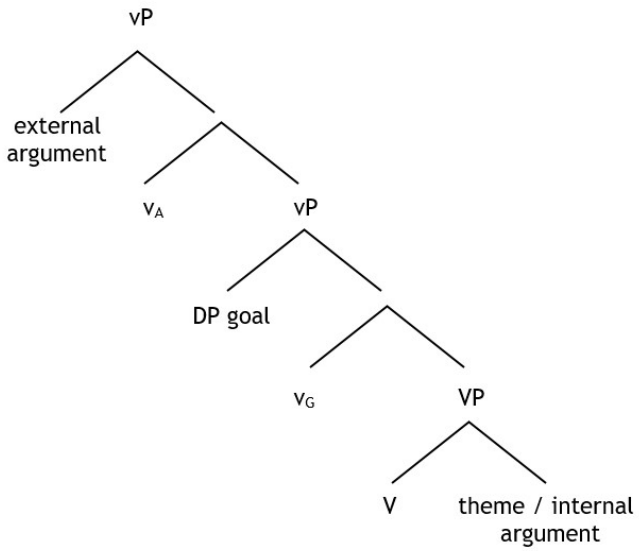


Figure 7.3. vP structure for the assignment of non-structural case (Woolford, 2006:116).

In sum, "lexical Case is limited to themes/internal arguments because only these are inside the VP proper at the point at which V licenses lexical Case; inherent Case is limited to arguments licensed by little/light v heads, because only these heads have the ability to license inherent Case" (Woolford, 2006:117).

The following Figure 7.4 and Figure 7.5 summarize the accounts by Eisenbeiss et al. (2005/06) and by Woolford (2006) on case assignment in German. The accounts differ not only regarding the number of types of case assignment. Whereas Eisenbeiss et al. (2005/06) assumed that Accusative on DPs within a prepositional phrase and Dative on DPs as indirect objects are assigned structurally, Woolford (2006) proposed that the case is assigned non-structurally within these structures. These different theoretical assumptions on case assignment are relevant when discussing acquisitional data.

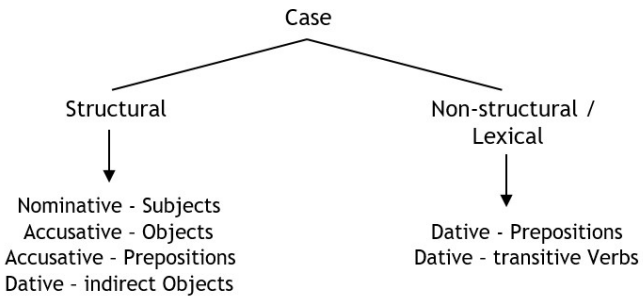


Figure 7.4. Case assignment according to Eisenbeiss et al. (2005/06) (based on Scherger (2015) and Lemmer (2018)).

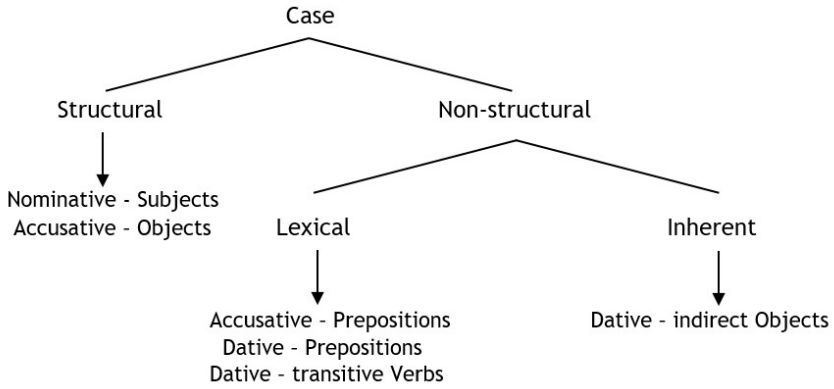


Figure 7.5. Case assignment according to Woolford (2006) (based on Scherger (2015) and Lemmer (2018)).

7.1.2. Case marking in German

Case is a very heterogeneous morphological category since languages vary in the number of cases that are marked morphologically, the syntactic and semantic functions of case, and the set of declination classes. German has a relatively rich case marking system. It consists of four cases: nominative, accusative, dative, and genitive. According to Eminds (1985) and Schütze (1997) nominative is the default case in German since it is used in contexts, in which there is no overt case assigner as illustrated in Example (9). Note that in English, accusative is used in such context.

(9) Ich das Auto putzen, kommt nicht in Frage.
I-NOM das-ACC clean-INF, come not in question
'Me cleaning the car, no way'

In addition, genitive can be marked postnominal as in Example (10) or prenominal on a proper noun or kinship term denoting the possessor as in Example (11).

(10) das Auto der Mama
the car the-GEN mommy
'the car of mommy'

(11) a. Peters Auto
'Peter's car'
b. Mamas Auto
'mommy's car'

There are several syncretisms in German case system. They result in ambiguities with respect to gender, case, and in some instances number. Only masculine nouns in singular

have a distinct morphology for all four cases. This means that masculine subjects and objects are always unambiguously case marked, thus, case marking provides clear information on which DP is the subject and which DP is the object of the sentence, cf. Example (12). For feminine and neuter determiner phrases, this is not the case, cf. Example (13) and Example (14), respectively. Therefore, clauses in which the first noun phrase is feminine or neuter are always temporarily ambiguous between a subject-first and an object-first reading.

(12) Der Hund beißt den Bären.
The-NOM bit-3SG the-ACC bear
'The dog bites the bear.'

(13) Die Katze kratzt den Hund.
The-NOM/ACC cat scratch-3SG the-ACC dog
'The cat scratches the dog.'

(14) Das Kaninchen beißt den Hamster.
The-NOM/ACC rabbit bit-3SG the-ACC hamster
'The rabbit bites the hamster.'

Regarding the morphological spell-out, German has regular paradigms for case marking together with gender and number on determiners and attributive adjectives. Nominative, accusative, dative and genitive are marked on personal pronouns, determiners, wh-words, quantifiers, possessive pronouns, and adjectives. Case marked personal pronouns and definite determiners are suppletive forms. The paradigm for the definite determiners, which combines case, gender, and number specification, is given in Table 7.1. Note that only masculine nouns have a distinct morphology for all cases whereas feminine and neuter nouns have the same form for both nominative and accusative case.

Table 7.1. Paradigm of case marking on definite determiners in German.

	Singular			**Plural**
	Masculine	Neuter	Feminine	
Nominative	*der*	*das*	*die*	*die*
Genitive	*des*	*des*	*der*	*der*
Dative	*dem*	*dem*	*der*	*den*
Accusative	*den*	*das*	*die*	*die*

Case marking on demonstratives like *dies-* 'this', wh-words like *welch-* 'which', quantifiers like *alle* 'all', and attributive adjectives is marked via regular suffixes that

also encode gender and number. The paradigm is given in Table 7.2. Like the case marking on definite determiners, in this paradigm as well only the case marking on masculine nouns is unambiguous.

Table 7.2. Paradigm of case marking on determiners and adjectives in German.

	Singular			**Plural**
	Masculine	Neuter	Feminine	
Nominative	*dies-er*	*dies-es*	*dies-e*	*dies-e*
Genitive	*dies-es*	*dies-es*	*dies-er*	*dies-er*
Dative	*dies-em*	*dies-em*	*dies-er*	*dies-en*
Accusative	*dies-en*	*dies-es*	*dies-e*	*dies-e*

The following determiners: indefinite articles, possessive pronouns, and the negation element *kein-* 'no' have stem ending in *–ein*. They are inflected according to the paradigm summarized in Table 7.2 if they are used as pronouns. If they are used attributive, the paradigm in Table 7.3 applies.

Table 7.3. Paradigm of case marking on determiners ending in *–ein* used attributive.

	Singular			**Plural**
	Masculine	Neuter	Feminine	
Nominative	*ein-Ø*	*ein-Ø*	*ein-e*	*ein-e*
Genitive	*ein-es*	*ein-es*	*ein-er*	*ein-er*
Dative	*ein-em*	*ein-em*	*ein-er*	*ein-en*
Accusative	*ein-en*	*ein-Ø*	*ein-e*	*ein-e*

Additionally, some masculine nouns take the accusative/dative suffix *–n* in singular as in Example (15) and some plural forms of nouns carry –n in dative plural context as in Example (16).

(15) für den Junge-n
for the-ACC boy-ACC
'for the boy'

(16) mit den Kinder-n
with the-DAT children-DAT
'with the children'

7.2. Previous research on acquisition of case marking

This section reviews the previous studies on case marking acquisition. First, Section 7.2.1 gives a brief cross-linguistic overview on case acquisition, and then case acquisition in monolingual German-speaking children is presented. Section 7.2.2 concentrates on case acquisition in eL2 learners of German.

7.2.1. Monolingual acquisition of case

The acquisition of case marking in monolingual acquisition has been investigated in variety of languages (see Schütze & Wexler (1996) for English, Laalo (2002) and (Clahsen, Eisenbeiss & Vainikka (1994) for Finish, Babyonyshev (1993), Gagarina & Voeikova (2002) and Polinsky (2006) for Russian, and Ketrez & Aksu-Koç (2002) and Aksu-Koç & Slobin (1985) for Turkish). The results of these studies indicate that case acquisition depends on the language type. In general, case marking occurs earliest in agglutinative languages such as Turkish or Hungarian, then in Slavic and Baltic languages like Russian or Polish, and later in languages with a periphrastic case marking on nouns and articles like German. The first case oppositions in Turkish-speaking children were already observed at age 1;3, and the whole case system seems to be acquired before the age of three (Ketrez & Aksu-Koç, 2002; Aksu-Koç & Slobin, 1985). Data from Finish-speaking children show first case oppositions even earlier about the age of 1;0 (Laalo, 2002). Russian-speaking children start to mark case about the age of two (Babyonyshev, 1993; Gagarina & Voeikova, 2002). Babyonyshev (1993) also demonstrated that structural case is acquired earlier than lexical case. The acquisition of Russian case system is completed about the age of six (Polinsky, 2006).

The acquisition of German case marking has been examined in several studies analyzing spontaneous speech production of children aged between two and three (Clahsen, 1982, 1984; Clahsen et al., 1996; Clahsen et al., 1994; Eisenbeiss, 2000; Eisenbeiss, 2003; Eisenbeiss et al., 2005/06; Schütze, 1997; Tracy, 1986; Wittek & Tomasello, 2005). The results from these studies give a clear picture of case marking acquisition. In the first stage, monolingual children do not use case markings contrastively. Most DPs occur without any case marking or are neutral with respect to morphological case distinctions (nominative overgeneralizations) as illustrated in Examples (17) and (18), respectively, and prenominal genitives lack the obligatory –s suffix on the possessor, cf. Example (19).

(17) gleich Ø wauwau suche (Mon, 2;7, Clahsen, 1984:7)
soon Ø dog search

(18) noch ein fisch malen (Mon, 2;4, Clahsen, 1984:9)
one more a-NOM fish draw

(19) julia-Ø zimmer auch (Mon, 2;8, Clahsen et al., 1994:97)
julia-Ø room too

The earliest case marker that appears is the –s suffix of the prenominal possessive genitive. It is initially restricted to a few proper names or kinship terms that are very frequent in children's input such as *mamas* 'mommy's'. As soon as children produce –s in all obligatory contexts, they overgeneralize it to common nouns, which cannot be combined with this suffix in German. In the next stage around the age of three, thus after the two-words phase, children develop their early case system in which nominative and accusative forms are distinguished. In this binary case system, nominative marks subjects, and accusative marks all other semantic functions in a sentence (Clahsen, 1984). Regarding the appearance of accusative and dative forms, personal pronouns that are marked for accusative and dative occur earlier than regular accusative and dative suffixes on determiners and adjectives. Clahsen et al. (1994) argued that the late acquisition of accusative case marking is due to its morphological realization in German. Regular accusative marking requires a DP as a carried system for case marking. Therefore, as long as the DP has not been established, regular accusative case marking is not possible. Once the DP has been developed, accusative case marking is acquired as well. Moreover, accusative forms occur earlier than datives. Accusative case marking is also overgeneralized in contexts where dative case marking is target-like as illustrated in Example (20). It is important to note that dative overused instead of accusative is not reported. Moreover, accusative and dative case marking are not overgeneralized for subjects. Postnominal genitive is acquired late about the age of six (Mills 1985).

(20) a. ich such mich eins aus (Mon, 3;5, Clahsen, 1984:11)
I choose me-ACC one out
'I choose out one for me'

b. das sag ich die mama (Mon, Eisenbeiss et al., 2005/06:21)
this tell I the-ACC mommy
'I tell that mommy'

As mentioned above, compering case acquisition in German with case acquisition in other languages, German-speaking children acquire case marking late and overgeneralize

some case markers. It is argued that it is due to the formal complexity of German case system with a lot of syncretism (Clahsen, 1984; Eisenbeiss, 2003; Milles, 1985; Szagun, 1999; Tracy, 1986). The usage of nominative instead of accusative and accusative instead of dative could be because of the phonological similarity between these case markers. Nominative and accusative case marking on neuter and feminine nouns in singular and on all genders in plural are identical, and accusative case marking on masculine nouns is phonologically very similar to dative case marking. This explanation is supported by the fact that the same children who used accusative case marking instead of dative case marking on masculine nouns supplied the target-like dative markers on feminine nouns in singular and on nouns in plural (Eisenbeiss, 1991). However, the phonological similarity cannot explain accusative overgeneralizations on personal pronouns since forms like *mich* 'I-ACC' and *mir* 'I-DAT' or *dich* 'you-ACC' and *dir* 'you-DAT' are phonologically different. According to Clahsen (1984) the key weakness of the explanations given by Milles (1985) and Tracy (1986) is that they do not account for the direction of the overgeneralizations. This means it remains unclear whether children use nominative instead of accusative, and accusative instead of dative, and almost never overgeneralize accusative for nominative and dative for accusative. Therefore, Clahsen (1984) pointed out that behind the formal aspects of case marking, the functional aspects must be taken into consideration. Based on his analysis, he concluded that children start to acquire case marking after they had acquired the genuine V2 position in main clauses. Before this stage is reached, subjects always occur in the preverbal position and DPs that had other grammatical functions (objects and adjuncts) in the postverbal position. With the acquisition of topicalization children need a new tool that marks the function of a DP since at this point not only objects and adjuncts occur postverbal but also subjects. This leads children to acquire case.

The acquisition of structural and lexical case marking separately was investigated in the study by Eisenbeiss et al. (2005/06). Spontaneous speech of five German-speaking children with SLI aged between five and seven and five TD children the age of two and three was examined. Only sentences were included in the analysis in which the child produced both an argument that required nominative, accusative or dative case marking as well as the corresponding case assigner, that is, the case assigning verb or preposition. Moreover, only unambiguous, nonsyncretic case markings on definite articles, demonstratives, quantifiers with strong inflections, wh-words, and personal pronouns were analyzed, cf. Example (21a) vs. Example (21b). All forms of indefinite articles, article-words, and pronouns that end with *–ein* in their base form and that are inflected in the same way, such as *mein* 'my' were excluded from the analysis. In addition,

substitutions of *–m* by *-n* in dative contexts were not counted, while correct usage of *dem* 'the-DAT' was counted, cf. Example (22a) vs. Example (22b).

(21) a. Lisa sieht den Hund. (analyzed)
Lisa sees the-ACC dog
'Lisa sees the dog.'
b. Lisa sieht die Maus . (not analyzed)
Lisa sees the-NOM/ACC mouse
'Lisa sees the mouse.'

(22) a. Lisa hilft dem Hund. (analyzed)
Lisa helps the-DAT dog
'Lisa is helping the dog.'
b. *Lisa hilft den Hund. (not analyzed)
Lisa helps the-ACC dog
'Lisa is helping the dog.'

Only the results for TD children are reported. The analysis revealed that structural case marking was mostly correct (99.6%), whereas lexical case marking was more error prone, and its correctness score was 68%. The difference between lexical and structural case marking also holed at the individual participant level in that each of the five children achieved better accuracy scores for structural than for lexical case marking. Regarding the structural case, the following error types were observed. In only three sentences, the accusative determiner form *den* was used instead of the nominative form *der* as in Example (23). In four sentences, nominative case marking was produced instead of accusative case marking on direct object and complements of prepositions, cf. Example (24). Case marking errors on indirect objects were also rare. In all six sentences accusative case marking was overgeneralized, cf. Example (25).

(23) is den koffer von die von de[r] sascha (Eisenbeiss et al., 2005/06:19)
is the-ACC suitcase oft the-ACC oft the-DAT sascha
'This is Sascha's suitcase'

(24) der da muss wir doch erst wieder anziehe(n) (Eisenbeiss et al., 2005/06:20)
this one-NOM there must we but first again dress
'But we have to dress up this one again'

(25) das habe jetz die mama zählt (Eisenbeiss et al., 2005/06:21)
this have now the-ACC mommy told
'I have told this to mommy now'

As mentioned before children marked the lexical case more frequently incorrectly than structural case. In contrast to structural case marking, there was a considerable degree of individual variation for lexical case marking; the scores range from 20% to almost 90%. Two types of errors were observed in contexts in which lexical datives were required on arguments of a verb. Children overgeneralized the unambiguous accusative forms or the forms that could be either nominatives or accusatives, cf. Example (26), or they overgeneralized nominatives to the Possessor argument of the verb *gehören* 'belong', cf. Example (27), or the Theme argument of the intransitive verb *sein* 'be' and *werden* 'become', cf. Example (28). Concerning the case marking in PPs, children used accusative forms or forms that could be either nominatives or accusatives instead of dative case marking. Such overgeneralizations of accusative forms after prepositions were also reported in other studies (Milles, 1985; Clahsen, 1984; Tracy, 1986; Eisenbeiss, 2003).

(26) ich hab mich da wegetan (Eisenbeiss et al., 2005/06:23)
I have myself-ACC there hurt
'I hurt myself there'

(27) wer das gehört? (Eisenbeiss et al., 2005/06:23)
who-NOM that-NOM/ACC belongs
'Who does this belong to?'

(28) ich bin kalt (Eisenbeiss et al., 2005/06:24)
I-NOM am cold
'I am cold'

In summary, these data show that whereas structural case marking is almost error free, dative marking of arguments of intransitive and transitive verbs and dative marking on complements of prepositions is more error prone. In the non-target-like utterances, children replace dative by the corresponding structural case. According the authors the later acquisition of lexical case marking can be explained by the idiosyncratic properties of lexical case assignment that have to be learned on an item-by-item basis.

Different findings on dative case marking on indirect objects are reported by Schönenberger, Sterner & Ruberg (2011) and Schönenberger, Rothweiler & Sterner (2012). In contrast to Eisenbeiss et al. (2005/06) who analyzed spontaneous speech production, they conducted an elicitation production task. The child was prompted to produce sentences with *geben* 'give' or *schenken* 'give a present' which required nominative for subject, accusative for direct object, and dative for indirect object as illustrated in Example (29) (Schönenberger et al., 2011:146).

(29) Ich gebe der Maus den Ball.
I give-1SG the-DAT mouse the-ACC ball
'I'm giving the mouse the ball.'

Fourteen monolingual children aged 2;4 to 5;0 and 21 eL2 children aged 4;0 to 6;6 were tested. Only the results of monolingual children are summarized at this point, for the results of eL2 children see Section 7.2.2. The monolingual children marked only 36.3% of indirect objects target-like with dative (41 out of 113 cases). Note that Eisenbeiss et al. (2005/06) reported very high accuracy scores (95%) in indirect object contexts. Instead of dative case marking, monolingual children overgeneralized accusative to dative contexts (56.6%) or used case forms that are ambiguous between nominative and accusative (7.1%). There were also many utterances in which *dem* 'the-DAT' was substituted by *den* 'the-ACC' or *ihm* 'he-DAT' by *ihn* 'he-ACC'. These utterances were excluded by Eisenbeiss et al. (2005/06) due to their phonological similarity. Regarding the case marking on direct objects, children produced 75% of them correctly. Looking at the non-target-like accusative marking, children more often overgeneralized nominative (18%) than dative (7%). This also differs from the findings in Eisenbeiss et al. (2005/06). Moreover, the individual data analysis revealed that not only young children, but also older children produced non-target-like case marking in the experiment.

An elicitation task for testing case marking was used by Ruigendijk (2015) as well. The task elicits nominative case marking on subjects, accusative case marking on direct objects, dative case marking on direct objects, and dative case marking on indirect objects as illustrated in Examples (30) to (32), respectively (Ruigendijk, 2015:43).

(30) Die Königin kitzelt den Koch.
The-NOM king tickle-3SG the-ACC cook
'The king tickles the cook.'
(31) Die Prinzessin hilft dem König.
The-NOM princess help-3SG the-DAT king
'The princess helps the king.'
(32) Der Clown schickt dem Zauberer einen Brief.
The-NOM clown send-3SG the-DAT magician a-ACC letter
'The clown sends the magician a letter.'

The analysis of the pilot data from eight children aged 5;7 to 9;3 years revealed that the children performed well on nominative subjects and on accusative direct objects.

Dative objects, both in transitive and ditransitive sentences caused more difficulties. The most frequent error type in the dative contexts was the overuse of accusative case marking. These results are in line with the findings by Schönenberger et al. (2011) and Schönenberger et al. (2012) which also showed that monolingual German-speaking children have difficulties in dative case marking on indirect objects. The results on case marking on indirect object differ from the findings by Eisenbeiss et al. (2005/06) since in their data the children performed well in these contexts. Regarding dative case marking on direct objects, Ruigendijk (2015) and Eisenbeiss et al. (2005/06) reported that children had lot difficulties in these contexts. This indicates that dative assigned lexically is acquired late since it must be learned for each verb separately. Results on dative case marking on indirect objects varied depending whether spontaneous speech data or data from an experimental task was examined. Eisenbeiss et al. (2005/06) assumed that dative is assigned structurally in these contexts and thus it should not cause problems. This was also showed in their data. According to Woolford's (2006) approach, however, dative on indirect objects is an inherent case that belongs to the non-structural case. This can explain the poor performance on dative case marking on indirect objects in the experimental studies by Schönenberger et al. (2011), Schönenberger et al. (2012), and Ruigendijk (2015).

Taken together, monolingual German-speaking children acquire the case marking system about the age of three. Moreover, there is a contrast between structural and lexical case marking. It can be assumed that the structural case assignment mechanism is already operative in two-year-old children and that children like adults associate certain phrase structure positions such as subject or direct object with a particular case marking. These structural cases are overapplied when children have not yet acquired the lexical exceptions. Moreover, accusative case marking is acquired earlier than dative case marking which in experimental studies cause difficulties even at age six.

7.2.2. eL2 acquisition of case

Whereas several studies investigated case marking acquisition in monolingual German-speaking children, only few studies examined case marking acquisition in eL2 learners. In the following, first studies analyzing spontaneous speech data are summarized (Kostyuk, 2005; Marouani, 2006; Lemke, 2009; Schönenberger et al. 2012; Schönenberger, Sterner & Rothweiler, 2013). Then, the findings from elicited production studies are reported (Schönenberger et al., 2012; Schönenberger et al., 2011; Lemmer, 2018). Finally, studies on case assignment within a prepositional phrase are focused (Wegener, 1995; Marouani, 2006; Turgay, 2011; Gutzmann & Turgay, 2011; Lemmer, 2018).

The studies that examined spontaneous speech data of eL2 children overwhelming reported difficulties in the acquisition of German case system. Kostyuk (2005) investigated data of three eL2 children with L1 Russian at age 2;9 – 3;11, 3;0 – 3;11, and 4;0 – 5;4 years. She only found forms marked for accusative within the first year of exposure to German. However, all eL2 learners used these forms unsystematically. They mostly substituted the accusative case marking with nominative or they omitted the determiners. Thus, Kostyuk (2005) concludes that eL2 learners do not completely acquire case marking after 11 to 16 months of exposure to German.

Marouani (2006) investigated the acquisition of case marking in nine eL2 children with L1 Arabic. They were between 2;12 and 5;3 at the first recording session, and between 3;10 and 5;12 at the last one. Regarding the accusative case marking, she identified five developmental stages. In the 1st phase, the DPs were not marked for accusative since the determiners were omitted. The verbs lacked in these utterances as well or were placed in their infinitival form in the final position as illustrated in Example (33) and Example (34), respectively. However, the canonical word order (subject, object) was already established. The same patterns were found in monolingual children (Tracy, 1986; Clahsen, 1984).

(33) a. ich auch Auto (eL2, 3;5, Marouani, 2006:230)
I too car

b. ich auch Schaf (eL2, 3;3, Marouani, 2006:230)
I too sheep

(34) ich Eis essen (eL2, 3;4, Marouani 2006:230)
I ice-cream eat-INF

In the 2nd phase, first determiners occurred. However, they were not unambiguously marked for accusative since the gender system was not established yet, cf. Example (35). It is important to note that pronouns were marked target-like for accusative at this stage as illustrated in Example (36).

(35) a. ich hab eine Fenster (eL2, 3;9, Marouani, 2006:232)
I have a-NOM/ACC window
'I have a window'

b. die hat kein Elefant (eL2, 4;9, Marouani, 2006:232)
she has no-NOM/ACC elephant
'She has not an elephant'

(36) a. ein Elefant rink (trinkt) mich (eL2, 3;12, Marouani, 2006:232)
a-NOM elephant drink-Ø me
'An elephant is drinking me'
b. wir dürfen ihn malen (eL2, 5;3, Marouani, 2006:232)
we are allowed him paint-INF
'We are allowed to paint him'

In the next stage, some accusative forms occurred. However, their usage was not systematically yet. In the 4th phase, the beginning of the binary case system could be identified. Note that, the accusative was realized gender independent, it is, the children overwhelming used *den* 'the-ACC-masculine' or *die* 'the-ACC-feminine' for determiners marked for accusative, cf. Example (37).

(37) a. ich baue den Boden (eL2, 5;8, Marouani, 2006:235)
I build-1SG the-ACC floor
'I'm building the floor'
b. der Kleine will die Ballon (eL2, 3;12, Marouani, 2006:236)
the small want-3SG the-ACC ballon
'The small one wants the ballon'

In the 5th stage, the binary case system was established. In the most utterances, the masculine and feminine accusative forms were used. According to Marouani (2006), the non-target-like forms are due to the fact that the children did not acquire the gender since the nouns were marked for the same gender in nominative and accusative as illustrated in Example (38).

(38) a. der Vase (eL2, 3;7, Marouani, 2006:237)
the-NOM vase
'the vase'
er macht den Vase zu
he make-3SG the-ACC vase off
'He is making off the vase'
b. die Käse (eL2, 5;5, Marouani, 2006:237)
the-NOM cheese
'the cheese'
der Maus esst die Käse
the-NOM mouse eat-3SG the-ACC cheese
'The mouse is eating the cheese'

With respect to the dative case marking, Marouani (2006) observed that the structures requiring this case were produced rarely. Moreover, the dative case marking was more prompted to errors than accusative case marking (49% vs. 69%). In contexts, in which dative direct objects were required, eL2 children always substituted dative case marking with accusative. Only some structures with pronouns such as *das schmeckt mir* 'it taste-3SG I-DAT' or *das gefällt mir* 'it please-3SG I-DAT' were produced target-like. Marouani (2006) argued that these utterances were formulaic and not analyzed yet. In utterances with ditransitive verbs like *geben* 'give', dative on indirect objects were correctly marked in only 36% of cases. The children substituted also in these contexts mostly the dative case marking with accusative case marking. Since the word order of direct and indirect objects were target-like in these utterances, Marouani (2006) suggests that eL2 children only have difficulties with the morphological case realization. Taking together, the data by Marouani (2006) indicate that the acquisition of case marking cause difficulties to eL2 learners, and that the German case system is not acquired fully at the age of five.

Six eL2 learners whose data were examined by Lemke (2009) differed in their first languages (Russian, Arabic, Turkish and English). The children aged between 2;11 and 4;6 at the first recording session and between 4;0 and 5;7 at the last one. The analyses of their data revealed that only four out of these children established a binary case system. Two of them distinguished correctly between nominative and accusative case marking after seven and 16 months of exposure to German, respectively. One eL2 learner distinguished between nominative and dative forms, and between accusative and dative case marking. One eL2 child marked the DPs correctly in nominative and accusative contexts, and in nominative and dative contexts. In two children target-like occurrence of dative case marking was found if it was assigned by a preposition. Note that like the children examined by Marouani (2006) none of these eL2 learners acquired the German case system completely.

Schönenberger et al. (2013) and Schönenberger et al. (2012) analyzed case marking in longitudinal spontaneous production data of four eL2 children with L1 Turkish. The children aged between 3;9 and 6;6. They started to acquire German between 2;9 and 4;2, and their length of exposure was between 8 and 30 months. Regarding the structural case marking, the accuracy rates were very high. Nominative was almost exclusively marked target-like (99.5%), accusative was correctly marked in 93% of utterances, and dative in 93.9%. Lexical case assignment was prompted to errors more often in comparison to structural case. Dative assigned by prepositions was target-like in 73.2% of PPs, and dative

assigned by verbs in 80%. Note however that the children produced only 10 utterances that required dative case marking on indirect objects. In sum, eL2 children parallel monolingual children from Eisenbeiss et al. (2005/06) in performing better on structural case than on lexical case. In comparison to eL2 children examined by Marouani (2006) and Lemke (2009), eL2 learners from Schönenberger et al. (2013) and Schönenberger et al. (2012) assigned the accusative and the dative more frequently target-like.

The assignment of structural case was investigated using an elicited production task by Schönenberger et al. (2012) and Schönenberger et al. (2011). As mentioned in Section 7.2.1 above, monolingual children and eL2 learners were tested in these studies. eL2 children started to acquired German between the age of 2;9 and 4;2, and their length of exposure to German ranged between 13 and 41 months. Two groups of eL2 learners were compared: 12 children with L1 Turkish and 9 children with L1 Polish or Russian. Regarding the dative case marking on indirect object, the eL2 group more often omitted the determiner than the monolingual group. The eL2 children with L1 Turkish had a higher omission rate than the eL2 children with L1 Polish or Russian (23% vs. 14%). The results for utterances with a determiner for the monolingual children and for the eL2 learners are summarized in Table 7.4.

Table 7.4. Structural dative case marking in monolingual children and eL2 learners from Schönenberger et al. (2012).

	Monolingual children	eL2 children L1 Turkish	eL2 children L1 Polish/Russian
Dative	36.3%	10.9%	25%
Ambiguous Nom/Acc	7.1%	10.9%	1.1%
Non dative	56.6%	78%	73.9%

Target-like dative case marking was produced very rarely in both eL2 groups and in monolingual group. Like the monolingual children, the eL2 learners most frequently overgeneralized accusative case marking to dative contexts, cf. Example (39).

(39) ich gebe den tiger den auto (eL2, 25 ME, Schönenberger et al., 2011:149)
I give the-ACC tiger the-ACC car
Target: Ich gebe dem Tiger das Auto.
I give the-DAT tiger the-ACC car
'I'm giving the car to the tiger.'

Note however that *dem* substitutions with *den* were excluded from the analysis. If these utterances had been included in the analysis, the error rate would have been even higher in all groups. Forms that are ambiguous and can therefore be analyzed as nominative or accusative were used rarely, cf. Example (40).

(40) ich schenke das slossel auch das tiger (Mon, 3;5, Schönenberger et al., 2011:149)
I give the-NOM/ACC key too the-NOM/ACC tiger
Target: Ich schenke dem Tiger den Schlüssel.
I give the-DAT tiger the-ACC key
'I'm giving the key to the tiger.'

Interestingly, eL2 children often used PPs to express the indirect object of a ditransitive verb while monolingual children did not. There was also a difference between the eL2 groups. eL2 children with L1 Turkish produced twice as many PPs instead of indirect objects as eL2 children with L1 Polish/Russian (about 40% vs. about 20%). Various prepositions were used by the children. *Für* 'for' and *zu* 'to' occurred most frequently. In PPs with a preposition that assigns dative, children used almost exclusively non-target-like case marking. They produced forms like *das* 'the-NOM/ACC' or *die* 'the-NOM/ACC' (54%), and substitutions with *den* 'the-ACC' or *ihn* 'he-ACC' (33%). This high error rate was expected since the prepositions are lexical case assigners.

In contrast to dative case marking, eL2 children and monolingual children assigned accusative case more frequently target-like. For eL2 children with L1 Turkish the accuracy score was about 90% and for eL2 children with L1 Polish/Russian 75%. The children used either nominative or dative instead of accusative case marking as in Examples (41) and (42), respectively.

(41) ich senke die Maus der Teller (Mon, 3;1, Schönenberger et al., 2012:17)
I give the-NOM/ACC mouse the-NOM plate
Target: Ich schenke der Maus den Teller.
I-NOM give the-DAT mouse the-ACC plate
'I'm giving the plate to the mouse.'

(42) dem Auto geb ich zu Maus (eL2, 20 ME, Schönenberger et al., 2012:17)
the-DAT car give I to mouse
Target: Das Auto geb ich der Maus.
The-ACC car give I-NOM the-DAT mouse
'The car, I'm giving to the mouse.'

Taking together, especially in studies by Schönenberger et al. (2013) and Schönenberger et al. (2012), eL2 children and monolingual children produced a large number of structural case errors under experimental condition, although spontaneous speech data partially indicate that eL2 children do not have difficulties with structural case assignment. However, the structures with ditransitive verbs are very rarely used in spontaneous speech of eL2 children. According to Schönenberger at al. (2012) the high error rate in the experimental task could be due to the processing limitations since the children were obliged to produce a structure that almost never occurred in their spontaneous speech.

Lemmer (2018) investigated acquisition of case marking in 22 eL2 and 11 eL2-SLI children using elicited production task from LiSe-DaZ (Schulz & Tracy, 2011). The participants are subgroups from MILA-sample and thus eL2 learners are the same as in the present thesis. However, Lemmer (2018) focused on differences between eL2-TD children and eL2-SLI children in case acquisition. eL2 learners were tested across four test rounds and aged 3;8 at first test round and 5;8 at the fourth test round. Her analysis based on case assignment model proposed by Woolfords (2006). The results show that eL2 children marked accusative on direct objects target-like at age 5;8. The analyses of individual developmental paths revealed that 14 out of 22 eL2 children mastered accusative on direct objects at age 5;8. This case is assigned structurally according to Woolfords (2005). In contrast, dative case marking on indirect objects caused difficulties to eL2 children even at age 5;8. They marked it correctly in only 17% of utterances. The mastery in dative on indirect objects was reached only by two eL2 children at age 5;8. This indicates that the acquisition of dative on indirect objects, which is assigned lexically, causes a lot of difficulties for eL2 children. Regarding the error patterns, Lemmer (2018) found out that eL2 children omitted the determiner or substituted nominative instead of accusative and accusative instead of dative the most frequently.

Case marking within a PP seems also to be difficult to eL2 children. Wegener (1995) suggests that the acquisition of case marking within a PP differs from the acquisition of case marking assigned by a verb. The acquisitional order of case assigned by a verb is nominative < accusative < dative, whereas within a PP dative should be marked target-like before accusative. This is because dative case marking within a PP is more frequent than accusative case marking. On the other hand, accusative is assigned more frequently by a verb than dative.

The analysis by Marouani (2006) revealed however that eL2 learners mostly overgeneralized accusative in contexts where dative case marking was required as illustrated in Example (43).

(43) a. der sitzt auf den Stuhl (eL2, 5;5, Marouani, 2006:250)
he sit-3SG on the-ACC chair
Target: Der sitzt auf dem Stuhl
He sit-3SG on the-DAT chair
'He is sitting on the chair'

b. sie ist in die Schule (eL2, 4;3, Marouani, 2006:250)
she is in the-ACC school
Target: Sie ist in der Schule
She is in the-DAT school
'She is at school'

Turgay (2011) and Gutzmann & Turgay (2011) investigated the production of case marking in PPs with four different elicitation tasks. The participants of their study were eL2 children with L1 Turkish or Italian aged six to nine years, monolingual German-speaking children aged six to nine, and younger three- and four-year-old monolingual children. In general, the analysis revealed that eL2 children had more difficulties with the target-like case marking within PPs than monolingual children (51% vs. 87%). Moreover, eL2 children omitted the determiner in 20.5% of PPs, whereas monolingual children did it in only 5% of PPs. The cross-sectional comparison revealed that within the monolingual group, the older children performed slightly better than the younger children did. Regarding the eL2 group, the incorrect case marking decreased on 10% (30% by six-year-olds vs. 20% by nine-year-olds). There was also a slight difference between the two groups of eL2 learners. eL2 children with Italian as L1 marked the case more frequently non-target-like than eL2 children with Turkish as L1 did. Looking at the incorrect case marking, monolingual children and eL2 children showed the same error pattern. Both groups mostly substituted dative case marking with accusative case marking (monolingual group: 53%, eL2 group: 40%), cf. Example (44). In contrast, the dative substitutions instead of accusative were rare (monolingual group: about 4%, eL2 group: about 10%). In the remaining of non-target-like utterances in the monolingual and in the eL2 group, the marking was ambiguous, it is, it could be accusative or nominative. Additionally, the comparison between accusative and dative case marking showed that in monolingual and in eL2 children, errors were more frequent if dative was required.

(44) Dann ist der Vogel immer noch auf den Stuhl (eL2, Turgay, 2011:406)
Then is the-NOM bird always still on the-ACC chair
Target: Dann ist der Vogel immer noch auf dem Stuhl
Then is the-NOM bird always still on the-DAT chair
'Then, the bird is still on the chair'

In sum, the results of this study indicate that case assignment in PPs caused difficulties for eL2 children, and thus are in line with the findings by Marouani (2006). However, the data do not conform the assumption by Wegener (1995) since dative case marking were more prompted to errors than accusative case marking for monolingual children and for eL2 children as well till the age of nine. Thus, Turgay (2011) and Gutzmann & Turgay (2011) conclude that the acquisition order is the same for case assigned by prepositions and by verbs. It means, the accusative case marking is acquired earlier than the dative case marking.

The study by Lemmer (2018) also investigated dative case marking in PPs. She found out that eL2 children marked dative in PPs target-like in 81% of utterances at age 5;8. This indicates that dative assigned inherently is easier for eL2 children than dative assigned lexically (81% vs. 17%). 8 out of 22 eL2 learners reached mastery on dative in prepositional phrase. Based on the error patterns, Lemmer (2018) proposed a developmental path toward target-like production of PPs, cf. (45). eL2 children start with production of bare NPs. In the next stage, they produce prepositions with a noun phrase. Finally, eL2 learners use target-like PPs with preposition and a determiner phrase marked for case. Note that, the case has not to be marked target-like in the final stage.

(45) Stages in acquisition of PPs (Lemmer, 2018)
i. Bare NP (*Baum* 'tree')
ii. PP = P + NP (*in Baum* 'in tree')
iii. PP = P + DP (*in den/dem Baum* 'in the-ACC/the-DAT tree')

In sum, previous research overwhelmingly investigated the acquisition of dative and accusative case marking in monolingual and in eL2 children, and mostly distinguished between structural and non-structural case assignment (but Lemmer (2018)). Generally, accusative case marking is acquired earlier than dative case marking in monolingual and in eL2 children, and do not cause any difficulties for children. Regarding the dative case marking on indirect objects, the findings are controversial. Some studies report that this case marking is acquired early at age four to five in monolingual children and at age five to seven in eL2 learners. Other findings indicate that dative case marking is not

completely acquired even at age seven in monolingual and in eL2 children. Concerning dative case marking within PPs, monolingual children acquire it till age six. eL2 learners have difficulties with this case marking even at elementary school age. The comparisons of non-target-like case markings reveal that monolingual and eL2 children parallel regarding their errors. The most frequent errors are substitutions: children marked the DP with nominative instead of accusative, and with accusative instead of dative. The omissions of determiners were found as well in monolingual and in eL2 children.

However, most of these results based on analyses on spontaneous speech data of only several monolingual and eL2 children. The few experimental studies (Schönenberger et al., 2012; Schönenberger et al., 2011; Lemmer, 2018) reported findings that only partially are in line with the studies investigated children's spontaneous speech data. In addition, the experimental studies examined mostly cross-sectional data of eL2 children. Thus, it remains unclear how case marking develops over time in monolingual and in eL2 children if tested under experimental conditions. In addition, to date no study has investigated whether external factors affect the acquisition of case.

7.3. Elicitation of case

This section focuses on current elicitation task of case marking in monolingual children and eL2 learners[1]. It is structured as follows. In Section 7.3.1 research hypotheses are formulated. Section 7.3.2 presents the participants, and Section 7.3.3 describes the elicitation production task. In Section 7.3.4 the data analysis is explained. In Section 7.3.5 the results concerning pace of acquisition and impact of external factors are presented.

7.3.1. Research hypotheses

In this section, the acquisitional hypotheses with respect to children's production of case marking are formulated. Concerning first the hypotheses related to the children's pace of acquisition. Previous research (Kostyuk, 2005; Marouani, 2006; Lemke, 2009; Schönenberger et al. 2011, 2012, 2013) indicates that eL2 children produced fewer target-like case realizations than monolingual children at age three. Looking at eL2 children's development over time, their rate of change was greater than that of monolingual

[1] More detailed analyses regarding different case assignments (structural, lexical, inherent) and individual developmental patterns for a subgroup of eL2 children investigated in this study is given in Lemmer (2018).

children even if they had not reached the target-like attainment necessarily. Therefore, the following two hypotheses are formulated:

(H1.1) eL2 children produce significantly fewer target-like case markings at the first test round than monolingual children do.
(H1.2) eL2 children show a significantly greater rate of change regarding the target-like case realization than monolingual children do.

Turning now to the predictions that are formulated regarding the role of the external factors. To date, only the results for the sample of LiSe-DaZ (Schulz & Tracy, 2011) indicate that external factors did not affect children's acquisition of case realization. Consequently, the following hypotheses are stated:

(H2.1) External factors do not affect the eL2 and the monolingual children's target-like case realization at the first test round.
(H2.2) External factors do not affect the rate of change towards target-like case realization of monolingual and of eL2 children.

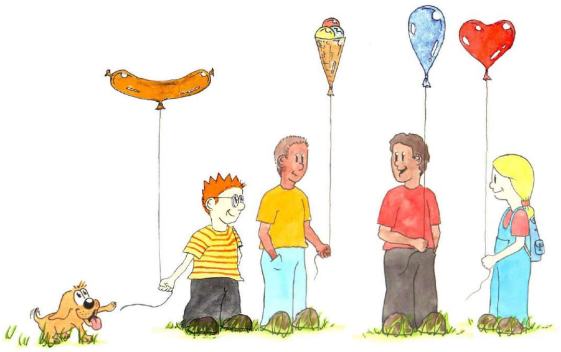
7.3.2. Participants

To examine children's case marking, the data of the whole eL2 group (n=29) and the whole monolingual group (n=45) were analyzed. The detailed description of the participants is given in Section 3.4.

7.3.3. Task

The case production is examined within the same elicited production task, which also tested children's production of sentence clauses in LiSe-DaZ (Schulz & Tracy, 2011). Nine case marking forms are elicited in eight items. Two items elicit the structural accusative assigned by the verbs *nehmen* 'take' and *sehen* 'see'. An example is given in Example (46).

(46) An item for a structural accusative elicitation (Item 13.2, *Elicited production*, LiSe-DaZ (Schulz & Tracy, 2011))



Experimenter: *Und wen kannst du hier noch sehen?*
'And who can you see here?'

Child: *Den Hund. / Einen Hund.*
The-ACC dog / a-ACC dog
'the dog.' / 'A dog.'

The other seven items elicit the non-structural case. In five items the lexical case assignment is required. There are two items in which a preposition (*auf* 'on' or *für* 'for') assigns an accusative, and three items in which the nouns are marked for dative by the prepositions *auf* 'on', *in* 'in' and *hinter* 'behind'. In two items, the inherent dative is elicited by the verb *geben* 'give'. Example (47) illustrates a typical item for the lexical case marking, and Example (48) for the inherent case marking.

(47) An item for a lexical dative elicitation (Item 9.1, *Elicited production*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Ibo sieht die Tiere zuerst und sagt Lise, wo sie sind. Er sagt, guck mal das Eichhörnchen sitzt…*
'Ibo is seeing the animals first and is telling Lise where they are. He says, look the squirrel is sitting…'

Child: *auf dem Baum.*
on the-DAT tree
'on the tree.'

(48) An item for an inherent dative elicitation (Item 10.1, *Elicited production*, LiSe-DaZ (Schulz & Tracy, 2011))

Experimenter: *Die Karotte gibt sie wem?*
'The carrot is she giving whom?'

Child: *Dem Hasen.*
The-DAT rabbit
'the rabbit.'

7.3.4. Data analysis

Children's responses were classified in three categories: correct case marking, incorrect case marking, and different response. Table 7.5 summarizes which responses were coded as target-like and which as incorrect for an item with an accusative case marking, and for an item with a dative case marking.

Table 7.5. Coding of responses types in case elicitation.

Case	Correct responses	Incorrect responses	Different responses
ACCUSATIVE 'And who can you see here?'	*den Hund* 'the-ACC dog' *einen Hund* 'a-ACC dog' *seinen Hund* 'his dog' *ihn* 'him'	*die Hund* 'the-NOM dog' *eine Hund* 'a-NOM dog' *Hund* 'Ø dog' *de Hund* 'place holder dog'	*da* 'there' *hier* 'here'
DATIVE 'The carrot is she giving whom?'	*dem Hase(n)* 'the-DAT rabbit' *einem Hase(n)* 'a-DAT rabbit' *seinem Hase(n)* 'his rabbit' *ihm* 'him'	*die Hase* 'the-NOM / the-ACC rabbit' *den Hase* 'the-ACC rabbit' *eine/ein Hase* 'a-NOM rabbit' *Hase* 'Ø rabbit' *de Hase* 'place holder rabbit'	*da* 'there' *hier* 'here'

A correct case marking is given if the case is marked unambiguously on the definite or indefinite article or on a possessive pronoun. This condition is met in eight out of nine case elicitations. The item *für das Eichhörnchen* 'for the squirrel' was excluded from the analysis since the determiner *das* is ambiguous for nominative and accusative. The responses as *im* (*in* + *dem*, in + the-DAT) were classified as target-like. The marking was classified as incorrect in two cases: when the article was omitted or when the case

marking was substituted with a wrong one. As different responses, utterances such as *da* 'there' or *hier* 'here' were classified.

7.3.5. Results

This section summarizes the results from the case elicitation task. Section 7.3.5.1 compares pace of acquisition in monolingual and in eL2 children. Section 7.3.5.2 deals with impact of external factors on production of case marking.

7.3.5.1. Pace of acquisition

In the following the results on pace of acquisition of case marking are presented. Figure 7.6 illustrates the number of correct case realization across all items for the monolingual and the eL2 group. The monolingual children marked case correctly in four out of nine items at age 3;7. Their performance improved only slightly, and they realized case target-like in six out of nine items at age 5;8. eL2 learners performed very poor at age 3;7. They improved only very slightly within two years. At age 5;8 they marked case in four out of nine items correctly, thus they performed as three-year-old monolingual children.

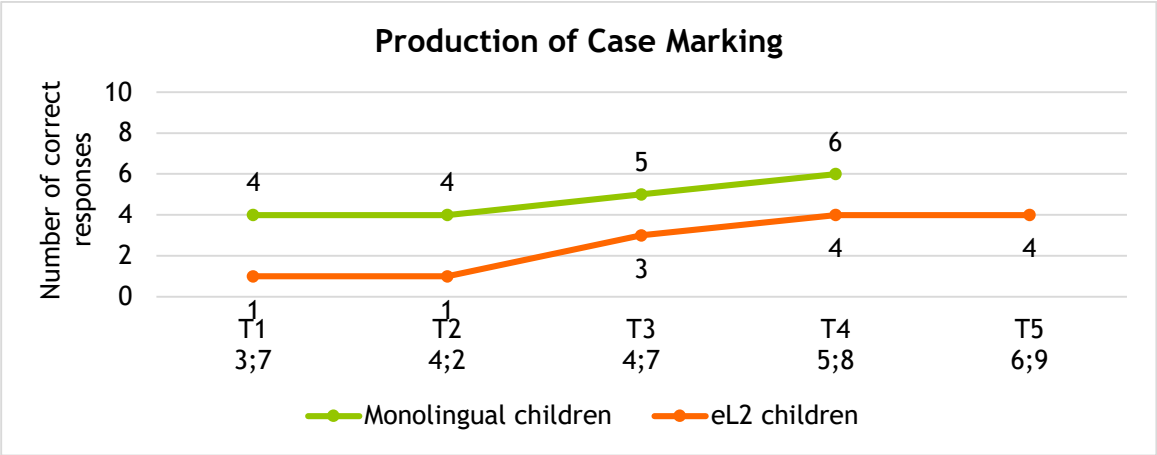


Figure 7.6. Number of correct case realization (9 items) for monolingual and for eL2 group.

This data description does not indicate how the group improvement is achieved. Thus, spaghetti plots were plotted for each group separately. The results are depicted in Figure 7.7 for monolingual children and in Figure 7.8 for eL2 learners. The monolingual children showed a very heterogenous performance at first test round. Their case realization improved over time. However, at fourth test round, they performed heterogenous as well, and only a few of them marked case in all items target-like. The eL2 children performed worse than monolingual children. At first test round, the majority of eL2 children did not

mark case in any item correctly. Their performance improved over time. However, at fifth test round they marked case in one to six items target-like. These analyses indicate that case marking is not acquired in monolingual children till the age of five and in eL2 children till the age of six.

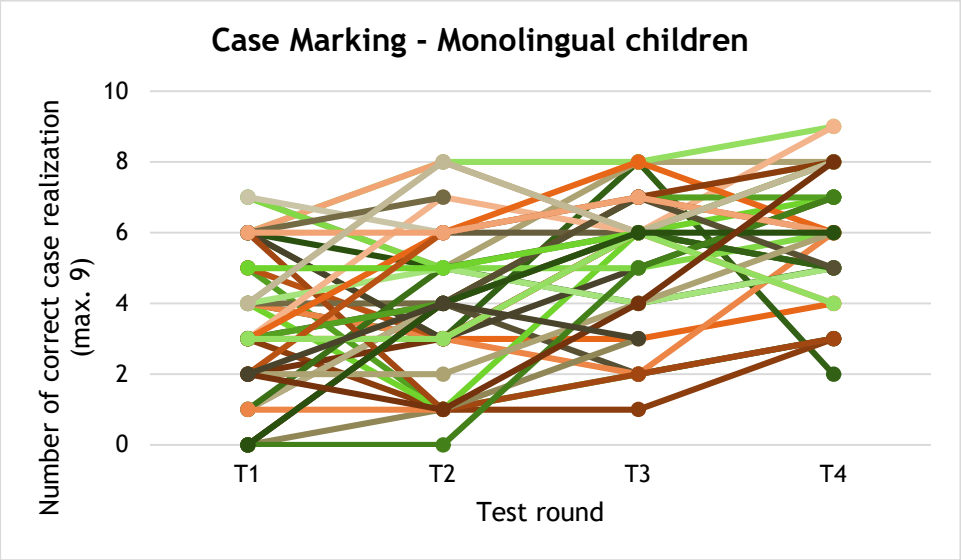


Figure 7.7. Individual development of monolingual children in production of case marking.

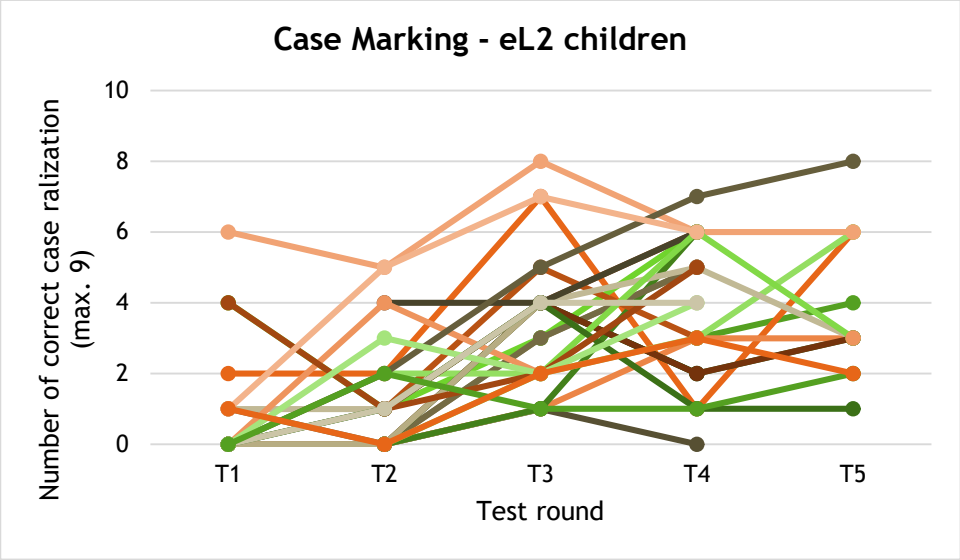


Figure 7.8. Individual development of eL2 children in production of case marking.

In following the results from the analysis with mixed linear model are reported. Regarding fixed effects for case realization, Table 7.6 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* value and the associated *p* values for the predictors that emerged as significant in the final model.

Table 7.6. Fixed effects for case realization.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	2.6371	0.3165	123	8.33	<.0001
Group	-2.4168	0.3366	71.1	-7.18	<.0001
Age	0.2031	0.03261	203	6.23	<.0001
Age*Age[1]	-0.00280	0.000825	175	-3.39	0.0009

[1] Quadratic effect of age

Concerning the intercept, all children realized case marking correctly in 2.6 out of 9 items. The estimated difference in intercept between monolingual and eL2 children was -2.4168 (p.<.0001). This means that eL2 learners performed significantly poorer than monolingual children at first test round. Moreover, the analysis revealed a significant linear and quadratic effect of age, i.e. that case realization improved significantly over time in all children. The interaction between age and acquisition type was not significant and was therefore removed from the final model. This result indicates that the slope of eL2 children and the slope of monolingual children did not differ significantly. Thus, monolingual and eL2 learners had a similar rate of change towards target-like realization of case marking.

Regarding the random effects, Table 7.7 lists the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values.

Table 7.7. Random effects for case realization.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	1.3409	0.6232	2.15	0.0157
Covariance between random intercept and random slope	-0.01146	0.02446	-0.47	0.6393
Random slope	0.001237	0.001279	0.97	0.1667
Residual	2.4263	0.2770	8.76	<.0001

The analysis revealed that the variance of the individual intercept was significant. This is explained by the group differences. The effect of random slope was not significant, indicating that all children improved their performance over time. There was no effect

for covariance between random intercept and random slope, suggesting that children's development over time did not depend on their performance at the first test round at age three.

In summary, the analyses show that although the monolingual and the eL2 children distinguish in their intercepts, their slopes are very similar. This means that eL2 learners and monolingual children improved the realization of case marking over time, and that their rate of change was similar.

7.3.5.2. The role of external factors

The following section summarizes the results regarding the role of the external factors on monolingual and eL2 children's production of case marking. First, it was considered whether each factor (gender, mother's educational background, father's educational background, and the non-verbal intelligence) separately influenced children's performance at the first test round. The analyses revealed that the external factors did not influence children's production of case marking at the first test round. Since no significant effects were found for the intercept, the impact of the external factors on the rate of change could not be investigated.

7.4. Discussion

This substudy investigated how monolingual and eL2 children acquire case marking in German. Concerning the pace of acquisition of case marking, the analysis revealed that the three-year-old eL2 learners of German marked case significantly poorer target-like than their monolingual peers at the age of three (T1), confirming hypothesis (H1.1). With respect to pace of acquisition, it was found that all children improved their performance over time. However, there was not a significant difference between rate of change of eL2 children and rate of change of monolingual children towards target-like production of case marking, what rejects hypothesis (H1.2). The eL2 learners performed at age 6;9 very similar to monolingual children at age 4;2 and marked case target-like only in almost 50% of cases. This indicates that the eL2 learners acquired case marking very slowly, and that this phenomenon is not completely acquired at this age. Notably, the monolingual children produced non-target-like case marking even at age 5;8 as well. These findings corroborate the results reported for monolingual acquisition (Eisenbeiss et al. 2005/06; Schönenberger et al., 2011; Schönenberger et al., 2012) and for eL2 acquisition of case (Marouani, 2006; Lemke, 2009; Lemmer, 2018; Schönenberger et al. 2012; Schönenberger et al., 2013).

In addition, the findings from this study confirm that timing in monolingual acquisition interacts with acquisition pace in eL2 learners as proposed by Tsimpli (2014). Case marking is acquired late in monolingual children, and thus eL2 children acquire this structure very slowly and show a shallow improvement over time. However, the results from Lemmer (2018) indicate that acquisition pace in eL2 learners differs with respect to the way the case is assigned. Is seems that eL2 children have the greatest rate of change for accusative on direct objects which is assigned structurally whereas the improvement is very poor for dative in indirect objects which is assigned inherently.

The next goal of this study was to examine the role of the external factors for children's production of case marking. The results indicate that gender, mother's educational background, father's educational background, and non-verbal IQ did not influence children's performance at first test round, confirming hypothesis H2.1. Since no effects for the intercept were found, the hypothesis H2.2 formulating for the role of the external factors on the rate of change was not tested. These results suggest that although case marking in German belongs to phenomena, which are acquired very late in monolingual and in eL2 children, their acquisition is not affected by external factors.

This study leaves several issues open. Thus, future studies are needed to investigate when eL2 learners of German mark different types case target-like, and whether their acquisition pace differs depending on the way how a case is assigned. Moreover, longitudinal studies should be conducted in which different methods (spontaneous speech and elicited production) are used. The comparison of methods is important for language assessment since only tasks should be conducted, which reliable measure children's language skills.

8. Acquisition of word classes

Chapter 8 investigates monolingual and eL2 children's production of the following word classes: lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions. The chapter is organized as follows. Section 8.1. gives an overview of the classification of word classes and their features in German. Previous research on monolingual and eL2 acquisition of word classes is summarized in Section 8.2. Section 8.2 focuses on the present elicitation of word classes. In Section 8.3.1, research hypotheses are formulated. Section 8.3.2 describes the participants, and Section 9.3.3 the task. The results for each word class separately are presented in Section 8.3.4 and discussed in Section 8.4.

8.1. Word classes in German

All languages distinguish between words that belong to closed word classes and words that belong to open word classes. Open word classes consist of so-called content words, i.e. words that have more or less concrete, specific meaning. Generally, four major open word classes are distinguished, nouns, verbs, adjectives, and adverbs. Based on distinctive grammatical properties, each of this class may be divided into several subclasses (Schachter & Shopen, 2007; Velupillai, 2012). Closed word classes consist of words that have a grammatical function, and thus have an abstract meaning or even no meaning at all. In contrast to open classes, new words are not readily added to close classes, and they tend to have only a small number of members. The most common closed classes are pronouns, articles, adpositions (prepositions, postpositions, and inpositions), modal verbs, auxiliary verbs, conjunctions, focus particles, clitics. Languages differ, however, in how many word classes they have, and in the proportions of these classes (Evans, 2000; Haspelmath, 2001; Schachter & Shopen, 2007; Velupillai, 2012). In following a brief overview of the word classes that are assessed in LiSe-DaZ (Schulz & Tracy, 2011) is given (lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions).

Verbs typically refer to actions, processes, and states. Grammatically, they may be marked for tense, aspect, mood, voice, polarity, and person agreement. Depending on language, these grammatical aspects are marked either through morphological or syntactic processes. In German, verbs are marked for tense, mood, and voice. Moreover, German verbs agree with the subject in person and number (cf. Section 9.1.1).

Auxiliary verbs convey mainly grammatical information and are thus semantically more or less empty. They express tense, aspect, mood, voice, or polarity of the verb with which they are associated (Schachter & Shopen, 2007; Velupillai, 2012). Some of them (e.g. *haben* 'have') can also be used as full verbs. German has three auxiliary verbs: *sein* 'be', *haben* 'have', and *werden* 'will', which express tense, mood, and voice. Since German is a verb second language, in sentences with finite auxiliaries, they are placed in verb second position whereas the lexical verb remains in verb final position as illustrated in Example (1) (cf. Section 9.1 for more details on German sentence structure).

(1) Lise hat den Hund gefüttert.
Lise have-3SG the-ACC dog feed-PAR.
'Lise fed the dog.'

Modal verbs express modality, and thus modify the meaning of the lexical verb, with which they are combined in a clause. According to Pollock (1989), these verbs do not assign theta role to a noun phrase, to which they are subcategorized. This feature also counts for auxiliary verbs. The meaning of modal verbs is very complex (Diewald, 1999). German has six modal verbs (*können*, *müssen*, *wollen*, *dürfen*, *sollen*, *mögen*). Each of these verbs has several objective meanings, which depend on context. Example (2) illustrates it with two possible meanings of the modal verb *können*.

(2) a. Ability
Lise kann schwimmen.
Lise can-3SG swim.
'Lise can swim.'
b. Posibility
In der Ostsee kann man schwimmen.
In the-DAT Baltic Sea can-3SG one swim
'It is possible to swim in the Baltic Sea.'

In addition, each of modal verbs has a so-called subjective meaning. This meaning involves speaker's affiliation to the clause. Thus, modal verbs express an assumption or are used to convey an assertion. This is shown in Example (3).

(3) Es könnte regnen.
It coud-3SG rain.
'It could rain.'

As in German sentences with finite auxiliaries, finite modal verbs are placed in verb second position and the lexical verb in verb final position as shown in Example (4) (cf. Section 9.1 for more details on German sentence structure).

(4) Lise soll den Hund füttern.
Lise should-3SG the-ACC dog feed-INF.
'Lise should feed the dog.'

Focus particles are words that modify the meaning of an underlying sentence. However, they are optional elements, which can be omitted without making the underlying sentence ungrammatical (Dimroth & Klein, 1996). This is illustrated in (5).

(5) Underlying sentence: Lisa soll den Hund füttern.
Lisa should-3SG the-ACC dog feed-INF.
'Lisa should feed the dog.'
Sentence with focus particle: Nur Lisa soll den Hund füttern.
Only Lisa should-3SG the-ACC dog feed-INF.
'Only Lisa should feed the dog.'

Moreover, Example (5) shows that a focus particle does not refer to the whole underlying sentence but is only connected with its part. In the Example (5), it is the DP 'Lisa'. The part of underlying sentence, to which a focus particle refers, is called differently in the literature: Bezugsausdruck 'phrase of reference' (Dimroth & Klein, 1996), related constituent (Reis & Rosengren, 1997) or domain of application (Nederstigt, 2003).

Prepositions belong to adpositions, i.e. words that express the relation between the noun phrase that they govern and some other constituent in the sentence (Schachter & Shopen, 2007; Velupillai, 2012). Prepositions precede the noun phrase that they govern, as illustrated in Example (6). In addition, they assign case to the governed noun phrase as in Example (6), in which the preposition *auf* 'on' assigns dative to the noun phrase *der Baum* 'the tree'.

(6) auf dem Baum
on the-DAT tree
'on the tree'

Conjunctions connect words, phrases, or clauses. Two types of conjunctions are distinguished, coordinating conjunctions and subordinating conjunctions. Coordinating

conjunctions (*and*, *or*, *but*) assign the entities an equal status. Subordinate conjunctions (*because*, *whether*, *if*) make one entity subordinate to another (Schachter & Shopen, 2007; Velupillai, 2012). In German, subordinate conjunctions require a different verb placement than coordinate conjunctions. Finite verb occurs in verb second position in both sentences if they are connected via a coordinate conjunction (cf. Example (7)). In contrast, in sentences connected with a subordinate conjunction, the finite verb of matrix clause occurs in verb second position, and the finite verb of subordinate clause is placed final (cf. Example (8)).

(7) Lise füttert die Enten und Ibo streichelt den Hund.
Lise feed-3SG the ducks and Ibo pet-3SG the-ACC dog.
'Lise is feeding the ducks and Ibo is petting the dog.'

(8) Ibo schimpft mit dem Hund, weil er weggelaufen ist.
Ibo rant-3SG with the-DAT dog because he away-run is.
'Ibo is ranting the dog because he run away.'

8.2. Previous research on acquisition of word classes

This section focuses on acquisition of word classes. First in 8.2.1, the general development of word acquisition is drafted, and then, the studies on composition of early lexicon in monolingual children are summarized. Section 8.2.2 gives an overview on development of lexicon in eL2 learners.

8.2.1. Monolingual acquisition of word classes

Monolingual children produce their first words around the age of 12 months (Bloom, Tinker & Margulis, 1993; Bates, Dale & Thal, 1995). Bloom et al. (1993) found the interindividual variation between age 13 and 17 months. In the first phase, the vocabulary increases very slowly. At about 18 - 19 months, the most children reach the active vocabulary of 50 words (Bloom et al., 1993; Menyuk, Liebergott & Schultz, 1995). In their cross-sectional study, Bates, Marchman, Thal et al. (1994) analyzed the size of early vocabulary in about 1800 children. They found out variability in the size of early child lexicon. At age 1;4, the children disposed of 44 words (range: 0 - 347); at age 1;8, the vocabulary size accounted for 170 words in average (range: 3 - 544). In the next developmental stage, after the children reached about 50 words, their vocabulary increases faster, and children learn several new words during a week. This phase is known as 'vocabulary spurt'. Different developmental patterns were reported for this stage: fast vocabulary explosion (Bloom,

1993; Goldfield & Reznick, 1990), several increases at different times (Clark, 1995), long-term vocabulary surge (Goldfield & Reznick, 1990) or a gradual and linear increase (Bloom, 1993; Goldfield & Reznick, 1990). At age two, children disposed of about 300 words, and at age three their vocabulary size accounts for about 500 words. At age six, the children have access to about 5000 words (Aitchison, 1994).

Several studies investigated, which word classes are represented in early child lexicon (Brown, 1998; Choi, 1998; Bates et al., 1994; Gopnik, 1988; Gentner, 1981; Gentner, 1982; Kauschke, 2000; Kauschke, 2007; Pine, Lieven & Rowland, 1997; Snyder, Bates & Bretherton, 1981; Tardif, 1996). In this context, the so called 'noun-bias-hypothesis' was tested. This assumption implies that nouns are acquired earlier than verbs and other word classes, and that nouns dominate the early lexicon. Gopnik (1988) investigated lexical development of English-speaking children aged 12 to 20 months. Her analysis revealed that social words, that fulfill interactive and social functions, are the earliest words in lexical development. Nouns occurred on average after the social words were already presented in the lexicon. The relational words, which express appearance or disappearance of objects, or some aspects of action, were found afterwards. The findings from several studies are in line with the 'noun-bias-hypothesis' indicating that nouns are acquired before verbs (Gentner, 1981, 1982; Snyder et al., 1981). However, results from studies investigating lexical development in languages such as Mandarin or Korean suggest that acquisition order of nouns and verbs depends on language (Brown, 1998; Choi, 1998; Tardif, 1996). In early lexicon of children acquiring Mandarin or Korean, verbs occurred more often than nouns.

The cross-sectional study by Bates et al. (1994) investigated which word classes occurred at which ages in English-speaking children aged 1;4 to 2;6. They found out that the amount of different word classes changed with age, and proposed three stages for the development of the early lexicon. At the first stage, the number of nouns increased and reached 55% for 100 words. At the second stage, when the child vocabulary consists of about 300 words, the number of nouns decreased whereas the number of verbs and adjective increased. In the last phase by the vocabulary size of 400 words, the increase of verbs flattened whereas the amount of functional words raised. According to Bates et al. (1994:98), these three stages reflect the general development "from reference to predication to grammar". Similar developmental patterns were also found by Pine et al. (1997).

Kauschke (2000) investigated the composition of early child lexicon in 32 German-speaking children aged 1;1 to 3;0. Her analysis of longitudinal spontaneous speech data

showed that the composition of early child lexicon changed over time. At age 1;1, personal-social words and relational words are the most frequent word classes with 41% and 34%, respectively. Two months later (age 1;3), the amounts of these word classes decreased, and more nouns (15%) and onomatopoeic words (10%) were found. Moreover, first verbs occurred at this age (3%). The number of verbs increased to 12% at age 1;9. At this age, nouns were the most frequent word class (27%) whereas the amount of personal-social words and relational words decreased. At age 3;0, verbs were the most frequent produced word class (23%). First functional words occurred at age 1;1, however their amount was very low (1.3%). An increase of functional words in child lexicon was observed at age 3;0 when this word class accounted for 11.9%. This large increase of number of functional words in child lexicon relates to the acquisition of syntax. Kauschke (2000) notes however that there was a lot of interindividual variation at age two regarding the vocabulary size and the distribution of word classes. These results for German are in line with findings for English as reported by Bates et al. (1994) and Pine et al. (1997).

Grimm & Schulz (2014) investigated the amount of functional words and main verbs in a subgroup of sample from the MILA-project (for the project description see Section 3.2). 34 monolingual children at age 5;7 (range: 5;5 – 5;9), and 22 eL2 learners of German at age 5;7 (range 5;4 – 5;9) were tested with the *Elicited Production* from LiSe-DaZ (Schulz & Tracy, 2011) (see Section 8.3.3 for a detailed description of the task). The analysis revealed that as expected monolingual children produced all elicited functional word classes (focus particles, prepositions, complementizers, modal and auxiliary verbs) and main verbs. The results of eL2 learners are described below in Section 8.2.2.

In summary, the word acquisition begins about the age of 12 months. Several studies showed that the composition of early child lexicon changed over time. Whereas social-pragmatic words and relational words are the most frequent word classes about the age of 12 months, the number of nouns increases about age of two. At age three, verbs have the largest amount in child lexicon. However, more detailed studies are needed with respect to functional words since in the most analyses different functional words were not investigated separately.

8.2.2. eL2 acquisition of word classes

To date, the acquisition of word classes in eL2 learners was not investigated a lot. From studies investigated acquisition of German sentence structure in eL2 learners (Rothweiler, 2007; Thoma & Tracy, 2006; Tracy & Thoma, 2009) can be gather that eL2

children acquired the different functional words in the course of 12 to 16 months of exposure to German. However, more detailed analyses regarding vocabulary acquisition are missed.

Jeuk (2011) analyzed spontaneous speech data of nine eL2 children with L1 Turkish. The data were collected during the first year of kindergarten, which was also the first year of systematic exposure to German. The children were between 3;0 and 3;10 at the first recording session. With respect to vocabulary size after one year of exposure to German, the analysis revealed a lot of variability. Three children established large vocabulary with 198, 248, and 262 different words, respectively. The other five eL2 learners had the vocabulary size between 48 and 113 types. One child produced only four different words after one year of exposure to German. Regarding the slope, in the first months of exposure, children vocabulary increased slowly. However, in most eL2 children a kind of vocabulary spurt was observed, indicating that eL2 vocabulary acquisition proceeds like monolingual acquisition. Additionally, Jeuk (2011) investigated the composition of early lexicon of eL2 learners. His analysis showed that nouns were the most frequent word class during the first year of exposure to German in eight out of nine children; they accounted for about 30% of types. In only one child, the number of verbs was higher than the number of nouns after one year of exposure to L2 (40% vs. 20%). Social-pragmatic words were very frequent as well in the first months of exposure. Thus, Jeuk (2011) concludes that in the first stage of vocabulary acquisition eL2 children show similar pattern to monolingual children as reported in Kauschke (2000). In addition, he points out that in contrast to lexicon of monolingual children nouns rather than verbs are the most frequent word class in vocabulary of eL2 learners after one year of exposure to German. However, this conclusion cannot be hold, since Kauschke's results (2000) show that about age two, nouns were produced more frequently than verbs (27% vs. 12%). This is about one year after the occurrence of first words. This period is comparable with twelve months of exposure to German of eL2 children. Under this assumption, composition of monolingual and eL2 lexicon is similar.

Grimm & Schulz (2014) investigated the occurrence of different functional words and main verbs in 34 monolingual children and 22 eL2 learners of German. The eL2 children were 5;7 (range: 5;4 – 5;) and had 34 months of exposure to German (range: 29 – 45). As method, *Elicited Production* from LiSe-DaZ (Schulz & Tracy, 2011) was used (cf. Section 8.3.3 for the description of the task). In average, the eL2 learners produced eight prepositions, five focus particles, six modal and auxiliary verbs, five complementizers, and 16 main verbs. The statistical analyses for each word class separately revealed that

at age 5;7, the amount of produced words by eL2 children did not differ from the amount of produced words by monolingual children. Note however, that token and not types were analyzed in this study. Thus, it remains unclear whether eL2 children have the same amounts of types for each word class that was investigated.

In sum, the few studies on vocabulary acquisition in eL2 children indicate that eL2 learners acquire new words similarly to monolingual children. As in monolingual acquisition, in the first stage, the vocabulary size increased slowly, and after a critical amount of words was learned, eL2 children acquire new words faster. However, as in monolingual children, the vocabulary size varies a lot in eL2 children. Moreover, in the first stage of acquisition the composition of lexicon seems to be similar in monolingual and eL2 children. From these studies, it remains unclear how vocabulary size and composition of lexicon develop over a longer period in eL2 acquisition.

8.3. Elicitation of word classes

In this section, the results from the elicitation of different word classes (lexical verbs, modal and auxiliary verbs, focus particles, prepositions, conjunctions) are presented. It is organized as follows. Section 8.3.1 presents research hypotheses and Section 8.3.2 the participants. In Section 8.3.3 the elicitation production task is described. Section 8.3.4 summarizes the main findings for pace of acquisition of each word class separately, and for impact of external factors on acquisition of word classes.

8.3.1. Research questions and hypothesis

In this section, the research hypotheses (cf. Section 3.1) are specified with respect to production of word classes (lexical verbs, modal and auxiliary verbs, focus particles, prepositions, conjunctions). Let us focus first on the hypotheses related to the first research question, i.e. the pace of acquisition. As was pointed out in Section 3.1, it is expected that at the first test round the eL2 children generally perform significantly worse than the monolingual children. This holds for production of word classes since the eL2 children have had less exposure to German than the monolingual group. To date, only Jeuk (2011) investigated eL2 children's development of vocabulary within their first year of exposure to German and observed a vocabulary spurt in most children. In addition, the analyses in Grimm & Schulz (2014) revealed that at age 5;7, eL2 children produced similar number of tokens across different word classes like monolingual children. Based on these

results, it is predicted that eL2 children show a greater rate of change than the monolingual children do. Therefore, the following hypotheses are formulated:

(H1.1) eL2 children produce significantly fewer tokens in each word class at the first test round than monolingual children do.
(H1.2) eL2 children show a significantly greater rate of change regarding the production of different word classes than monolingual children do.

In addition, this study investigates the role of external factors (gender, the non-verbal intelligence, mother's educational background, and father's educational background) for children's language performance. For children up to age two no significant effects of gender were reported (Grimm & Aktas, 2001; Glück, 2007). Moreover, no correlations between production of different word classes and mother's educational background, and between production of different word classes and non-verbal IQ were found for LiSe-DaZ (Schulz & Tracy, 2011). Therefore, the following hypotheses were formulated:

(H2.1) External factors do not affect eL2 and the monolingual children's production of different word classes at the first test round.
(H2.2) External factors do not affect the rate of change in production of different word classes in monolingual and in eL2 children.

8.3.2. Participants

To investigate children's production of different word classes, the data of the whole eL2 group (n=29) and the whole monolingual group (n=45) were analyzed. The detailed description of the participants is given in Section 3.4.

8.3.3. Task

Children's production of the word classes is investigated in LiSe-DaZ (Schulz & Tracy, 2011) with the same elicitation task that is used for the production of sentence structure and case marking (see Section 7.3.3 and Section 9.3.2 for a detailed description). Five word classes that are essential for German sentence structure are elicited in the task: lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions.

The goal of the analysis was to assess, which word classes monolingual and L2 children use. Therefore, the token and not the types were counted for each of five word classes, respectively.

8.3.4. Results

This section gives an overview of the monolingual and the eL2 children's production of the following word classes: lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions. First, the results with respect to the pace of acquisition are described for each of these word classes separately. Then, the role of external factors for their production is analyzed.

8.3.4.1. Pace of acquisition of lexical verbs

This subsection investigates monolingual and eL2 children's production of lexical verbs. Figure 8.1 illustrates the number of produced lexical verbs across four test rounds for the monolingual children and across five test rounds for the eL2 children.

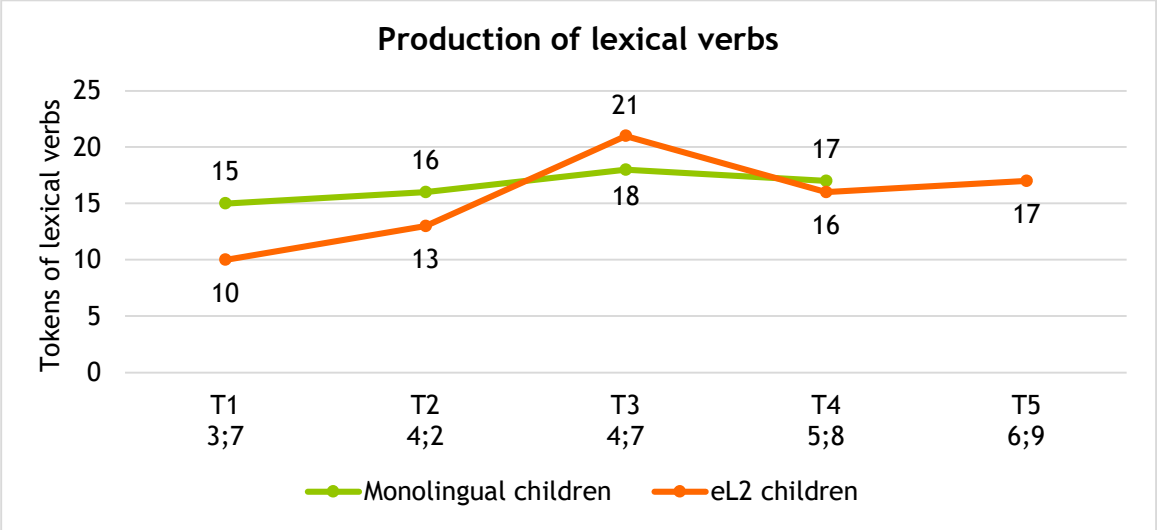


Figure 8.1. Tokens of lexical verbs for monolingual and for eL2 group.

The number of produced verbs in the monolingual group remained almost constant across all ages and averaged between 15 and 18 verbs. In contrast, the eL2 learners produced on average ten lexical verbs at age 3;7, and the number of verbs increased with age, and reached more than 20 verbs at age 4;7. After this age, the number of lexical verbs decreased, and reached 17 at age 5;8, and 18 at age 6;9. These results indicate that the eL2 children produced fewer lexical verbs than the monolingual children at age 3;7 did. The number of produced verbs increased with age, and at age 4;7 eL2 children used even more verbs than the monolingual children. However, it must be kept in mind that tokens and not types were counted. At age of five, the eL2 group and the monolingual group produced on average the same number of lexical verbs.

From this description, it remains unclear whether and how the production of lexical verbs differs between monolingual and the eL2 children individually. Thus, in the next step spaghetti plots were plotted which illustrate the individual performance of each child across all test rounds. The Figure 8.2 depicts individual developmental paths of monolingual children in production of lexical verbs, and Figure 8.3 of eL2 learners.

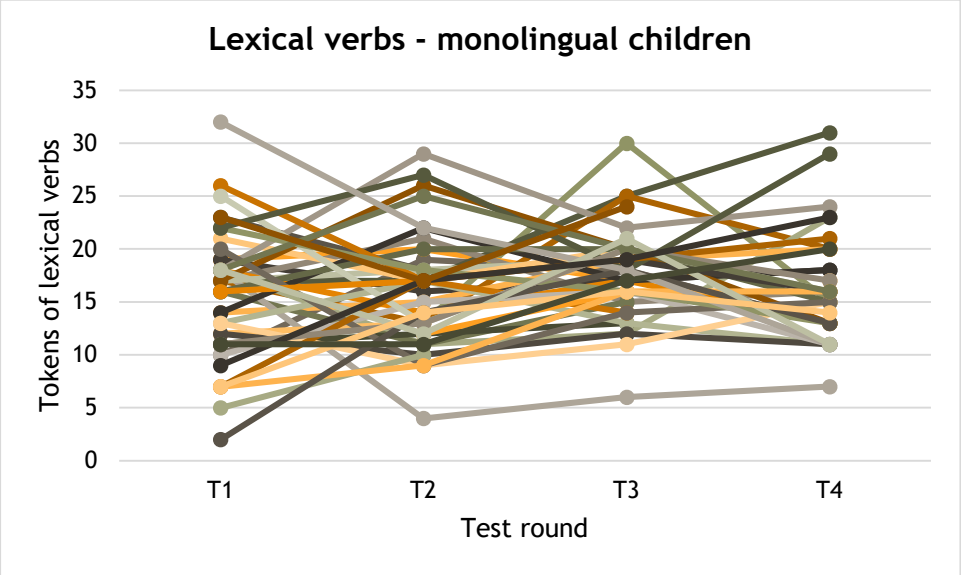


Figure 8.2. Individual developmental paths of monolingual children in production of lexical verbs.

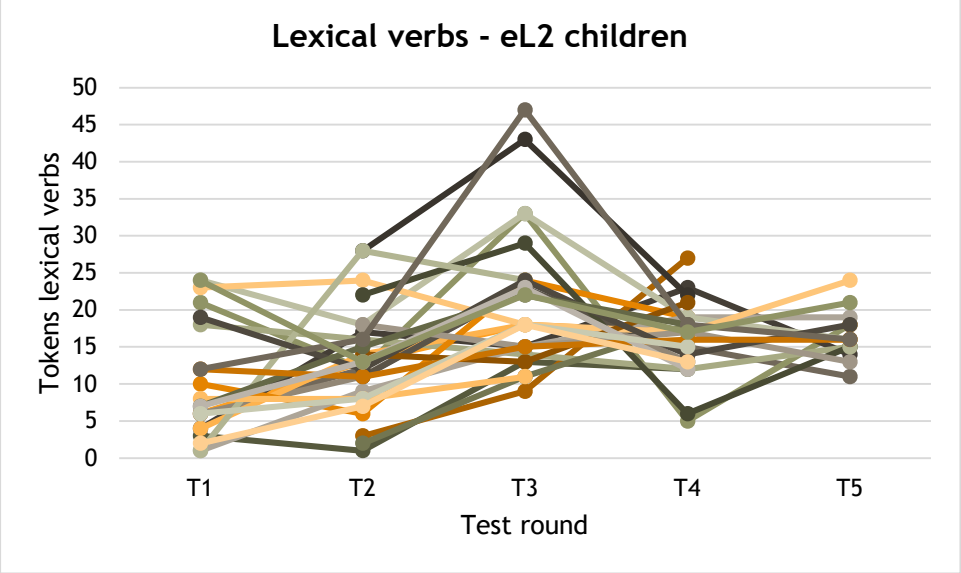


Figure 8.3. Individual developmental path of eL2 children in production of lexical verbs.

The figures show that the monolingual and the eL2 children performed very heterogeneous at the first test round. In both groups, there were children who produced only few lexical verbs, and children who used more than ten lexical verbs at age three. More importantly, the spaghetti plots show that the monolingual and the eL2 children had

overwhelmingly similar slopes. The slopes of the most children were shallow. Regarding the production of lexical verbs at the last test round, the most monolingual and eL2 children produced between 10 and 20 lexical verbs. Thus, the number of tokens varies a lot in both groups.

In the following, children's pace of acquisition is investigated statistically. A mixed linear model analysis was performed over tokens of lexical verbs to investigate children's developmental path in production of this word class. The fixed effects are discussed first. Table 8.1 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for production of lexical verbs. With respect to the intercept, all children produced on average almost 12 lexical verbs at age of three. The estimated difference in intercept between the monolingual group and the eL2 group was not significant. This reveals that the eL2 children did not differ from the monolingual children in the number of produced verbs at the first test round. In terms of children's development over time, there was a significant linear and quadratic effect of age. This indicates that the eL2 and the monolingual children produced more lexical verbs with increasing age. The interaction between age and acquisition type could not be computed since no significant effect of acquisition type for the intercept was found.

Table 8.1. The fixed effects for production of lexical verbs.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	11.8560	1.0261	140	11.55	<.0001
Age	0.5138	0.1048	191	4.90	<.0001
Age*Age[1]	-0.01035	0.002434	114	-4.25	<.0001

[1] Quadratic effect of age

Consider now to the random effects. Table 8.2 summarizes the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of individual intercept was significant. This indicates that there were some intraindividual differences between the children at age of three. The effect of random slope was not significant what suggests that the number of produced lexical verbs increased in all children over time. The effect for the covariance between the random intercept and the random slope was not significant.

Table 8.2. The random effects for production of lexical verbs.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	20.5367	8.0935	2.54	0.0056
Covariance between random intercept and random slope	-0.4549	0.2761	-1.65	0.0994
Random slope	0.003638	0.01038	0.35	0.3629
Residual	30.5673	3.2311	9.46	<.0001

In sum, these results show that the monolingual and the eL2 groups developed very similarly regarding their production of lexical verbs. Monolingual and eL2 children improved their performance over time, and they showed a similar rate of change.

8.3.4.2. Pace of acquisition of modal and auxiliary verbs

This section examines the production of modal and auxiliary verbs in monolingual and eL2 children. Figure 8.4 summarizes the number of produced modal and auxiliary verbs for the monolingual children across four test rounds, and for the eL2 children across five test rounds. Regarding the monolingual children, their performance was very constant across all ages, and they produced on average seven modal and auxiliary verbs at first three test rounds, and six at fourth test round. The eL2 learners produced on average only three modal and auxiliary verbs at age 3;7. The number of the produced verbs increased across the following test rounds, and at age 4;7, the el2 children produced the same number of verbs like one year older monolingual children.

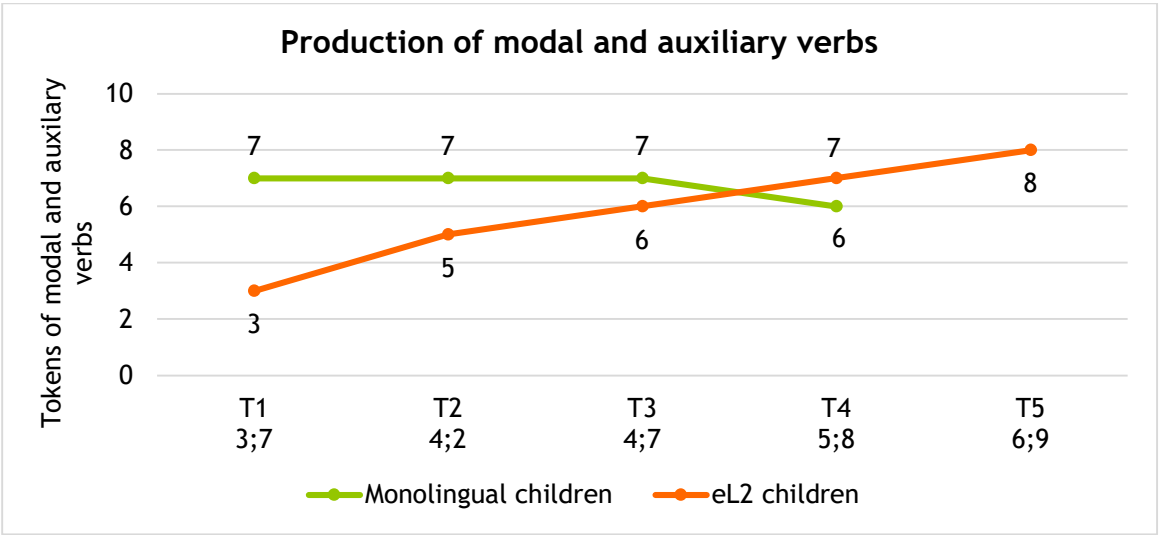


Figure 8.4. Tokens of modal and auxiliary verbs for monolingual and for eL2 group.

However, this analysis makes impossible to conclude about children's individual performance. Figure 8.5 illustrates the individual production of modal and auxiliary verbs for each monolingual child, and Figure 8.6 for each eL2 child.

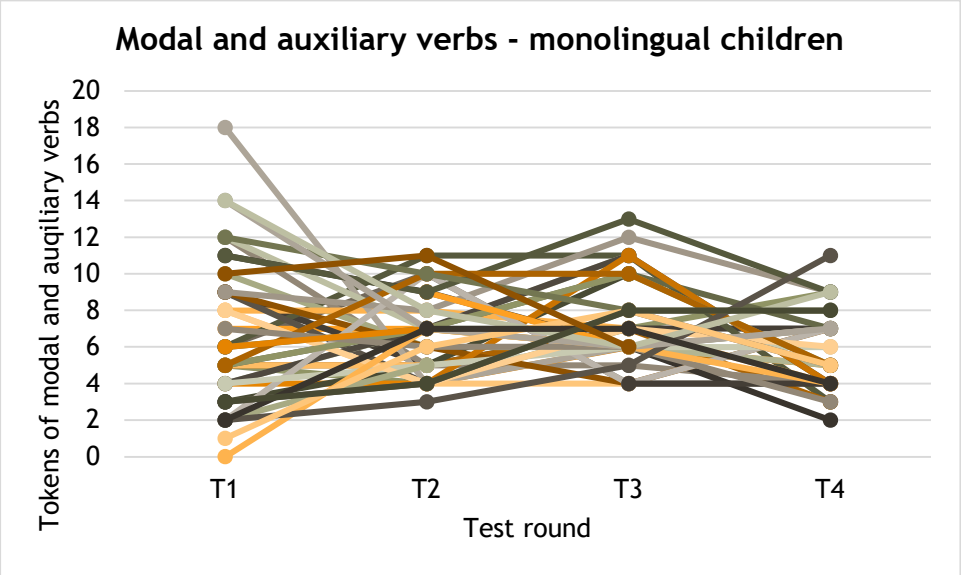


Figure 8.5. The individual developmental paths of monolingual children in production of modal and auxiliary verbs.

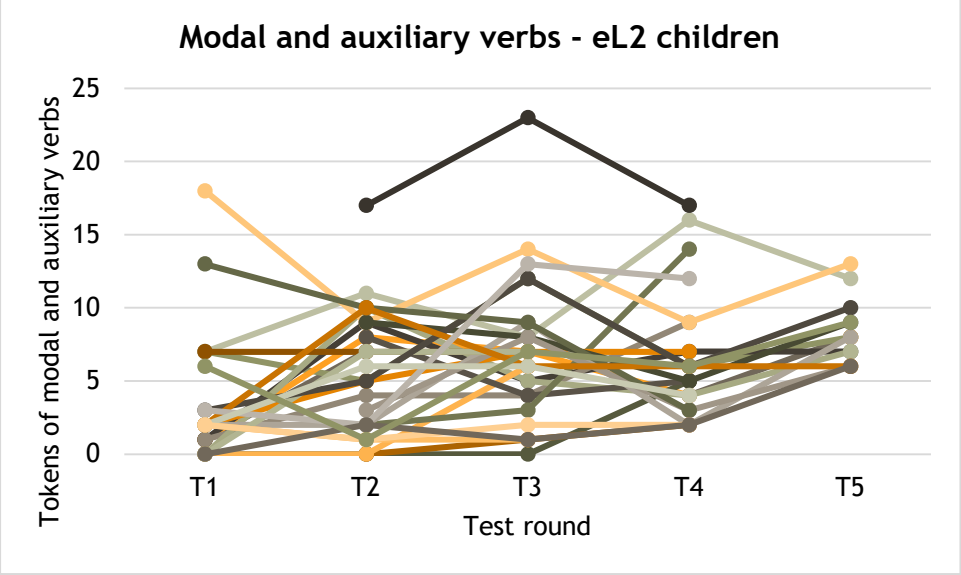


Figure 8.6. The individual developmental paths of eL2 children in production of modal and auxiliary verbs.

With respect to the intercept, Figure 8.5 shows that the monolingual children performed very heterogeneous and produced between almost none to 14 modal and auxiliary verbs at age three. One child produced even 18 modal and auxiliary verbs. The performance of eL2 children was heterogeneous as well. In contrast to the monolingual

children, the eL2 children used fewer modal and auxiliary verbs at first test round; their amount counted between none to seven. The slopes of monolingual children were overwhelmingly shallow. This was also the case for some eL2 children. However, about the half of eL2 children had a steeper slope. Regarding the production of the modal and auxiliary verbs at fourth and at fifth test round, the monolingual and the eL2 children showed a very heterogeneous performance. Most children in both groups used between five and ten modal and auxiliary verbs. This indicates that the monolingual and the eL2 children performed similarly in production of modal ad auxiliary verbs.

To investigate children's pace of acquisition in production of modal and auxiliary verbs, a mixed linear model analysis was performed over the number of produced modal and auxiliary verbs. The fixed effects are presented first. Table 8.3 summarizes the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for the production of modal and auxiliary verbs.

Table 8.3. Fixed effects for the production of modal and auxiliary verbs.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	5.7943	0.4873	64.7	11.89	<.0001
Age	0.04226	0.01765	34.8	2.39	0.0222

Concerning the intercept, all children produced on average almost six modal and auxiliary verbs. The effect of intercept was significant ($p<.0001$). However, there was no significant effect of group regarding the intercept. This indicates that monolingual and eL2 children did not distinguish in their performance at first test round. Moreover, the analysis revealed a significant effect of age suggesting that all children produced more modal and auxiliary verbs with increasing age. The interaction between age and acquisition type could not be computed since no significant effect for acquisition type at first test round was found.

Regarding the random effects, Table 8.4 summarizes the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of individual intercept was significant indicating that there were interindividual differences between the children. The effect of random slope was not significant. This suggests that the number of produced modal and auxiliary verbs increased over time in all children. There was no significant effect for covariance between the random intercept and the random slope.

Table 8.4. Random effects for production of modal and auxiliary verbs.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	7.6612	2.8968	2.64	0.0041
Covariance between random intercept and random slope	-0.1093	0.1000	-1.09	0.2745
Random slope	0.000662	0.004198	0.16	0.4374
Residual	8.5636	0.9923	8.63	<.0001

These results suggest that monolingual and eL2 children performed similarly in production of modal and auxiliary verbs. Moreover, a lot of intraindividual variation was observed in both groups.

8.3.4.3. Pace of acquisition of focus particles

This subsection examines children's production of focus particles *nicht* 'not', *nur* 'only' and *auch* 'too'. Figure 8.7 summarizes the number of produced focus particles for the monolingual group and for the eL2 group.

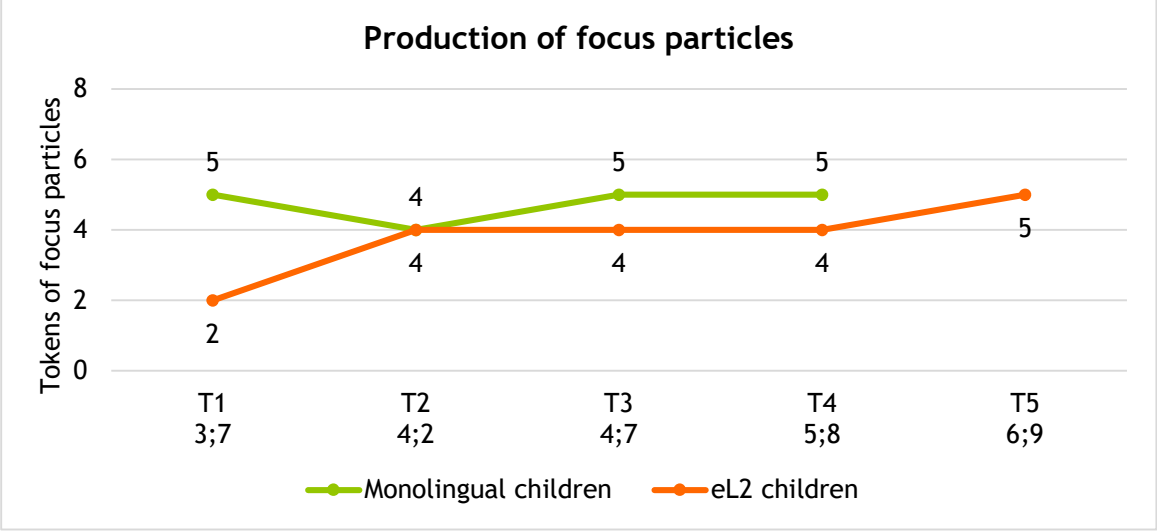


Figure 8.7. Tokens of focus particles for the monolingual and for the eL2 group.

The monolingual children used on average four or five focus particles across all test rounds. In contrast, the eL2 children produced on average only two focus particles at age three. The number of produced focus particles increased very fast over time. At second test round, the eL2 children produced on average four focus particles, and thus performed like monolingual children.

As already pointed out for other word classes, analysis of group performance remains unclear whether there was some intraindividual variation in the participants. Figure 8.8 illustrates therefore the individual performance of each monolingual child across four test rounds, and Figure 8.9 of each eL2 child across five test rounds. Regarding the monolingual children, Figure 8.8 shows that they performed very heterogeneous across all test rounds. The number of produced focus particles varied between one and eleven at first test round, and between one and seven at four test rounds. The slopes of monolingual children were rather shallow. The intraindividual variation in eL2 group was large as well. In contrast to monolingual children, the eL2 children produced only between none to five focus particles at first test round. The slopes of eL2 children varied a lot. Some eL2 children showed rather a shallow slope, whereas the slope of others was rather steep. At fifth test round, the eL2 children used between three and eight focus particles and performed very similarly to monolingual children at age five. These results indicate that there was a lot of individual variation in monolingual and in eL2 group. Although the eL2 children produced overwhelmingly fewer focus particles at age three, they improved their performance, and at last test round, they reached the same scores as monolingual children.

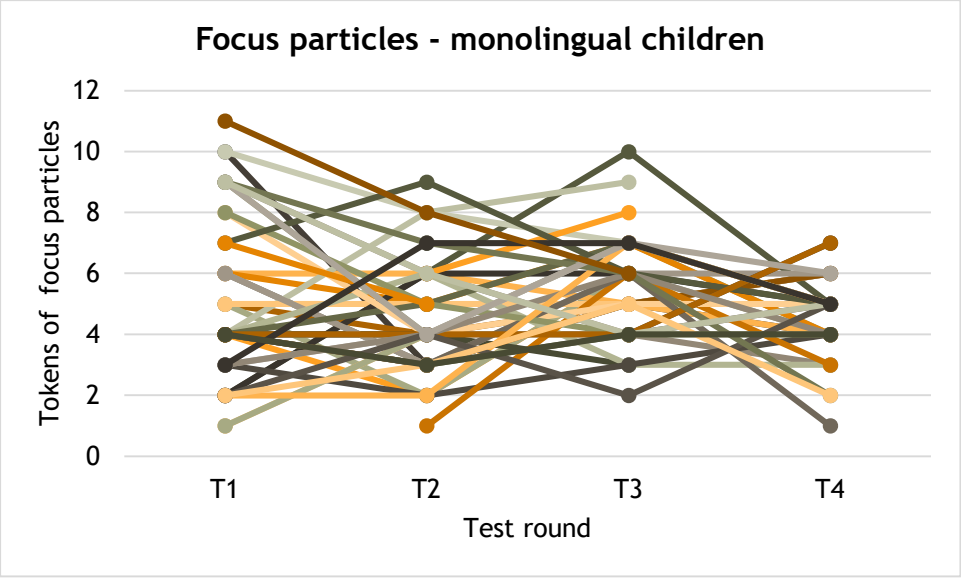


Figure 8.8. Individual developmental paths of monolingual children in production of focus particles.

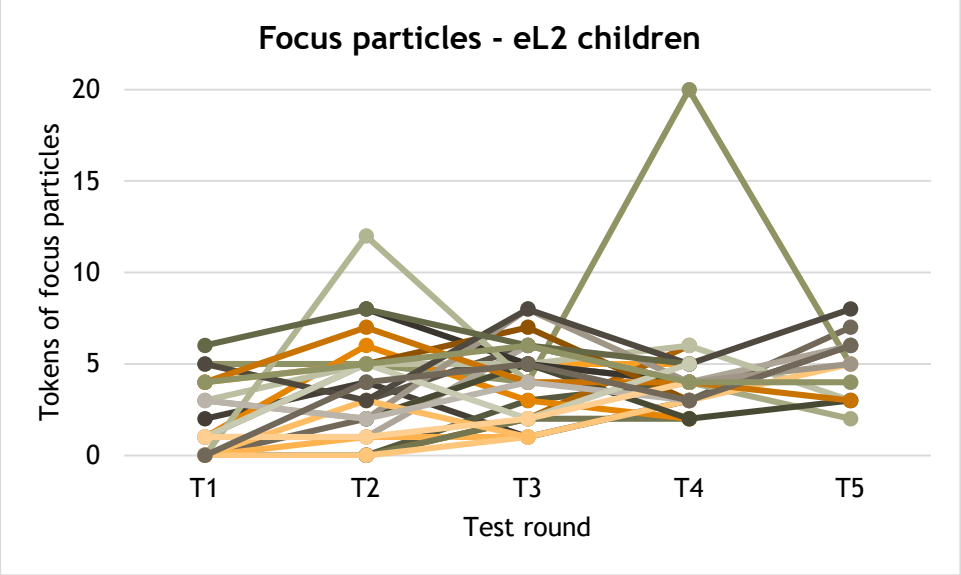


Figure 8.9. Individual developmental paths of eL2 children in production of focus particles.

A mixed linear model analysis was performed over the number of produced focus particles to examine children's pace of acquisition in production of this word class. With respect to fixed effects, Table 8.5 summarizes the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for the production of focus particles.

Table 8.5. Fixed effects for production of focus particles.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	4.8950	0.2100	77.3	23.31	<.0001
Group	-1.1506	0.3273	70.3	-3.52	0.0008

Regarding the intercept, all children produced on average almost five focus particles. The effect of intercept was significant (p<.0001). The analysis revealed a significant effect of group. This indicates that the eL2 children produced significantly fewer focus particles at first test round than the monolingual children did. However, there was no significant effect of age suggesting that the children did not use more focus particles with increasing age.

Concerning the random effects for production of focus particles, Table 8.6 summarizes the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. Since the analysis did not reveal a fixed effect for age, only the random effect for the intercept was computed. The analysis revealed that the variance of

individual intercept was significant indicating that the children differed interindividual at age 3;7. This significant variance between the children is explained by the group differences. Thus, monolingual children produced more focus particles than eL2 children at age three.

Table 8.6. Random effects for the production of focus particles.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	0.6636	0.3344	1.98	0.0236
Residual	4.7569	0.4613	10.31	<.0001

In sum, these results show that the monolingual and the eL2 children distinguished in their intercepts of production of focus particles. Moreover, the analysis revealed that both groups did not improve their performance in production of focus particles.

8.3.4.4. Pace of acquisition of prepositions

This section investigates the production of prepositions in the monolingual and the eL2 children. The results of monolingual children across four test rounds and of eL2 children across five test rounds are depicted in Figure 8.10.

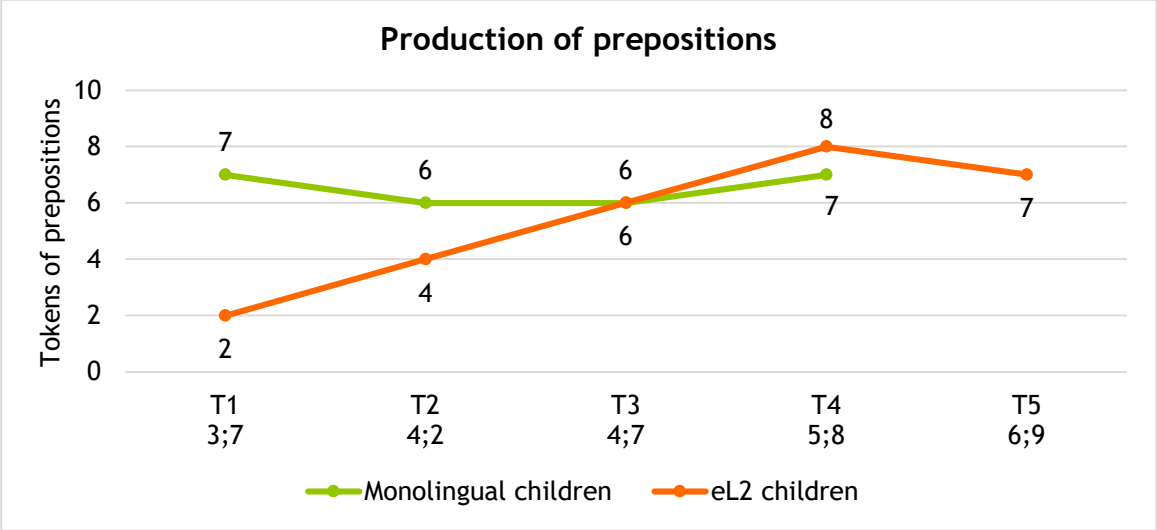


Figure 8.10. Tokens of prepositions for the monolingual and for the eL2 group.

The monolingual children kept the number of produced prepositions very constant across all test rounds since they used six or seven prepositions. In contrast, the number of prepositions increased in the eL2 group. At age three, eL2 learners produced on average only two prepositions. Six months later, they used on average four preposition,

and at age 4;7, the eL2 children produced on average six of them, performing like monolingual children.

This data description does not indicate how the group improvement comes about. Thus, spaghetti plots were plotted for each group separately. Figure 8.11 illustrates the individual production of prepositions for each monolingual child across four test rounds, and Figure 8.12 for each eL2 child across five test rounds. Concerning the production of propositions in the monolingual group at age three, Figure 8.11 shows that they performed very heterogeneous. Whereas some monolingual children did not use any prepositions at this age, some already produced more than 10. The slopes of monolingual children differed interindividual as well. In the children that used none or only very few prepositions at age three, the number of produced prepositions increased constantly within the next two test rounds. In contrary, the children that produced many prepositions at first test round used them rarely across the next test rounds. At age five, the monolingual children produced between three and 10 prepositions. Regarding the eL2 children, their intercepts were also heterogeneous. There were more eL2 learners than monolingual children who did not produce any preposition at age three. The slopes of eL2 learners were overwhelmingly steep until the fourth test round. Like in monolingual children, the number of used prepositions decreased between the fourth and the fifth test round in eL2 learners. At the last test round, eL2 children produced between three and 11 prepositions.

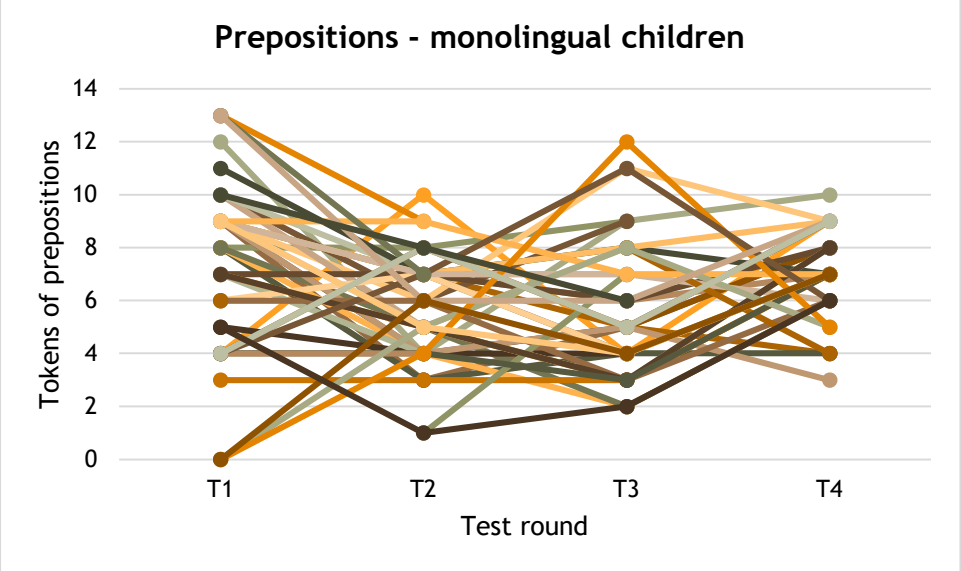


Figure 8.11. Individual developmental paths of the monolingual children in production of prepositions.

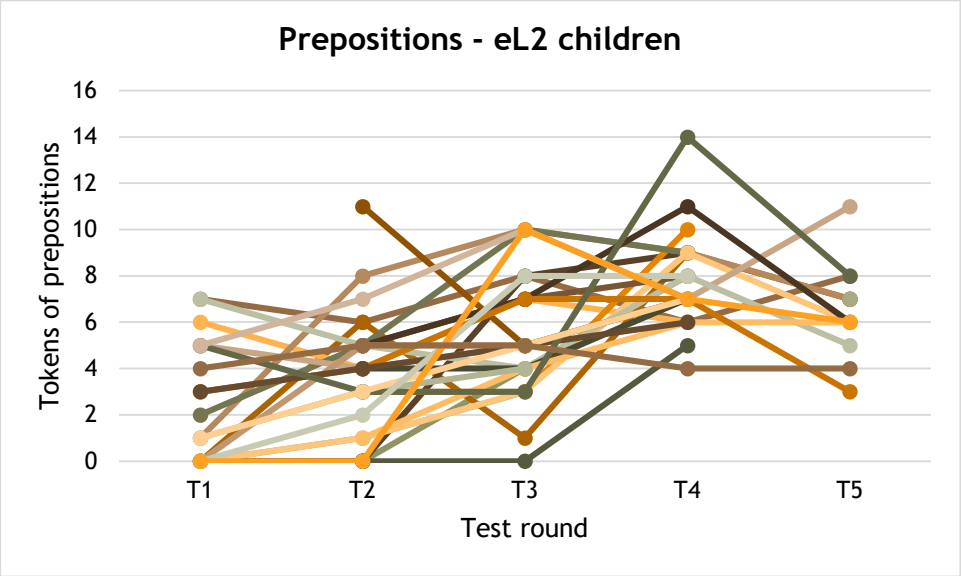


Figure 8.12. Individual developmental paths of the eL2 children in production of prepositions.

A mixed linear model analysis was performed over the number of produced prepositions to investigate children's developmental path in production of this word class. The fixed effects are presented first. Table 8.7 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated p values for the predictors that emerged as significant in the final model for the production of prepositions.

Table 8.7. Fixed effects for production of prepositions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	6.2419	0.4360	82	14.31	<.0001
Age	0.01207	0.02278	149	0.53	0.5969
Group	-3.5463	0.6758	69.8	-5.25	<.0001
Group*Age[1]	0.1209	0.03002	74.6	4.03	0.0001

[1] Interaction between acquisition type and age

The analysis revealed a significant effect of intercept. On average, all children produced six prepositions, but the significant effect indicates that there were some intraindividual differences between them. The effect of group was significant as well. The estimated difference in intercept between the monolingual group and the eL2 group was -3.5463 (p<.0001). This means that the eL2 children produced on average three prepositions fewer than monolingual children at age three. The effect of age was not significant in this model what suggests that the children did not improve their

performance with the increasing age. However, in the previous model, which included only Age and Group as factors, a significant effect for age was found (p<.0001). Therefore, the model was expended, and the interaction between acquisition type and age was investigated. This analysis revealed a significant interaction between acquisition type and age. This means that the slopes in the eL2 group were steeper than in the monolingual group. Thus, eL2 children had a significantly greater rate of change than monolingual children.

In terms of the random effects for the production of prepositions, Table 8.8 summarized the covariance parameters, their estimates, the standard errors, the *z* values, and the *p* values. The analysis revealed that the variance of individual intercept was significant indicating that the children differed interindividual in their usage of prepositions at age three. The effect of random slope was not significant suggesting that the number of produced prepositions increased over time in all children. The covariance between the random intercept and the random slope was not significant as well.

Table 8.8. Random effects for production of prepositions.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	3.1170	1.3828	2.25	0.0121
Covariance between random intercept and random slope	-0.08622	0.05446	-1.58	0.1134
Random slope	0.001685	0.002365	0.71	0.2381
Residual	5.9241	0.6242	9.49	<.0001

In sum, these results show that the eL2 children produced fewer prepositions than the monolingual children at age three, and that there were some intraindividual differences between the children at this age. Regarding children's pace of acquisition, the monolingual children kept the number of produced prepositions quite constantly whereas the number of used prepositions increased over time in the eL2 children. At age 4;7, the eL2 children produced the same number of prepositions as the monolingual children at this age. Note however that tokens and not types were considered in this analysis. It is possible that if types were regarded, the eL2 children would differ from the monolingual children.

8.3.4.5. Pace of acquisition of conjunctions

This subsection examines the production of conjunctions in monolingual and in eL2 children. Figure 8.13 presents the number of produced conjunctions for monolingual children across four test rounds and for eL2 children across five test rounds. The monolingual children used an average already five conjunctions at age three. The number of conjunctions increased only slightly over time and reached seven at age five. In contrast, the eL2 learners used on average only one conjunction at age three. Within three years, the number of used conjunctions increased constantly in eL2 group. At age six, the eL2 children performed as the four-year-old monolingual children producing on average six conjunctions.

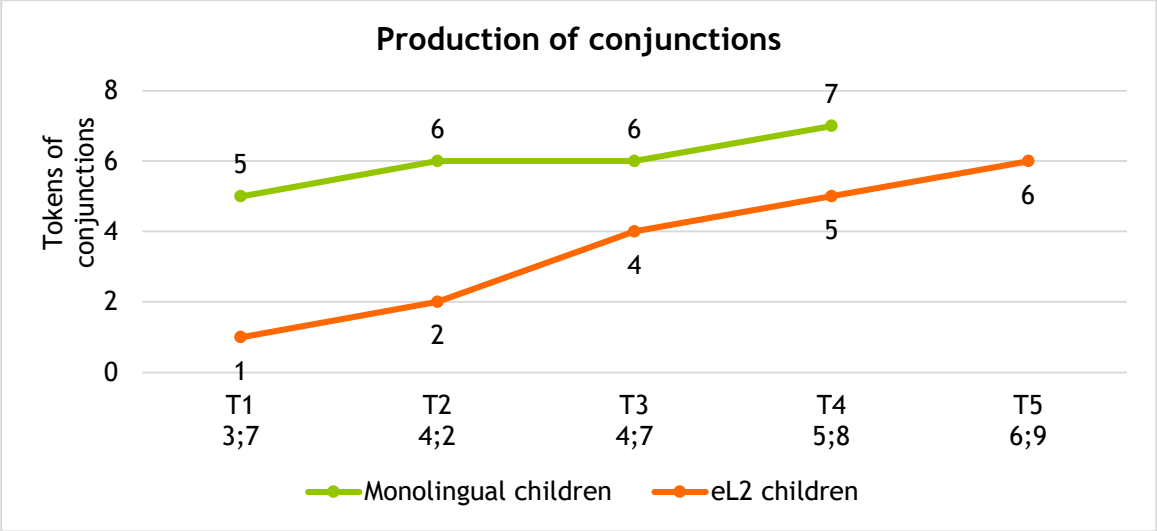


Figure 8.13. Tokens of conjunctions for the monolingual and for the eL2 group.

To investigate whether there was some intraindividual variation in monolingual and eL2 children, their individual performance is examined next. Figure 8.14 illustrates the individual production of conjunctions for each monolingual child across four test rounds, and Figure 8.15 for each eL2 child across five test rounds. Figure 8.14 and Figure 8.15 show that the monolingual and the eL2 children performed differently at age three. Whereas all monolingual children produced conjunctions at this age, the majority of eL2 children did not use any of them. However, there was a lot of interindividual variation in the monolingual group. The monolingual children produced between one and 13 conjunctions at age three. Regarding the slopes of monolingual children, a similar pattern as described for the production of prepositions was observed. These monolingual children who produced only few conjunctions at age three used them more often at the second test round whereas in these children with many conjunctions at age three, the number of produced conjunctions dropped at the second test round. The slopes of monolingual

children did almost not change from the second test round. At the fourth test round, they produced between three and 16 conjunctions.

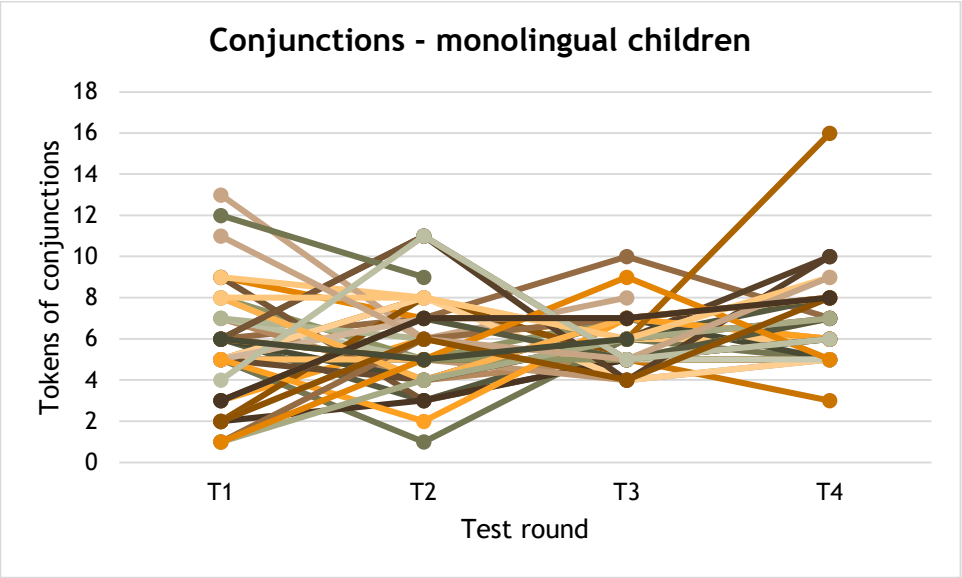


Figure 8.14. Individual developmental paths of the monolingual children in production of conjunctions.

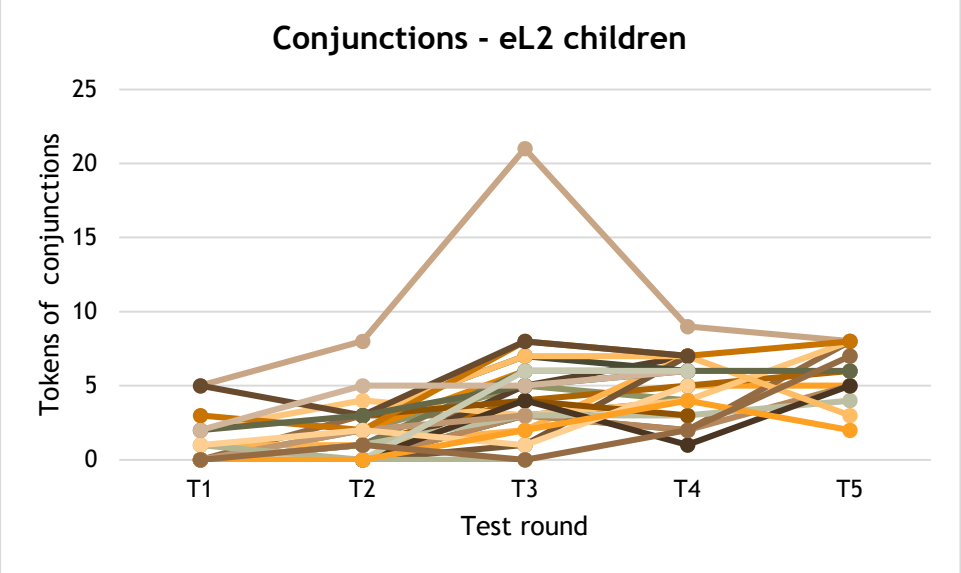


Figure 8.15. Individual developmental paths of the eL2 children in production of conjunctions.

The performance of eL2 children was not as heterogeneous as of the monolingual children. The number of used conjunctions increased in all eL2 learners until the third test round and remained overwhelmingly constant during the following test rounds. The pattern observed in the majority of the monolingual children was only found in one eL2 child who used five conjunctions at the first test round, 21 at the third test round, and

at the fifth test round the number of produced conjunctions decreased to eight. The number of used conjunctions in eL2 group amounted between three and eight at the fifth test round.

A mixed linear model analysis was performed over the number of produced conjunctions to examine children's developmental path in production of this word class. The fixed effects are discussed first. Table 8.9 lists the estimated coefficients, their standard errors, the degree of freedom, the *t* values and the associated *p* values for the predictors that emerged as significant in the final model for the production of conjunctions.

Table 8.9. Fixed effects for the production of conjunctions.

Effect	Estimate	Standard error	DF	*t* value	*p* value
Intercept	5.1581	0.3570	105	14.45	<.0001
Age	0.06422	0.01950	218	3.29	0.0012
Group	-4.1092	0.5510	93.3	-7.46	<.0001
Group*Age[1]	0.07047	0.02542	214	2.77	0.0061

[1] Interaction between acquisition type and age

On average, all children produced five conjunctions at age three. The effect of intercept was significant. The analysis also revealed a significant effect of group. The estimated difference in intercept between the monolingual group and the eL2 group was -4.1092 (p<.0001). This means that the eL2 children produced on average four conjunctions fewer at age three than the monolingual children. Regarding children's development over time, a significant effect of age was found. This indicates that the eL2 children and the monolingual children produced more conjunctions with increasing age. Compering the monolingual and the eL2 group, the analysis revealed that the estimated difference in the rate of change between the monolingual children and the eL2 children was 0.7047 (p<.0061). This means that the slope of eL2 learners was significantly steeper than the slope of monolingual children. Based on these results it can be assumed that the eL2 children produced significantly fewer conjunctions than the monolingual children at age three. However, the eL2 learners had a significant greater rate of change in terms of production of conjunctions than monolingual children.

The random effects for the production of conjunctions were examined next. Table 8.10 summarizes the covariance parameters, their estimates, the standard errors, the *z*

values, and the *p* values. The analysis revealed that the variance of individual intercept was significant. This significant variance between the participants is explained by the group differences. No effect was found for the covariance between the random intercept and the random slope. The effect of random slope could not be counted.

Table 8.10. Random effects for production of conjunctions.

Covariance parameter	Estimate	Standard error	*z* value	*p* value
Random intercept	1.5345	0.7658	2.00	0.0226
Covariance between random intercept and random slope	-0.01058	0.01665	-0.64	0.5253
Random slope	0	.	.	.
Residual	4.5804	0.4472	10.24	<.0001

In sum, these results show that the eL2 children produced significantly fewer conjunctions at age three than the monolingual children. In addition, the number of produced conjunctions varied more in the eL2 group than in the monolingual group at age three. However, despite this poorer performance at first test round, eL2 children had a greater rate of change over time than monolingual children. This indicates that eL2 learners developed faster than the monolingual group.

8.3.4.6. The role of external factors

In the following section, the role of external factors on the production of five word classes (lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions) in monolingual and in eL2 children is examined. The analyses were performed for each word class separately. First for each word class, it was investigated whether each factor separately influenced children's performance at first test round. These analyses revealed that gender, mother's educational background, father's educational background, and the non-verbal IQ did not affect children's intercept of production of any word class. This means that external factors under consideration did not influence monolingual and eL2 children's production of word classes at age three. Since no significant effects were found for the intercept, the impact of the external factors on the slope was not considered.

8.4. Discussion

This substudy investigated the production of five word classes: lexical verbs, modal and auxiliary verbs, focus particles, prepositions, and conjunctions in monolingual and in eL2 children. Concerning children's usage of these word classes at age three, the results differ with respect to which word class is taken into consideration. At age three, no differences between eL2 and monolingual children were found in tokens of lexical verbs, and of modal and auxiliary verbs. Note, however, that children differ interindividual in production of these two word classes, but the acquisition type could not explain these differences. Regarding focus particles, prepositions, and conjunctions, eL2 children produced fewer tokens than monolingual children at age three. Thus, hypothesis (H1.1) is only partially confirmed. The results for rate of change differ for the investigated world classes. The analysis revealed no improvement over time in the production of focus particles for eL2 and for monolingual children. All children produced with increasing age more lexical verbs, and more modal and auxiliary verbs, but there were no differences in development between eL2 and monolingual children. In contrast, concerning prepositions and conjunctions, eL2 learners had a significantly greater rate of change than monolingual children had. These results confirm hypothesis (H1.2) only partially as well.

The most differences between eL2 learners and monolingual children were found for the production of prepositions and of conjunctions. As shown in Section 2.2, these word classes are acquired late in monolingual children. In the present study, the number of produced prepositions and conjunctions increased very gradually over time and not volatilely in eL2 learners. This suggests that the emergence of prepositional phrases and of subordinate clauses takes place slower in eL2 acquisition. This is in line with the assumption that phenomena that are acquired late in monolinguals need more time in eL2 acquisition.

Moreover, these results indicate that acquisition of production of prepositions and of conjunctions differs from the acquisition of comprehension of telicity and of wh-questions. Recall that for comprehension of telicity and of wh-questions a very fast rate of change within one year between ages 3;7 and 4;8 was found. In contrast, the rate of change of production of prepositions and of conjunctions developed very gradually over time. Thus, the developmental patterns for production of prepositions and conjunctions seem to be like acquisition of comprehension of negation.

With respect to external factors, the analyses revealed that gender, mother's educational background, father's educational background, and the non-verbal IQ did not

affect children's production of any word class at age three. This confirms hypothesis (H2.1). Since no effects for children's performance at first test round were found, the hypothesis (H2.2) formulating for the role of the external factors on the rate of change was not tested. Previous studies showed that children whose mothers had a higher education had consistently larger vocabulary (Armon-Lotem, Walters & Gagarina, 2011; Chondragianni & Marinis, 2011; Glück, 2007; Golberg, Paradis & Crago, 2008; Hoff, 2006; Kiese-Himmel, 2005; Oller & Eilers, 2002; Paradis 2009; Paradis, 2011). The results from the current study extend these findings and indicate that parental educational background did not affect the emergence of different word classes.

Future studies should investigate not only tokens but also types for different word classes since three-year-old eL2 learners do not have such differentiated lexicon as their monolingual peers. Consequently, it can be expected that eL2 children use fewer different lexical verbs compared to three-year-old monolingual children. This assumption also counts for prepositions and conjunctions, respectively since it was shown that eL2 children often use one place holder from each of these word classes and overgeneralize it for all contexts in which a preposition or a conjunction is required.

9. Acquisition of sentence structure

This chapter focuses on acquisition of German sentence structure in eL2 learners and in monolingual children. It is organized as follows. In Section 9.1, the German sentence structure is discussed regarding the finiteness and verb placement in matrix and subordinate clauses. Section 9.2 considers the acquisition of sentence structure. First, in Section 9.2.1 the studies on monolingual and eL2 acquisition of finiteness and verb placement in German are summarized, and then, Section 9.2.2 gives an overview of studies on monolingual and eL2 acquisition of German subordinate clauses. Section 9.3 presents the general results on development of sentence structure in eL2 and in monolingual children. The acquisition of verb placement and finiteness in matrix clauses is examined in Section 9.4. In Section 9.5, the development of subordinate clauses is investigated.

9.1. Sentence structure in German

This section gives an overview on German sentence structure. First, Section 9.1.1 concentrates on finiteness and verb placement in German matrix clauses. Then, Section 9.1.2 deals with the structure of German subordinate clauses.

9.1.1. Finiteness and verb placement in matrix clauses

German belongs to the SOV languages that show V2 movement, i.e. in matrix clauses the finite verb must appear in V2, as shown in Example (1).

(1) Lise füttern-t den Hund.
Lise feed-3SG the dog
'Lise is feeding the dog.'

According to Chomsky (1995), verbs are base-generated within a head-final VP, and already inflected. Moreover, agreement, tense, and finiteness are strong features, which must be checked and deleted before LF. To check agreement, tense, and finiteness features overt verb movement from V^0 to C^0 via I^0 is required (Vikner, 1995). IP is assumed to be head-final in German (Homberg & Platzack, 1995; Vikner, 1995). In contrast to finite verbs, nonfinite verbs are restricted to V^0 and are not licensed in C^0, cf. Example (2).

(2) *Lise fütter-n den Hund.
Lise feed-INF the dog
'Lise is feeding the dog.'

Figure 9.1 illustrates the German sentence structure for matrix clauses such as in Example (1).

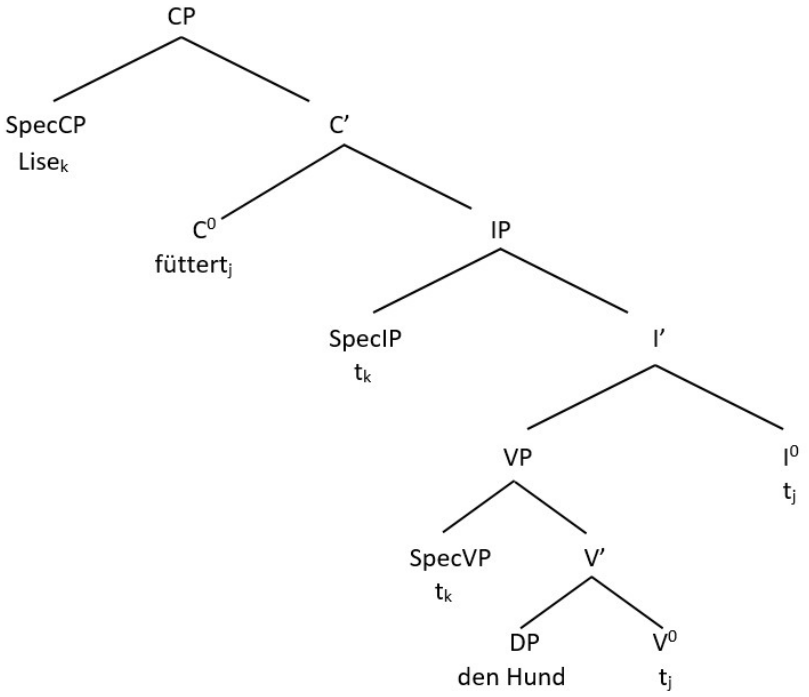


Figure 9.1. German matrix sentence structure (based on Grewendorf (1988)).

Spec CP is assumed to be specified for a strong +EPP feature (Chomsky, 1995), requiring overt movement of one constituent. Typically, it is the subject as in Example (1). However, a topicalized object, cf. (3), an adverb, cf. (4) or a wh-pronoun, cf. (5) moves to this position as well (Chomsky, 2000).

(3) Den Hund füttert Lise.
the-Acc dog feed-3SG Lise
Lise is feeding the dog.'

(4) Heute füttert Lise den Hund.
today feed-3SG Lise the-Acc dog
'Today, Lise is feeding the dog.'

(5) Wann füttert Lise den Hund?
when feed-3SG Lise the-Acc dog
'When is Lise feeding the dog?'

Recent syntactic theories typically assume the existence of more fine-grained functional projection levels, e.g. Split-INFL (Pollock, 1989; Chomsky, 1995) and/or Split-CP (Müller & Sternefeld, 1993; Rizzi, 1997), stipulating the projection of different

functional categories, such as Tense Phrase (TP) and Agreement Phrase (AgrP), or Force Phrase (ForceP) and Finiteness Phrase (FinP), respectively. According to the Split-INFL assumption, agreement is assigned in the AgrP, and finiteness in the TP. This means that both features are assigned independently from each other.

Haider (1993, 2010) proposed a different account for German sentence structure. He argues that an IP do not exist in German since there is no evidence for this position in form of finite verb forms in midfield. Thus, Haider (1993, 2010) assumes that there is at least one functional projection above the VP and it accommodates either the finite verb moved to the functional head position or the complementizer (cf. Section 7.1.2 for detailed description of subordinate clauses in German). These two clause types are presented in (6) and (7) (Haider, 2010:84).

(6) $[_{FP}\ XP_i\ [_{F}{}^{0}\ V_{fin\text{-}j}\ (\ldots)\ [_{VP}\ \ldots\ e_i\ \ldots\ e_j]]]$

(7) $[_{CP}\ C^{0}\ (\ldots)\ [_{VP}\ \ldots\ldots\ldots\ V_{fin}]]$

Several accounts try to explain what motivates verb movement in German. Chomsky (1995) suggests that verb forms occur already inflected in V^0. According to him, verbs do not move because of feature assignment but because of feature checking. The features of verbs must be checked with the features of each functional phrase, and only if the features match each other, the movement to C^0 is licensed. Alternatively, Pollock (1989) assumes that verbs are generated as bare forms in V^0, and thus the assignment of finiteness and agreement markers triggers verbs to move. Within the Distributed Morphology approach (Hale & Keyser, 1993) it is also assumed that verbs as roots are inserted in the syntactic computation and that tense morphemes are then assigned and checked via agreement with a higher functional projection. Another explanation in given with terms of assertion. In this approach, the verb moves to the top-most functional domain to check the illocutionary force of the sentence. This results in V2 (Reis, 1985; Reis, 1997; Wechsler, 1991).

Taking together, differences between the presented accounts are relevant, when discussing when finiteness and agreement features are assigned or checked and what triggers the verb movement in German. Whereas from the former accounts a causal relation between verb movement, and finiteness and agreement marking are predicted, the latter assumes that verb movement, and finiteness and agreement marking are independent of each other.

In German, verbs are morphologically marked for finiteness. Since the focus of this study is on the acquisition of finiteness marking in present tense, the finiteness marking in other tenses are not investigated in this section. The present tense inflectional paradigm for lexical verbs consists of five different suffixes for marking 1st, 2nd, and 3rd person singular and plural, respectively (cf. Table 9.1). Importantly, all present tense suffixes are obligatory, except for 1st person singular marking *–e*, which may be omitted in colloquial speech. Unlike English, infinitivals (e.g. spiel-en, play-INF) can be clearly distinguished from bare forms (e.g., spiel-Ø, play- Ø), since German infinitival verbs are overtly marked with the suffix *–en*.

Table 9.1. German inflectional paradigm for lexical and modal verbs (present tense agreement marking).

Bare form			*spiel-Ø* 'play-Ø'	--
Infinitival form			*spiel-en* 'play-INF'	*könn-en* 'can-INF'
Singular	1	*ich* 'I'	*spiel-e/Ø* 'play-1SG/Ø'	*kann* 'can-1SG
	2	*du* 'you'	*spiel-st* 'play-2SG'	*kann-st* 'can-2SG'
	3	*er/sie/es* 'he/she/it'	*spiel-t* 'play-3SG'	*kann* 'can-3SG'
Plural	1	*wir* 'we'	*spiel-en* 'play-1PL'	*könn-en* 'can-1PL'
	2	*ihr* 'you'	*spiel-t* 'play-2PL'	*könn-t* 'can-2PL'
	3	*sie* 'they'	*sie spiel-en* 'play-3PL'	*könn-en* 'can-3PL'

Modal verbs differ in finiteness marking from lexical verbs. In singular, there is a vowel change, and there is no overt finiteness marking in 1st and 3rd person singular. The forms of *sein* 'be' are overwhelmingly suppletive. *Haben* 'have' as auxiliary verb is inflected as a lexical verb.

9.1.2. Subordinate clauses in German

This section deals with structure of German subordinate clauses. As mentioned in Section 9.1.1 above, German belongs to the SOV languages that show V2 movement, i.e. in matrix clauses the finite verb must appear in V2. In contrast, in German subordinate clauses, the

finite verb remains in verb final position (I^0), and the complementizer is placed in C^0 (Vikner, 1995) as shown in Example (8).

(8) wenn Lise den Hund füttert.
if Lise the-Acc dog feed-3SG
'if Lise is feeding the dog.'

Figure 9.2 illustrates the syntactic structure for a typical subordinate clause in German as in Example (8).

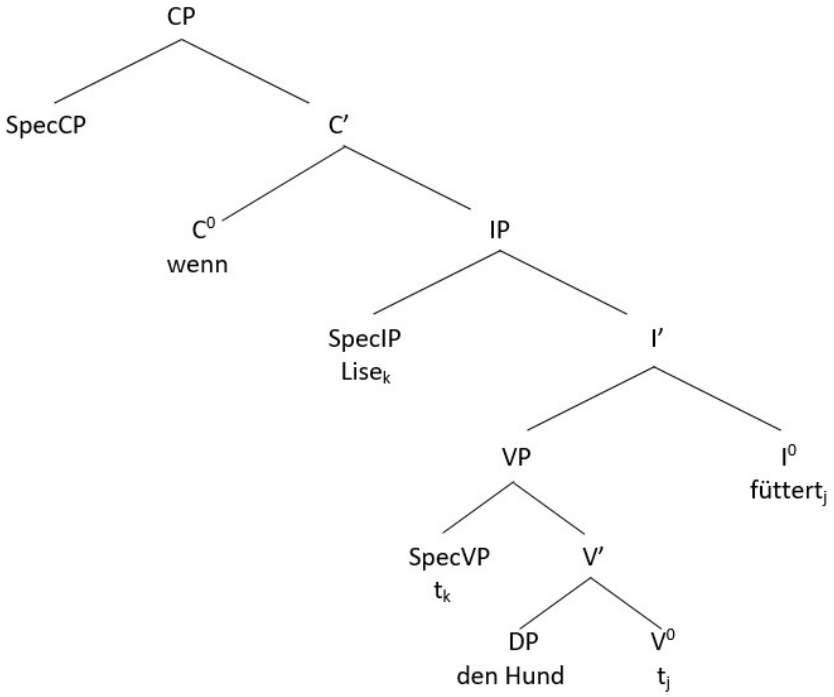


Figure 9.2. German subordinate sentence structure (based on Grewendorf (1988)).

As mentioned in Section 9.1.1, Haider (1993, 2010) proposed a different account for German sentence structure. According to him in German, the finite verb moves out of VP only in V2 structures, and it ends up in the top-most functional head position. If this position is blocked by a complementizer as in subordinate clauses, the finite verb stays in the functional position below. The finite verb is clause final in subordinate clauses since the "the cascade of functional heads except for the C^0-head is head final" (Haider, 2010:57). The resulting structure for subordinate clauses is presented in (9).

(9) $[_{CP}\ C^0\ (\ldots)\ [_{VP}\ \ldots\ldots\ldots\ V_{fin}]]$

Regarding the clauses introduced by *weil* 'because', they frequently appeared with verb placed in V2 in spoken varieties of German. Example (9) and Example (10) illustrate the two types of clauses with *weil* (Reis, 2013:222).

(9) Wir waren gestern schwimmen, weil das Wetter **war** so schön.
We were yesterday swim-INF because the weather was so beautiful
'We were swimming yesterday because the weather was so beautiful.'

(10) Wir waren gestern schwimmen, weil das Wetter so schön **war**.
We were yesterday swim because the weather so beautiful was
'We were swimming yesterday because the weather was so beautiful.'

Generally, three different interpretation of *weil*-V2-clauses are possible, whereas *weil*-Vf-clauses have only one interpretation. Both types of *weil*-clauses can occur as an explanation for a circumstance, which was expressed in a preceding proposition. This kind of explanation is called propositional. This is illustrated in Examples (11) for *weil*-Vf and (12) for *weil*-V2 from Antomo & Steinbach (2010:17):

(11) Mittags sind wir zurückgefahren, weil der Himmel ganz grau **war**.
At midday are we driven back because the heaven fully grey was
'We drove back at midday because the heaven was fully grey.'

(12) Mittags sind wir zurückgefahren, weil der Himmel **war** ganz grau.
At midday are we driven back because the heaven was fully grey
'We drove back at midday because the heaven was fully grey.'

In contrast to *weil*-Vf-clauses, *weil*-V2-clauses can express the so-called epistemic explanation for the attitude of the speaker (cf. Blühdorn, 2008; Günthner, 1993; Pasch, 1997; Wegener, 1993). Example (13) illustrates this interpretation (Antomo & Steinbach, 2010:17).

(13) Es hat geschneit, weil die Straße **ist** ganz weiß.
It has snown because the street is fully white
'It was snowing because the street is fully white.'

The last possible interpretation of *weil*-V2-clauses is explanation, which is referred to the speech act. As epistemic explanations, this explanation refers to the illocutionary level. These *weil*-V2-clauses explain why the speech act in the preceding clause was fulfilled as illustrated in Example (14) from Antomo & Steinbach (2010:19).

(14) Ich habe den Job gekriegt. Weil das **interessiert** dich doch am meisten.
I have the-ACC job got. Because that interest-3SG you of course most of all
'I have got the job. Because that is of course most of all interesting for you.'

According to Antomo & Steinbach (2010) *weil*-V2-clauses have specific syntactic, semantic, and pragmatic properties, which distinguished them from integrated *weil*-clauses with Vf. Antomo & Steinbach (2010) argue that *weil*-V2-clauses are paratactic structures, thus they cannot be interpreted within the scope of the matrix clause. In contrast, *weil*-Vf-clauses are syntactically integrated and thus subordinate. Moreover, w*eil*-V2-clauses exclusively occur postposed as illustrated in Example (15) (cf. Uhmann, 1998:102).

(15) a. Peter kommt zu spät, weil er **hat** keinen Parkplatz gefunden.
Peter come-3SG too late because he has no parking place found
'Peter is coming too late because he did not find any parking place.'
b. *Weil er **hat** keinen Parkplatz gefunden, kommt Peter zu spät.
Because he has no parking place found come-3SG Peter too late
'Because he did not find any parking place, Peter is coming too late.'

Important difference between *weil*-Vf and *weil*-V2-clauses is that *weil*-V2-clauses are less optimal than *weil*-Vf-clauses in question-response-contexts as shown in Example (16) from Antomo & Steinbach (2010):

(16) A: Warum bist du den zu spät gekommen?
'Why did you come too late?'
B: #Weil ich **habe** keinen Parkplatz gefunden.
Because I have no parking place found
'Because I did not find any parking place.'

Antomo & Steinbach (2010) assumes that *weil*-V2-clauses are prosodic disintegrated, and thus they finish with a falling intonation. Regarding the pragmatic properties, the matrix clause and the *weil*-V2-clause have separate focus-background-structure. Moreover, Antomo & Steinbach (2010) argue that *weil*-V2-clauses always fulfill an independent assertive speech act. According to them, the V2-order triggers this assertional force potential.

Reis (2013) proposes a different analysis of *weil*-V2 clauses and argues against the account by Antomo & Steinbach (2010). Reis's analysis (2013) included several different *weil*-clauses, which were not considered by Antomo & Steinbach (2010). Her corpus

included interrogative *weil*-clauses with V2 (Example (17a)), interrogative *weil*-clauses with Vf (Example (17b)), interrogative *weil*-clauses with V1 (Example (17c)), and imperative *weil*-clauses with V1 (Example (17d)); all examples taken from Reis (2013:224).

(17) Wir sind an den Bodensee gefahren,
'We gone to Lake Constance,'
a. weil wo **ist** es schöner im Juni als dort?
because where is it more beautiful in June than there
b. weil warum in die Ferne **schweifen**?
because why in the faraway place ramble-INF
c. weil **könnte** man es im Urlaub irgendwo besser treffen?
because could one it in holidays anywhere better meet
d. weil *glaub* ja nicht, dass ich die Ferntourismusmode mitmache.
because believe well not that I the trend of long-haul tourism join-1SG in

All *weil*-clauses in Example (17) have an assertive interpretation and all other properties of *weil*-V2 clauses although verbs do not occur in V2-position. Thus, Reis (2013) concludes that V2 cannot trigger this assertive interpretation. She argues that all these *weil*-clauses must be analyzed as roots. The analysis as roots explains why these *weil*-clauses fulfill an independent speech act. Moreover, Reis (2013) shows that the causal semantics of *weil* is responsible for the assertive interpretation.

9.2. Previous research on acquisition of sentence structure

This section summarizes previous research on German sentence structure. In Section 9.2.1, acquisition of finiteness and verb placement in matrix clauses in monolingual and eL2 children is presented, and different accounts proposed to explain developmental patterns are discussed. Section 9.2.2 gives an overview of studies on acquisition of subordinate clauses in monolingual children and eL2 learners.

9.2.1. Previous research on the acquisition of finiteness and verb placement in matrix clauses

To master the sentence structure in German matrix clauses, children must acquire verb movement from V^0 to C^0 (V2 position) as well as the correct marking of finiteness. Across different learner groups, a range of non-target-like developmental patterns has been observed regarding verb form and verb placement. These patterns include *en*-infinitivals

in Vf (18) and in V2 (19), target-like inflected finite verbs in Vf (20), incorrectly inflected verbs in V2 (21), and presumably finite bare verbs in V2 (22).

(18) hier Buch vorles-en (Mon, Clahsen, 1982:63)
here book read-INF

(19) du fahr-en auch (eL2, Rothweiler, 2006:104)
you drive-INF too

(20) und das Teddy jetzt nicht schwimmen geh-t (Mon, Tracy, 1991:227)
and that Teddy now not swim go-2SG

(21) Du nehm-t die (eL2-SLI, Rothweiler et al., 2012:47)
You take-3SG she-ACC

(22) a. da geh-Ø jetzt die leute rein (Mon, Clahsen, 1982:67)
there go-Ø now the people inside

b. das geh-Ø nikt (eL2, Prévost, 2003:81)
this go-Ø not

Disregarding for now potential differences between acquisition types, several accounts have been proposed to explain these patterns in acquisition: an Optional Infinitive stage (Wexler, 1994) for structures such as (19), the Truncation Hypothesis (Rizzi, 1993/1994; Prévost, 2003) for structures like (18) and (20), and the Missing Surface Inflection Hypothesis (Haznedar & Schwartz, 1997; Prévost, 2003) for structures as in (22). In the following, the developmental patterns and different accounts will be discussed regarding their relevance for monolingual and eL2 typical acquisition, respectively.

9.2.1.1. Monolingual acquisition of finiteness and verb placement in matrix clauses

This section summarizes first the studies on monolingual acquisition of German matrix clauses (Clahsen, 1982; Clahsen, Penke & Parodi, 1993; Dimroth, Gretsch, Jordens et al., 2003; Meisel, 1992; Poeppel & Wexler 1993; Tracy, 1991). Then three accounts (an Optional Infinitive stage (Poeppel & Wexler, 1993; Wexler, 1994; Weverink, 1990), the Truncation Hypothesis (Rizzi, 1993/1994) and Local Well-Formedness Constraint (Weissenborn, 1994), which explain the production of non-target-like structures in children speech, are discussed in more details.

To master the sentence structure in German matrix clauses, children have to acquire verb movement from V^0 to C^0 (V2 position) as well as the correct marking of finiteness. In general, the analysis of spontaneous speech data revealed that monolingual children systematically omit inflected verbs and use infinitival verb forms instead in the first

acquisitional stage of sentence structure (Clahsen, 1982; Clahsen et al., 1993; Tracy, 1991). Typically, in this phase children produced utterances with infinitival forms placed exclusively in clause final position. Beside the infinitivals, children frequently use verb particles, which occurred in final position as well. Tracy (1991) called this acquisitional stage Milestone 2. Some examples of for this phase typical utterances are given in (24) and (25).

(24) a. Mon (=Simone) noch mehr Wasser hol-en (Mon, Clahsen & Penke, 1992)
Mon some more water fetch-INF

b. hier Buch vorles-en (Mon, Clahsen, 1982:63)
here book read-INF

(25) a. auto weg (Mon, Clahsen, 1982:54)
car away

b. mami Türe auf (Mon, Tracy, 1991:194)
mum door up

Inflected verb forms or bare verb forms placed in clause finale position were found only very infrequently at this stage (Clahsen, 1982; Clahsen et al., 1993; Dimroth et al., 2003; Tracy, 1991). Examples of such utterances are given in (26) and (27), respectively.

(26) und das Teddy jetzt nicht schwimmen geh-t (Mon, Tracy, 1991:227)
and that teddy now not swing go-2SG

(27) des auch noch rausmach-Ø (Mon, Dimroth et al., 2003:77)
that too still out-make

Target-like marking of person and number in verbs co-occurs with correct placement in V2, suggesting a strong relation between agreement and verb placement, cf. Example (28) (Clahsen, 1982; Tracy, 1991; Clahsen & Penke, 1992; Meisel, 1992; Poeppel & Wexler, 1993). Following Tracy (1991) children who produce utterances of this type reach Milestone 3 of syntactic development. Monolingual children master verb movement from V^0 to C^0 via I^0 by age 3.

(28) a. ich bau-e da eine kirche (Mon, Clahsen, 1982:57)
I build-1SG there a church

b. ich komm-e gleich wieder (Mon, Tracy, 1991:259)
I come-1SG soon again

In their analysis of the Simone Corpus comprising data from ages 1;7 to 2;8, Clahsen & Penke (1992) found infinitival *–en* only in Vf position, as illustrated in Example (18) above. Moreover, more ungrammatical bare forms than infinitival *–en* forms appeared in V2. Clahsen (1992) interprets the bare forms, which appear mostly in 2SG and 3SG contexts, as nonfinite. Similarly, Clahsen (1982) reported bare forms across all developmental stages and agreements contexts for three children aged 1;2 to 3;6. An overuse of bare forms in V2 position was also shown by Blom (2003) for children acquiring Dutch as their first language. She analyzed elicited production data from six monolingual Dutch children aged between 1;7 and 3;4. Around the age of 2;6 the children produced a total of 8.5% bare lexical verbs in V2 position. Substitutions of inflectional markers occurred on only 1.4% of the utterances.

It is important to note that children do not directly exclusively produce clauses with moved finite verbs after the stage with utterances containing infinite verb forms in Vf. In contrary, children go through an Optional Infinitive Stage as first described by Wexler (1994) for English. The existence of this stage is also documented for different languages including German (Clahsen & Penke, 1992; Poeppel & Wexler, 1993; Verrips & Weissenborn, 1992; Weissenborn, 1990; Wexler, 1994), and Dutch (Blom, 2003; Weverink, 1990). During this developmental stage occurring around the age of two, children use nonfinite verbs in V2 as in Example (29) parallel with finite verb forms in V2. These so-called Roots Infinitives (RIs) generally appear with lexical verbs and are not found with auxiliaries (Wexler, 1994) or subject clitics (Pierce, 1989). Subjects are almost always dropped in these clauses.

(29) das da <u>rutsch-en</u> nich runt (Mon, Clahsen et al., 1996:139)
this one slip-INF not down
'not slip down this one'

The occurrence of clauses with finite verbs in V2 at the Optional Infinitive Stage indicates that children already have the knowledge of functional categories and verb movement is available to them. Thus, the question arises why they do not produce these sentences as frequently and systematically as adults do and use RIs. One of the explanations of RIs is Rizzi's Truncation Hypothesis (TH) (Rizzi, 1993/1994). According to TH children have full grammatical competence from early on, but they lack the knowledge that the CP must be projected in every sentence. Rizzi (1993/1994) argues that this knowledge matures. Weissenborn (1994) holds the view that truncated structures result from reduced processing resources. His Local Well-Formedness Constraint requires that the representation of any child's utterance is locally well formed with respect to a

representation of the adult grammar. Thus, children cannot omit projections from the middle of a syntactic structure. This results in structures whose root is a CP or any projection below CP. In the case of RIs, the infinitival verb form remains in V^0 as there is no higher landing site in V2. In some cases, verbs in Vf are inflected (cf. Example (20) above) (Clahsen, Bartke & Göllner, 1997). Given a structure as in Figure (9.1) in Section 9.1.1, this pattern corresponds to an acquisitional stage with truncation above IP and movement of the inflected verb from V^0 to I^0. In support of the Truncation Hypothesis, nonfinite verbs are banned from V2, as movement and feature checking are available as soon as IP and CP have been projected. In the few attested cases of verbs in V2 that lack overt finiteness marking, bare forms were more frequent than infinitival verb forms (Clahsen & Penke, 1992).

In sum, monolingual children acquire the target-like marking of person and number in verbs and their correct placement in V2 simultaneously, suggesting a strong relation between finiteness and verb placement. In general, incorrect finiteness marking in V2 was found very rarely. The results indicate that monolingual children mostly use bare verb forms instead of target-like inflected forms. Infinitival and substitutions with incorrect suffixes occur rarely.

9.2.1.2. eL2 acquisition of finiteness and verb placement in matrix clauses

Research on the relation between finiteness marking and verb placement in eL2 acquisition is still scarce. In the following, first the studies focusing on the production of non-target like verb forms in matrix clauses in eL2 English (Haznedar & Schwartz 1997; Haznedar, 2001), German (Prévost, 2003), and Dutch (Blom & Baayen, 2013) are discussed. Next, the studies on the acquisition of matrix clauses in eL2 learners of German are presented in more details (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006; Kostyuk, 2005; Chilla, 2008; Sopata, 2010; Schulz et al., 2008; Wenzel et al., 2009).

As already mentioned, to date only a few studies focused on the relation between finiteness marking and verb placement in eL2 acquisition. Haznedar & Schwartz (1997) and Haznedar (2001) examined the spontaneous speech of one four-year-old eL2 learner of English with Turkish as L1. For inflection, they analyzed verbs in obligatory contexts for past tense and 3SG present tense. The following utterances were excluded from the analysis: formulaic utterances and repetitions, utterances with auxiliaries *be*/*do*/*have* and copula *be*, yes/no questions, wh-questions, and negated utterances. Their analysis revealed that the child produced bare verb forms in contexts where 3SG *-s* was obligatory,

as shown in Example (30). After 6 months of exposure to English target production of 3SG *–s* was first attested. The percentage of verbs inflected with 3SG *–s* increased gradually over the time, and after 16 months of exposure correct production of 3SG *–s* reached 70%. Interestingly, although 3SG *–s* was omitted in many utterances, it was almost always used correctly. The errors occurred only in contexts with 3PL. Moreover, inflectional substitutions were found in only 2.7% of the utterances. Importantly, copula and auxiliary *be* was produced from early on in target-like verb position, as illustrated in Example (31). According to the authors, these data indicate the presence of an INFL category.

(30) Dinosaur turn-Ø back and drink-Ø water. (eL2, Session 25, Haznedar, 2001:15)

(31) I'm something eating. (el2, Session 10, Haznedar, 2001:9)

Based on this data, Haznedar & Schwartz (1997) and Haznedar (2001) argue that observed bare forms like *turn* and *drink* in Example (30) are covertly finite and serve as a default reflecting the eL2 learner's difficulty with overt morphology. This assumption is referred to as the Missing Surface Inflection Hypothesis (MSIH). It is however important to note that evidence for the MSIH from English is necessarily limited: 3SG *–s* is the only overt verbal suffix for present tense marking in English, and the infinitival form is not overtly marked and therefore undistinguishable from the bare form. German, in contrast, requires overt finiteness marking for all verb forms (except 1SG) and has two different forms: The infinitival form, marked with the suffix *–en*, and the unmarked bare form.

The spontaneous speech production of one eL2 learner of German with L1 English at the age of three was analyzed by Prévost (2003). Only utterances containing a verb and at least one other element were retained for analysis, hence also structures without a subject. Prévost (2003) found bare and inflected forms in V2 position, but infinitival *–en* forms only in Vf position. Furthermore, the number of infinitival *–en* forms in Vf decreased over time, whereas the ration of bare verb forms (grammatical and ungrammatical) stayed similar. According to Prévost (2003), these data indicate that infinitival *–en* forms and bare forms are not of the same nature, and that the TH and the MSIH are not opposing hypotheses, but rather complement each other. Verbs marked with *–en* are nonfinite and remain in verb final position, while bare verb forms have finite properties since they appear in finite context (V2 position) from which infinitival forms are excluded. The occurrence of bare forms in V2 reflect moreover the eL2 learner's difficulty in supplying the target-like morphological suffix.

Similar findings are reported by Blom & Baayen (2013) who examined the elicited production data of 62 eL2 learners of Dutch aged between four and nine with different

first languages (Mandarin, Cantonese, Moroccan-Arabic, and Turkish). The analysis revealed that eL2 children made almost no errors in 1SG contexts where the bare verb form is the correct one. Significantly more incorrect verb forms were produced in those contexts that involved inflected verb forms. In this context, omission errors predominated, and substitution errors occurred very rare.

Subsequent studies confirmed that eL2 learners of German realized the finiteness marking on the verb in V2 mostly target-like and did not substitute verbal inflectional suffixes (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006; Kostyuk, 2005; Chilla, 2008, but see Sopata (2010) for deviant developmental pattern). Rothweiler (2006) analyzed spontaneous speech production of three eL2 learners with L1 Turkish between the age of three and five. Her analysis differs from that by Prévost (2003) in two aspects: only utterances with a subject were examined, and bare verb forms were assumed to be non-finite. According to Rothweiler (2006), the results strongly support that finiteness, subject-verb-agreement and V2 develop in connection to each other also in eL2 acquisition. Furkan, one of the children, distinguished from early on between finite verb forms in V2 as in (32) and non-finite verb forms in Vf as illustrated in Examples (33) and (34). Infinitival *–en* forms in V2 as in (35) were produced very rarely. After eight months of exposure to German 91% of verbs agreed with the subject.

(32) das pass-t hier schon (eL2, Rothweiler, 2006:101)
this fit-3SG here mod
'this fits here'

(33) schrenkmen helf-en (eL2, Rothweiler, 2006:101)
actionman help-INF
'the actionman will help'

(34) das da park-Ø (eL2, Rothweiler, 2006:101)
this there park-Ø
'this (car) parks here'

(35) das helf-en mal (eL2, Rothweiler, 2006:101)
that help-INF mod
'this one will help (you)'

Ece has acquired V2 and subject-verb-agreement before the first recording with nine months of exposure to German. Melisa revealed a slower development with respect to verb position and verb agreement, and the acquisitional stages were more overlapping. In contrast to Furkan and Ece, in Melisa's data Vf-sentences co-occurred with V2-clauses

and target-like subject-verb-agreement. Not until after 12 months of exposure to German the correctness for subject-verb-agreement reached 94% although the verbal paradigm was already complete. This slightly different development can be explained by the fact that Melisa started to acquired German later than Furkan and Ece at the age of 4;5. However, a similar kind of overlap was also found in monolingual children as well (Fritzenschaft, Gawlitzek-Maiwald, Tracy & Winkler, 1990).

Tracy & Thoma (2009) and Thoma & Tracy (2006) examined spontaneous speech and elicited production data of six eL2 learners aged between 3;0 and 3;11 at the first recording session and between 4;1 and 5;1 at the last one. Their first languages (Arabic, Russian, and Turkish) differ significantly from German with respect to morphological type, word order, and the availability of functional categories. The major finding of these studies is that there is a large inter-individual variation in the speed of acquisition of the syntactic structure of German main clauses. Whereas some eL2 children acquired it within six months of exposure to German, some children may take even one year. Moreover, the eL2 learners consistently marked the verb in V2 for finiteness, and almost all realizations of subject-verb-agreement were target-like. Importantly, there was no interaction between the pace of acquisition and child's first language. These results are like the findings by Rothweiler (2006) and Chilla (2008). However, these studies did not analyze bare forms and *–en* forms in detail.

In her longitudinal study, Kostyuk (2005) investigated amongst others main clauses production in three eL2 learners of German with Russian as first language. The children were systematic exposed to German with joining the kindergarten at the age of three. However, they had some German input before, but its intensity was not reported in detail. Children's spontaneous speech was recorded between ages 4;0 to 5;4 for Artur, 2;9 to 3;11 for Igor, and 3;0 to 3;11 for Jakob. The analysis revealed that all three eL2 learners preferred V2 position for finite verbs in main clauses. Some clauses with V1 or V3 were also attested. However, they disappeared with increasing age. In Artur's and Igor's data there was a clear connection between the finiteness and verb position: finite verbs occurred in V2, whereas infinite verb forms were almost only attested in Vf. In contrast, Jakob used more frequently infinite verb forms also in V2 than Artur and Igor, however, also in his corpus infinitival in Vf were predominated. Bare verb forms in V2 or Vf were not reported by Kostyuk (2005).

Untypical developmental patterns for eL2 acquisition were reported by Sopata (2010) for three eL2 children with L1 Polish who were first exposed to German between the age 3;8 and 4;7. Regarding the verb placement in main clauses, in the first months of exposure

to German, all children used infinitival verb forms not only in Vf but also in V2, cf. Example (36) or V1, cf. Example (37). Moreover, infinitives were used in V2 even though subject-verb-agreement had already been acquired by two of the children. Only in one child (Witek) the correctness of inflection accounted more than 90% after nine months. According to Sopata (2010), the lack of preference for infinitive verb forms in Vf cannot be explained with transferring of Polish grammar. She argued that at this developmental stage the headedness of VP is a variable one.

(36) Du brauch-en Teddy (eL2, 9 months of exposure, Sopata, 2010:221)
You need-INF teddy

(37) Mach-en das ganz (eL2, 5 months of exposure, Sopata, 2010:221)
Do-INF this entirely

Concerning the placement of finite verb forms, the pattern used most frequently by all of three eL2 learners was the SVO order. Only one child (Jan) started to produce non-subject-initial main clauses frequently after five months of exposure to German, but even then SVO clauses were predominated. More importantly, one child (Adam) did not strictly acquire V2 and subject-verb-agreement simultaneously since he first produced correctly inflected verbs, and three months later finite verbs in V2. In addition, all children also used deviant V3 clauses, which number decreased with age, cf. Example (38).

(38) a. Keine du kauf-st (eL2, 5 months of exposure, Sopata, 2010:223)
None you buy-2SG

b. Dann er flieg-t (eL2, 4 months of exposure, Sopata, 2010:223)
Then he fly-3SG

Sopata (2010) concluded that the language development of these three eL2 learners revealed different pattern from monolingual acquisition and is more like second language acquisition in adults. Despite a similar developmental pattern to adults, the rate of acquisition of eL2 children is faster than of adult L2 learners. Bare verb forms occurred very rarely in the data and were excluded from the analysis.

The studies by Schulz et al. (2008) and by Wenzel et al. (2009) are the first, which investigated the acquisition of German sentence structure in a larger sample of eL2 children using a cross-sectional design. 74 monolingual German-speaking children and 91 eL2 learners with different L1s aged between three and seven were tested with the pilot version of *Elicited production* of LiSe-DaZ (Schulz & Tracy, 2011). Children's utterances were classified based on four milestones of sentence structure acquisition as first

formulated for monolingual acquisition by Tracy (1991). A particular milestone was assigned to a child if she produced at least two utterances of the particular type. The results show that eL2 children produced more complex structures with their increasing age. At the age of three, about 35% of eL2 children produced structures with infinite verb forms or verb particles in Vf (Milestone 2). About 60% of three- and four-year-old eL2 children reached already Milestone 3, i.e., they used matrix sentences with finite verbs in V2. The percentage of eL2 learners with Milestone 3 decreased with their age since even more children reached milestone 4, i.e., they started to produce subordinate clauses (see Section 9.2.2.2 for more details). Looking at eL2 learners' development based on their length of exposure to German, the analysis revealed that 60% of children with none to ten months of exposure to German reached Milestone 3. Among children with 11 to 20 months of exposure to German about 45% reached this milestone and the percentage of children who mastered subordinate clauses increased. In general, these results confirmed the findings of longitudinal studies analyzing eL2 children's spontaneous speech production reported above with respect to verb placement. However, verb forms produced by the children were not examined. The occurrence of different milestones in one child was not considered as well so that the individual distribution of clauses with V2 and clauses with Vf remains unclear.

In summary, studies so far provide first evidence for parallels between eL2 learners of German and monolingual children in the acquisition of finiteness and verb placement in matrix clauses. In eL2 acquisition, the correct morphological marking of verbs in the target position is mastered relatively fast, after about 6 to 18 months of exposure to German (Prévost, 2003; Rothweiler, 2006; Tracy & Thoma, 2009). Nonfinite verbs seem to be restricted to verb final position and substitutions of inflectional morphemes are rarely documented. Bare forms in V2 position have been reported by Prévost (2003) for eL2 acquisition. In line with the MSIH (Haznedar & Schwartz, 1997; Haznedar, 2001), Prévost (2003) suggests that bare forms are covertly finite, while verbs marked with the infinitival marker *–en* are truly nonfinite and therefore restricted to the Vf position, as predicted by the TH (Rizzi, 1993/1994). Only Sopata (2010) found deviant developmental patterns of eL2 learners. To date, eL2 research on the acquisition of finiteness and verb placement is limited in several respects. First, studies so far involve single participants (Prévost, 2003) or small groups (Rothweiler, 2006; Tracy & Thoma, 2009) or wide age ranges, as in the Dutch study by Blom & Baayen (2013), making generalizations difficult. Second, data mostly consist of spontaneous speech samples, allowing for little control over the types of utterances produced. Third, the different verb types (modals, auxiliaries, and lexical verbs) were not always differentiated. Finally, except for Prévost

(2003), non-finiteness marking (-Ø vs. *–en*) as well as verb position (V2 vs. Vf) were not analyzed together.

9.2.2. Previous research on the acquisition of subordinate clauses

To master German subordinate clauses, children must recognize that in contrast to matrix clauses, the finite verb remains in Vf position, and a complementizer is placed in C^0. The following sections summarize previous research on the acquisition of subordinate clauses in monolingual German-speaking children and eL2 learners of German. The focus is on the variation in acquisition and on children's individual developmental paths toward mastery of subordinate clauses.

9.2.2.1. Monolingual acquisition of subordinate clauses

Monolingual acquisition of subordinate clauses in German is well studied (Clahsen, 1982; Clahsen, 1986; Fritzenschaft et al., 1990; Rothweiler, 1993; Tracy, 1991). Generally, first subordinate clauses occur about the age between 2;6 and 3;6 indicating a lot of variation regarding the acquisition age.

Rothweiler (1993) investigated spontaneous speech data of seven monolingual German-speaking children aged between 2;9 and 5;6. All children produced their first subordinate clauses about the age of three. The first complementizers used by the children were *wenn* 'if' and *weil* 'because' as illustrated in Example (39) and Example (40), respectively.

(39) gleich spiel ich auch mitem markus wenn der draußen is (Rothweiler,1993:204)
in a moment play-Ø I too with-DAT markus if he outside is
'In a moment I'm playing with Markus if he is outside'

(40) weil wir den alten nicht mehr wollten (Rothweiler, 1993:196)
because we the-Acc old not more want-1PL-Past
'because we didn't want the old one anymore'

Importantly, Rothweiler's analysis revealed that monolingual children distinguish between the verb placement in matrix clauses and in subordinate clauses from early on. This confirms the results by Clahsen (1982), Fritzenschaft et al. (1990) and Tracy (1991).

Verb placement errors were very rare. Only in two out of 753 subordinate clauses with a complementizer, the verb was placed in V2 position resulting in an ungrammatical structure, cf. Example (41). In other nine subordinate clauses, the verb was placed in V2

as well. However, these utterances were either relative clauses or *weil*-clauses, which are grammatical in colloquial speech, cf. Example (42).

(41) a. sach ich se – was sing ich (Rothweiler, 1993:42)
say-Imperative I sing-1SG – what sing-1SG I
'Say I'singing – what I'm singing'

b. weil möchte i doch (Rothweiler, 1993:42
because want-1SG I ADV-PART
'Because I want'

(42) a. es gibt menschen die werfen einfach dreck ausm me aufm fenster (Rothweiler, 1993:42)
it give-3SG people who throw-3PL basically trash from-DAT window 'There are people they basically throw trash from the window'

b. weil da is kein gesich (Rothweiler, 1993:42)
because there is no face
'Because there is no face'

Fritzenschaft et al. (1990) and Gawlitzek-Maiwald, Tracy & Fritzenschaft (1992) reported a lot of variation in spontaneous speech data of four children aged 1;11 to 3;0 at the first recording session. In one child for example, first subordinate clauses, that were introduced with a complementizer, were accompanied by iteration, breaks, and reverting to V2 structures. The other child produced subordinate clauses with a complementizer, in which the finite verb was placed in V2, directly after the complementizer as illustrated in Example (43). A similar structure was also reporter by Rothweiler (1993) as shown in Example (41b) above. After several months, all non-target-like structure disappeared, and only subordinate clauses with verb in Vf position were found. These findings indicate that children use different strategies to encode German sentence structure.

(43) a. wenn hab I au mal burstag habt (Gawlitzek-Maiwald at al., 1992:147)
when have I too ADV-PART birthday had
'When I had a birthday too'

b. weil hab ich mich auch naßgespritzt (Gawlitzek-Maiwald et al., 1992:147)
because have I myself too splashed
'Because I splashed myself too'

Additionally, Fritzenschaft et al. (1990) and Rothweiler (1993) report a precursor phase in the acquisition of subordinate clauses about the age between 3;3 and 3;8. In this

phase, children produced either subordinate clauses in which the complementizer is lacked, but the verb is placed in Vf position, cf. Example (44), or subordinate clauses with a placeholder for complementizer such as [m], cf. Example (45).

(44) Du solls die mama sang Ø ich immer einen umfall mach (Rothweiler 1993:173)
you should the mum tell Ø I always a crash make
'You should tell the mum that I always make a crash.'

(45) e – me nich meine mama bis (= weil du nich…) (Rothweiler 1993:43)
placeholder not my mother are (= because you not…)
'Because you are not my mother.'

9.2.2.2. eL2 acquisition of subordinate clauses

Several studies confirmed that eL2 learners very early recognize the different verb placement in German matrix and subordinate clauses and produced the finite verb in Vf position in subordinate clauses (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy, 2006; Kostyuk, 2005).

In the spontaneous speech data of three eL2 children analyzed by Rothweiler (2006) almost exclusively target-like subordinate clauses were found as illustrated in Example (46). None of the children produced subordinate clauses with non-finite verb forms, neither in Vf nor in V2 position. Subordinate clauses with finite verb placed in V2 position were very rare, cf. Example (47). Moreover, in the last example also the complementizer is missed.

(46) a. wenn mein onkel da hm so pickser reingesteckt hat dann blutet das
(eL2, 15 months of exposure, Rothweiler, 2006:105)
when my uncle there hm so needle in-put has then bleeds that
'when my uncle pricked (a) needle into (x) it started to bleed'

b. ich kann allein kommen weil ich hier wohne
(eL2, 15 months of exposure, Rothweiler, 2006:106)
I can alone come because I here live
'I can come on my own because I live next to here'

(47) ich weiss nicht Ø is da (eL2, 9,5 months of exposure, Rothweiler, 2006:106)
I know not Ø is there
'I don't know what is there'

Similar results were reported in the study by Tracy & Thoma (2009) and Thoma & Tracy (2006) who also analyzed spontaneous speech data of eL2 learners of German. Once the children had stable produced matrix clauses with finite verbs in V2 position, the first subordinate clauses arised. However, some more intraindividual variation was found in the data. One child AHA marginally used *weil*-clauses with finite verb in V2 position as illustrated in example (48).

(48) weil die mensch hat hier brennt (eL2, 13 months of exposure, Tracy & Thoma, 2009:18)
because the human has here burned
'because the person burned here'

The other child RNV produced precursors of subordinate clauses already after eight months of exposure to German. She used left-periphery placeholders such as [*vaʃ*] 'what for *dass* 'that' or *wenn* 'when/if' for *bis* 'until' as illustrated in Example (49). Similar usage of placeholders is known from monolingual acquisition (Fritzenschaft et al., 1990; Rothweiler, 1993).

(49) a. ich will nicht [*vaʃ*] du hast gewinn (eL2, 8 months of exposure, Tracy & Thoma, 2009:21)
I want not what you have won
'I don't want you to win'
b. warte doch mal wenn ich hab fertig gemal (eL2, 8 months of exposure, Tracy & Thoma, 2009:21)
wait ADV-PART when I have finished drawing
'wait until I'm done drawing'

Kostyuk (2005) who investigated spontaneous speech data of three el2 children reported a lot of deviant pattern in acquisition of subordinate clauses. Artur produced subordinate clauses with verb in V2 and Vf position simultaneously whereby the subordinate clauses with V2 occurred more frequently. Not until the age of 4;10 the subordinate clauses with finite verb in Vf position overwhelmed. Igor produced his first subordinate clauses earlier than Artur. However, during the first nine months of exposure almost exclusively subordinate clauses with verbs in V2 were found. At age 3;11, the proportion changed, and subordinate clauses with verb in Vf occurred overwhelmingly. The third child, Jakub, acquired the subordinate clauses very slowly, and produced them very rarely. As Igor, he used first subordinate clauses with verb in V2 position. The following Example (50) illustrates the non-target-like verb placement in subordinate clauses produced by the three eL2 children.

(50) a. ich zeig' dir wie habe ich (eL2, Kostyuk, 2005:145)
show-Ø you-DAT how have-1SG I
'I show you how I have'

b. wenn er kann nicht reinparken (eL2, Kostyuk, 2005:147)
if he can not inside park-INF
'if it cannot park inside'

c. ich zeige wo is der pinocchio (eL2, Kostyuk, 2005:147)
I show-1SG where is the pinocchio
'I show where the pinocchio is'

As mentioned in Section 9.2.1.2, the studies by Schulz et al. (2008) and by Wenzel et al. (2009) are the first which investigated the acquisition of German sentence structure in a larger sample of eL2 children using a cross-sectional design. At age four, only about 30% out of 14 eL2 learners produced subordinate clauses. The percentage of children using subordinate clauses increased with age. At age five it accounted for almost 60% (out of 40), and at age six for 80% (out of 17). All seven-year-olds produced subordinate clauses. Looking at the pace of acquisition, subordinate clauses occurred in utterances of about half of eL2 children with 26 to 30 months of exposure to German. With more months of exposure to German, the percentage of subordinate clauses increased, and with 36 months of exposure or more, the most eL2 learners were able to produce subordinate clauses.

In sum, the results of the studies reported support the claim that eL2 acquisition of subordinate clauses is like monolingual acquisition (but see Kostyuk, 2005). eL2 learners distinguish the different verb placements in German matrix and subordinate clauses right from the beginning, so that they almost exclusively produced target-like subordinate clauses with verb in Vf position. During the acquisitional stage, usage of placeholders, omission of conjunctions, or some ungrammatical structures with verb in V2 position were reported for eL2 children. However, these phenomena are also well known from monolingual acquisition, and their occurrences in eL2 data were not higher comparing to data of monolinguals.

To date, eL2 research on the acquisition of subordinate clauses is limited in several respects. As for acquisition of matrix clauses, studies so far involve small groups (Rothweiler, 2006; Tracy & Thoma, 2009), what makes generalizations difficult. Moreover, data mostly consist of spontaneous speech samples, allowing for little control

over the types of utterances produced. Finally, *weil*-clauses were not always differentiated regarding the V2 and Vf placement of finite verb.

9.3. Development of sentence structure

This introductory section provides an overview of the general development of sentence structure in eL2 learners and monolingual children. The section is organized as follows. Section 9.3.1 presents the participants. The elicited production task is described in Section 9.3.3. Section 9.3.4 describes the data analysis. Results of the analysis are presented in Section 9.3.5 and discussed in Section 9.3.6.

9.3.1. Participants

To investigate children's general development of sentence structure, the data of the whole eL2 group and the whole monolingual group as described in Section 3.4 were analyzed. The number of children varies depending on the test round. Table 9.2 gives an overview of the participants across four test rounds for monolingual children and across five test rounds for eL2 children.

Table 9.2. Number of monolingual and eL2 children analyzed regarding their development of sentence structure.

	T1	T2	T3	T4	T5
Age	3;7	4;2	4;7	5;8	6;9
Monolingual children	45	45	41	35	-
eL2 children	29	29	28	26	15

9.3.2. Task

The production data are collected in LiSe-DaZ (Schulz & Tracy, 2011) using an elicited production task. The task comprises 19 items in total, aimed at eliciting different sentence types (nine declarative matrix clauses, two wh-questions, two yes/no questions, six subordinate clauses) and the different subject-verb-agreement forms. At the same time, different word classes are elicited, including lexical, modal, and auxiliary verbs as well as prepositions, conjunctions, and focus particles. The experimenter and the child look at a picture book, specifically created for that test, and the experimenter prompts the child to produce the target structures by asking a question or starting a sentence.

Example (51) and Example (52) illustrate typical test items for eliciting declarative matrix clauses.

(51) Experimenter: Guck mal, was passiert auf diesem Bild?
'Look, what is happening on this picture?'
Child: Die Kinder spielen Ball mit dem Hund.
The children play-3PL ball with the-DAT dog
'The children are playing ball with the dog.'

(52) Expermenter: Lise hat das Skateboard bekommen und kann jetzt fahren. Und was macht der Hund?
'Lise has received the skateboard and can ride now. And what is the dog doing?
Child: Er fährt mit.
He ride-3SG with
'He is riding with.'

Within six subordinate clauses, different conjunctions are elicited: *weil* 'because' (3 items), *wenn* 'if' (2 items), and *dass* 'that' (1 item). Example (53) illustrate a test item for elicitation of subordinate clause with *weil* 'because', and Example (54) illustrates a test item for elicitation of subordinate clauses with *wenn* 'if'. In addition, there is a possibility to produce two indirect yes/no-questions that are introduced by the conjunction *ob* 'whether', and two indirect wh-questions introduced by *was* 'what' or by *wann* 'when'.

(53) Experimenter: Da steckt ja ein kleiner Hund drin. Warum macht der Hund so ein trauriges Gesicht?
'There is sticking a small dog. Why is the dog doing such a sad face?'
Child: Weil er in der Tonne eingesperrt war.
Because he in the-DAT bin locked was
'Because he was locked in the bin.'

(54) Experimenter: Ibo hat eine Idee. Wenn er die Tonne umkippt, kann er den Hund befreien. Deshalb sagt Ibo zu Lise: Wir können den Hund nur retten, …
'Ibo has an idea. If he falls over the bin, he can rescue the dog. Therefore, he says to Lise: We can rescue the dog only …

Child: wenn wir die Tonne umkippen.
if we the-ACC bin fall-3Ll over
'if we fall over the bin.'

All children were tested individually by trained student assistants in a quiet room in their kindergarten. Testing took place four times for monolingual children and five times for eL2 children. There were six months interval between the first and the second test round, and between the second and the third test round. The interval was one year between the third and the fourth test round, and between the fourth and the fifth test round. All test sessions were video recorded for later transcription and coding. When a child failed to supply an answer, the test item was repeated once.

9.3.3. Data analysis

Each child's utterance was classified to one out of five milestones. The five milestones correspond to the structure of German clauses. Note that by this classification only the verb placement but not its finiteness was taken into consideration. Table 9.3 illustrates the classification.

Table 9.3.Classification of utterances by the syntactic milestones.

Milestone	**Examples**	
Milestone 0	Luftballons	'Balloons'
Milestone 1	Spielen	'Play'
	Winken	'Wave'
	Raus	'Out'
Milestone 2	Fußball spielen	'Play soccer'
	Nicht da gehen	'Not go there'
Milestone 3	Die Lise hat die Hund gerettet	'Lise has rescued the dog'
	Können wir weitergehen?	'Can we go?'
	Wann bist du endlich fertig?	'When are you finished?
Milestone 4	Weil der in der Mülltonne war	'Because he was in the bin'
	Wenn du nicht wegrennst	'If you will not go away'

The utterances without a verb were classified as Milestone 0. Milestone 1 were one-word-utterances consisting of a verb or a verb particle. Multiword utterances with verb in the final position were analyzed as Milestone 2. Matrix clauses with verb in V2 position

were classified as Milestone 3, and finally subordinate clauses with a conjunction and a verb placed in final position as Milestone 4. Importantly, only clauses with at least two constituents between the conjunction and the finite verb were classified as Milestone 4. Consequently, sentences such as *Weil er weint* (Because he cry-3SG, 'Because he is crying') were classified as Milestone 2 (cf. Schulz & Tracy, 2011).

A syntactic milestone was assigned to a child if she produced at least three utterances of the respective milestone. In results, only the highest reached milestone was considered since the usage of subordinate clauses does not mean that all other sentence structures were not produced.

9.3.4. Results

The following section summarizes the general development of sentence structure in monolingual and in eL2 children. The results are depicted in Figure 9.3 for monolingual children and in Figure 9.4 for eL2 learners.

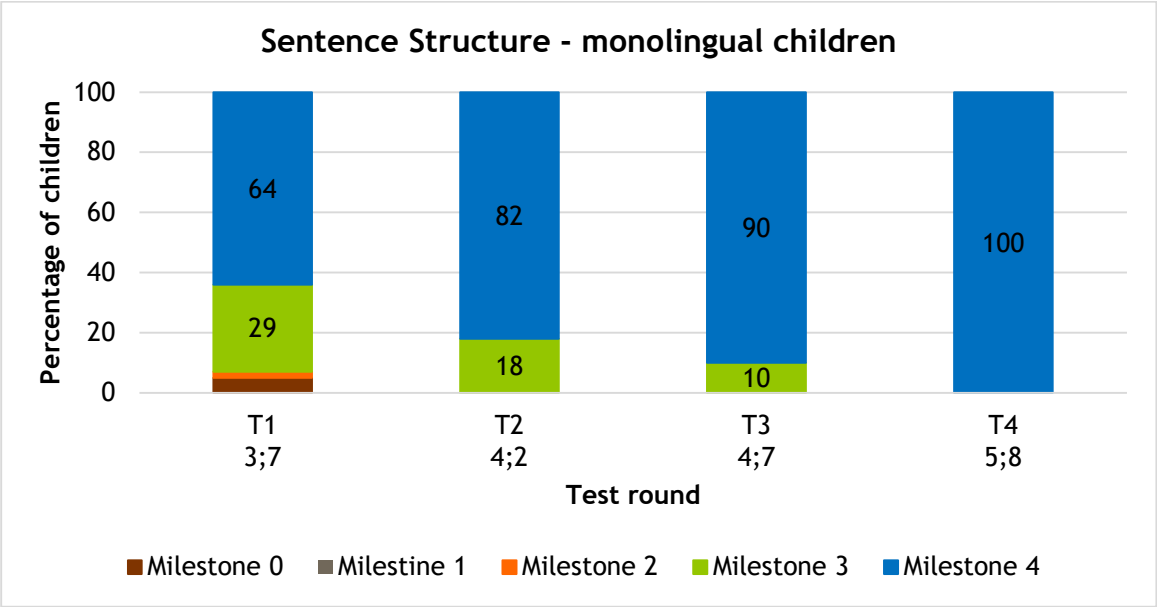


Figure 9.3. The percentage of monolingual children according to the reached milestone across four test rounds.

Looking at the monolingual group, at age 3;7 over 60% of children already reached Milestone 4, whereas almost 30% of children produced clauses corresponding to Milestone 3. Only 7% of monolingual children used exclusively structures classified as Milestone 2 or Milestone 1. At age 4;2, the percentage of monolingual children reaching Milestone 4 increased to 82%, and at age 4;7 to 90%. All monolingual children reached Milestone 4 at age 5;8.

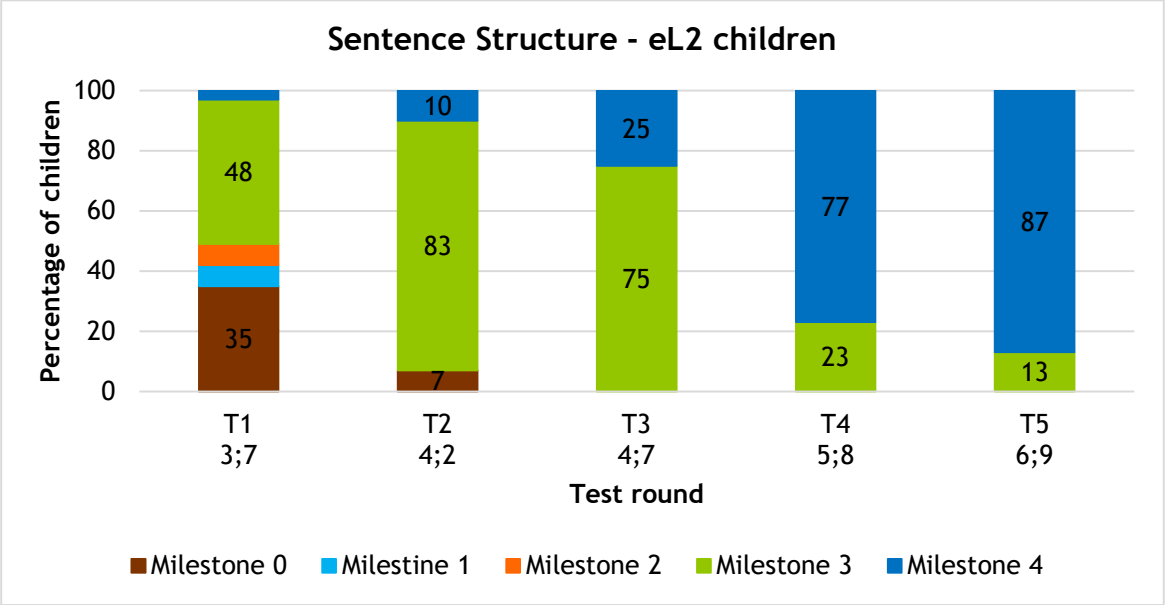


Figure 9.4. The percentage of eL2 children according to the reached milestone across five test rounds.

Regarding the development of eL2 children, at age 3;7 35% of them used structures corresponding to Milestone 2 and about the half of them reached Milestone 3. The development in this group was very fast. Six months later at age 4;2, already 83% of the eL2 children produced structures of Milestone 3. At age 4;7, 25% of the eL2 children reached Milestone 4. The other 75% of them produced structures of Milestone 3. At age 5;8, the percentage of the eL2 children who reached Milestone 4 increased to 77%. One year later at age 6;9, 87% of the eL2 children reached Milestone 4. This indicates that not all six-year-old eL2 children fully acquired German sentence structure.

In sum, these results show that at age 3;7 two third of the monolingual children had acquired the German sentence structure, and at age 5;8 all monolingual children reached Milestone 4. Whereas at age 3;7 only 3% of eL2 children produced subordinate clauses, one year later the percentage of eL2 children increased to 25%, and at age 5;8 to 77%. Thus, the acquisition of sentence structure proceeds very fast in eL2 learners. However, at age 6;9 there were still some eL2 children (13%) who did not reach Milestone 4.

9.3.5. Discussion

This section gave an overview of how sentence structure is acquired in monolingual and in eL2 children. The results indicate that German sentence structure is acquired very fast in eL2 learners. Moreover, they show that the developmental stages are the same in monolingual and in eL2 children. These findings confirm the previous results from studies

on acquisition of German sentence structure (Chilla, 2008; Rothweiler, 2006; Schulz et al., 2008; Tracy & Thoma, 2009; Thoma & Tracy 2006; Wenzel et al., 2009).

However, this analysis only considered the verb placement but not the verb form. Since there is a complementary distribution in German with respect to verb placement and its finiteness, more detailed analyses are required. Thus, the following Section 9.4 deals with the acquisition of verb placement and finiteness in matrix clauses, and Section 9.5 examines the acquisition of subordinate clauses.

9.4. Acquisition of verb placement and finiteness in matrix clauses

This section examines the acquisition of verb placement and finiteness in matrix clauses in eL2 children[2]. It is organized as follows. In Section 9.4.1, research hypotheses are formulated. Section 9.4.2 describes the participants, and Section 9.4.3 gives an overview of the data analysis. The results are presented in Section 9.4.4 and discussed in Section 9.4.5.

9.4.1. Research hypotheses

This substudy focuses on eL2 children's developmental path toward target-like acquisition of verb placement and finiteness in matrix clauses (Q3). Adopting the Truncation Hypothesis (TH) (Rizzi, 1993/94) it is expected that eL2 children produce infinitival verb forms only in Vf position and finite verb forms only in V2 position. In addition, in line with MSIH (Haznedar, 1997; Haznedar & Schwartz, 1997; Prévost, 2003), bare verb forms are assumed as default finite forms, und therefore, they are supposed to occur only in V2 position. The following hypotheses are formulated:

(H3.1) eL2 children obey the ban on nonfinite forms in V2 position.

(H3.2) eL2 children produce bare verb forms exclusively in V2 position.

The next goal is to investigate whether eL2 children distinguish between lexical verbs and functional verbs (modal and auxiliary verbs). Previous findings for monolingual (Clahsen, 1991; Wexler, 1994) and for eL2 children (Parodi, 1998; Prévost, 2003) indicate that children correctly place functional verbs in V2 and inflect them target-like from early on. Thus, the following hypothesis was stated:

[2] Parts of this study were already reported in Wojtecka, Schwarze, Grimm & Schulz (2013), Schwarze, Wojtecka, Grimm & Schulz (2015), Schulz & Schwarze (2017), and Lemmer (2018).

(H3.3) eL2 children produce exclusively finite functional verbs and place them in V2 position.

In addition, analyzing data from four test rounds, it is expected that after two years of exposure to German, eL2 learners improve their performance, and produce more correctly inflected verb forms in V2 position and fewer infinitival forms in Vf.

(H3.4) eL2 children produce more target-like inflected verb forms in V2 position at T4 compared to T1.

(H3.5) eL2 children produce fewer infinitival forms in Vf at T4 compared to T1.

9.4.2. Participants

To investigate eL2 children's developmental path in the acquisition of verb placement and finiteness, only these children were included in the analysis whose data were complete across four test rounds (T1, T2, T3, T4). This counts for 25 eL2 learners of German (11 girls, 14 boys). Children's age and their length of exposure to German across all test rounds are given in Table 9.4.

Table 9.4. eL2 children's age and length of exposure to German across four test rounds for acquisition of verb placement and finiteness in matrix clauses.

	T1	**T2**	**T3**	**T4**
Age range	3;5 – 4;1	4;0 – 4;4	4;5 – 4;11	5;5 – 6;4
Mean age	3;9	4;3	4;8	5;9
SD in months	2.4	1.6	1.8	2.4
Exposure to German in months	5 – 19	10 – 27	16 – 32	29 – 45
Mean exposure	10	15	21	34
SD in months	3.8	4.4	4.2	4.5

Children's age ranged from 3;5 to 4;1 (M = 3;9, SD = 2.4 months) at first test round, and from 5;5 to 6;4 (M = 5;9, SD = 2.4) at fourth test round. Their length of exposure to German at T1 ranged from 5 to 19 months (M = 10 months, SD = 3.8 months). Children had their first systematic exposure to German at age 3, typically when entering kindergarten. They spoke 18 different first languages, with Turkish, Serbo-Croatian, and Arabic being the most frequent. At the time of testing, all families predominantly used their first language at home.

9.4.3. Data analysis

The data were collected with the elicitation production task from LiSe-DaZ (Schulz & Tracy, 2011). The detailed description of the task is given in Section 9.3.2.

To examine the relationship between the acquisition of finiteness and of verb placement, all declarative matrix clauses containing a lexical or a functional verb were included in the data analysis (n = 990). Non-declaratives (i.e. yes/no questions, wh-questions, imperatives) and subordinate clauses were excluded from the analysis (n = 734).

Verb placement was coded as V2 or Vf. Table 9.5 illustrates the coding of matrix clauses with V2.

Table 9.5. Coding of matrix clauses with V2.

Finiteness	Inflection	Example
+ finite	target	Der Hund spiel-*t* mit dem Ball. The dog play-3SG with the ball
+ finite	substitution	Der Hund spiel-*e* mit dem Ball. The dog play-1SG with the ball
? finite	bare	Der Hund spiel mit dem Ball. The dog play-Ø with the ball
- finite	infinitival	Der Hund spiel-en mit dem Ball The dog play-INF with the ball

Structures that were ambiguous regarding verb placement like *Er geht* (he go-3SG, 'he goes') were excluded from this analysis. Verb forms were coded as finite if they were inflected with *–e*, *-st*, and *–t*. Importantly, *-en* was also coded as finite when used in 1PL or 3PL context in V2. The form *–Ø* was coded as finite only if used for 1SG. All verb forms were then coded for (in)correct subject-verb-agreement. We distinguished between correctly inflected forms (i.e. verbs with the target inflectional suffix) and incorrect forms (i.e. substitutions, bare forms, and infinitival forms with *–en*). The bare verb form *–Ø* was coded as incorrect if it was used in a context other than 1SG. The verb form *–en* was classified as infinitival if used in a context other than 1PL or 3PL. Note that target-like inflected verb forms in Vf were coded as 'target' regarding the morphological marking despite the fact that the resulting structures is not adult-like. Table 9.6 illustrate the coding of matrix clauses with Vf.

Table 9.6. Coding of matrix clauses with Vf.

Finiteness	Inflection	Example
- finite	infinitival	Der Hund mit dem Ball spiel-en. The dog with the ball play-INF
? finite	bare	Der Hund mit dem Ball spiel. The dog with the ball play-Ø
+ finite	target	Der Hund mit dem Ball spielt. The dog with the ball spiel-3SG
+ finite	substitution	Der Hund mit dem Ball spiel-e The dog with the ball play-1SG

9.4.4. Results

This section reports the results regarding the acquisition of verb placement and finiteness in matrix clauses. First in Section 9.4.4.1, an overview about clauses produced by the eL2 children is given. Section 9.4.4.2 investigates which verb forms eL2 children produced in V2 and in Vf clauses. The analysis in Section 9.4.4.3 looks at eL2 children's clauses with lexical and functional verbs separately to examine whether they treat these two verb types differently. In Section 9.4.4.4, eL2 children's individual developmental path in the acquisition of finiteness and verb placement is investigated.

9.4.4.1. General results

This section gives an overview about types of utterances that were produced by eL2 children across four test rounds. Five types of clauses were distinguished: matrix clauses with V2, matrix clauses with Vf, clauses with ambiguous verb placement, questions, and subordinate clauses. The total number of clauses produced by eL2 children increased across four test rounds from 196 to 496. Regarding the matrix clauses, already these general results show that matrix clauses with V2 were used more frequently than matrix clauses with Vf across all test rounds. With increasing age, the eL2 children produced more questions. Moreover, the number of produced subordinate clauses increased as well across four test rounds indicating that more and more eL2 learners acquired the German sentence structure completely. This is in line with the results on the development of sentence structure already reported in Section 9.3.4. Table 9.7 summarizes the results.

Table 9.7. Number of different types of clauses produced by eL2 children (n=25) across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	196 (100%)	346 (100%)	468 (100%)	496 (100%)
V2 matrix clauses*	135 (69%)	235 (68%)	254 (54%)	260 (52%)
Vf matrix clauses	20 (10%)	28 (8%)	22 (5%)	7 (1%)
Ambiguous clauses	23 (12%)	23 (7%)	38 (8%)	21 (4%)
Questions	1 (1%)	19 (5%)	43 (9%)	63 (13%)
Subordinate clauses	17 (8%)	41 (12%)	111 (24%)	145 (29%)

*without questions

9.4.4.2. Comparing verb forms in verb second and verb final position

This section compares the finiteness marking in matrix clauses with V2 with the finiteness marking in matrix clauses with Vf. Table 9.8 presents the results for V2 clauses with lexical and functional verbs produced by eL2 children across four test rounds.

Table 9.8. Raw number and proportions of verb forms in V2 position produced by eL2 children (n=25) across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	135 (100%)	235 (100%)	254 (100%)	260 (100%)
Target inflection	120 (89%)	202 (86%)	248 (97.5%)	257 (99%)
Non-target inflection				
Bare	8 (6%)	23 (10%)	5 (2%)	1 (0.5%)
Infinitival	4 (3%)	8 (3%)	0	0
Substitution	3 (2%)	2 (1%)	1 (0,5%)	2 (0.5%)

The eL2 children inflected 89% of verbs in V2 target-like at age 3;9 and 86% at age 4;3. The mean accuracy scores were over 90% at age 4;8 and at age 5;9. Regarding the non-target inflection, bare forms were the most frequent error type, accounting for 6%

at age 3;9 and 10% at age 4;3. Infinitivals and substitutions were found very rarely across all ages. At age 4;8 infinitival forms in V2-clauses did not occur anymore. These results indicate that in V2-clauses, the eL2 children mostly produced correctly inflected verb forms already at age 3;9. Instead of incorrectly inflected verb forms in V2, they preferred to use bare verb forms than infinitivals and substitutions.

A different pattern was found in clauses with verbs in Vf position. The distribution of verb forms in Vf clauses is depicted in Table 9.9. Overall, the eL2 learners produced only few utterances with verbs in Vf at all ages, suggesting that already at age 3;9 after about 10 months of exposure to German, they know that German is a V2 language. As expected, correctly marked finite verbs in Vf were infrequent. The eL2 children produced only two clauses (7%) with a target-like inflected verb in Vf at age 4;3, three clauses (14%) at age 4;8, and one clause (14%) at age 5;9. Likewise, bare forms occurred in only two clauses (10%) at age 3;9, and in one clause (4%) at age 4;3. Substitutions were produced in only one clause each at age 3;9 and 4;8. In Vf position, the most frequent verb forms were infinitivals, accounting for over 80% at all ages. These data suggest that the eL2 children are aware of nonfinite properties of infinitival verb forms in German, licensing their realization in the base-generated V^0 position.

Table 9.9. Raw number and proportions of verb forms in Vf produced by eL2 (n=25) children across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	20 (100%)	28 (100%)	22 (100%)	7 (100%)
Target inflection	0	2 (7%)	3 (14%)	1 (14%)
Non-target inflection				
Bare	2 (10%)	1 (4%)	0	0
Infinitival	17 (85%)	25 (89%)	18 (82%)	6 (86%)
Substitution	1 (5%)	0	1 (4%)	0

9.4.4.3. Comparing verb types in verb second and verb final position

This subsection examines whether eL2 children treat lexical verbs and functional verbs differently regarding their verb placement and their finiteness. Here for matrix clauses with lexical verbs and functional verbs were analyzed separately. Table 9.10 summarizes

the distribution of functional verb forms produced in matrix clauses with V2 across four test rounds, and Table 9.11 in matrix clauses with Vf across four test rounds.

Table 9.10. Raw number and proportions of functional verb forms in V2 produced by eL2 children (n=25) across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	77 (100%)	147 (100%)	168 (100%)	122 (100%)
Target inflection	76 (99%)	137 (93%)	165 (98%)	119 (97%)
Non-target inflection				
Bare	0	3 (2%)	2 (1%)	1 (1%)
Infinitival	0	5 (3%)	0	0
Substitution	1 (1%)	2 (2%)	1 (1%)	2 (2%)

Table 9.11. Raw number and proportions of functional verb forms in Vf produced by eL2 children (n=25) across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	2 (100%)	4 (100%)	3 (100%)	0
Target inflection	0	2 (50%)	2 (67%)	0
Non-target inflection				
Bare	0	0	0	0
Infinitival	2 (100%)	2 (50%)	1 (33%)	0
Substitution	0	0	0	0

The mean accuracy scores for functional verbs in matrix clauses with V2 were over 90% already at age 3;9. Bare verb forms, infinitivals, and substitutions were rarely found in V2 position at all ages. As expected, eL2 learners produced Vf clauses with functional verbs only occasionally. In these clauses, modal and auxiliary verbs were either target-like inflected or used in infinitival forms. At age 5;9, modal and auxiliary verbs in Vf did not appear anymore.

The results for lexical verb forms in V2 clauses are given in Table 9.12.

Table 9.12. Raw number and proportions of lexical verb forms in V2 produced by eL2 children (n=25) across four test rounds.

	Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Total number of clauses		58 (100%)	88 (100%)	116 (100%)	138 (100%)
Target inflection	V2	44 (76%)	65 (74%)	113 (97%)	138 (100%)
Non-target inflection					
Bare	V2	8 (14%)	20 (23%)	3 (3%)	0
Infinitival	V2	4 (7%)	3 (3%)	0	0
Substitution	V2	2 (3%)	0	0	0

76% of lexical verbs in V2 clauses were inflected target-like at age 3;9, and 74% at age 4;3. At age 4;8 target-like inflection increased to 97%, and it reached 100% at age 5;9. Looking at the non-target-like verb forms, bare forms were the most frequent, accounting for 14% of the errors at age 3;9, and 23% at age 4;3 (cf. Example (55)), whereas infinitival forms and substitutions were rarely found. Infinitive verb forms were produced in only four V2 clauses (7%) at age 3;9, and in three V2 clauses (3%) at age 4;3 (cf. Example (56)). Substitutions occurred in two V2 clauses (3%) at age 3;9, cf. Example (57). At age 4;8 only three non-target-like verb forms were attested, all of them bare forms.

(55) Examples of clauses with a bare verb form

a. *Der <u>schneid</u> das von Baum.* (eL2, 2028, 3;6)
He cut-Ø that of tree
'He is cutting that from the tree.'
Target: Der schneid-t das vom Baum.

b. *Die <u>spiel</u> Fußball.* (eL2, 2037, 3;8)
They play-Ø soccer
'They are playing soccer.'
Target: Die spiel-en Fußball.

c. *Die <u>mach</u> auch.* (eL2, 2037, 4;3)
She do-Ø too
'She is also doing.'
Target: Sie mach-t auch.

d. *Die flieg bis in Himmel.* (eL2, 2112, 4;2)
She fly-Ø till in heaven
She is flying to the heaven.'
Target: Sie flieg-t bin zum Himmel.

(56) Examples of clauses with infinitival verb form

a. *Der steh-en hier.* (eL2, 2028, 3;6)
He stand-INF here
'He is standing here.'
Target: Der steh-t hier.

b. *Er mach-en so.* (eL2, 2029, 4;2)
He do-INF so
'He is doing so.'
Target: Er mach-t so.

(57) Examples of clauses with substitution

a. *Hund spiel-e Ball.*[3] (eL2, 2140, 3;8)
Dog play-1SG ball
'The dog is playing ball.'
Target: Hund spiel-t Ball.

b. *Hund nehm-e ihn.* (eL2, 2140, 3;8)
Dog take-1SG him
'The dog is taking it.'
Target: Der Hund nimm-t ihn.

These results indicate that in V2 clauses, eL2 children mostly produced target-like inflected forms of lexical verbs already at age 3;9. Bare verb forms are the most frequent non-target-like form produced in V2 clauses, whereas substitutions and infinitival forms occurred very rare in V2.

Consider now the distribution of lexical verb forms in Vf clauses. Table 9.13 presents the results for Vf clauses with lexical verbs produced by eL2 children across the four test rounds.

[3] Note, that children in this study grow up in the area of Frankfurt and are exposed to the Hessian dialect, where *–e* can mark an infinitival verb form. *–e* in V2 in a context other than 1SG were produced in two cases by one child and may also be analysed as infinitival in V2.

Table 9.13. Raw number and proportions of lexical verb forms in Vf produced by eL2 children (n=25) across four test rounds.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
Total number of clauses	18 (100%)	24 (100%)	19 (100%)	7 (100%)
Target inflection	0	0	1 (5%)	1 (14%)
Non-target inflection				
Bare	2 (11%)	1 (4%)	0	0
Infinitival	15 (83%)	23 (96%)	17 (90%)	6 (86%)
Substitution	1 (6%)	0	1 (5%)	0

As already mentioned, only few matrix clauses with verbs in Vf position occurred at all ages. As assumed, eL2 children almost never produced correctly marked finite lexical verbs in Vf. They occurred only in one Vf clause each at age 4;8 (5%) and at age 5;9 (14%). Similarly, bare forms were produced in only two Vf clauses (11%) at age 3;9, and in one clause (4%) at age 4;3. Substitutions were attested in only one clause each at age 3;9 and at age 4;8. The most frequent form of lexical verbs in Vf position were infinitivals. The eL2 learners produced them in 15 clauses with Vf (83%) at age 3;9, in 23 clauses with Vf (96%) at age 4;3, in 17 clauses with Vf (90%) at age 4;8, and in 6 clauses with Vf (86%) at age 5;9. These results indicate that in eL2 acquisition, the sentence final position in matrix clauses is restricted to infinitival forms of lexical verbs.

In summary, the results on lexical verbs and on functional verbs provide evidence that the eL2 learners of German differentiate between these two types of verbs even in the early acquisitional stage. This is indicated by the fact that the high accuracy scores of over 90% for modal and auxiliary verbs in V2 was already seen at age 3;9 and after about 10 months of exposure to German. Moreover, functional verbs almost never occurred in Vf clauses. In contrast, lexical verbs were indeed mostly target-like inflected in V2 clauses, but they also occurred in V2 clauses with non-target inflection till age 4;8. Furthermore, only infinitival forms of lexical verbs are produced in Vf clauses.

9.4.4.4. eL2 children's developmental path towards the acquisition of verb placement and finiteness in matrix clauses

To examine the developmental path the eL2 children go through toward mastery of finiteness and of verb placement in matrix clauses, verb forms used in V2 matrix clauses

were analyzed on an individual level across four test rounds. Since the mean accuracy scores for functional verbs in V2 clauses were over 90% already at age 3;9, only V2 clauses with lexical verbs were included in the analysis. Recall first the group results presented in Table 9.12 above. The percentage of correctly inflected verb forms increased from 76% at age 3;9 to 97% at age 4;8, and to 100% at age 5;8. The only non-target-like verb forms found at age 4;8 were bare forms. This indicates that eL2 children had mastered verb placement and finiteness marking in the L2 German by age 4. Table 9.14 summarizes the analysis of eL2 children's verb form produced in V2 matrix clauses.

Table 9.14. Number of eL2 children (out of 25) using different verb forms in V2 clauses across four test rounds.

Age	T1 3;9	T2 4;3	T3 4;8	T4 5;8
Only target forms	5	12	22	25
Target forms and bare forms	5	5	3	0
Target forms and infinitival forms	0	1	0	0
Target, bare, and infinitival forms	1	2	0	0
Target forms and substitutions	1	0	0	0
Only bare forms	0	4	0	0
Bare forms and substitutions	0	0	0	0
Only infinitival forms	2	0	0	0
No analyzable responses	11	1	0	0

Five out of the 25 children (20%) inflected all verbs in V2 target-like already at age 3;9. 12 out of 25 children (48%) produced only correctly inflected verb forms at age 4;3, and 22 out of 25 children (84%) mastered the finiteness marking of verbs in V2 at age 4;8. One year later at age 5;8, all eL2 learners used only target forms of lexical verbs in V2

matrix clauses. As already pointed out above, bare verb forms were the most frequently produced non-target-like verb forms. They were used simultaneously with correctly inflected verbs by five eL2 children at age 3;9 and at age 4;3, and by three children at age 4;8. Target-like verb forms, bare verb forms and infinitivals were found in one eL2 child at age 3;9 and in two children at age 4;3. Three eL2 children produced exclusively bare verb forms at age 4;3. Only infinitivals were found in two eL2 learners at age 3;9. Substitutions were produced rarely as well. One eL2 learner used them together with correctly inflected verb forms at age 3;9; one child produced substitutions and bare verb forms at age 4;3. eL2 children's individual developmental patterns are summarized in Table B.5 in Appendix.

Taking together, the analysis of the individual data suggests that the acquisition of V2 and finiteness marking is not difficult for the majority of eL2 learners of German. At age 4;8 only three out of 25 children use some non-target-like verb forms along with correctly inflected verbs in V2 matrix clauses. Interestingly, these children use bare forms rather than infinitival forms or substitutions. One year later at age 5;8, all eL2 learners produced only target-like forms of lexical verbs in V2 matrix clauses.

9.4.5. Discussion

This substudy focused on eL2 children's developmental path toward target-like acquisition of verb placement and finiteness in matrix clauses (Q3). The results extend previous findings by examining elicited production data from the standardized language test LiSe-DaZ (Schulz and Tracy, 2011) and by including a larger sample of eL2-children (n = 25) that we tested in four test rounds.

The first two hypotheses (H3.1) and (H3.2) assumed Prévost's (2003) finding that eL2 learners of German distinguish between bare and infinitival forms with respect to verb placement. The results confirm both hypotheses, and thus support the assumption that eL2 children treat finite and nonfinite verb forms differently. Infinitival verb forms, which are marked with *-en*, were not used as substitutes for finite verb forms in V2 position. Infinitival forms appeared almost exclusively in Vf position. This indicates that eL2 children have knowledge of the nonfinite properties of this verb form. In the V2 position, which requires overt finiteness marking in German, eL2 children mostly produced correctly inflected verb forms and some bare forms. Infinitival and substitution errors were rare. These results suggest that eL2 children obey the ban of nonfinite V2. The complementary distribution of infinitival and bare forms in our data is consistent with previous findings for eL2 German (Prévost, 2003), Dutch (Blom & Baayen, 2012) and

English (Haznedar, 1997; Haznedar and Schwartz, 1997). As already proposed by Prévost (2003), the results can be explained via the combination of the Truncation Hypothesis (TH) and the Missing Surface Inflection Hypothesis (MSIH). The TH is able to account for the occurrence of infinitival forms in Vf clauses. When eL2 learners do not yet have the ability to project functional categories above VP, they produce VPs with infinitival verb forms in head-final V^0 instead. The MSIH can account for the production of bare verb forms in V2 position. When eL2 children have difficulties with inflectional morphology but have acquired functional categories including C^0 as the position for the finite verb in German matrix clauses, they may use bare verb forms as default finite forms in V2.

The next goal was to investigate whether eL2 children treat lexical verbs and functional verbs differently regarding their placement and finiteness marking. The data show that eL2 children produced functional verbs exclusively in V2 position and inflected them target-like. In contrast, lexical verbs occurred not only in V2 but in Vf as well. Moreover, some non-target-like forms of lexical verbs were found as well. These results confirm hypothesis (H3.3) and are in line with the previous findings for monolingual (Clahsen, 1991; Wexler, 1994) and for eL2 children (Parodi, 1998, Prévost, 2003).

The last hypotheses focused on the individual developmental path in eL2 acquisition. The results confirm the close relationship between the acquisition of verb placement and finiteness in eL2 learners (Prévost, 2003; Rothweiler, 2006; Tracy & Thoma, 2009). With increasing age eL2 children produced more target-like inflected verb forms in V2. At the same time, they produced fewer infinitival forms in Vf. These is in line with hypotheses (H3.4) and (H3.5). Importantly, those eL2 learners who had not yet mastered finiteness and verb placement used mostly bare verb forms rather than infinitival forms in V2. Given the complementary distribution of infinitival verb forms (in Vf) and bare forms (in V2) and that Vf matrix clauses were rarely attested, we argue that at age 3;9, after about 10 months of exposure, eL2 children have already acquired the functional projections above VP. Moreover, it can be claimed that at that age, and with that amount of exposure, typically developing eL2 children do not have difficulties with the acquisition of finiteness itself but may have difficulty with its overt morphological marking.

To conclude, this substudy shows that the acquisition of verb placement and finiteness does not present a challenge for eL2 learners. This finding provides further evidence for parallels between monolingual and eL2 acquisition and thus substantiates the view that the critical period for mastering morpho-syntactic requirements (i.e. V2

movement of the verb is triggered by the need to check finiteness features) does not end before age of three.

9.5. Acquisition of subordinate clauses

This section investigates eL2 children's acquisition of subordinate clauses. The chapter is organized as follows. In Section 9.5.1 research hypotheses are formulated. Section 9.5.2 describes the participants, and Section 9.5.3 gives an overview of the data analysis. The results are presented in Section 9.5.4.1 regarding verb placement in subordinate clauses, and in Section 9.5.4.2 with respect to children's individual developmental path. Section 9.5.5 discusses the findings.

9.5.1. Research hypotheses

This substudy addresses the question on eL2 children's developmental path toward target-like production of subordinate clauses (Q3). Previous finding on eL2 acquisition of subordinate clauses indicate that eL2 learners acquire subordinate clauses in similar way to monolingual children. Importantly, it was shown that eL2 learners distinguish the different verb placement in German matrix and subordinate clauses right from the beginning, so that they almost exclusively produced target-like subordinate clauses with verb in Vf position (Rothweiler, 2006; Schulz et al., 2008; Tracy & Thoma, 2009; Thoma & Tracy, 2006; Wenzel et al., 2009). Based on these results, the following hypothesis is formulated:

(H3.1) In subordinate clauses with conjunctions different than *weil* 'because', eL2 children place the finite verb target-like in Vf position.

In this study, subordinate clauses with *weil* 'because' were analyzed separately since finite verb can be placed in Vf or V2 position in these clauses. As already mentioned above previous studies only reported *weil*-clauses with Vf. Moreover, as described in Section 9.5.4.1 below, monolingual adults placed finite verbs exclusively in Vf position in the contexts given by the task. Thus, the following hypothesis is formulating regarding *weil*-clauses:

(H3.2) In subordinate clauses with *weil* 'because', eL2 children place the finite verb in Vf position.

In addition, analyzing data from four test rounds, it is expected that after two years of exposure to German, eL2 learners improved their performance, and produce more target-like subordinate clauses. Therefore, the following hypothesis is stated:

(H3.3) eL2 children produce more target-like subordinate clauses at T4 compared to T1.

9.5.2. Participants

To investigate the acquisition of subordinate clauses the data of three groups were compared. The first group consists of the same 25 eL2 children whose data were already analyzed with respect to the acquisition of finiteness and verb placement in matrix clauses (cf. Section 9.4). The detailed description of these children is given in Section 9.4.2 above. The second group consists of 21 monolingual children (6 girls and 15 boys). Monolingual children's age ranged from 3;5 to 3;9 (M = 3;7, SD = 1.9 months) at first test round, and from 5;5 to 5;9 (M = 5;7, SD = 1.4) at fourth test round. Monolingual children's age and eL2 learners' age and their length of exposure to German are summarized in Table 9.15.

Table 9.15. Participants' description for analysis of production of subordinate clauses.

		T1	T2	T3	T4
Monolingual children	Age range	3;5 – 3;9	4;0 – 4;4	4;4 – 4;8	5;5 – 5;9
	Mean age	3;7	4;2	4;7	5;7
	SD in months	1.9	1.5	1.5	1.4
eL2 children	Age range	3;5 – 4;1	4;0 – 4;11	4;5 – 4;11	5;5 – 6;4
	Mean age	3;9	4;3	4;8	5;9
	SD in months	2.4	1.6	1.8	2.4
	Exposure to German in months	5 – 19	10 – 27	16 – 32	29 – 45
	Mean exposure	10	15	21	34
	SD in months	3.8	4.4	4.2	4.5

In addition, 20 monolingual German-speaking adults (10 female, 10 male) were tested as control group. Their mean age was 24 (age range: 19 – 31; SD=3.6 years). The reason for the inclusion of adults in the analysis of subordinate clauses was to investigate whether they produce *weil*-clauses with verb in V2 position, which as pointed out in Section 9.1.2 are very frequent in the colloquial speech, but not licensed in the contexts given in the elicitation task.

9.5.3. Data analysis

To investigate the acquisition of finiteness and verb placement in subordinate clauses only clauses with conjunctions were included in the analysis (n=931, monolingual adults n=123, monolingual children n=497, eL2 children n=311). These clauses were analyzed regarding the marking of finiteness and verb placement. With respect to the finiteness, the same coding was used as for matrix clauses (cf. Section 9.4.3). Table 9.16 provides an overview of coding of verb placement in subordinate clauses. For verb placement, verb first (V1), verb second (V2), or verb final (Vf) were distinguished.

Table 9.16. Coding of verb placement in subordinate clauses.

Verb placement	**Example**
Vf	Weil sie Nüsse hat. Because she nuts has 'Because she has nuts.'
V1	Weil hat sie Nüsse. Because has she nuts 'Because she has nuts.'
V2	Dass der Ballon geht kaputt. That the balloon get-3SG broken 'That the balloon is getting broken.'
weil-V2	Weil sie hat Nüsse. Because she has nuts 'Because she has nuts.'

Structures that were ambiguous regarding verb placement like *Weil er geht* (because he go-3SG, 'because he goes') were excluded from this analysis (n=40, monolingual adults n=5, monolingual children n=15, eL2 children n=20). In addition, the conjunction was coded. This is especially important for V2 clauses since *weil*-clauses with V2 are grammatical in some contexts in German, but with other conjunctions they are not. Furthermore, this coding allows examining whether monolingual children and eL2 learners show a preference for *weil*-clauses with a particular verb placement. Thus, it was investigated whether they prefer *weil*-Vf clauses or *weil*-V2 clauses, or whether both types of *weil*-clauses are produced equally frequently.

9.5.4. Results

In the following, the results regarding the production of subordinate clauses with conjunctions in monolingual children, eL2 children and monolingual adults are reported. In Section 9.5.4.1, verb placement in subordinate clauses is analyzed, and the distribution of different conjunctions in monolingual children and eL2 children is examined. Section 9.5.4.2 deals with individual developmental path in acquisition of subordinate clauses in monolingual and in eL2 children.

9.5.4.1. Verb placement in subordinate clauses

First the subordinate clauses produced by monolingual adults, monolingual children and eL2 children were analyzed regarding the verb placement. Table 9.17 summarizes the production of subordinate clauses in monolingual adults.

Table 9.17. Verb placement in subordinate clauses produced by monolingual adults (n=20).

	Total number of clauses	118
Verb placement	Vf (excluding *weil*)	66
	Vf (*weil*-clauses)	51
	V2 (*weil*-clauses)	1

As expected, monolingual adults placed the verb in Vf position in subordinate clauses with conjunctions different from *weil*. In almost the half of subordinate clauses *weil* 'because' was used as conjunction. In these clauses, the verb almost exclusively occurred in Vf. Only one subordinate clause with *weil* and verb in V2 position was found in their data, cf. Example (58).

(58) *weil sie hat etwas zu Essen.*
because she has something to eat
'because she has something to eat.'

Since monolingual children inflected all verbs in subordinate clauses correctly, only verb placement is taken into consideration in the following analyses. Table 9.18 presents the results for verb placement in subordinate clauses with conjunctions different than *weil* 'because' produced by monolingual children across four test rounds. Monolingual children produced almost exclusively target-like subordinate clauses with Vf across all

test rounds. Their amount increased across four test rounds from 51 clauses to 79. Only three ungrammatical subordinate clauses with verb placed in V2 and a different conjunction than *weil* were produced by two different monolingual children at age 4;3, and one by a child at age 5;9. The four not target-like clauses are given in Example (59). Note however, that in two out of these four clauses *wegen* is used as conjunction. This word is not a conjunction in German, but is used very frequently instead of *weil* 'because' in early stage of acquisition of subordinate clauses (cf. Section 9.2.2).

Table 9.18. Verb placement in clauses with conjunctions different from *weil* 'because' produced by monolingual children (n=21) across four test rounds.

		Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Verb placement	Total number of clauses		51 (100%)	65 (100%)	81 (100%)	79 (100%)
Vf			51 (100%)	62 (95%)	81 (100%)	78 (99%)
V1			0	0	0	0
V2			0	3 (5%)	0	1 (1%)

(59) Examples of subordinate clauses with V2

a. *Dass gleich <u>kommt</u> der Luftballon.* (Mon, 1013, 4;0)
That soon come-3SG the-NOM balloon
'That the balloon is coming soon.'
Target: Dass der Luftballon gleich kommt.

b. *Wenn sie <u>is</u> fertig.* (Mon, 1135, 4;1)
When she is read.
'When she is ready.'
Target: Wenn sie fertig ist.

c. *Wegen er <u>will</u> die Schnur haben.* (Mon, 1097, 4;2)
Because he want-3SG the string have-INF
'Because he wants to have the string.'
Target: Weil er die Schnur haben will.

d. *Wegen er <u>will</u> das da.* (Mon, 1001, 5;7)
Because he want-3SG this there
'Because he wants this.'
Target: Weil er das da will.

Table 9.19 presents the results for verb placement in clauses with *weil* 'because' produced by monolingual children across four test rounds.

Table 9.19. Verb placement in clauses with *weil* 'because' produced by monolingual children (n=21) across four test rounds.

		Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Verb placement	Total number of clauses		50 (100%)	51 (100%)	59 (100%)	49 (100%)
Vf			29 (58%)	25 (49%)	32 (54%)	26 (53%)
V2			21 (42%)	26 (51%)	27 (46%)	23 (47%)

The number of clauses with *weil* remained constant across four test rounds. Regarding the verb placement, in about the half of *weil*-clauses the finite verb occurred in Vf position. However, in the other *weil*-clauses, monolingual children placed the verb in V2 position. Some examples of *weil*-clauses with V2 are given in (60).

(60) Examples of *weil*-clauses with V2

a. *Weil die müssen den Hund fangen.* (Mon, 1022; 3;8)
Because they must the-ACC dog catch-INF
'Because they must catch the dog.'

b. *Weil der Baum fällt dann da um.* (Mon, 1026, 4;2)
Because the tree fall-3SG then there over.
‚Because the tree falls over then there.'

c. *Weil die wollen auch Nüsse.* (Mon, 1024, 4;1)
Because they want-3PL too nuts
‚Because they want nuts too.'

Concerning now the subordinate clauses produced by eL2 learners. Only three subordinate clauses with non-target-like inflected verb forms were produced by the eL2 children. The first one was a substitution produced by an eL2 child at age 4;2, cf. Example (61). In the two other cases an infinitival form was used instead of a correctly inflected verb form by two different eL2 learners at fourth test round, cf. Example (62).

(61) Example of a substitution in subordinate clause

Dass sie sich nicht weh tu-st. (eL2, 2028, 4;2)

That she herself not hurt-2SG

'That she doesn't hurt herself.'

Target: Dass sie sich nicht weh tu-t.

(62) Examples of infinitivals in subordinate clause

a. *Wenn du mitkomm-en*. (eL2, 2029; 5;5)

If you with come-INF

'If you come with.'

Target: Wenn du mitkomm-st.

b. *Dass man so rett-en*. (eL2, 2036, 5;8)

That one so rescue-INF

'That one rescues so.'

Target: Dass man so rette-t.

In the following analyses only subordinate clauses with target-like verb inflection are taken into consideration. Table 9.20 presents the results for verb placement in subordinate clauses with conjunctions different from *weil* 'because' produced by eL2 children across four test rounds. eL2 learners produced only three subordinate clauses at age 3;9. One of them was target-like. In the other two, the finite verb was not placed in Vf position. At age 4;3, the number of subordinate clauses increased slightly. The most of them (75%) were target-like regarding the verb placement. The number of subordinate clauses increased remarkably at age 4;8. At this age, the percentage of target-like subordinate clauses with Vf increased as well to 91%.

Table 9.20. Verb placement in subordinate clauses with conjunctions different from *weil* 'because' produced by eL2 children (n=25) across four test rounds.

		Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Verb placement	Total number of clauses		3 (100%)	12 (100%)	47 (100%)	92 (100%)
Vf			1 (33,3%)	9 (75%)	43 (91%)	82 (89%)
V1			1 (33,3%)	1 (17%)	0	0
V2			1 (33,3%)	2 (8%)	4 (9%)	10 (11%)

Generally, eL2 children did not produce subordinate clauses with finite verb that was not placed in Vf position frequently. Regarding the non-target-like subordinate clauses with conjunctions different from *weil*, clauses with V1 were very rare, and were produced only once at age 3;9 and at age 4;3, respectively (cf. Example (63)). Subordinate clauses with V2 produced with different conjunction than *weil* were produced more frequently, especially at age 5;9, cf. Example (64). However, in nine out of 10 subordinate clauses with V2 produced at age 5;9 *wegen* was used as conjunction. This preposition is often used in the monolingual and the eL2 children instead of *weil*, cf. Example (65).

(63) Examples of subordinate clauses with V1

a. *Dass darf nicht der Hund dahingehen.* (eL2, 2077, 3;8)
That allow-3SG not the-NOM dog there go
'That the dog in not allowed to go there.'
Target: Dass der Hund da nicht hingehen darf.

b. *Damit können nicht die da dran kommen.* (eL2, 2127, 4;3)
So that can-3PL not they there by come
'So that they cannot come there by.'
Target: Damit die nicht da dran kommen können.

(64) Examples of subordinate clauses with V2

a. *Dass sie mag auch dem Skateboard fahren.* (eL2, 2077, 4;3)
That she want-3SG too the-DAT Skateboard ride
'That she wants to ride the skateboard.'
Target: Dass sie auch mit dem Skateboard fahren mag.

b. *Ob sie darf holen.* (eL2, 2077, 4;3)
Whether she can-3SG get
'Whether she can get.'
Target: Ob sie darf holen.

(65) Examples of subordinate clauses with V2 and *wegen*

a. *Wegen der wollte draußen bleiben.* (eL2, 2085, 5;7)
Because he wanted outside stay
'Because he wanted to stay outside.'

b. *Wegen die hat ein Nuss mitgebracht.* (eL2, 2085, 5;7)
Because she has a nut brought.
'Because she has brought a nut.'

These results indicate that eL2 learners very early recognize the target-like position of finite verb in German subordinate clauses if they used a conjunction different from *weil* 'because'.

Consider now verb placement in clauses with *weil* 'because' produced by the eL2 learners across four test rounds. Table 9.21 summarizes the results.

Table 9.21. Verb placement in clauses with *weil* 'because' produced by eL2 children (n=25) across four test rounds.

		Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Verb placement	Total number of clauses		14 (100%)	28 (100%)	64 (100%)	50 (100%)
Vf			4 (29%)	8 (29%)	26 (41%)	24 (48%)
V1			2 (14%)	3 (10%)	4 (6%)	0
V2			8 (57%)	17(61%)	34 (53%)	26 (52%)

The number of produced clauses with *weil* increased across four test rounds. The eL2 children produced subordinate clauses with *weil* and finite verb in V2 position already at age 3;9. However, in the majority of clauses with *weil* at age 3;9 and at age 4;3, the verb was placed in V2 position. The percentage of *weil*-clauses with Vf reached 41% at age 4;8, and 48% at age 5;9. This performance is comparable to the performance of age-matched monolingual children. The *weil*-clauses with V2 accounted for about 50% at age 4;8 and at age 5;9. Some examples of *weil*-clauses with V2 are given in Example (66).

(66) Examples of *weil*-clauses with V2

a. *Weil die <u>sind</u> böse.* (eL2, 2112, 3;7)
Because they are bad
'Because they are bad.'

b. *Weil der <u>war</u> da drin.* (eL2, 2119, 4;4)
Because he was there inside
'Because he was there inside.'

c. *Weil die <u>wollen</u> auch paar Nüsse.* (eL2, 2088, 4;9)
Because they want-3PL too some nuts
'Because they want some nuts too.'

d. *Weil der ist in der Mülltonne.* (eL2, 2051, 5;4)
Because he is in the-DAT bin
'Because he is in the bin.'

Subordinate clauses with *weil* and a non-target-like verb placement in V1 were produced very rarely across four test rounds. Only two clauses of this type occurred at age 3;9, three at age 4;3, and four at age 4;8. Some examples are given in Example (67).

(67) Examples of *weil*-clauses with V1

a. *Weil ist der alleine.* (eL2, 2127; 3;8)
Because is he alone
'Because he is alone.'
Target: Weil der alleine ist.

b. *Weil hat er Angst bei dieser Dunkelheit.* (eL2, 2028, 4;7)
Because has he fear by that darkness
'Because he is afraid in that darkness.'
Target: Weil er Angst bei dieser Dunkelheit hat.

Compared to the age-matched monolingual children, the eL2 learner produced fewer subordinate clauses with conjunctions different than *weil* 'because' till age 5;9. At age 4;8, eL2 children produced about the same number of subordinate clauses as three-year-old monolingual children. As expected, monolingual and eL2 children produced almost exclusively target-like subordinate clauses with conjunctions different from *weil*, thus they placed the finite verb in Vf position.

Regarding the clauses with *weil* 'because', monolingual and eL2 children used them with verb placed in Vf or V2 position. The percentage of these two structures remained constantly in monolingual children across four test rounds and accounted for about 50%. eL2 learners preferred *weil*-clauses with V2 at age 3;9 and 4;3. The percentage of *weil*-clauses with Vf increased with age and accounted for about 50% at age 4;8 and 5;9 as in monolingual children. Note that monolingual adults almost never produced *weil*-V2 clauses in the given contexts. These results suggest that monolingual and eL2 children treat weil-clauses differently than subordinate clauses with other conjunctions.

In the following, subordinate clauses with finite verb in Vf are analyzed regarding the distribution of different conjunctions across four test rounds. Table 9.22 gives an overview of conjunctions' distribution produced by monolingual children across four test rounds. The conjunction that was used in more than one third of subordinate clauses with

Vf by monolingual children across all test rounds was *wenn* 'if'. The second frequent one was *weil* 'because' which occurred in about 30% of subordinate clauses with Vf. Note however that if taken *weil*-V2 clauses also into account this conjunction was used the most frequently. *Dass* 'that' and *ob* 'whether' were used in about 10% of clauses. Interestingly, although the number of produced subordinate clauses increased from 80 to 113, the proportion of used conjunctions remained the same in monolingual children across four test rounds.

Table 9.22. Conjunctions' distribution in subordinate clauses with Vf produced by monolingual children across four test rounds.

	Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Total number of Vf subordinate clauses		80 (100%)	87 (100%)	113 (100%)	104 (100%)
Conjunction					
weil 'because'		29 (36%)	25 (29%)	32 (28%)	26 (25%)
wenn 'if'		29 (36%)	38 (44%)	39 (34.5%)	37 (36%)
dass 'that'		8 (10%)	11 (13%)	16 (14%)	17 (16%)
ob 'whether'		8 (10%)	8 (9%)	12 (11%)	14 (13%)
damit 'so that'		1 (1.5%)	1 (1%)	1 (1%)	0
was 'what'		3 (4%)	3 (3%)	8 (7%)	6 (6%)
wann 'when'		2 (2.5%)	1 (1%)	4 (3.5%)	4 (4%)
warum 'why'		0	0	1 (1%)	0

Table 9.23 illustrates the distribution of conjunctions in subordinate clauses with Vf produced by eL2 children. Since the number of produced subordinate clauses increased with age by the eL2 children, also the number of produced conjunctions increased. In subordinate clauses produced at age 3;9 and at age 4;3, *weil* 'because' occurred the most frequently. At age 4;3 *wenn* 'if' and *dass* 'that' were used as conjunctions in 25% of clauses, respectively. More variation in the usage of different conjunction was observed at age 4;8. eL2 children used seven different conjunctions at this age. The most frequent conjunctions remained *weil* 'because', *wenn* 'if' and *dass* 'that'. In almost the half out of 106 subordinate clauses produced at age 5;9 *wenn* 'if' was used and was the most frequent conjunction like in monolingual children. Like in monolingual children, the

second frequent conjunction in subordinate clauses with Vf used by eL2 children was *weil* 'because'. Note however that also el2 children used *weil* very frequently with verb placed in V2. *Dass* 'that' was used as the third frequent conjunction at age 5;9.

Table 9.23. Conjunctions' distribution in subordinate clauses with Vf produced by eL2 children across four test rounds.

	Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
Total number of Vf subordinate clauses		5 (100%)	17 (100%)	69 (100%)	106 (100%)
Conjunction					
weil 'because'		4 (80%)	8 (47%)	26 (38%)	24 (23%)
wenn 'if'		0	4 (24%)	24 (35%)	44 (41%)
dass 'that'		1 (20%)	4 (24%)	12 (17%)	16 (15%)
ob 'whether'		0	1 (2.5%)	3 (4%)	4 (4%)
damit 'so that'		0	0	1 (1.5%)	2 (2%)
bis 'before'		0	0	0	1 (1%)
was 'what'		0	1 (2.5%)	2 (3%)	10 (9%)
wann 'when'		0	0	1 (1.5%)	3 (3%)
wo 'where'		0	0	0	2 (2%)

Taking together, the distribution of different conjunctions in eL2 children is very similar to their distribution in monolingual children. Both groups used *weil* 'because', *wenn* 'if', and *dass* 'that' the most frequently. However, one must be kept in mind that these three conjunctions were required in the contexts given in the elicitation task.

In sum, the results indicate that eL2 learners acquire the structure of German subordinate clauses very fast. The number of produced subordinate clauses increased across four test rounds. At age 4;8, eL2 children produced about the same number of subordinate clauses in total as three-year-old monolingual children. At age 5;9, eL2 learners produced similar number of subordinate clauses as age-matched monolingual children. Ungrammatical subordinate clauses with verb placed in V1 or V2 with conjunctions different from *weil* 'because' were produced very rarely by eL2 and monolingual children. Interestingly, eL2 children and monolingual children frequently

produced *weil*-V2 clauses. However, whereas the percentage of *weil*-V2 clauses in eL2 children decreased, and accounted for 52% at age 5;9, it remained constant in monolingual children and accounted for about 50% across all test rounds.

9.5.4.2. Individual developmental path towards acquisition of subordinate clauses

In this section, individual developmental paths in acquisition of subordinate clauses of monolingual children and of eL2 learners are described. Table 9.24 summarizes verb placement in subordinate clauses that monolingual children produced across four test rounds. Table B.6 in Appendix presents individual developmental path for each out of 21 monolingual children separately across four test rounds.

Table 9.24. Number of monolingual children according to verb placement in subordinate clauses across four test rounds.

	T1	**T2**	**T3**	**T4**
Age	**3;9**	**4;3**	**4;8**	**5;9**
Number of children	**21**	**21**	**21**	**18**
Only Vf	**10**	**8**	**10**	**6**
Vf, *weil*-Vf	7	7	10	6
Vf	2	1	0	0
weil-Vf	1	0	0	0
***Weil*-V2**	**2**	**0**	**0**	**0**
Different verb placement	**9**	**13**	**11**	**12**
Vf, *weil*-V2	3	7	6	4
Vf, *wegen*-V2	0	0	0	1
weil-Vf, *weil*-V2	1	0	0	0
Vf, *weil*-Vf, *weil*-V2	5	3	5	7
Vf, *weil*-V2, V2	0	1	0	0
Vf, *weil*-V2, *wegen*-V2	0	1	0	0
Vf, *weil*-Vf, *weil*-V2, V2	0	1	0	0

At age 3;9 only about the half out of 21 monolingual children (48%) produced exclusively subordinate clauses with verb placed in Vf position independent which

conjunction they used. Two monolingual children (9%) produced exclusively *weil*-V2 clauses at this age. Nine monolingual children (43%) used subordinate clauses with different verb placements at age 3;9. Three out of them placed the verb in Vf in clauses with a conjunction different from *weil*, and in the *weil*-clauses, they placed the verb in V2 position. Five children produced Vf clauses with conjunctions different than *weil*, in *weil*-clauses, the verb occurred either in Vf position or in V2 position. One child produced exclusively subordinate *weil*-clauses with verb placed in Vf and in V2.

At age 4;3, the number of monolingual children who produced exclusively Vf subordinate clauses reminded almost the same (8 out of 21, 38%). The other 13 children (62%) used subordinate clauses with different verb placements. In seven children, Vf-clauses with a conjunction different from *weil*, and *weil*-V2 clauses occurred. Three children produced Vf-clauses with different conjunctions than *weil*, *weil*-Vf clauses, and *weil*-V2 clauses. One child used Vf clauses, *weil*-V2 clauses, and ungrammatical V2-clauses. One child produced four different structures; she placed the verb in Vf or in V2 position in clauses with *weil* and in clauses with a conjunction different from *weil*.

Six months later at age 4;8, 10 out of 21 monolingual children (48%) produced exclusively subordinate clauses with Vf. The other 11 children (52%) used structures with different verb placements. Six out of them produced Vf subordinate clauses with a conjunction different from *weil*, and *weil*-V2 clauses. Five children used Vf subordinate clauses with conjunctions different from *weil*. In their *weil*-clauses, the verb occurred either in Vf or in V2 position.

At age 5;9 only six out of 18 monolingual children (33%) produced exclusively subordinate clauses with Vf. Eleven children (77%) used subordinate clauses with different verb placements. In five out of these 11 children Vf clauses with a conjunction different from *weil* were found. Regarding their *weil*-clauses, the verb was placed either in Vf or in V2 position. Note that one out of these four children used *wegen* instead of *weil*. Seven children produced Vf subordinate clauses with conjunctions different from *weil*. In clauses with *weil*, they placed the verb either in Vf or in V2 position.

Taking together, only about the half of monolingual children produced exclusively subordinate clauses with Vf till the age of 5;9. The other half of monolingual children used subordinate clauses with different verb placements at the same time across four test rounds. Most of them placed the verb in sentence final position if the conjunction

used was not *weil*. If *weil* occurred as conjunction, the verb was placed in V2 position very frequently.

The individual analysis of eL2 children regarding the verb placement in subordinate clauses across four test rounds is summarized in Table 9.25. Table B.7 in Appendix presents individual developmental path for each out of 25 eL2 learners separately across four test rounds. At age 3;9, 18 out of 25 eL2 learners (72%) did not produce any subordinate clauses. Subordinate clauses with Vf occurred in only one eL2 child (4%). Three eL2 learners (12%) produced only *weil*-V2 clauses. Three eL2 children produced subordinate clauses with Vf, but at the same time they used *weil*-V2 clauses, and ungrammatical subordinate clauses with verb placed in V2 with conjunctions different from *weil*.

The number of eL2 children who did not produce any subordinate clauses decreased at age 4;3 to 11 (44%). Only two out of 25 eL2 learners (8%) used exclusively Vf subordinate clauses at this age. One out of these children used subordinate clauses with *dass* 'that' and verb placed in Vf; the other one produced *weil*-Vf clauses. One eL2 child (4%) placed the verb in V1 position in subordinate clauses. Five eL2 children (20%) produced exclusively *weil*-clauses with V2. In six eL2 children (24%) subordinate clauses with different verb placements occurred at the same time. One out of these children produced subordinate clauses with Vf with conjunctions different from *weil*, and *weil*-V2 clauses. The other five children used subordinate clauses with Vf, subordinate clauses with V2 and a conjunction different from *weil* and *weil*-V2 clauses.

At age 4;8 all eL2 learners produced subordinate clauses. The number of eL2 children who exclusively used subordinate clauses with Vf remained very low (6 out of 25 (24%)). Three eL2 children (12%) produced ungrammatical subordinate clauses and placed the verb in V1 or V2. Three eL2 children (12%) used exclusively *weil*-V2 clauses. 13 out of 25 eL2 children (52%) used structures with different verb placements at the same time. In four out of these children subordinate clauses with Vf and *weil*-V2 clauses occurred. Five children used Vf-clauses with *weil* and other conjunctions, but also *weil*-V2 clauses. Two children produced only subordinate clauses with *weil* and placed the verb in Vf or V2 Structures with V2 and a conjunction different from *weil* were found in only two eL2 learners.

Table 9.25. Number of eL2 children according to verb placement in subordinate clauses across four test rounds.

	T1	T2	T3	T4
Age	**3;9**	**4;3**	**4;8**	**5;9**
Number of eL2 children	**25**	**25**	**25**	**25**
No subordinate clauses	18	11	0	0
Only Vf	**1**	**2**	**6**	**6**
Vf, *weil*-Vf	0	0	5	5
Vf	1	1	1	1
weil-Vf	0	1	0	0
Only non-target-like verb placement	**0**	**1**	**3**	**0**
V1	0	1	1	0
V2	0	0	2	0
***weil*-V2**	**3**	**5**	**3**	**0**
Different verb placements	**3**	**6**	**13**	**19**
Vf, *weil*-V2	0	1	4	6
Vf, *weil*-V2, V2	0	1	1	0
Vf, *weil*-Vf, *weil*-V2, V2	0	1	1	0
Vf, V2	0	0	0	1
weil-Vf, *weil*-V2	1	1	2	0
Vf, *weil*-Vf, *weil*-V2	0	1	5	8
Vf, *wegen*-V2	0	0	0	3
Vf, *weil*-Vf, *wegen*-V2	0	0	0	1
Vf, V2	0	1	0	0
weil-V2, V1	1	0	0	0
weil-V2, V2, V1	1	0	0	0

At age 5;9, only six out of 25 eL2 children (24%) exclusively used subordinate clauses with Vf. In 19 out of 25 eL2 children (76%) subordinate clauses with different verb placements were found at the same time. There were six eL2 children who used Vf

subordinate clauses with conjunctions different from *weil* and *weil*-V2 clauses. Eight eL2 learners produced subordinate clauses with conjunctions different than *weil* correctly. However, looking at their clauses with *weil* they placed the verb in Vf or in V2 position. There were four eL2 children who used *wegen* instead of *weil*; in these clauses the verb was also placed in V2. In other subordinate clauses, they placed the verb correctly in Vf position. At age 5;9, only one eL2 child (4%) produced Vf subordinate clauses and V2-clauses with conjunctions different from *weil* at the same time.

Comparing the developmental path of eL2 learners with monolingual children, it can be assumed that whereas the half out of 21 monolingual children produced exclusively Vf subordinate clauses at age 5;9, only six out of 25 eL2 children used them at this age. However, analyzing the different subordinate clauses separately many similarities between eL2 learners and monolingual children were found. Looking at only subordinate clauses with conjunctions different from *weil*, eL2 children as well as monolingual children used them almost exclusively with target-like verb placement from the time when the first subordinate clauses emerged. Subordinate clauses with ungrammatical verb placement (V1 or V2) were found very rarely in eL2 children. With respect to the production of subordinate clauses with *weil*, eL2 children and monolingual children showed a lot of variation. In both groups, there were children who used exclusively *weil*-clauses with Vf. However, eL2 children and monolingual children very often produced *weil*-clauses with the verb placed in V2 position, which almost never occurred in the adult control group. Moreover, in many eL2 learners and monolingual children *weil*-Vf and *weil*-V2 clauses were found at the same test round even at age 5;9. Some children produced *weil*-clauses with Vf first, and switched to *weil*-V2 clauses in later test rounds. These results indicate that acquisition of *weil*-clauses differs from acquisition of subordinate clauses with conjunctions different than *weil* in eL2 learners and in monolingual children.

9.5.5. Discussion

This substudy investigated eL2 children's developmental path toward target-like production of subordinate clauses (Q3). The data were gathered by using elicited production task from LiSe-DaZ (Schulz & Tracy, 2011). eL2 learners' developmental patterns were compared to the development of monolingual children, and to monolingual adults' performance on the task. The results extend the previous findings by analyzing subordinate clauses with *weil* 'because' and with conjunction different from *weil* 'because' separately, and by including a larger sample of monolingual (n=21) and eL2 children (n=25) who were tested in four test rounds.

With respect to verb placement in subordinate clauses with conjunctions different from *weil* 'because', the results show that eL2 learners placed the finite verb target-like in Vf position from the first occurrence of subordinate clauses. Ungrammatical clauses with verb placed in V2 were found very rarely. This confirms hypothesis (H3.1). These results indicate that eL2 children have knowledge of asymmetric verb placement in matrix and subordinate clauses in German from early on. In addition, the findings suggest that eL2 children acquire German sentence structure similarly to monolingual German-speaking children. The results are in line with previous findings from studies on eL2 acquisition of subordinate clauses (Clahsen, 1982; Fritzenschaft et al., 1990; Gawlitzek-Maiwald et al., 1992; Rothweiler, 1993; Tracy, 1991).

Regarding the production of subordinate clauses with *weil* 'because', the results indicate that eL2 children treat these clauses differently than subordinate clauses with other conjunctions. When the first clauses with *weil* 'because' occurred, eL2 learners placed the finite verb overwhelmingly in V2 position. Note, that finite verbs in V2 were almost not found in subordinate clauses with conjunction different from *weil* 'because'. Across four test rounds, the percentage of *weil*-clauses with Vf increased, and reached about 50% at age 5;9. Thus, these results reject the hypothesis (H3.2). These findings indicate that eL2 children acquire two different complementary structures for *weil*-clauses: a paratactic one and a subordinate one. Assuming these two structures, the occurrence of finite verbs in V2 and in Vf can be explained, since in the paratactic structure the finite verb is placed in V2 position, and in the subordinate structure it is placed in Vf position. Interestingly, several eL2 learners produced the *weil*-clauses with a paratactic structure before they start to use subordinate clauses with conjunctions different from *weil* 'because'. Some eL2 children used paratactic and subordinate structures simultaneously. Moreover, there were some eL2 learners who produced *weil*-clauses exclusively with finite verb in V2 position and subordinate clauses with other conjunctions with finite verb in Vf position. Thus, they placed the verb in V2 or in Vf dependent on the conjunction that they used. Note, that monolingual children also produced *weil*-clauses with finite verb in V2 frequently. In contrast, monolingual German-speaking adults did not produce *weil*-V2 clauses in the given contexts. However, as already mentioned in Section 9.1.2, *weil*-clauses with finite verb placed in V2 are very often in German colloquial speech. Thus, children acquiring German as L1 or eL2 are exposed to these clauses very frequently. This indicates that a high frequency of *weil*-clauses with V2 in input affects their acquisition. Importantly, as already mentioned eL2 children did not transfer V2 verb placement to other subordinate clauses.

In addition, analyzing data from four test rounds, the results show that after two years of exposure to German, eL2 learners improved their performance, and produced subordinate clauses more frequently. This confirms hypothesis (H3.3). Moreover, the amount of produced subordinate clauses by eL2 learners at age 5;9 is like those of monolingual children at this age. These findings are in line with previous results on acquisition of subordinate clauses in German (Rothweiler, 2006; Schulz et al., 2008; Tracy & Thoma, 2009; Thoma & Tracy, 2006; Wenzel et al., 2009).

Taking together, this substudy shows that eL2 learners acquire the structure of German subordinate clauses very fast and show similar developmental patterns to monolingual children. Moreover, the results indicate that it is important to distinguish between clauses with *weil* 'because' and clauses with other conjunctions. Since this is the first study that analyzed clauses with *weil* 'because' separately, more studies are needed to investigate how frequent *weil*-clauses with V2 are in eL2 acquisition. In addition, since all monolingual children tested in this study already used *weil*-clauses with Vf at age 3;8, it remains open how frequent younger monolingual children use *weil*-clauses with V2.

10. General discussion

This thesis aimed to characterize the acquisition pace and the typical developmental path in eL2 acquisition of selected phenomena of German morphosyntax and semantics and compare them to monolingual acquisition. In addition, the influence of 'Age of Onset' and of external factors on eL2 acquisition was examined. Based on this goal, three main research questions were arised:

(Q1) Pace of acquisition
How fast do eL2 children reach the typical milestones in the acquisition of German compared to monolingual children?

(Q2) 'Age of Onset' and external factors
How do 'Age of Onset' and selected external factors affect eL2 children's language performance compared to monolingual children?

(Q3) Individual developmental path
Which developmental paths and error patterns are characteristic for eL2 children compared to monolingual children?

To investigate these questions, language data of 29 eL2 learners of German and 45 monolingual German-speaking children were analyzed. At the first test round, the eL2 children were 3;7 years old and had ten months of exposure to German. The monolingual children were age-matched, and thus 3;7 years old at the first test round as well. The eL2 learners were tested in six test rounds across three years and were 6;9 at the last test round. The monolingual children were tested in five test rounds across two years, and were 5;7 at their last test round. To examine children's language abilities the standardized test LiSe-DaZ (Schulz & Tracy, 2011) was used, which assesses morpho-syntactic, semantic, and to some degree pragmatic and lexical abilities in comprehension and production. In addition, children's non-verbal intelligence was assessed via the non-verbal scales of the K-ABC (Kaufman et al., 2009). Children's language biography and parents' educational background were collected in telephone interview with parents. This longitudinal design allows to claim about acquisition pace in eL2 children compared to monolingual children, and to investigate developmental paths and error patterns in eL2 acquisition compared to monolingual acquisition. Moreover, by adding 'Age of Onset' and the external factors into the analysis, it is possible to make predictions whether these factors affect children's language acquisition.

To date, the most studies on eL2 acquisition focused on language production. Based on mostly longitudinal spontaneous speech data of only small number of children, they investigated acquisition of sentence structure, subject-verb-agreement, and case marking. Their results indicate that eL2 learners acquire sentence structure and subject-verb-agreement faster than monolingual children (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006), whereas the acquisition of case marking causes them more difficulties (Marouani, 2006; Lemke, 2009; Lemmer, 2018; Schönenberger et al. 2012; Schönenberger, Sterner & Rothweiler, 2013). Moreover, similar developmental paths to those of monolingual children are claimed (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006). Only several studies examined comprehension abilities in eL2 learners, however overwhelmingly in cross-sectional design. The findings from comprehension studies on telic and atelic verbs, and on wh-questions indicate that eL2 children acquire their target-like interpretation faster than monolingual children (Schulze, 2012; Schulz 2013; Schulz & Ose, 2007). The same acquisition stages towards target-like interpretation like in monolingual acquisition are assumed as well. This was reported for comprehension of wh-questions (Schulz, 2013). Taking together, to date, no study exists, that examines comprehension and production abilities in a large group of eL2 learners of German in a longitudinal design.

Thus, the present study closed this research gap, and extended the previous results by investigating pace of acquisition, impact of factors, and individual developmental paths in a longitudinal design with large groups of participants. Moreover, this study focused not only on one language structure, but examined acquisition of different, rule-based phenomena of German in comprehension and in production. These three issues are still part of debate in eL2 acquisition research and were not examined in a large design yet. Thus, the key strength of this study is that it allows more overarching assumption about eL2 acquisition.

In previous sections, the results for each language structure were discussed separately regarding pace of acquisition, impact of factors, and individual developmental path. The goal of this chapter is to connect the findings about each phenomenon, and to discuss them in a more overarching way with respect the three research questions formulated in Section 3.1 and repeated at the beginning of this section. Thus, this chapter is organized as follows. Section 10.1 discusses acquisition pace in eL2 learners. Section 10.2 deals with the impact of factors on eL2 acquisition, and Section 10.3 focuses on individual developmental paths. Finally, Section 10.4 summarizes the main findings and gives a short outlook.

10.1. Acquisition pace

The first research question of this study concerned pace of acquisition in eL2 learners:

(Q1) Pace of acquisition

How fast do eL2 children reach the typical milestones in the acquisition of German compared to monolingual children?

Acquisition pace was investigated for the following phenomena: comprehension of telicity, comprehension of wh-questions, comprehension of negation, production of case marking, and production of word classes. Figure 10.1 summarizes the development over time of comprehension abilities for monolingual children, and Figure 10.2 of their production abilities, whereas in Figure 10.3 the development over time of comprehension abilities for eL2 learners is depicted, and in Figure 10.4 of their production abilities.

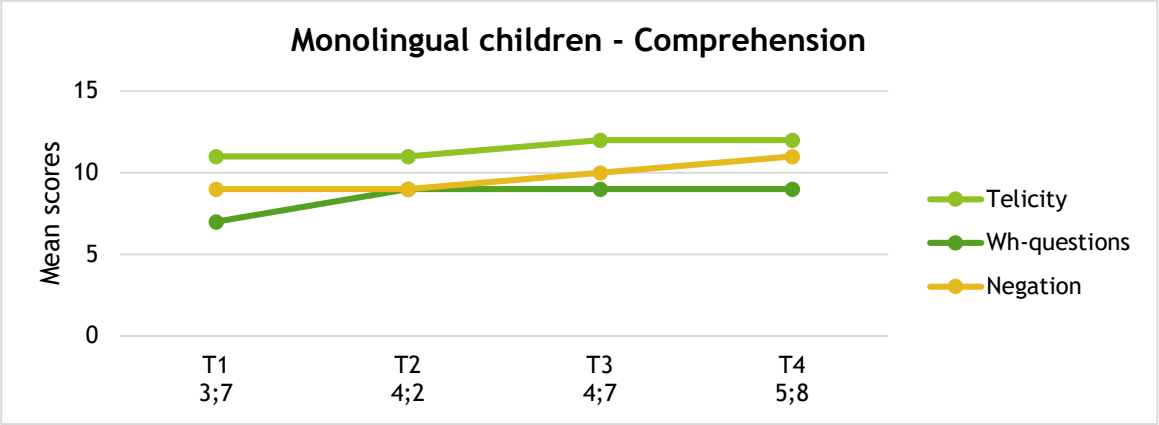


Figure 10.1. Development over time of comprehension abilities for monolingual children.

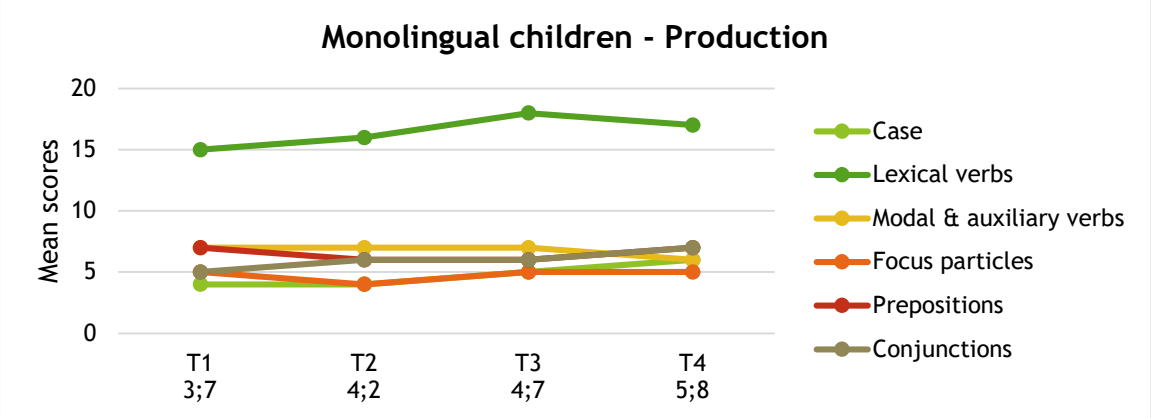


Figure 10.2. Development over time of production abilities for monolingual children.

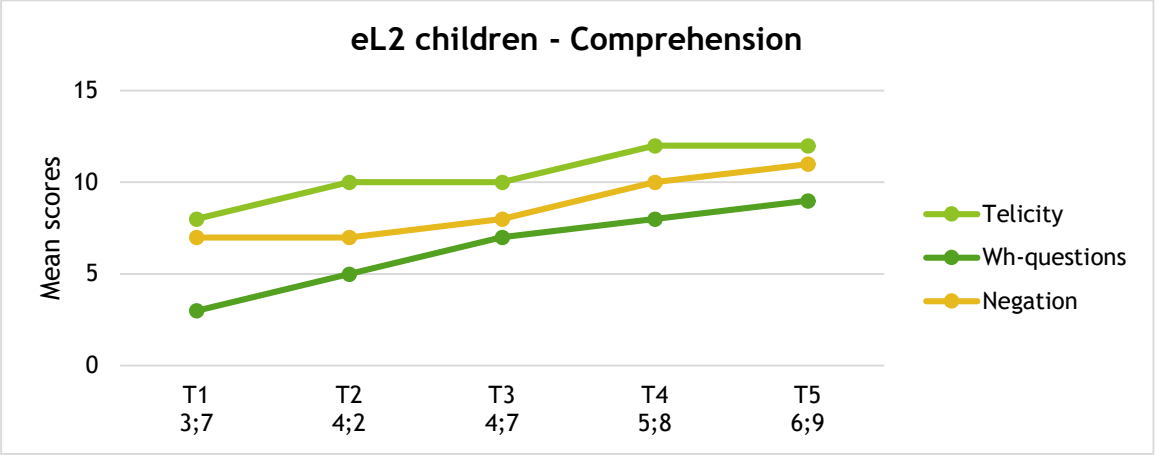


Figure 10.3. Development over time of comprehension abilities for eL2 children.

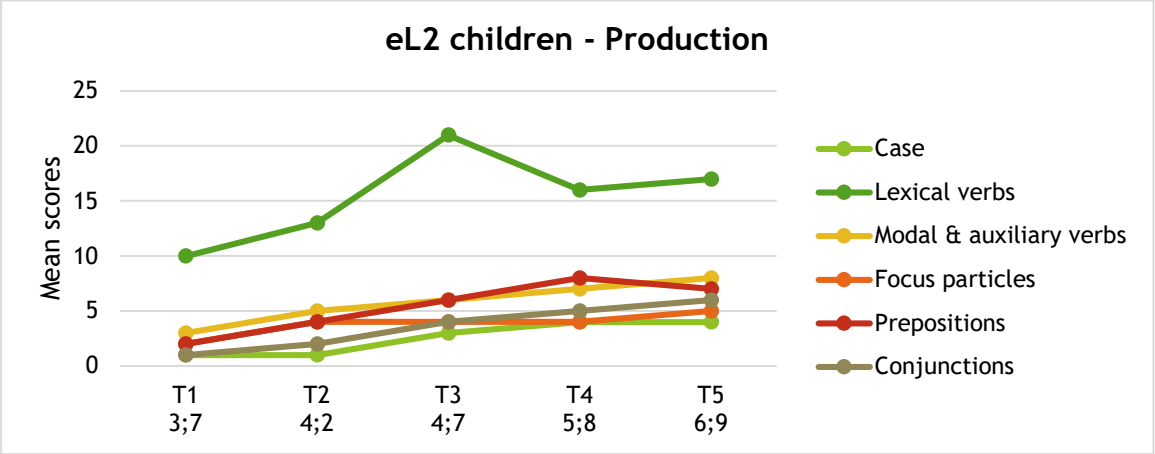


Figure 10.4. Development over time of production abilities for eL2 children.

From these overviews three assumptions follow. Firstly, the performance of monolingual children at the age of three differs from of eL2 learners at the age of three for some phenomena. Secondly, there are differences between the development over time of monolingual children and of eL2 children. Finally, the development over time of monolingual and of eL2 children depends on phenomenon.

Two hypotheses regarding the question (Q1) were formulated in Section 3.1:

(H1.1) eL2 children perform significantly worse than monolingual children at the first test round at age three.

(H1.2) eL2 children show a significantly greater rate of change than monolingual children.

Regarding first hypothesis (H1.1), eL2 children's performance at age three differed significantly from those of monolingual children in the following scales: comprehension of telicity, comprehension of wh-questions, comprehension of negation, production of

case marking, production of focus particles, production of prepositions, and production of conjunctions. No differences to monolingual children were found for production of lexical verbs, and production of modal and auxiliary verbs. Thus, eL2 children performed worse than monolingual children in most phenomena taken into consideration, what confirms hypothesis (H1.1) partially. The differences in performance between monolingual and eL2 children were expected due to less exposure to German of eL2 learners. At the first test round eL2 children had on average only ten months of exposure to German, and this amount of time is not sufficient to show similar performance to those of three-year-old monolingual children even if rule-based structures are taken into consideration. No differences between monolingual and eL2 learners were found only for production of lexical verbs, and of modal and auxiliary verbs. The possible explanation for these results may be the fact that tokens and not types were counted. It is obvious that the lexicon of three-year-old eL2 learners is not as differentiated as of monolingual children at this age. Consequently, it can be expected that eL2 children use fewer different lexical, modal, and auxiliary verbs compared to three-year-old monolingual children.

Concerning the hypothesis (H1.2), eL2 learners showed a significantly greater rate of change, thus faster acquisition pace, than monolingual children in the following scales: comprehension of telicity, comprehension of wh-questions, production of prepositions, and production of conjunctions. No differences regarding acquisition pace between eL2 children and monolingual children were found for comprehension of negation, production of case marking, and production of focus particles[4]. Thus, hypothesis (H1.2) can be partially confirmed. The findings on faster acquisition pace of selected phenomena are in line with several studies that reported that eL2 children develop faster than monolingual children (Rothweiler, 2006; Schulz, 2013; Schulze, 2012; Thoma & Tracy, 2006; Tracy & Thoma, 2009). However, this is the first study that also found no differences in acquisition pace of eL2 and monolingual children for some phenomena.

In the following, these results are discussed with respect to Tsimpli's account (2014), which was presented in Section 2.1. Tsimpli (2014) argues that time and process of acquisition depend on linguistic properties of a structure under consideration. According to this account, core syntax phenomena are acquired early around age of three in monolingual children. In contrast, phenomena with increased semantic complexity and /

[4] Note that rate of change cound not be computed for production of lexical verbs, and production of modal and auxiliary verbs, since no effects of acquisition type were found for the first test round.

or discourse properties are acquired around age of five or even later in monolingual children. Moreover, Tsimpli suggests that the time of acquisition in simultaneous bilinguals and in eL2 learners can be derived from the acquisition time in monolingual children. Thus, concerning the eL2 acquisition, it is to expect that eL2 learners show a fast pace of acquisition for the early phenomena, whereas for the acquisition of late phenomena, they need more time.

Among the phenomena, which were investigated regarding their pace of acquisition in this study, some are acquired early and some late in monolingual children (see Table 1 and Table 2 in Section 2.2 for the classification in early and late acquired phenomena).

The comparison of the findings on pace of acquisition with the classification in early and late phenomena reveals that the expectations from Tsimpli's account (2014) are only partially fulfilled. As expected, fast acquisition pace was found for comprehension of telicity. Particularly the eL2 learners improved their target-like interpretation within one year between ages 3;7 and 4;7 and performed at ceiling at age five like monolingual children. This indicates that eL2 learners have early knowledge on some core sematic concepts and are able to derive telic or atelic interpretation after short exposure to German if telicity is inherently part of the verb meaning.

Surprisingly, the other phenomena, in which eL2 learners also showed fast acquisition pace, belong to structures, which are acquired late in monolingual children. There are several possible explanations of these results, partly depending on the phenomenon under consideration. With respect to comprehension of wh-questions, already previous studies had shown that eL2 learners very fast catch up to their monolingual peers (Schulz et al. 2008; Schulz, 2013) although monolinguals mastered interpretation of wh-questions at age five, thus late according to Tsimpli (2014). However, it is important to keep in mind that different types of wh-questions are distinguished: subject, object, and adjunct (cf. Section 5.1). Subject wh-questions are target-like interpreted already at age thee, and object wh-questions at age four by monolingual children. Only adjunct wh-questions, monolinguals correctly comprehend late, around age five (Penner, 1999; Schulz, 2013; Siegmüller et al. 2005). Considering this, it is not so surprisingly anymore, that eL2 learners show a very fast acquisition pace of interpretation of wh-questions. The steepest development toward target-like interpretation was noticed between ages 3;7 and 4;7, when the amount of correct responses particularly on subject and object wh-questions increased of around 40%. Note that a high improvement at these ages was also found for comprehension of telicity. At age 4;7 target-like interpretation of subject wh-questions was mastered, and at age 5;8 interpretation of object wh-questions. As expected, at age

six, the comprehension of adjunct wh-questions was not completely acquired. These results suggest that eL2 children apply their language learning mechanism very efficient, since they perform as only one year older monolingual children, although they have a significantly shorter exposure to German. More importantly, the syntactic structure of wh-questions in eL2 children's L1, which differs from the German structure, does not affect their acquisition of German. In addition, the findings reveal that it is not always sufficient to examine a language phenomenon as a whole to classify it as acquired early or late. More importantly, it is required to consider its syntactic structure, which allows classifying a phenomenon in some subtypes, since pace of acquisition varies depending on these properties. As was shown for wh-questions, less complex structures (subject wh-questions) are acquired earlier and faster than more complex (adjunct wh-questions). Taking together, the complexity of linguistic structure in different types of wh-questions can explain why eL2 learners show a fast pace of acquisition for a phenomenon, that is assumed to be acquired late in monolingual children.

However, fast acquisition pace of production of prepositions and of production of conjunctions can only partially be explained with their structure complexity. Monolingual children produced their first prepositions and conjunctions already around the age of three, however, their amount increased slightly with age, and reached a constant level around the age of five (Kauschke, 2000; Schulz & Tracy, 2011). This is the reason for counting these two word classes to late phenomena in monolingual acquisition. In contrast to these findings, the analyses conducted in this study revealed that monolingual children produced a very constant number of prepositions and of conjunctions across the four test rounds. Therefore, no development between the age of three and five was observed any more. This suggests that prepositions and conjunctions as word classes are already acquired around the age of three, thus quite early. Regarding the performance of eL2 learners, the number of produced prepositions increased very fast particularly between ages 3;7 and 4;7 from two to six. Thus, already at age four, eL2 learners performed parallel to their monolingual peers. In contrast, the production of conjunctions developed slower in comparison to production of prepositions. The largest improvement was again observed between ages 3;7 and 4;7. However, similar performance to monolingual children was attested at age 6;9. At this age, eL2 learners produced on average six conjunctions. Note that monolingual children reached this amount already at age 4;2. Taking together, fast acquisition pace was found for both word classes although similar performance to monolingual children was attested at different ages in eL2 learners. These findings provide the evidence that L1 of eL2 children does not influence the acquisition

of word classes since eL2 learners acquire them very fast and independent on whether a particular word class exists in their L1 or not. Moreover, prepositions as word class seem to be easier to acquire than conjunctions. However, it is important to note that in this study, only their occurrence was investigated, and not whether a preposition was correctly used semantically, and whether the structure of preposition phrase was target-like. Thus, the early occurrence of prepositions indicates that eL2 learners perceive the core function of this word class between ages three and four. This resulted very often in overgeneralization of one preposition on all contexts. With increasing age, different prepositions, their meaning, and the target-like structure of German preposition phrase are acquired. According to previous studies, this process is not completed till the age of six (Lemmer, 2018; Turgay, 2011). Regarding the production of conjunctions, their acquisition pace depends on how fast a child acquires German sentence structure. Whereas the structure of matrix clauses develops very fast in eL2 learners, the emergence of subordinate clauses needs mostly more time. Moreover, eL2 children show more individual variation in their acquisition pace (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy, 2006). This was also shown in this study (cf. Section 9.5). Consequently, acquisition pace of conjunctions reflects this pattern. Some eL2 children produced occasionally conjunctions already at age three or four. However, the highest amount of conjunctions occurred later at age five and six. In summary, fast acquisition pace of prepositions and of conjunctions in eL2 learners can be found if the amount of tokens and not types is analyzed, and if their target-like meaning, and the correctness of the whole structure, in which they occur, are not taken under consideration.

No differences in acquisition pace between monolingual and eL2 children were found for three scales: comprehension of negation, production of case marking, and production of focus particles. Comprehension of negation and production of case marking are assumed to be acquired late in monolingual children. Target-like comprehension of negation requires not only mastery of syntax of negation, but also its semantics, and integration of discourse information. The results of this study show that this task causes difficulties for monolingual children until age of six, and for some eL2 learners even longer. These findings are in line with the predictions from Tsimpli (2014). Similar acquisition pace of monolingual and eL2 learners was also found for production of case marking. Case assignment is a pure syntactic phenomenon. However, depending on which case has to be assigned and in which construction, its syntactic complexity increases (cf. Section 7.1). This leads to that case marking is completely acquired late in monolingual children, and thus as expected in eL2 learners as well. However, the most important limitation of this study lies in the fact that different case assignment types (structural vs.

non-structural) were not taken into consideration. Thus, it can be expected that a more detailed analysis would reveal differences in acquisition pace depending on which way the case is assigned. That a more differentiated investigation of acquisition of case marking is necessary was already shown by Lemmer (2018).

Unexpected, similar acquisition pace of monolingual and eL2 children was found for production of focus particles. This word class occurs very early in monolingual children. A closer look at the data explains this result. At age 3;7 monolingual children produced on average five focus particles, and eL2 learners only two. However, only six months later, at age 4;2, eL2 children performed exactly like their monolingual peers using on average four focus particles. This indicates that the conducted statistical analysis was not sensitive enough for this. More importantly, these results demonstrate that focus particles are acquired very fast and very early in eL2 learners.

Taking together, this study extends the previous findings on pace of acquisition in eL2 learners. It could be shown that for several phenomena (comprehension of telicity, comprehension of wh-questions, production of prepositions, and production of conjunctions) eL2 learners show a faster acquisition pace than monolingual children. For these phenomena the greatest development was observed between ages 3;7 and 4;7, what indicates that eL2 children used their language learning mechanism very efficient, and acquired a lot of core, rule-based structures only after a relative short exposure to German. Interestingly, also phenomena were identified (comprehension of negation, production of case marking), for which acquisition pace of eL2 children did not differ from that of monolingual children. These phenomena however belong to those, which are acquired around age of five of later in monolingual children. In addition, the results on pace of acquisition show that eL2 learners do not stagnate in their language development, and catch up their monolingual peers in all phenomena, which was taken into consideration, by the age of six.

10.2. Impact of factors on eL2 acquisition

The second research question focused on the impact of factors on eL2 acquisition:

(Q2) 'Age of Onset' and external factors

How do 'Age of Onset' and selected external factors affect eL2 children's language performance compared to monolingual children?

Whether 'Age of Onset' and external factors have impact on eL2 acquisition, was investigated for the following phenomena: comprehension of telicity, comprehension of wh-questions, comprehension of negation, production of case marking, and production of word classes. The 'Age of Onset' to German was very homogenous in the eL2 group and accounted for 2;9 (range: 2;0 – 3;4), and thus as expected the statistical analysis revealed no effects of this factor for any scale. As external factors gender, mother's educational background, father's educational background, and the non-verbal intelligence were analyzed. Two hypotheses with respect to question (Q2) were formulated in Section 3.1:

(H2.1) External factors do not affect the eL2 and the monolingual children's performance at the first test round.

(H2.2) External factors do not affect the rate of change of monolingual and of eL2 children.

The results from the present study confirm hypothesis (H2.1) with one exception. Gender, mother's educational background, father's educational background, and the non-verbal intelligence do not influence eL2 children's performance at the age of 3;7 in the following scales: comprehension of telicity, comprehension of wh-questions, production of case marking, and production of word classes. Only for comprehension of negation was shown that non-verbal IQ affects eL2 learners' performance at age 3;7.

Regarding the following factors: gender, mother's educational background and father's educational background, the findings from the present study support previous results (Schulz & Tracy, 2011; Schulze, 2012). However, with respect to non-verbal IQ, the results only partially match those reported in the previous studies since they had found some effects not only for comprehension of negation. These inconsistent results may be because Schulz & Tracy (2011) used a different statistical method. Schulze (2012) conducted a multilevel analysis as well, however, her sample was smaller. Moreover, it also seems possible that the effects of children's non-verbal IQ on their language

performance are due to the tasks measuring the IQ. As was already mentioned in Section 2.3, these tasks are solved non-verbally, however, particular language skills are required to comprehend their instructions. In line with Schulz & Tracy (2011), the view is adopted that the majority of three-year-old eL2 learners do not yet acquire these comprehension skills because of too short exposure to German.

The hypothesis (H2.2) was only investigated for comprehension of negation since only for this scale an effect for children's performance at first test round was found. The analysis revealed that non-verbal IQ does not affect eL2 learner's development over time, what confirms hypothesis (H2.2). More importantly, this result supports the assumption that the effect found at age three is caused by insufficient comprehension skills.

In general, the findings regarding the second research question (Q2) indicate that acquisition of core, rule-based phenomena is not sensitive to external factors if the first exposure to L2 takes place around the age of three.

10.3. Individual developmental paths

The last research question concerned individual developmental paths in eL2 acquisition:

(Q3) Individual developmental path

Which developmental paths and error patterns are characteristic for eL2 children compared to monolingual children?

This issue was investigated for the following phenomena: comprehension of telicity, comprehension of negation, production of matrix clauses, and production of subordinate clauses. Two hypotheses with respect to question (Q3) were formulated in Section 3.1:

(H3.1) eL2 children pass through the same developmental stages as monolingual children.

(H3.2) Error patterns found in eL2 children are similar to error patterns of monolingual children.

Regarding the hypothesis (H3.1), this study showed that eL2 learners pass through the same developmental stages as monolingual children towards acquisition of target-like comprehension of telicity and of negation. These results confirm the hypothesis (H3.1) for comprehension. Thus, these findings provide a further support for similar developmental paths of eL2 and monolingual children towards target-like comprehension,

and extend the previous research, since to date only Schulz (2013) reported the same acquisition sequences in eL2 learners for comprehension of wh-questions. As was pointed out in Section 10.1, eL2 learners showed faster acquisition pace than monolingual children for comprehension of telicity, but not for comprehension of negation. Importantly, the results with respect to acquisition stages indicate that differences in acquisition pace of eL2 learners do not cause differences in developmental paths. Thus, regardless of how fast eL2 children acquire a phenomenon, they go through the same developmental stages as monolingual children.

Concerning the acquisition of sentence structure, the results show that generally, eL2 learners go through the same developmental stages as monolingual children do. They first produced clauses with infinite verbs in Vf position, then matrix clauses with verbs in V2, and finally subordinate clauses with verbs in Vf position. These findings confirm the hypothesis (H3.1), and are in line the previous results from studies on acquisition of sentence structure (Chilla, 2008; Rothweiler, 2006; Schulz et al., 2008; Tracy & Thoma, 2009; Thoma & Tracy 2006; Wenzel et al., 2009). However, regarding the production of subordinate clauses, in some eL2 learners, *weil*-clauses with V2 occurred before they used subordinate clauses with verbs in Vf. Whether this pattern also occurred in monolingual children remains unclear since the monolingual children tested in the present study were already too advanced with respect to the acquisition of subordinate clauses, and to date no study exists which investigates this issue.

With respect to error patterns (H3.2), only the results for production of matrix and subordinate clauses are discussed. The findings on verb placement and finiteness in matrix clauses show that eL2 learners used the non-target-like verb forms in V2 very rarely. Interestingly, bare forms and not substitutions or infinitival forms were the most frequent error type. Incorrect finiteness marking in V2 was found very rarely also in monolingual children (Clahsen, 1982; Tracy, 1991; Clahsen & Penke, 1992; Meisel, 1992; Poeppel & Wexler, 1993). Moreover, the results indicate that monolingual children mostly use bare verb forms instead of target-like inflected forms; infinitival and substitutions with incorrect suffixes occur rarely. Regarding verb placement in subordinate clauses with conjunctions different from *weil* 'because' the results show that eL2 learners generally placed the finite verb target-like in Vf position from the first occurrence of subordinate clauses. Ungrammatical clauses with verb placed in V2 were found very rarely. Subordinate clauses with verb placed in V2 position were also occurred in monolingual children (Fritzenschaft et al., 1990; Gawlitzek-Maiwald et al., 1992; Rothweiler, 1993).

Thus, taking together the results on error patterns in production of matrix and subordinate clauses confirm hypothesis (H3.2).

In sum, the findings on individual developmental paths (Q3) indicate that eL2 learners of German pass through the same developmental stages toward target-like comprehension or production of phenomena considering in this study. Similar error patterns for eL2 and monolingual children were found as well.

10.4. Conclusion & Outlook

The goal of this thesis was to characterize the acquisition pace and the typical developmental path in eL2 acquisition of selected phenomena of German morphosyntax and semantics and compare them to monolingual acquisition. Three main points can be concluded with respect to the main research questions:

(Q1) Pace of acquisition

eL2 children showed a faster acquisition pace than monolingual children only for selected phenomena. Overwhelmingly faster development was found for structures that are acquired early in monolingual children. The greatest development was mostly observed between ages 3;7 and 4;7. eL2 learners need more time for phenomena that are acquired late in monolingual children.

(Q2) 'Age of Onset' and external factors

Independent on whether a phenomenon is acquired early or late, no effects of external factors on eL2 children's performance were found (exception: effect of non-verbal IQ on comprehension of negation at age 3;7).

(Q3) Individual developmental path

eL2 children show the same developmental stages and error types independent how fast a structure under consideration is acquired.

The present study raises several interesting issues to be addressed in future research. eL2 children, whose language development was described and discussed in this study, had not completely acquired all phenomena under investigation. This counts for production of case marking, production of subordinate clauses, and comprehension of negation. Thus, future studies should investigate when the acquisition of these phenomena is completed

in eL2 learners. Moreover, more studies are needed, which employ a variety of methods with the same eL2 and monolingual children, and within and across modalities comprehension and production. In addition, studies should compare acquisition of different phenomena in eL2 children and learners, who have their first exposure to a second language after age of four. This comparison makes possible to investigate to which age second language learners have access to specific language learning mechanism, and whether the age differs across language phenomena.

11. Summary

The present study investigated the acquisition pace and the typical developmental path in eL2 acquisition of selected phenomena of German morphosyntax and semantics and compared them to monolingual acquisition. In addition, the influence of 'Age of Onset' and of external factors on eL2 acquisition was examined. Three main research questions were arised:

(Q1) Pace of acquisition
How fast do eL2 children reach the typical milestones in the acquisition of German compared to monolingual children?

(Q2) 'Age of Onset' and external factors
How do 'Age of Onset' and selected external factors affect eL2 children's language performance compared to monolingual children?

(Q3) Individual developmental path
Which developmental paths and error patterns are characteristic for eL2 children compared to monolingual children?

To date, the most studies on eL2 acquisition focused on language production. Based on mostly longitudinal spontaneous speech data of only small number of children, they investigated acquisition of sentence structure, subject-verb-agreement, and case marking. Their results indicate that eL2 learners acquire sentence structure and subject-verb-agreement faster than monolingual children (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006), whereas the acquisition of case marking causes them more difficulties (Marouani, 2006; Lemke, 2009; Lemmer, 2018; Schönenberger et al. 2012; Schönenberger, Sterner & Rothweiler, 2013). Moreover, similar developmental paths to those of monolingual children are claimed (Rothweiler, 2006; Tracy & Thoma, 2009; Thoma & Tracy 2006). Only several studies examined comprehension abilities in eL2 learners, however overwhelmingly in cross-sectional design. The findings from comprehension studies on telic and atelic verbs, and on wh-questions indicate that eL2 children acquire their target-like interpretation faster than monolingual children do (Schulze, 2012; Schulz 2013; Schulz & Ose, 2007). The same acquisition stages towards target-like interpretation like in monolingual acquisition are assumed as well. This was reported for comprehension of wh-questions (Schulz, 2013). Taking together, to date, no

study exists, that examines comprehension and production abilities in a large group of eL2 learners of German in a longitudinal design.

Thus, the present study closed this research gap, and extended the previous results by investigating pace of acquisition, impact of factors, and individual developmental paths in a longitudinal design with large groups of participants. Language data of 29 eL2 learners of German and 45 monolingual German-speaking children were examined. At the first test round, the eL2 children were 3;7 years old and had ten months of exposure to German. The monolingual children were age-matched, and thus 3;7 years old at the first test round as well. The eL2 learners were tested in six test rounds across three years and were 6;9 at the last test round. The monolingual children were tested in five test rounds across two years, and were 5;7 at their last test round. The standardized test LiSe-DaZ (Schulz & Tracy, 2011) was employed to examine children's language skills. The test assesses the following abilities: comprehension of telicity, comprehension of wh-questions, and comprehension of negation, production of case marking, production of different word classes, production of matrix clauses with respect verb placement and finiteness and production of subordinate clauses. In addition, children's non-verbal intelligence was assessed via the non-verbal scales of the K-ABC (Kaufman et al., 2009). Children's language biography and parents' educational background were collected in telephone interview with parents.

Three main points can be concluded with respect to the main research questions. eL2 learners showed a significantly greater rate of change, thus faster acquisition pace, than monolingual children in the following scales: comprehension of telicity, comprehension of wh-questions, production of prepositions, and production of conjunctions. These phenomena are acquired early (till age of five) in monolingual children. Notably, not all these phenomena belong to core syntactic structures, e.g. comprehension of telicity. Thus, the results are only partially in line with Tsimpli's assumption (2014). No differences regarding acquisition pace between eL2 children and monolingual children were found for comprehension of negation, production of case marking, and production of focus particles. These phenomena are acquired late in monolingual development and involve semantic and pragmatic knowledge as expected by Tsimpli (2014). Additionally, the greatest development was overwhelmingly observed between ages 3;7 and 4;7. The findings of faster acquisition pace of several phenomena are in line with several studies that reported that eL2 children develop faster than monolingual children (Rothweiler, 2006; Schulz, 2013; Schulze, 2012; Thoma & Tracy, 2006; Tracy & Thoma, 2009).

Independent on whether a phenomenon is acquired early or late, no effects of external factors on eL2 children's performance were found (exception: effect of non-verbal IQ on comprehension of negation at age 3;7). These findings indicate that acquisition of core, rule-based phenomena is not sensitive to external factors if the first exposure to L2 takes place around the age of three.

Moreover, eL2 children show the same developmental stages and error types in comprehension of telicity, comprehension of negation, production of matrix and subordinate clauses. This is also independent on how fast they acquire a structure under consideration. Thus, these findings provide a further support for similar developmental paths of eL2 and monolingual children towards target-like comprehension and production. These results extend the previous research as well, since to date only Schulz (2013) investigated developmental sequences in eL2 comprehension of wh-questions whereas the most study focused on production (Lemmer, 2018; Rothweiler, 2006; Thoma & Tracy, 2006; Tracy & Thoma, 2009).

Bibliography

Abney, Steven Paul. 1987. *The English noun phrase in its sentential aspect*. MIT working papers in linguistics. Cambridge, MA.

Aitchison, Jean. 1994. *Words in the mind: an introduction to the mental lexicon*. Oxford: Basil Blackwell.

Aksu-Koç, Aylin & Slobin, Dan. 1985. The acquisition of Turkish. In Dan Slobin (ed.), *The cross-linguistic study of child language,* 839–878. Mahwah, NJ: Erlbaum.

Antinucci, Francesco & Miller, Ruth. 1976. How children talk about what happened. *Journal of Child Language* 3 (2), 167–189.

Antomo, Mailin & Steinbach, Markus. 2010. Desintegration und Interpretation: *Weil*-V2-Sätze an der Schnittstelle zwischen Syntax, Semantik und Pragmatik. *Zeitschrift für Sprachwissenschaft* 29, 1-37.

Armon-Lotem, Sharon. 2010. Instructive bilingualism: can bilingual children with SLI rely on one language in learning a second one. *Applied Psycholinguistics* 31, 29-36.

Armon-Lotem, Sharon; Walters, Joel & Gagarina, Natalia. 2011. The impact of internal and external factors on linguistic performance in the home language and in L2 among Russian-Hebrew and Russian-German preschool children. *Linguistic Approaches to Bilingualism* 1 (3), 291–317.

Armon-Lotem, Sharon; Haman, Ewa; Jensen de López, Kristine; Smoczynska, Magdalena; Yatsushiro, Kazuko; Szczerbinski, Marcin, et al..2015. A large-scale cross-linguistic investigation on the acquisition of passive. Language Acquisition 23, 27-56.

Arroyo, Francisco Valle. 1982. Negatives in context. *Journal of Verbal Learning and Verbal Behavior* 21, 118–126.

Avrutin, Sergey. 2000. Comprehension of discourse-linked and non-discourse-linked questions by children and Broca's aphasics. In Yosef Grodzinsky, Lewis P. Shapiro, David Swinney (eds.), *Language and the brain. Representation and processing*, 295-313. San Diego: Academic Press.

Babyonyshev, Maria. 1993. The acquisition of Russian case system. *MIT working papers in linguistics* 19, 1–43.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9, 5–16.

Bates, Elisabeth; Dale, Philip & Thal, Donna. 1995. Individual differences and their implications for theories of language development. In Paul Fletcher, Brian MacWhinney (eds.), *The handbook of child language*, 96-152. Cambridge, MA: Blackwell Publishers.

Bates, Elisabeth; Marchman, Virginia; Thal, Donna; Fenson, Larry; Dale, Philip; Reznick, Steven; Reilly, Judy & Hartung, Jeff. 1994. Developmental and stylistic variation in the composition of early vocabulary. *Journal of Child Language* 21, 85–121.

Behrens, Heike. 1998. How difficult are complex verbs? Evidence from German, Dutch and English. *Linguistics* 36, 679–712.

Behrens, Heike. 2008. *Corpora in language acquisition research: History, methods, perspectives*. Amsterdam: John Benjamins.

Berman, Ruth A.. 1983. Establishing a schema: Children's construals of verb-tense marking. *Language Sciences* 5, 61–78.

Bierwisch, Manfred. 1988. On the grammar of local prepositions. In Manfred Bierwisch, Wolfgang Motsch, Ilse Zimmermann, Rudolf Růžička (eds.): *Syntax, Semantik und Lexikon. Rudolf Růžička zum 65. Geburtstag* (Studia grammatica, 29), 1-66. Berlin: Akademie-Verlag.

Biran, Michal & Ruigendijk, Esther (2015): Do case and gender information assist sentence comprehension and repetition for German- and Hebrew-speaking children? *Lingua* 164, 215–238.

Blom, Elma. 2003. *From root infinitive to finite sentence. The acquisition of verbal inflections and auxiliaries*. Utrecht: LOT dissertation series.

Blom, Elma & Baayen, Harald. 2013. The impact of verb form, sentence position, home language and L2 proficiency on subject-verb agreement in child L2 Dutch. *Applied Psycholinguistics* 1, 1–35.

Bloom, Lois. 1970. *Language development: form and function in emerging grammars.* Cambridge: MIT Press.

Bloom, Lois. 1993. *The transition from infancy to language: Acquiring the power of expression.* New York: Cambridge University Press.

Bloom, Lois; Lifter, Karin & Hafitz, Jeremie. 1980. Semantics of verbs and the development of verb inflection in child language. *Language* 56, 386–412.

Bloom, Lois; Merkin, Susan & Wootten, Janet. 1982. Wh-questions: Linguistic factors that contribute to the sequence of acquisition. *Child Development* 53, 1084–1092.

Bloom, Lois; Tinker, Erin & Margulis, Cheryl. 1993. The words children learn: Evidence against a noun bias in early vocabularies. *Cognitive Development* 8, 431–450.

Blühdorn, Hardarik. 2008. Epistemische Lesart von Satzkonnektoren - Wie sie zustande kommen und wie man sie erkennt. In Inge Pohl (ed.), *Semantik und Pragmatik-Schnittstellen*, 2017-251. Frankfurt am Main: Lang.

Blume, Alisa. 2012. *Interpretation einfacher w-Fragen bei drei- bis fünfjährigen Kindern. Ein Methodenvergleich*. Eine unveröffentlichte Masterarbeit. Frankfurt am Main.

Bošković, Željko. .2002. On multiple wh-fronting. *Linguistic Inquiry* 33, 351–383.

Bronckart, Jean-Paul & Sinclair, H.. 1973. Time, tense and aspect. *Cognition* 2, 107–130.

Brown, Penelope. 1998. Children's first verbs in Tzeltal: evidence for an early verb category. In Elena Lieven (ed.), *Special Issue: Developing a verb category: Cross-linguistic perspectives. Linguistics* 36, 713–755.

Caplan, David. 1983. Syntactic competence in agrammatism - a lexical hypothesis. In Michael Studdert-Kennedy (ed.), *Psychobiology of language*, 177-187. Cambridge, Mass.: MIT Press.

Carpenter, Patricia A. & Just, Marcel Adam. 1975. Sentence comprehension: A psycholinguistic processing model of verification. *Psychological Review* 82, 45–73.

Chase, William G. & Clark, Herbert H.. 1971. Semantics in the perception of verticality. *British Journal of Psychology* 62, 311–326.

Chilla, Solveig. 2008. *Erstsprache, Zweitsprache, Spezifische Sprachentwicklungsstörung? Eine Untersuchung des Erwerbs der deutschen Hauptsatzstruktur durch sukzessiv-bilinguale Kinder mit türkischer Erstsprache*. Hamburg: Dr. Kovac.

Choi, Soonja. 1998. Verbs in early lexical and syntactic development in Korean. In Elena Lieven (ed.), *Special Issue: Developing a verb category: Cross-linguistic perspectives. Linguistics* 36, 755–781.

Chomsky, Noam. 1981. *Lectures on government and binding*. Dodrecht: Foris.

Chomsky, Noam. 1986. *Knowledge of language*. New York: Praeger.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge: MIT Press.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels, Juan Uriagereka & Samuel Jay Keyser (eds.), *Step by step. Essays on minimalist syntax in honor of Howard Lasnik*, 89-155. Cambridge, Mass.: MIT Press.

Chondragianni, Vasiliki & Marinis, Theodoros. 2011. Differential effects of internal and external factors on the development of vocabulary, tense morphology and morpho-syntax in successive bilingual children. *Linguistic Approaches to Bilingualism* 1 (3), 318–345.

Clahsen, Harald. 1982). *Spracherwerb in der Kindheit. Eine Untersuchung zur Entwicklung der Syntax bei Kleinkindern*. Tübingen: Gunter Narr Verlag.

Clahsen, Harald. 1984. Der Erwerb von Kasusmarkierungen in der deutschen Kindersprache. *Linguistische Berichte* 89, 1–31.

Clahsen, Harald. 1986. Verb inflection in German child language: acquisition of agreement markings and the functions they encode. *Linguistics* 24, 79–121.

Clahsen, Harald. 1988. Kritische Phasen der Grammatikentwicklung: Eine Untersuchung zum Negationserwerb bei Kindern und Erwachsenen. *Zeitschrift für Sprachwissenschaft* 7, 3–31.

Clahsen, Harald. 1991. *Child Language and Developmental Dysphasia: Linguistic Studies of the acquisition of German*. Amsterdam: Benjamins.

Clahsen, Harald. 1992. Learnability theory and the problem of development in language acquisition. In Jürgen, Weissenborn, Helen Goodluck & Thomas Roeper (eds.), *Theoretical issues in language acquisition: Continuity and change in development*, 53-76. Hillsdale, NJ: Lawrence Erlbaum.

Clahsen, Harald: Bartke, Susanne & Göllner, Sandra. 1997. Formal features in impaired grammars: A comparison of English and German SLI children. *Journal of Neurolinguistics* 10, 151-171.

Clahsen, Harald; Eisenbeiss, Sonja & Penke, Martina. 1996. Lexical learning in early syntactic development. In Harald Clahsen (ed.), *Generative perspectives on language acquisition*, 129-159. Amsterdam, Philadelphia: John Benjamins Publishing Company.

Clahsen, Harald; Eisenbeiss, Sonja & Vainikka, Anne. 1994. The seeds of structure: an syntactic analysis of acquisition of case marking. In Teun Hoekstra, Bonnie D. Schwartz (Eds.), *Language acquisition studies in generative grammar: Papers in honor of Kenneth Wexler from the 1991 GLOW Workshops*, 85-118. Amsterdam: Benjamins.

Clahsen, Harald; Penke, Martina & Parodi, Teresa. 1993. Functional Categories in Early Child German. *Language Acquisition* 3 (4), 395–429.

Clahsen, Harald & Penke, Martina. 1992. The acquisition of agreement morphology and its syntactic consequences: New evidence on German child language from the Simone-corpus. In Jürgen Meisel (ed.), *The acquisition of verb placement. Functional categories and V2 phenomena in language acquisition*, 181-223. Dodrecht: Kluwer Academic Publishers.

Clancy, Patricia M.. 1989. Form and function in the acquisition of Korean wh-questions. *Journal of Child Language* 16 (2), 323–347.

Clark, Eve. 1995. The lexicon in acquisition. In Paul Fletcher & Brian MacWhinney (eds.), *The handbook of child language*, 393-412. Cambridge, MA: Blackwell Publishers.

Clark, Herbert H. & Chase, William G.. 1972. On the process of comparing sentence against pictures. *Cognitive Psychology* 3, 472–517.

Comrie, Bernard. 1976. *Aspect*. Cambridge: Cambridge University Press.

Culicover, Peter W.. 2014. Constructions, complexity, and word order variation. In F. J. Newmeyer & L. B. Preston (eds.), *Measuring Grammatical Complexity*, 148-178. Oxford: Oxford University Press.

Czepluch, Hartmut. 1988. Kasusmorphologie und Kasusrelationen: Überlegungen zur Kasustheorie des Deutschen. *Linguistische Berichte* 116, 275–310.

Dahl, Östen. 1979. Typology of sentence negation. *Linguistics* 17, 79–106.

Dahl, Östen. 1993. Negation. In Joachim Jacobs, Arnim von Stechow, Wolfgang Sternefeld (eds.), *Syntax: Ein internationales Handbuch zeitgenössischer Forschung. An international handbook of contemporary research*, 914-923. Berlin: Walter de Gruyter.

Deevy, Patricia & Leonard, Laurence B.. 2004. Comprehension of Wh-questions in children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 47, 802–815.

de Jong, Jan. 2010. Notes on the nature of SLI. *Applied Psycholinguistics* 31, 273-277.

de Villiers Jill. & Flusberg Helen B.. 1975. Some facts one simply cannot deny. In *Journal of Child Language* 2, 279–286.

Diewald, Gabriele. 1999. *Die Modalverben im Deutschen: Grammatikalisierung und Polyfunktionalität*. Tübingen: Niemeyer.

Dimroth, Christine. 2007. Zweitspracherwerb bei Kindern und Jugendlichen. Gemeinsamkeiten und Unterschiede. In Tanja Anstatt (ed.), *Mehrsprachigkeit bei Kindern und Erwachsenen: Erwerb, Formen, Förderung*, 115-137. Tübingen: Attempto.

Dimroth, Christine. 2009. Stepping stones and stumbling blocks. Why negation accelerates and additive particles delay the acquisition of finiteness in German. In Christina Dimroth & Peter Jordens (eds.), *Functional categories in learner language*, 135-168. Berlin, New York: Mouton de Gruyter.

Dimroth, Christine; Gretsch, Petra Jordens, Peter; Perdue, Clive & Starren, Marianne. 2003. Finiteness in Germanic languages: A stage-model for first and second language development. In Christine Dimroth & Marianne Starren (eds.), *Information structure and the dynamics of language acquisition. Studies in bilingualism, v. 26*, 65-94. Amsterdam, Philadelphia: John Benjamins.

Dimroth, Christine & Klein, Wolfgang. 1996. Fokuspartikeln in Lernervarietäten. Ein Analyserahmen und einige Beispiele. *Zeitschrift für Literaturwissenschaft und Linguistik* 104, 73-114.

Donaldson, Margaret. 1970. Developmental aspects of performance with negatives. In Giovanni B. Flores d'Arcais & Willem J. M. Levelt (eds.), *Advances in psycholinguistics*, 369-412. Amsterdam: North-Holland.

Dürscheid, Christa. 1999. *Die verbalen Kasus des Deutschen: Untersuchungen zur Syntax, Semantik und Perspektive*. Berlin: De Gruyter.

Eiferman, Rivka R.. 1961. Negation, a linguistic variable. *Acta Psychologica* 18, 258–273.

Eisenbeiss, Sonja. 1991. *Passiv und Kasus*. Staatsexamenarbeit. Köln.

Eisenbeiss, Sonja. 2000. The acquisition of the determiner phrase in German child language. In Luigi Rizzi & Marc-Ariel Friedemann (eds.), *The acquisition of syntax. Studies in comparative developmental linguistics*, 26–62. London, New York: Routledge.

Eisenbeiss, Sonja. 2003. *Merkmalsgesteuerter Grammatikerwerb. Eine Untersuchung zum Erwerb der Struktur und Flexion von Nominalphrasen*. Düsseldorf.

Eisenbeiss, Sonja. 2009. Generative approaches to language learning. *Linguistics* 47, 273-310.

Eisenbeiss, Sonja; Bartke, Susanne & Clahsen, Harald. 2005/06. Structural and Lexical Case in Child German: Evidence from Language-Impaired and Typically Developing Children. *Language Acquisition* 13 (1), 3–32.

Eminds, Joseph. 1985. *A unified theory of syntactic categories*. Dodrecht.

Evans, Nicholas. 2000. Word classes in the word's languages. In Geert E. v. Booij, Christian Lehmann & Joachim Mugdan (eds.), *An international handbook of inflection and word-formation*, 708-731. Berlin: de Gruyter.

Forner, Monika. 1979. The mother as LAD: interaction between order and frequency of parental input and child production. In Fred R. Eckman & Ashley J. Hastings (eds.), *Studies in first and second language acquisition*, 17-44. Rowley, Mass.: Newbury House Publishers.

Freidin, Robert & Sprouse, Rex A.. 1991. Lexical case phenomena. In Robert Freidin (ed.), *Principles and parameters in comparative grammar*, 392-416. Cambridge: MIT Press.

Friedmann, Naama; Belletti, Adriana & Rizzi, Luigi. 2009. Relativized relatives: Types of intervention in the acquisition of A-bar dependencies. *Lingua* 119 (1), 67–88.

Fritzenschaft, Agnes; Gawlitzek-Maiwald, Ira; Tracy, Rosemarie & Winkler, Susanne. 1990. Wege zur komplexen Syntax. *Zeitschrift für Sprachwissenschaft* 9, 52–134.

Gagarina, Natalia & Voeikova, Maria. 2002. Acquisition of case and number in Russian. In Ursula Stephany, Maria Voeikova (eds.), *Development of nominal inflection in first language acquisition*, 369-383. Den Haag: Mouton de Gruyter.

Gallmann, Peter. 1992. Dativanhebung. In *Groninger Arbeiten zur germanistischen Linguistik* 35, 92–121.

Gawlitzek-Maiwald, Ira; Tracy, Rosemarie & Fritzenschaft, Agnes. 1992. Language acquisition and competing linguistic representations: the child as arbiter. In Jürgen Meisel (ed.), *The acquisition of verb placement. Functional categories and V2 phenomena in language acquisition*, 139-179. Dodrecht: Kluwer Academic Publishers.

Genesee, Fred; Paradis, Johanne & Crago, Martha. 2004. *Dual language learning and disorder: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes.

Gentner, Dedre. 1981. Some interesting differences between verbs and nouns. *Cognition and Brain Theory* 4, 161–178.

Gentner, Dedre. 1982. Why nouns are learned before verbs: linguistic relativity versus natural partitioning. In Stan Kuczaj (ed.), *Language development. Vol. 2: Language, thought and culture*, 301-334. Hillsdale, NJ: Erlbaum.

Gilkerson, Jill; Hyams, Nina & Curtiss, Susan. 2004. On the scope of negation: More evidence for early parameter setting. In Jacqueline van Kampen & Sergio Baauw (eds.),

Proceedings of Generative Approaches to Language Acquisition 10, 175-185. Utrecht: LOT.

Givón, Talmy. 1978. Negation in language: pragmatics, function, ontology. In Peter Cole (ed.), *Syntax and Semantics*, 69-112. New York: Academic Press.

Glenberg, Arthur M. & Robertson, David A.. 1999. Indexical understanding of instruction. *Discourse Processes* 28, 1–26.

Glück, Christian. 2007. *Wortschatz- und Wortfindungstest für 6-10-jährige*. München: Elsevier.

Golberg, Heather; Paradis, Johanne; Crago, Martha. 2008. Lexical acquisition over time in minority L1 children learning English as a L2. *Applied Psycholinguistics* 29, 1–25.

Goldfield, Beverly & Reznick, J. Steven. 1990. Early lexical acquisition: rate, content and the vocabulary spurt. J*ournal of Child Language* 17, 171–181.

Gopnik, Alison .1988. Three types of early word: Social words, cognitive-relational words and names and their relation to cognitive development. *First Language* 8, 49–70.

Grewendorf, Günther. 1988. *Aspekte der deutschen Syntax. Eine Rektions-Bindungs-Analyse*. Tübingen: Narr.

Grewendorf, Günther. 2002. *Minimalistische Syntax*. Tübingen, Basel: Francke UTB.

Grimm, Angela & Schulz, Petra. 2012. Das Sprachverstehen bei frühen Zweitsprachlernern: Erste Ergebnisse der kombinierten Längs- und Querschnittsstudie MILA. In Bernt Ahrenholz (ed.) *Einblicke in die Zweitspracherwerbsforschung und ihre forschungsmethodischen Verfahren*, 195-218. Berlin, New York: Mouton de Gruyter.

Grimm, Angela & Schulz, Petra. 2014. Sprachfähigkeiten von Kindern mit DaZ bei Schuleintritt. In Beate Lüdtke & Inger Petersen (eds.), *Deutsch als Zweitsprache: erwerben, lernen und lehren*, 35-50. Stuttgart: Klett Fillibach.

Grimm, Angela & Schulz, Petra. 2016. Warum man bei mehrsprachigen Kindern dreimal nach dem Alter fragen sollte: Sprachfähigkeiten simultan-bilingualer Lerner im Vergleich mit monolingualen und frühen Zweitsprachlernern. *Diskurs Kindheits- und Jugendforschung* 11, 27–42.

Grimm, Hannelore. 2003. *Störungen der Sprachentwicklung*. Göttingen: Hogrefe.

Grimm, Hannelore. 2001. *Sprachentwicklungstest für drei- bis fünfjährige Kinder (SETK 3-5). Diagnose von Sprachverarbeitungsfähigkeiten und auditiven Gedächtnisleistungen*. Göttingen: Hogrefe.

Gualmini, Andrea. 2004. Some knowledge children don't lack. *Linguistics* 42, 957–982.

Gutzmann, Daniel & Turgay, Katharina. 2011. Funktionale Kategorien in der PP und deren Zweitspracherwerb. *Zeitschrift für Sprachwissenschaft* 30 (2), 169–221.

Günthner, Susanne. 1993. „… weil – man kann es ja wissenschaftlich untersuchen" – Diskurspragmatische Aspekte der Wortstellung in WEIL – Sätzen. *Linguistische Berichte* 143, 37-59.

Haberzettl, Stefanie. 2005. *Der Erwerb der Verbstellungsregeln in der Zweitsprache Deutsch durch Kinder mit russischer und türkischer Muttersprache*. Tübingen: Niemeyer.

Haegeman, Liliane. 1994. *Introduction to government and binding*. Oxford: Blackwell Publishers.

Haegeman, Liliane. 1995. *The syntax of negation*. Cambridge: Cambridge University Press.

Haider, Hubert. 1993. *Deutsche Syntax, generativ - Vorstudien zur Theorie einer projektiven Grammatik*. Tübingen: Narr.

Haider, Hubert. 2004. Wie viel Syntax braucht die Semantik, und wie viel Semantik enthält die Syntax? *Tidsskrift for Sprogforskning* 2, 71–90.

Haider, Hubert. 2010. *The syntax of German*. Cambridge: Cambridge University Press.

Håkansson, Gisela. 2001. Tense morphology and verb-second in Swedish L1 children, L2 children and children with SLI. *Bilingualism: Language and Cognition* 4, 85-99.

Hale, Kenneth & Keyser, Samuel Jay. 1993. On the argument structure and the lexical expression of syntactic relations. In Kenneth Hale & Samuel Jay Keyser (eds.), *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*, 53-109. Cambridge, Mass.: MIT Press.

Hamann, Cornelia. 2000. Negation, Infinitives, and Heads. In Susan M. Powers & Cornelia Hamann (eds.), *The acquisition of scrambling and cliticization,* 423-477. Dodrecht: Kluwer.

Hamann, Cornelia. 2006. Speculations about early syntax: the production of wh-questions by normally developing French children and French children with SLI. *Catalan Journal of Linguistics* 5, 143-189.

Hansson, Kristina & Nettelbladt, Ulrika. 2006. Wh-questions in Swedish children with SLI. *International Journal of Speech-Language-Pathology* 8 (4), 376–383.

Haspelmath, Martin. 2001. Word classes / parts of speech. In Paul B. Baltes & Neil. J. Smelser (eds.), *International encyclopedia of the social and behavioral sciences*, 16538-16545. Amsterdam: Pergamon.

Hasselhorn, Markus; Schumann-Hengsteler, Ruth; Gronauer, Julia; Grube, Dietmar; Mähler, Claudia; Schmid, Inga, Seitz-Stein, Katja & Zoelch, Christof. 2012. *Arbeitsgedächtnistestbatterie für Kinder von 5 bis 12 Jahren (AGTB 5-12)*: Hogrefe.

Haznedar, Belma. 2001 The acquisition of the IP system in child L2 English. *Studies in Second Language Acquisition* 23, 2–39.

Haznedar, Belma & Schwartz, Bonnie. 1997. Are there optional infinitives in child L2 acquisition? In Elizabeth Hughes, Mary Hughes & Annabel Greenhill (eds.), *Proceedings of the 21st annual Boston University Conference on Language Development*, 257-268. Somerville, MA: Cascadilla Press.

Heinz, Wolfgang & Matiasek, Johannes. 1994. Argument structure and case assignment in German. In John Nerbonne, Klaus Netter, Carl Pollard (eds.), *German in head-driven phrase structure grammar (CSLI lecture notes, no. 46)*, 199–236. Stanford, Calif.: Center for the Study of Language and Information.

Hirsch, Christopher & Hartman, Jeremy. 2006. Some (Wh-) questions concerning passive interactions. In Adriana Belletti, Elisa Bennati, Cristiano Chesi, Elisa Di Domenico & Ida Ferrari (eds.), *Language acquisition and development. Proceedings of the GALA 2005 conference*, 256-268. Cambridge: Cambridge Scholars Press.

Hoff, Erika. 2003. Causes and consequences of SES-related differences in parent-to-child speech. In Marc H. Bornstein & Robert H. Bradely (eds.), *Socioeconomic status, parenting, and child development*, 147-160. Mahwah, NJ: Lawrence Erlbaum Associates.

Hoff, Erika. 2006. How social contexts support and shape language development. *Developmental Review* 26, 55–88.

Homberg, Anders & Platzack, Christer. 1995. *The role of inflection in Scandinavian syntax*. Oxford: Oxford University Press.

Horn, Laurence R. 1989. *A natural history of negation*. Chicago: University of Chicago Press.

Houwer, Annick de. 2009. *Bilingual first language acquisition*. Bristol.

Jakubowicz, Celia. 2010. Measuring derivational complexity: New evidence from typically developing and SLI learners of L1 French. *Lingua* 121 (3), 339–351.

Jeschull, Liane. 2007. The pragmatics of telicity and what children make of it. In Alyona Belikova, Luisa Meroni & Maria Umeda (eds.), *Proceedings of the 2nd Conference on Generative Approaches to Language Acquisition North America (GALANA)*, 180-187. Somerville, MA: Cascadilla Press.

Jeuk, Stefan. 2011 *Erste Schritte in der Zweitsprache Deutsch. Eine empirische Untersuchung zum Zweitspracherwerb türkischer Migrantenkinder in Kindertageseinrichtungen*. Freiburg i.Br.: Fillibach.

Johnson, Carolyn Echols. 1981. *Children's questions and the discovery of interrogative syntax*. Sanford University.

Just, Marcel Adam & Clark, Herbert H.. 1973. Drawing interfaces from the presuppositions and implications of affirmative and negative sentences. *Journal of Verbal Learning and Verbal Behavior* 12, 21–31.

Kaufman, Alan S.; Kaufman, Nadeen L.; Melchers, Peter & Preuß, Ulrich. 2009. *Kaufman Assessment Battery for Children, Deutsche Version (K-ABC)*.

Kaup, Barbara; Lüdtke, Jana; Zwaan, Rolf A.. 2006. Processing negated sentences with contradictory predicates: Is a door that is not open mentally closed? *Journal of Pragmatics* 38, 1033–1050.

Kaup, Barbara; Lüdtke, Jana & Zwaan, Ralf A.. 2007. The experimental view of language comprehension: How is negation represented? In Franz Schmalhofer & Charles A. Perfetti (eds.), *Higher level language processes in the brain: Inference and comprehension processes*, 255-288. Mahwah, NJ: Lawrence Erlbaum.

Kauschke, Christina. 2000. *Der Erwerb des frühkindlichen Lexikons - eine empirische Studie zur Entwicklung des Wortschatzes im Deutschen*. Tübingen: Narr.

Kauschke, Christina. 2007. *Erwerb und Verarbeitung von Nomen und Verben*. Tübingen: Niemeyer.

Kauschke, Christina & Siegmüller, Julia. 2002. *Patholinguistische Diagnostik bei Sprachentwicklungsstörungen*. München: Urban & Fischer.

Ketrez, F. Nihan & Aksu-Koç, Ayhan. 2002. Early nominal morphology in Turkish: Emergance of case and number. In Ursula Stephany & Maria D. Voeikova (eds.), *Development of nominal inflection in first language acquisition*, 15-48. Den Haag: Mouton de Gruyter.

Kiese-Himmel, Christiane. 2005. *Aktiver Wortschatztest für 3- bis 5-jährige Kinder (AWST-R)*. Göttingen: Beltz.

Klima, Edward & Bellugi, Ursula. 1966. Syntactic regularities in the speech of children. In John Lyons, Roger J. Wales (eds.), *Psycholinguistic papers*, 183-208. Edinburgh: Edinburgh University Press.

Kostyuk, Natalia. 2005. *Der Zweitspracherwerb beim Kind. Eine Studie am Beispiel des Erwerbs des Deutschen durch drei russischsprachige Kinder*. Hamburg: Dr. Kovac.

König, Ekkehard. 1991. *The meaning of focus particles. A comparative perspective*. London: Routledge.

Krämer, Irene. 1998- Children's interpretation of indefinite object noun phrases: Evidence from the scope of negation. In Reneé van Bezooijen & René Kager (eds.), *Linguistics in the Netherlands*, 163-174. Amsterdam, Philadelphia: John Benjamins Publishing Company.

Krifka, Manfred. 1992. Thematic relations as links between nominal reference and temporal constitution. In Ivan A. Sag & Anna Szabolcsi (eds.), *Lexical matters*, 29-53. Stanford, Calif.: Stanford University Press.

Kroffke, Solvieg & Rothweiler, Monika. 2006. Variation im frühen Zweitspracherwerb des Deutschen durch Kinder mit türkischer Erstsprache. In Maurice Vliegen (ed.), *Variation in Sprachtheorie und Spracherwerb*, 145-153. Frankfurt am Main: Peter Lang.

Laalo, Klaus. 2002. Acquisition of case and plural in Finish. In Ursula Stephany & Maria D. Voeikova (eds.), *Development of nominal inflection in first language acquisition*, 49-90. Den Haag: Mouton de Gruyter.

Lemke, Vytautas. 2009. *Der Erwerb der DP: Variation beim frühen Zweitspracherwerb*. Mannheim.

Lemmer, Rabea. 2018. *Sprachentwicklungsstörungen bei frühen Zweitsprachlernern – Der Erwerb von Kasus, Finitheit und Verbstellung*. Dissertation. Goethe-University, Frankfurt am Main.

Leonard, Laurence B.. 1998. *Children with Specific Language Impairment*. Cambridge, MA: MIT Press.

Littell, Ramon C., Milliken, George A., Stroup, Walter W., Wolfinger, Russelt D. & Schabenberger, Oliver. 2006. *SAS® for mixed models*. SAS Institute.

Marouani, Zahida. 2006. *Der Erwerb des Deutschen durch arabischsprachige Kinder. Eine Studie zur Nominalflexion.* Heidelberg.

McGinnis, Martha. 1996. Projection and position. In João Costa, R. Goedemans, R. van der Vijver (eds.), *Proceedings of ConSole IV*, 203-220. Leiden: HIL.

McGinnis, Martha. 2001. Semantic and morphological restrictions in experiencer predicates. In J. T. Jensen & G. van Herk (eds.), *Proceedings of the 2000 CLA Annual Conference*, 245-256. Ottawa: University of Ottawa, Department of Linguistics, Cahiers Linguistiques d'Ottawa.

Meisel, Jürgen. 1992. Introduction: Functional categories and verb placement in language development. In Jürgen Meisel (ed.), *The acquisition of verb placement. Functional categories and V2 phenomena in language acquisition*, 1-21. Dodrecht: Kluwer Academic Publishers.

Meisel, Jürgen. 1997. The acquisition of the syntax of negation in French and German: contrasting first and second language development. *Second Language Research* 13 (3), 227–263.

Meisel, Jürgen. 2001. The simultaneous acquisition of two first languages: Early differentiation and subsequent development of grammars. In Jasone Cenoz & Fred Genesee, (ed.), *Trends in bilingual acquisition*, 11-41. Amsterdam: John Benjamins.

Meisel, Jürgen. 2004. The bilingual child. In Tej K. Bhatia & William C. Ritchie (eds.), *The handbook of bilingualism*, 91-113. Oxford: Blackwell Publishers.

Meisel, Jürgen. 2007. Mehrsprachigkeit in der frühen Kindheit: Zur Rolle des Alters bei Erwerbsbeginn. In Tanja Anstatt (ed.), *Mehrsprachigkeit bei Kindern und Erwachsenen: Erwerb, Formen, Förderung*, 93-113. Tübingen: Attempto.

Meisel, Jürgen. 2009. Second Language Acquisition in Early Childhood. *Zeitschrift für Sprachwissenschaft*, 5–34.

Menyuk, Paula; Liebergott, Jacqueline W. & Schultz, Martin C.. 1995. *Early language development in full-term and premature infants*. Hillsdale, NJ: Lawrence Erlbaum.

Mills, Anne. 1985. The acquisition of German. In Dan Slobin (ed.), *The cross-linguistic study of child language*, 141-254. Mahwah, NJ: Erlbaum.

Müller, Anja. 2012. Wie interpretieren Kinder nur? Experimentelle Untersuchung zum Erwerb von Informationsstruktur. Universitätsverlag Potsdam.

Müller, Gereon & Sternefeld, Wolfgang. 1993. Improper movement and unambiguous binding. *Linguistic Inquiry* 24, 461–507.

Musolino, Julien & Lidz, Jeffrey. 2006. Why children aren't universally successful with quantification. *Linguistics* 44 (4), 817–852.

Nederstigt, Ulrike. 2003. *Auch and noch in child and adult German*. Studies in Language Acquisition 23. Berlin, New York: Mouton de Gruyter.

O'Grady, William. 1997. *Syntactic development*. Chicago: University of Chicago.

Oller, David Kimbrough & Eilers, Rebecca E.. 2002. *Language and literacy in bilingual children*. London: Multilingual Matters.

Ose, Julia & Schulz, Petra. 2010. Was fehlt Jonas – Ein Taschentuch oder das Taschentuch? Eine Pilotstudie zum Artikelerwerb bei Kindern mit Deutsch als Zweitsprache. In Martina Rost-Roth (ed.), *DaZ-Spracherwerb und Sprachförderung Deutsch als Zweitsprache. Beiträge aus dem 5. Workshop Kinder mit Migrationshintergrund*, 79-97. Freiburg i. Br.: Fillibach.

Ouhalla, Jamal. 1993. Functional categories, agrammatism and language acquisition. *Linguistische Berichte* 143, 3–36.

Ouhalla, Jamal. 1994. *Introducing transformational grammar: From rules to principles and parameters*. Arnold: Hodder Headlines.

Paradis, Johanne. 2004. On the relevance of specific language impairment to understanding the role of transfer in second language acquisition. *Applied Psycholinguistics* 25, 67-82.

Paradis, Johanne. 2005. Grammatical morphology in children learning English as a second language: Implications of similarities with Specific Language Impairment. *Language, Speech and Hearing Services in the Schools* (36), 172–187.

Paradis, Johanne. 2009. *Oral language development in French and English and the role of home input factors. Report for the Conseil scolaire centre-nord*. Edmonton, Alberta. Available online at http://www.ualberta.ca/~jparadis, checked on 11/26/2016.

Paradis, Johanne. 2010. The interface between bilingual development and specific language impairment. *Applied Psycholinguistics* 31 (2), 3-28.

Paradis, Johanne. 2011. Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism* 1 (3), 213–237.

Paradis, Johanne & Crago, Martha. 2000. The morphology of specific language impairment in French: Evidence for an Extended Optional Default account. *Language Acquisition* 9, 269-300.

Paradis, Johanne & Crago, Martha. 2004. Comparing L2 and SLI grammars in French: Focus on DP. In Philipp Prévost & Johanne Paradis (eds.), *The acquisition of French in different contexts: Focus on functional categories*, 89-108. Amsterdam: Benjamins.

Paradis, Johanne, Rusk, Brian, Sorenson Duncan, Tamara & Govindarajan, Krithika. 2017. Children's second language acquisition of English complex syntax: The role of age, input, and cognitive factors. *Annual Review of Applied Linguistics* 37, 148-167.

Parodi, Teresa. 1998. *Der Erwerb funktionaler Kategorien im Deutschen*. Tübingen: Narr.

Pasch, Renate. 1997. *Weil* mit Hauptsatz – Kuckucksei im *denn*-Nest. *Deutsche Sprache* 25, 252-272.

Penner, Zvi. 1993. Asking questions without CPs? On the acquisition of root wh-questions in Bernese Swiss German and Standard German. In Hoekstra Teun, Bonnie Schwartz (eds.), *Language acquisition studies in generative grammar: Papers in honor of Kenneth Wexler from the 1991 GLOW Workshops*, 177-213. Amsterdam: Benjamins.

Penner, Zvi. 1999. *Screeningverfahren zur Feststellung von Störungen in der Grammatikentwicklung*. Schriftenreihe des Heilpädagogischen Seminars Zürich, Band 14 A. Luzern: Edition SZH/SPC.

Penner, Zvi. 2003. *Neue Wege der sprachlichen Förderung von Migrantenkindern*. Berg: kon-lab.

Penner, Zvi. & Kölliker Funk, Meja. 1998. *Therapie und Diagnose von Grammatikstörungen. Ein Arbeitsbuch*. Luzern: Edition SZH/SPC.

Penner, Zvi; Schulz, Petra & Wymann, Karin. 2003. Learning the meaning of verbs: what distinguishes language-impaired from normally developing children? *Linguistics* 41, 289–319.

Penner, Zvi; Tracy, Rosemarie & Weissenborn, Jürgen. 2000. Where scrambling begins: Triggering object scrambling at the early stage in German and Bernese Swiss German. In Susan M. Powers & Cornelia Hamann (eds.), *The acquisition of scrambling and cliticization,* 127-164. Dodrecht: Kluwer.

Pesetsky, David. 1987. WH-in situ: Movement and unselective binding. In Eric J. Reuland & Alice G. B. ter Meulen (eds.), *The representation of (in)definiteness* (Current studies in linguistics series, 14), 98-129. Cambridge, Mass.: MIT Press.

Philip, William; Coopmans, Peter; van Atteveldt, Wouter & van der Meer, Matthijs. 2001. Subject-object asymmetry in child comprehension of wh-questions. In Anna H.-J Do, Laura Domínguez & Aimee Johansen (eds.), *Proceedings of the 25th annual Boston University Conference on Language Development*, 587-598. Somerville, Mass.: Cascadilla Press.

Pierce, Amy. 1989. *On the emergence of syntax: A cross-linguistic study*. Cambridge: Massachusetts Institute of Technology.

Pine, Julian M.; Lieven Elena V. M.; Rowland, Caroline F.. 1997. Stylistic variation at the 'single-word' stage: Relations between maternal speech characteristics and children's vocabulary composition and usage. *Child Development* 68, 807–819.

Poeppel, David & Wexler, Kenneth. 1993. The Full Competence Hypothesis of clause structure in early German. *Language* (69), 1–33.

Polinsky, Maria. 2006. Acquisition of Russian: Uninterrupted and incomplete scenarios. In *Glossos* 8.

Pollock, Jean-Yves. 1989. Verb movement, Universal Grammar, and the structure of IP. *Linguistic Inquiry* 20 (3), 365–424.

Prévost, Philippe. 2003. Truncation and Missing Inflection in Initial Child L2 German. *Studies in Second Language Acquisition* 25, 65–97.

Pustejovsky, James. 1991. The syntax of event structure. *Cognition* 41, 47–81.

Pustejovsky, James. 1995. *The generative lexicon*. Cambridge: MIT Press.

Reis, Marga. 1985. Satzeinleitende Strukturen im Deutschen. Über COMP, Haupt- und Nebensätze, w-Bewegung und die Doppelkopfanalyse. In Werner Abraham (ed.), *Erklärende Syntax des Deutschen*, 271-311. Tübingen: Narr.

Reis, Marga. 1997. Zum syntaktischen Status unselbständiger Verbzweit-Sätze. In Christa Dürscheid, Karl-Heinz Ramers & Monika Schwarz (eds.). *Sprache im Fokus. Festschrift für Heinz Vater zum 65. Geburtstag*, 121-144. Tübingen: Niemeyer.

Reis, Marga. 2013. "*Weil*-V2"-Sätze und (k)ein Ende? Anmerkungen zur Analyse von Antomo & Steinbach (2010). *Zeitschrift für Sprachwissenschaft* 32, 221-262.

Reis, Marga & Rosengren, Inger. 1997. A modular approach to the grammar of additive particles: the case of German *auch*. *Journal of Semantics* 14(3), 237-309.

Rizzi, Luigi. 1990. *Relativized minimality* (Linguistic inquiry monographs, 16). Cambridge, Mass.: MIT Press.

Rizzi, Luigi. 1993/1994. Some Notes on Linguistic Theory and Language Development: The Case of Root Infinitives. *Language Acquisition* 3 (4), 371–393.

Rizzi, Luigi. 1996. Residual verb second and the wh-criterion. In Adriana Belletti & Luigi Rizzi (eds.), *Parameters and functional heads. Essays in comparative syntax*, 63-90. New York, Oxford: Oxford University Press.

Rizzi, Luigi. 1997. The fine structure of the left periphery. In Liliane Haegman (ed.), *Elements of Grammar: A Handbook of Generative Syntax*, 281-337. Dodrecht: Kluwer.

Rizzi, Luigi. 2004. Locality and the left periphery. In Adriana Belletti (ed.), *Structures and beyond: The cartography of syntactic structures (v. 3)*, 223-251. Oxford, New York: Oxford University Press.

Rogosa, David & Willett, John. 1985. Understanding correlates of change by modeling individual differences in growth. *Psychomatrica* 50, 203-228.

Rothweiler, Monika. 2015. Spracherwerb. In Jörg Meibauer, Ulrike Demske, Jochen Geilfuß-Wolfgang, Jürgen Pafel, Karl-Heinz Ramers, Monika Rothweiler, Markus Steinbach (eds.), *Einführung in die germanistische Linguistik*, 255–297. Stuttgart: Springer Verlag.

Rothweiler, Monika. 1993. *Der Erwerb von Nebensätzen im Deutschen. Eine Pilotstudie*. Tübingen: Niemeyer.

Rothweiler, Monika. 2006. The acquisition of V2 and subordinate clauses in early successive acquisition in German. In Conxita Lleó (ed.), *Interfaces in Multilingualism: Acquisition and Representation*, 91-113. Philadelphia: John Benjamins Publishing Company.

Ruigendijk, Esther. 2015. Contrastive elicitation task for testing case marking. In Sharon Armon-Lotem, Jan de Jong & Natalia Meir (eds.), *Assessing multilingual children disentangling bilingualism from language impairment*, 38-54. Bristol: Multilingual Matters.

Rumain, Barbara. 1988. Syntactics and interpretation of negation: A developmental study. *Journal of Experimental Child Psychology* 45, 119–140.

Schachter, Paul & Shopen, Timothy. 2007. Parts-of-speech system. In Timothy Shopen (ed.), *Language typology and syntactic description. Volume I: Clause Structure*, 1-60. Cambridge: Cambridge University Press.

Scherger, Anna-Lena 2015. *Schnittstelle zwischen Mehrsprachigkeit und Sprachentwicklungsstörung. Kasuserwerb deutsch-italienischer Kinder mit spezifischer Sprachentwicklungsstörung*. Hamburg: Dr. Kovac.

Schlesiger, Claudia. 2001. *Sprachverstehen bei spezifischer Sprachentwicklungsstörung. Grundlagen und Diagnostik* (Kölner Arbeiten zur Sprachpsychologie, Bd. 11). Frankfurt am Main: Peter Lang.

Schmidt, Claudia Maria 1995. *Satzstruktur und Verbbewegung. Eine minimalistische Analyse zur internen Syntax der IP (Inflection-Phrase) im Deutschen*. Tübingen: Niemeyer.

Schönenberger, Manuela; Rothweiler, Monika & Sterner, Franziska. 2012. Case marking in child L1 and early child L2 German. In Christoph Gabriel & Kurt Braunmüller (eds.), *Multilingual individuals and multilingual societies*, 3-21. Amsterdam: John Benjamins Publishing Company.

Schönenberger, Manuela; Sterner, Franziska & Rothweiler, Monika. 2013. The acquisition of case in child L1 and child L2 German. In Stavroula Stavrakaki, Marina Lalioti & Xenia Konstantinopoulou (eds.), *Advances in language acquisition. Proceedings of GALA 2009*, 191-199. Cambridge: Cambridge Scholars Press.

Schönenberger, Manuela; Sterner, Franziska & Ruberg, Tobias. 2011. The realization of indirect objects and dative case in German. In Julia Herschensohn & Darren Tanner (eds.), *Proceedings of the 11th Generative Approaches to Second Language Acquisition (GASLA 2011)*, 143-151. Somerville, MA: Cascadilla Press.

Schulz, Petra. 2013. Wer versteht wann was? Sprachverstehen im frühen Zweitspracherwerb des Deutschen am Beispiel der w-Fragen. In Arnulf Deppermann (ed.), *Das Deutsch der Migranten. Jahrbuch 2012 des Instituts für deutsche Sprache*, 313-337. Mannheim: De Gruyter.

Schulz, Petra. 2018a. Zur Semantik von Verben im Spracherwerb. In S. Engelberg, H. Lobin, K. Steyer & S. Wolfer (eds.), *Wortschätze. Dynamik - Muster - Komplexität. (=Institut für Deutsche Sprache, Jahrbuch 2017)*. Berlin, New York: de Gruyter.

Schulz, Petra. 2018b. Telicity in typical and impaired acquisition. In K. Syrett and S. Arunachalam (eds.), Semantics in Language Acquisition. Series: Trends in Language Acquisition Research. Amsterdam: Benjamins.

Schulz, Petra; Wymann, Karin & Penner, Zvi. 2001 The early acquisition of verb meaning in German by normally developing and language impaired children. *Brain and Language* 77 (3), 407–418.

Schulz, Petra & Penner, Zvi. 2002. How you can eat the apple and have it too: Evidence from the acquisition of telicity in German. In João. Costa & M. João Freitas (eds.), *Proceedings of the GALA 2001 Conference on Language Acquisition*, 239–246. Lisaboa: Assoc. Portuguesa de Linguistica.

Schulz, Petra. & Wittek, Angelika. 2003. Opening doors and sweeping floors: What children with specific language impairment know about telic and atelic verbs. In Barbara Beachley, Amanda Brown & Frances Colin (eds.), *Proceedings of the 27th annual Boston University Conference on Language Development*, 727-738. Somerville, MA: Cascadilla Press.

Schulz, Petra & Ose, Julia. 2007. What early successive learners of German know about telicity. Talk at Generative Approaches to Language Acquisition (GALA), June 2007.

Schulz, Petra & Wenzel, Ramona. 2007. Comprehension and production of Wh-questions in early L2 learners of German: Like or unlike SLI? Talk at International Symposium on Bilingualism (isb 6). Hamburg, June 2007.

Schulz, Petra; Tracy, Rosemarie & Wenzel, Ramona. 2008. Linguistische Sprachstandserhebung - Deutsch als Zweitsprache (LiSe-DaZ): Theoretische Grundlagen und erste Ergebnisse. In Bernt Ahrenholz (ed.), *Kinder und Jugendliche mit Migrationshintergrund: Empirische Befunde und Forschungsdesiderate*, 9-33. Freiburg i.Br.: Fillibach.

Schulz, Petra & Roeper, Tom. 2011. Acquisition of exhaustivity in wh-questions: A semantic dimension of SLI? *Lingua* 121 (3), 383–407.

Schulz, Petra & Tracy, Rosemarie. 2011. *Linguistische Sprachstandserhebung - Deutsch als Zweitsprache (LiSe-DaZ)*. Göttingen: Hogrefe.

Schulz, Petra & Grimm, Angela. 2012. Spracherwerb. In Heinz Drügh, Susanne Komfort-Hein, Andreas Kraß, Cécile Meier, Gabriele Rohowski, Robert Seidel, Helmut Weiß (eds.), *Germanistik. Sprachwissenschaft - Literaturwissenschaft - Schlüsselkompetenzen*, 155-172. Stuttgart, Weimar: J. B. Metzler.

Schulz, Petra & Schwarze, Rabea. 2017. How robust is the ban on nonfinite verbs in V2? Evidence from early second language learners of German with and without SLI. *Zeitschrift für Sprachwissenschaft*, 36(1), 51-78.

Schulze, Sally. 2012. *Früher Zweitspracherwerb des Deutschen. Längsschnittliche Analyse von Daten aus dem Projekt MILA erhoben mit der Linguistischen Sprachstandserhebung - Deutsch als Zweitsprache*. Unpublished B.A. Thesis. Goethe-University, Frankfurt am Main.

Schütze, Carson. 1997. *Infl in child and adult language: agreement, case and licensing*. Cambridge: MIT Press.

Schütze, Carson & Wexler, Kenneth. 1996. Subject case licensing and English root infinitives. In Andy Stringfellow, Dalia Cahana-Amitay, Elizabeth Hughes & Andrea Zukowski (eds.), *BUCLD 20: Proceedings of the 20th annual Boston University Conference on Language Development*, 670-681. Somerville, MA: Cascadilla Press.

Schwartz, Bonnie D.. 1992. Testing between UG-based and problem-solving models of L2A: Developmental Sequence Data. *Language Acquisition* 2, 1.19.

Schwartz, Bonnie D.. 2003. Child L2 acquisition: Paving the way. In Barbara Beachley, Amanda Brown & Frances Colin (eds.), *BUCLD 27: Proceedings of the 27th annual Boston University Conference on Language Development*, 26-50. Somerville, MA: Cascadilla Press.

Schwartz, Bonnie D.. 2009. Unraveling inflection in child L2 development. *Language, Interaction and Acquisition* 1, 63-88.

Schwarze, Rabea; Wojtecka, Magdalena; Grimm, Angela & Schulz, Petra. 2015. Finiteness and verb placement in early second language learners with SLI. In Cornelia Hamann, & Esther Ruigendijk (eds.). *Language Acquisition and Development: Proceedings of GALA 2013*, 429-445. Cambridge Scholars Publishing

Shirai, Yasuhiro & Andersen, Roger W.. 1995. The acquisition of tense-aspect morphology: a prototype account. *Language* 71, 743–762.

Siegal, Michael. 1997. *Knowing children*. Hove: Psychology Press.

Siegmüller, Julia; Herzog, Carmen & Herrmann, Heike. 2005. Syntaktische und lexikalische Aspekte beim Verstehen von Informationsfragen. *L.O.G.O.S. Interdisziplinär* 13, 29–35.

Singer, Judith D. & Willett, John B.. 2003. *Applied longitudinal data analysis. Modeling change and event occurrence*. Oxford, New York: Oxford University Press.

Snijders, Tom A. B. & Bosker, Roel J.. 2012. *Multilevel analysis. An introduction to basic and advanced multilevel modeling*. Los Angeles: SAGE.

Snyder, Lynn; Bates, Elizabeth & Bretherton, Inge. 1981. Content and context in early lexical development. *Journal of Child Language* 8, 565–582.

Sopata, Aldona. 2010. V2 Phenomenon in Child Second Language Acquisition. In Matthew T. Prior, Yukiko Watanabe & Sang-Ki Lee (eds.), *Selected Proceedings of the 2008 Second Language Research Forum: Exploring SLA Perspectives, Positions, and Practices*, 211-228. Somerville, MA: Cascadilla Press.

Stavrakaki, Stavroula. 2006. Developmental perspectives on Specific Language Impairment. Evidence from the production of wh-questions by Greek SLI children over time. *International Journal of Speech-Language-Pathology* 8 (4), 384–396.

Steele, Fiona. 2008. Multilevel models for longitudinal data. *Journal of the Royal Statistical Society: Series A (Statistic in Society)* 171, 5-19.

Steube, Anita. 2006. The influence of operators on the interpretation of DPs and PPs in German information structure. In Valéria Molnár & S. Winkler (eds.), *The architecture of focus*, 489-516. Berlin, New York: Mouton de Gruyter.

Steube, Anita & Sudhoff, Stefan. 2007. Negation und Fokuspartikeln in der Informationsstruktur der deutschen Standardsprache der Gegenwart. In Sandra Döring & Jochen Geilfuß-Wolfgang (eds.), *Von der Pragmatik zur Grammatik*, 87-108. Leipzig: Leipziger Universitätsverlag.

Stiebels, Barbara. 2002. *Typologie des Argumentlinkings. Ökonomie und Expressivität*. Berlin: Akademie Verlag.

Stromswold, Karin. 1995. The Acquisition of Subject and Object Wh-Questions. *Language Acquisition* 4 (1-2), 5–48.

Sudhoff, Stefan. 2008. Zum relativen Skopus von Negation und Fokuspartikeln im deutschen Mittelfeld. In Karin Pittner (ed.), *Beiträge zu Sprache und Sprachen 6: Vorträge der 16. Jahrestagung der Gesellschaft für Sprache und Sprachen*, 317-328. München: lincom europa.

Szagun, Gisela. 1999. Learning by ear: on the acquisition of case and gender marking by German-speaking children with normal hearing and with cochlear implants. *Journal of Child Language* 31 (1), 1–30.

Szagun, Gisela. 2006. *Sprachentwicklung beim Kind. Ein Lehrbuch*. Weinheim, Basel: Beltz.

Talmy, Leonard. 1991. Path to realization: A typology of event conflation. *Proceedings of the 17th annual meeting of the Berkeley Linguistics Society* 17, 480–519.

Tardif, Twila. 1996. Nouns are not always learned before verbs: Evidence from Mandarin speakers' early vocabularies. *Developmental Psychology* 32, 492–504.

Thoma, Dieter & Tracy, Rosemarie. 2006. Deutsch als frühe Zweitsprache: zweite Erstsprache? In Bernt Ahrenholz (ed.), *Kinder mit Migrationshintergrund: Spracherwerb und Fördermöglichkeiten*, 58-79. Freiburg i.Br.: Fillibach.

Trabasso, Tom; Rollins, Howard; Shaughnessy, Edward. 1971. Storage and verification stages in processing concepts. *Cognitive Psychology* 2, 239–289.

Tracy, Rosemarie. 1986 The acquisition of case morphology in German. *Linguistics* 24, 47–78.

Tracy, Rosemarie. 1990. Spracherwerb trotz Input. In Monika Rothweiler (ed.), *Spracherwerb und Grammatik. Linguistische Untersuchungen zum Erwerb von Syntax und Morphologie*, 22-49. Opladen: Westdeutscher Verlag.

Tracy, Rosemarie. 1991. *Sprachliche Strukturentwicklung. Linguistische und kognitionspsychologische Aspekte einer Theorie des Erstspracherwerbs*. Tübingen: Gunter Narr Verlag.

Tracy, Rosemarie. 1994. Raising questions: Formal and functional aspects of the acquisition of wh-questions in German. In Rosemarie Tracy & Elsa Lattely (eds.), *How tolerant is universal grammar: essays on language learnability and language variation,* 1-34. Tübingen: De Gruyter.

Tracy, Rosemarie & Gawlitzek-Maiwald, Ira. 2000. Bilingualismus in der frühen Kindheit. In Hannelore Grimm (ed.), *Sprachentwicklung. Enzyklopädie der Psychologie, CIII, Band 3*, 495-535. Göttingen: Hogrefe.

Tracy, Rosemarie & Thoma, Dieter. 2009. Convergence on finite V2 clauses in L1, bilingual L1 and early L2 acquisition. In Christine Dimroth & Peter Jordesn (eds.), *Functional categories in learner language. Studies on language acquisition (SOLA)*, 1-43. Berlin: Mouton de Gruyter.

Tsimpli, Ianthi Maria 2014. Early, late or very late? Timing acquisition and bilingualism. *Linguistic Approaches to Bilingualism* 4 (3), 283–313.

Turgay, Katharina. 2011. Der Zweitspracherwerb des deutschen Kasus in der Präpositionalphrase. *Zeitschrift für germanistische Linguistik* 39 (1), 24–54.

Tyack, Dorothy & Ingram, David. 1977. Children's production and comprehension of questions. *Journal of Child Language* 4 (02), 211–224.

Unsworth, Sharon. 2005. *Child L2, Adult L2, Child L1: Differences and similarities. A study on the acquisition of direct object scrambling in Dutch*. Utrecht: LOT.

Unsworth, Sharon. 2008. Age and input in the acquisition of grammatical gender in Dutch. *Second Language Research* 24, 365–395.

Unsworth, Sharon. 2013. Assessing age of onset effects in (early) child L2 acquisition. *Language Acquisition* 20, 74–92.

Unsworth, Sharon. 2016a. Early child L2 acquisition: age or input effects? Neither, or both? *Journal of Child Language* 43, 608-634.

Unsworth, Sharon. 2016b. Quantity and quality of language input in bilingual language development. In Elena Nicoladis & Simona Montanari (eds.), *Lifespan perspectives on bilingualism*, 136-196. Berlin, New York.

Unsworth, Sharon; Hulk, Aafke & Marinis, Theodoros. 2011. Internal and external factors in child second language acquisition. *Linguistic Approaches to Bilingualism* 1 (3), 207–212.

van der Lely, Heather K. J. & Battell, Jackie. 2003. Wh-movement in children with grammatical SLI: A test of the RDDR hypothesis. *Language* 79, 153–182.

van Hout, Angeliek. 1998 On the role of direct objects and particles in learning telicity in Dutch and English. In Annabel Greenhill, Mary Hughes, Heather Littlefield & Hugh Walsh (eds.), *Proceedings of the 22nd annual Boston University Conference on Language Development*, 397-408. Somerville, MA: Cascadilla Press.

van Hout, Angeliek. 2000. Event semantics in the lexicon-syntax interface: verb frame alternations in Dutch and their acquisition. In Carol Tenny & James Pustejovsky (eds.), *Events as grammatical objects. The converging perspectives of lexical semantics and syntax*, 239-282. Stanford, Calif.: CSLI Publications, Center for the Study of Language and Information.

van Hout, Angeliek. 2013. *Event semantics of verb frame alternations: A case study of Dutch and its acquisition*. New York, London: Routledge.

van Kampen, Jacqueline. 1997. *First steps in wh-movement*. Delft: Eburon.

Velupillai, Viveka. 2012. *An introduction to linguistic typology*. Amsterdam: John Benjamins Publishing Company.

Verkuyl, Henk J.. 1972. *On the compositional nature of the aspects*. Dodrecht: Reidel.

Verkuyl, Henk J.. 1993. *A theory of aspectuality*. Cambridge: Cambridge University Press.

Verrips, Maaike & Weissenborn, Jürgen. 1992. Routes to verb placement in early German and French: The independence of finiteness and agreement. In Jürgen Meisel (ed.), *The acquisition of verb placement. Functional categories and V2 phenomena in language acquisition*, 283-331. Dodrecht: Kluwer Academic Publishers.

Vikner, Sten. 1995. *Verb movement and expletive subjects in the Germanic languages*. Oxford: Oxford University Press.

Wagner, Laura. 2006. Aspectual bootstrapping in language acquisition: Telicity and transitivity. *Language Learning and Development* 2 (1), 51–76.

Wagner, Laura. 2010. Inferring meaning from syntactic structures in acquisition: The case of transitivity and telicity. *Language and cognitive processes* 25 (10), 1354–1379.

Wales, R. J. & Grieve, R..1969. What is so difficult about negation? *Perception and Psychophysics* 6, 327–332.

Wason, P. C.. 1961a. Response to affirmative and negative binary statements. *British Journal of Psychology* 52, 133–142.

Wason, P. C.. 1961b. The processing of positive and negative information. *Quarterly Journal of Experimental Psychology* 11, 92–107.

Wason, P. C.. 1965. The context of plausible denial. *Journal of Verbal Learning and Verbal Behavior* 4, 7–11.

Wason, P. C.. 1972. In real life negatives are false. *Logique et Analyse* 15, 17–38.

Wason, P. C. & Jones, S.. 1963. Negatives: Denotation and connotation. *British Journal of Psychology* 54, 299–307.

Wechsler, Stephen. 1991. Verb second and illocutionary force. In Katherine Leffel & Denis Bouchard (eds.), *Views on phrase structure*, 177-192. Kluwer: Dodrecht.

Wegener, Heide. 1990. Der Dativ - ein struktureller Kasus? In Gisbert Fanselow & Sascha Felix (eds.), *Strukturen und Merkmale syntaktischer Kategorien*, 70-103. Tübingen: Narr.

Wegener, Heide. 1993. Weil – das hat schon seinen Grund. Zur Verbstellung in Kausalsätzen mit *weil* im gegenwärtigen Deutsch. *Deutsche Sprache* 21, 289-305.

Wegener, Heide. 1995. Kasus und Valenz im natürlichen DaZ-Erwerb. In Ludwig M. Eichinger, Hans-Werner Eroms (eds.), *Dependenz und Valenz. (Beiträge zur germanistischen Sprachwissenschaft, Bd. 10*), 337-356. Hamburg: H. Buske.

Weissenborn, Jürgen. 1990. Functional categories and verb movement: the acquisition of German syntax reconsidered. In Monika Rothweiler (ed.), *Spracherwerb und Grammatik. Linguistische Untersuchungen zum Erwerb von Syntax und Morphologie*, 190-225. Opladen: Westdeutscher Verlag.

Weissenborn, Jürgen. 1994. Constraining the child's grammar: Local wellformedness in the development of verb movement in German and French. In Barbara Lust, Margarita Suner & John Whitman (eds.), *Syntactic theory and language acquisition: Crosslinguistic perspectives. Vol. 1: Heads, projection, and learnability*, 215-247. Hillsdale, NJ: Lawrence Erlbaum.

Weist, Richard M.; Wysocka, Hanna; Witkowska-Stadnik, Katarzyna; Buczowska, Ewa & Konieczna, Emilia. 1984. The defective tense hypothesis. On the emergence of tense and aspect in child Polish. *Journal of Child Language* 11 (2), 347–374.

Wenzel, Ramona; Schulz, Petra & Tracy, Rosemarie. 2009. Herausforderungen und Potentialen der Sprachstandsdiagnostik - Überlegungen am Beispiel von LiSe-DaZ. In Dorit Lengyel, Hans H. Reich, Hans-Joachim Roth & Marion Döll (eds.), *Von der Sprachdiagnose zur Sprachförderung*, 125-132. Münster, New York, München, Berlin: Waxmann.

Weverink, Meike. 1990. What's missing in Dutch? *Papers and Reports on Child Language Development* 29, 125–132.

Wexler, Kenneth. 1994. Optional infinitives, head movement and the economy of derivation. In David Lightfoot & Norbert Hornstein (eds.), *Verb movement*, 305-350. Cambridge: Cambridge University Press.

White, Lydia. 2003. *Second language acquisition and universal grammar*. Cambridge: Cambridge University Press.

Wilhem, Andrea & Hanna, Ken. 1992. On the acquisition of wh-questions. *Calgary working papers in linguistics* 15, 89–98.

Winkler, Steffi. 2006. The triggering effect of negation in the acquisition of finiteness in German L1 and L2. In Holger Mitterer & Tanya Stivers (eds.), *Annual report of the Max Planck Institute for Psycholinguistics*, 106-107. Nijmengen: Max-Planck-Institute for Psycholinguistics.

Wittek, Angelika. 1999. Zustandsveränderungsverben im Deutschen. Wie lernt das Kind die komplexe Semantik? In Jörg Meibauer & Monika Rothweiler (eds.), *Das Lexikon im Spracherwerb*, 278-295. Tübingen: A. Francke Verlag.

Wittek, Angelika & Tomasello, Michael. 2005. German-speaking children's productivity with syntactic constructions and case morphology: Local cues act locally. *First Language* 25, 103-125

Wode, Henning. 1977. Four early stages in the development of L1 negation. *Journal of Child Language* 4, 87–102.

Wojtecka, Magdalena; Koch, Corinna; Grimm, Angela & Schulz, Petra. 2011. Production and comprehension of sentence negation in child German. In Angela Grimm, Anja Müller, Cornelia Hamann & Esther Ruigendijk (eds.), *Production and comprehension asymmetries in child language. SOLA Studies on language acquisition 43*, 217-245. Berlin, Boston: De Gruyter.

Wojtecka, Magdalena; Koch, Corinna; Grimm, Angela & Schulz, Petra. 2013. What is easier to understand than true negatives? Acquisition of sentence negation in German. In Stavroula Stavrakaki, Marina Lalioti & Xenia Konstantinopoulou (eds.), *Advances in language acquisition. Proceedings of GALA 2009*, 251-259. Cambridge: Cambridge Scholars Press.

Wojtecka, Magdalena; Schwarze, Rabea; Grimm, Angela & Schulz, Petra. 2013. Finiteness and verb placement in German: A challenge for early second language learners? In Jennifer Cabrelli Amaro, Tiffany Judy, and Diego Pascual y Cabo (eds.), *Proceedings of the 12th Generative Approaches to Second Language Acquisition Conference (GASLA 2013)*, 211-221. Somerville, MA: Cascadilla Proceedings Project.

Wunderlich, Dieter. 1997. Cause and the structure of verbs. *Linguistic Inquiry* 28, 27–68.

Appendix

A. Detailed information about participants

Table A.1. Monolingual children: T-values in LiSe-DaZ at classification test round.

ID	Age	N of subtests with t < 40	T	WH	NEG	PREP	FOC	LV	MAV	CONJ	CASE
1001	4;5	0	56	43	45	40	51	62	46	57	43
1011	4;8	1	46	47	49	47	69	71	58	70	38
1012	4;10	0	56	53	57	66	63	59	54	57	56
1013	4;6	0	56	47	49	47	58	59	58	46	67
1014	4;8	1	56	61	65	47	71	71	69	51	34
1015	4;10	1	46	53	57	40	58	71	58	51	38
1022	4;9	1	46	61	52	34	51	55	50	57	56
1023	4;10	1	56	53	65	53	63	47	54	46	38
1024	4;8	0	56	53	52	66	58	64	58	51	67
1025	4;2	0	41	53	52	66	45	62	46	57	43
1026	4;9	0	46	53	65	66	51	55	58	46	56
1027	4;6	1	56	53	57	34	69	59	54	51	56
1042	4;11	1	56	53	65	71	58	64	54	51	67
1044	4;8	0	56	61	65	60	71	64	69	62	56
1045	4;8	0	56	61	65	57	58	68	46	51	56
1046	4;7	0	56	47	57	47	63	59	54	46	49
1059	4;6	0	41	61	57	40	45	50	67	46	56
1064	4;9	0	46	61	65	60	58	68	46	57	52
1065	4;9	0	56	53	57	60	63	71	70	46	52
1066	4;6	0	56	53	52	47	45	50	54	43	56
1067	4;8	0	56	53	65	-	-	-	-	-	-
1069	4;6	1	46	53	52	37	45	47	69	46	56
1070	4;6	1	56	43	65	53	69	68	67	51	38
1071	4;7	0	56	61	57	40	63	59	69	46	56
1073	4;7	0	56	53	41	40	69	57	46	43	49
1075	4;6	0	56	61	65	57	69	68	54	57	56
1078	4;9	1	56	53	57	37	58	43	58	46	60
1079	4;7	1	56	47	57	37	63	53	62	57	60
1080	4;8	1	56	53	41	37	51	57	67	57	67
1083	4;8	0	56	61	52	57	71	57	54	46	43
1084	4;6	0	56	53	49	60	51	64	46	51	56
1091	4;11	1	56	53	52	37	63	62	71	43	60
1095	4;6	1	56	53	65	37	51	64	67	46	60
1097	4;8	0	56	53	65	57	63	68	54	57	56
1108	4;4	1	56	53	47	40	54	41	50	51	34
1109	4;7	0	46	61	47	60	69	57	54	51	49

1110	4;8	1	46	43	52	71	39	62	50	68	52
1114	4;8	0	56	53	41	71	63	68	62	46	60
1116	4;5	0	56	61	65	57	58	59	58	68	60
1120	4;10	0	46	61	57	40	69	62	54	51	56
1122	5;0	0	54	59	60	48	47	65	52	44	55
1130	4;6	0	56	47	65	47	58	57	62	46	56
1131	4;6	0	56	47	47	40	69	64	58	43	56
1135	4;7	1	56	-	-	34	51	59	62	57	49
1144	4;10	0	56	47	41	53	63	71	54	51	43

ID Identity number, T Telicity, WH Wh-questions, NEG, Negation, PREP Prepositions, FOC Focus particles, LV Lexical verbs, MAV Modal and auxiliary verbs, CONJ Conjunctions

Table A.2. eL2 children: T-values in LiSe-DaZ at classification test round.

ID	Age	N of subtests with t < 40	VM	WH	NEG	PREP	FOC	LV	MAV	CONJ	CASE
2009	4;4	0	58	50	56	40	50	52	55	43	41
2028	4;8	0	66	64	57	63	55	71	63	52	71
2029	4;7	0	52	64	45	49	60	60	57	60	57
2033	4;6	0	48	56	54	41	41	55	52	57	62
2035	4;5	1	45	64	54	63	51	52	34	60	62
2036	4;8	1	42	50	45	36	46	45	40	52	45
2037	4;9	0	66	64	45	60	60	66	49	49	57
2039	4;10	0	52	59	66	68	60	54	52	52	45
2040	4;8	1	52	46	45	46	41	60	55	39	45
2049	4;9	1	57	56	39	46	65	66	49	64	45
2050	4;9	1	42	39	46	60	46	48	47	46	67
2051	4;5	0	48	59	45	68	61	66	57	64	57
2061	4;10	0	66	64	54	46	65	55	60	52	51
2077	4;10	0	66	64	54	53	60	71	58	71	71
2082	4;6	0	66	42	66	49	41	60	66	52	62
2085	4;7	0	66	59	71	53	60	71	71	57	62
2086	4;11	0	52	50	45	60	60	69	58	57	62
2088	4;11	0	57	64	71	49	68	52	57	70	62
2089	4;9	0	52	56	61	49	69	55	58	70	51
2107	4;8	0	52	56	-	53	55	66	57	52	51
2111	4;7	1	66	56	54	49	41	48	40	39	62
2112	4;9	0	66	56	66	60	69	66	63	71	62
2119	4;10	0	52	59	57	53	65	66	60	71	51
2121	4;11	0	66	71	71	46	55	55	55	60	67
2125	4;6	0	57	50	45	53	55	66	64	46	51
2127	4;7	0	66	71	51	68	46	60	55	60	71
2139	4;9	0	66	71	71	63	46	60	44	64	62
2140	4;10	1	48	46	34	68	60	71	40	49	45
2141	4;8	1	57	59	71	53	65	66	57	39	51

ID Identity number, T Telicity, WH Wh-questions, NEG, Negation, PREP Prepositions, FOC Focus particles, LV Lexical verbs, MAV Modal and auxiliary verbs, CONJ Conjunctions

Table A.3. eL2 children: Sex and language biography.

ID	Sex	Age of Onset to German	L1
2009	g	3;3	Bosnian
2028	b	2;6	Serbian
2029	b	2;10	Turkish
2033	g	2;9	Turkish
2035	g	3;0	Turkish
2036	g	3;2	Turkish
2037	b	3;3	Bosnian
2039	g	3;2	Turkish
2040	b	2;11	Greek
2049	g	2;11	Pandjabi
2050	b	2;8	Pandjabi
2051	b	2;7	Persian
2061	b	2;11	Croatian
2077	g	3;4	Croatian
2082	b	2;10	Arabic
2085	g	3;2	Afghan
2086	b	3;4	Kotocoli
2088	g	3;3	Turkish
2089	b	3;2	Turkish
2107	g	3;0	Italian
2111	b	3;0	Arabic
2112	g	3;0	Arabic
2119	g	2;10	Turkish
2121	g	3;1	Russian
2125	b	2;0	Jugoslav
2127	b	2;2	Russian
2139	b	3;2	Bosnian
2140	b	3;5	Persian
2141	b	2;0	Tchamba

ID Identity number, g Girl, b Boy

Table A.4. Monolingual children: Sex and age at each test round.

ID	Sex	Age at T1	Age at T2	Age at T3	Age at T4	Age at T5
1001	g	3;6	4;1	4;5	5;1	5;8
1011	b	3;9	4;3	4;8	5;0	5;10
1012	g	3;11	4;4	4;10	5;4	5;11
1013	b	3;7	4;0	4;6	5;0	5;7
1014	g	3;10	4;3	4;8	5;3	5;10
1015	b	4;0	4;5	4;10	5;4	5;11
1022	b	3;10	4;2	4;9	5;4	5;9
1023	b	3;11	4;5	4;10	5;4	5;11
1024	g	3;8	4;1	4;8	5;2	5;9
1025	b	3;6	4;2	-	-	-
1026	b	3;11	4;2	4;9	5;7	-
1027	g	3;7	4;2	4;6	5;1	5;8
1042	b	4;0	4;4	4;11	5;7	5;11
1044	b	3;9	4;5	4;8	-	-
1045	g	3;9	4;5	4;8	-	-
1046	b	3;6	4;1	4;7	5;0	5;7
1059	b	3;7	4;1	4;6	5;2	-
1064	g	3;8	4;5	4;9	5;5	5;10
1065	g	3;8	4;5	4;9	5;5	5;10
1066	b	3;6	4;0	4;6	5;1	5;6
1067	g	3;6	4;2	4;8	5;2	5;8
1069	b	3;7	4;0	4;6	5;0	5;7
1070	g	3;7	4;0	4;5	5;0	5;7
1071	g	3;7	4;1	4;7	5;1	5;7
1073	b	3;9	4;3	4;7	5;3	5;8
1075	g	3;8	4;1	4;5	5;2	5;8
1078	b	3;11	4;4	4;9	5;4	5;9
1079	b	3;8	4;1	4;7	5;1	5;6
1080	b	3;10	4;4	4;8	5;3	5;8
1083	g	3;9	4;5	4;8	5;4	-
1084	g	3;7	-	4;6	5;2	5;9
1091	g	4;1	4;5	4;11	5;5	5;11
1095	b	3;6	4;0	4;5	5;1	5;7
1097	b	3;6	4;2	4;8	5;3	5;9
1108	g	4;0	4;4	-	-	-
1109	g	3;8	4;1	4;7	5;2	5;8
1110	b	3;8	4;2	4;8	5;2	5;9
1114	g	3;8	4;2	4;8	5;3	5;9
1116	b	3;11	4;5	-	-	-
1120	b	3;11	4;4	4;8	5;5	5;10
1122	g	3;11	4;3	5;0	5;4	5;11
1130	g	3;7	4;0	4;6	5;0	5;7

1131	b	3;8	4;2	4;6	5;1	5;8
1135	b	3;8	4;1	4;7	-	5;7
1144	b	3;11	4;3	4;10	5;3	-

ID Identity number, g Girl, b Boy

Table A.5. eL2 children: Age and length of exposure to German at each test round.

ID	Age at T1	ME at T1	Age at T2	ME at T2	Age at T3	ME at T3	Age at T4	ME at T4	Age at T5	ME at T5	Age at T6	ME at T6
2009	4;0	9	4;4	12	-	-	5;4	25	5;9	30	6;11	44
2028	3;7	13	4;2	19	4;8	25	5;2	32	5;8	37	6;8	49
2029	3;6	8	4;2	15	4;7	21	5;0	26	5;6	32	-	-
2033	3;6	8	4;1	15	4;6	20	5;0	26	5;6	32	6;6	44
2035	3;9	8	4;1	12	4;5	17	5;1	25	5;7	30	-	-
2036	4;0	9	4;4	13	4;8	18	5;4	25	5;10	31	-	-
2037	4;1	9	4;4	13	4;9	18	5;5	26	5;11	32	-	-
2039	3;11	8	4;5	14	4;10	20	5;5	26	6;4	37	6;11	45
2040	3;9	9	4;4	16	4;8	21	5;4	28	5;9	34	6;9	46
2049	3;7	8	4;4	16	4;9	22	5;3	28	5;8	33	-	-
2050	3;8	11	4;4	19	4;9	25	5;4	31	5;9	36	-	-
2051	3;5	10	4;0	17	4;5	22	5;0	28	5;5	33	-	-
2061	3;8	9	4;4	17	4;10	22	5;4	29	5;11	36	7;0	49
2077	3;10	6	4;4	12	4;10	17	5;5	25	5;11	30	6;11	43
2082	3;7	9	4;1	14	4;6	20	5;1	27	5;6	31	6;8	45
2085	3;7	5	4;0	10	4;7	16	5;2	23	5;8	29	-	-
2086	4;1	9	4;4	12	4;11	18	5;5	25	5;11	31	7;1	45
2088	4;0	9	4;3	12	4;11	20	5;4	25	5;10	31	-	-
2089	3;11	8	4;2	11	4;9	19	5;3	24	5;9	30	6;10	44
2107	3;6	6	4;0	12	4;8	20	5;2	26	-	-	6;7	43
2111	3;8	8	4;1	13	4;7	19	5;3	27	-	-	-	-
2112	3;9	9	4;3	14	4;9	20	5;3	27	5;10	33	7;0	47
2119	3;11	13	4;5	19	4;10	24	5;5	31	6;0	37	-	-
2121	3;11	10	4;5	15	4;11	21	5;6	29	5;11	33	7;4	51
2125	3;7	19	4;1	24	4;6	30	5;1	37	5;8	43	-	-
2127	3;8	18	4;3	24	4;7	29	5;0	34	5;10	43	-	-
2139	3;7	5	4;2	12	4;9	19	5;3	24	5;8	30	-	-
2140	3;10	5	4;5	11	4;10	17	5;5	23	5;11	29	7;0	42
2141	3;6	18	4;3	27	4;8	32	5;2	38	5;9	45	6;9	57

ID Identity number, ME length of exposure to German in months.

B. Individual developmental patterns

Table B.1. Individual row scores (max.3) of the 24 eL2 children in interpretation of atelic and telic verbs across four test rounds.

	T1 Age 3;7		T2 Age 4;2		T3 Age 4;7		T4 Age 5;8	
ID	Atelic	Telic	Atelic	Telic	Atelic	Telic	Atelic	Telic
2035	3	3	3	3	3	2	3	3
2077	3	3	3	3	3	3	3	3
2119	3	3	3	3	1	3	3	3
2139	3	3	3	3	3	3	3	3
2089	3	3	2	2	3	2	3	3
2112	3	3	2	3	3	3	2	3
2051	3	3	1	1	0	3	3	3
2028	3	2	3	3	3	3	2	3
2082	3	2	3	3	3	3	3	3
2121	3	2	3	3	3	3	3	3
2029	3	2	3	2	3	3	3	3
2140	3	2	3	1	2	3	3	3
2127	3	0	3	3	3	3	2	3
2037	3	0	3	2	3	3	3	3
2061	3	0	3	2	3	3	3	3
2125	3	0	3	0	3	3	3	3
2033	3	0	3	2	3	0	3	3
2040	3	0	3	1	2	3	3	3
2141	3	0	3	0	3	2	3	3
2039	3	0	3	0	3	2	3	2
2050	3	0	3	0	3	0	3	2
2036	0	0	3	0	3	0	3	3
2085	0	0	2	2	3	3	3	2
2049	1	3	3	3	3	2	3	2

Table B.2. Individual mastery (✓) and non-mastery (-) of the 25 eL2 children in comprehension of verb adjacent (Adj.) and verb non-adjacent (N-Adj.) negation across four test rounds.

	T1 Age 3;7		T2 Age 4;2		T3 Age 4;7		T4 Age 5;8	
ID	Adj.	N-Adj.	Adj.	N-Adj.	Adj.	N-Adj.	Adj.	N-Adj.
2036	n.d.	n.d.	-	-	-	-	-	-
2125	n.d.	n.d.	-	-	-	-	-	-
2051	-	-	-	-	-	-	-	-
2121	✓	✓	✓	✓	✓	✓	✓	✓
2089	n.d.	n.d.	✓	✓	✓	✓	✓	✓
2085	n.d.	n.d.	-	-	✓	✓	✓	✓
2139	-	-	-	-	✓	✓	✓	✓
2086	n.d.	n.d.	-	-	-	-	✓	✓
2037	-	-	-	-	-	-	✓	✓
2127	-	-	-	-	-	-	✓	✓
2112	✓	-	✓	-	✓	✓	✓	✓
2141	✓	-	✓	✓	✓	✓	✓	✓
2061	-	-	✓	-	✓	-	✓	✓
2082	-	-	✓	-	✓	✓	✓	✓
2088	n.d.	n.d.	✓	-	✓	✓	✓	✓
2033	-	-	-	-	✓	-	✓	✓
2049	n.d.	n.d.	-	-	-	-	✓	-
2050	n.d.	n.d.	-	-	-	-	✓	-
2140	-	-	-	-	-	-	✓	-
2035	-	-	-	-	✓	-	✓	-
2028	-	-	-	-	-	✓	✓	✓
2029	-	-	-	✓	-	-	✓	-
2039	-	✓	✓	✓	✓	✓	-	-
2119	✓	-	-	-	-	✓	✓	✓
2077	-	-	✓	-	-	-	✓	✓

* n.d. = no data

Table B.3. Individual mastery (✓) and non-mastery (-) of eL2 first subgroup in comprehension of true negatives (TN) and false negatives (FN) negation across four test rounds.

	T1 Age:3;7		T2 Age: 4;2		T3 Age: 4;7		T4 Age: 5;8	
ID	TN	FN	TN	FN	TN	FN	TN	FN
2050	n.d.	n.d.	-	✓	-	-	-	✓
2088	n.d.	n.d.	-	✓	✓	✓	✓	✓
2085	n.d.	n.d.	-	✓	✓	✓	✓	✓
2089	n.d.	n.d.	-	✓	-	✓	✓	✓
2049	n.d.	n.d.	-	-	-	✓	✓	-
2127	-	-	-	✓	-	✓	-	✓
2029	-	✓	-	✓	-	✓	✓	-
2077	-	✓	-	✓	-	✓	-	✓
2112	-	✓	-	✓	✓	✓	✓	✓
2119	-	✓	-	✓	-	✓	✓	✓
2028	-	✓	✓	-	-	✓	✓	-

Table B.4. Individual mastery (✓) and non-mastery (-) of second eL2 group comprehension of true negatives (TN) and false negatives (FN) negation across four test rounds.

	T1 Age: 3;7		T2 Age: 4;2		T3 Age: 4;7		T4 Age: 5;8	
ID	TN	FN	TN	FN	TN	FN	TN	FN
2036	n.d.	n.d.	✓	-	✓	-	-	✓
2086	n.d.	n.d.	✓	-	✓	-	✓	✓
2082	-	-	✓	-	✓	✓	✓	-
2035	-	-	-	-	✓	-	✓	-
2037	✓	-	-	-	-	✓	-	✓
2139	✓	-	-	-	✓	✓	✓	✓
2061	✓	-	-	✓	-	✓	✓	✓
2140	✓	-	✓	-	-	-	-	✓
2033	✓	-	✓	-	✓	-	✓	✓
2141	✓	-	✓	-	✓	✓	✓	✓
2039	✓	-	✓	✓	✓	✓	-	✓

Table B.5. Developmental path of 25 eL2 learners towards the acquisition of finiteness in matrix clauses with V2.

ID	Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
2036		No data	No data	Target-like	Target-like
2049		No data	Target-like	Target-like	Target-like
2051		No data	Target-like	Target-like	Target-like
2061		No data	Target-like	Target-like	Taget-like
2119		No data	Target-like	Target-like	Target-like
2121		Target-like	Target-like	Target-like	Target-like
2127		Target-like	Target-like	Target-like	Target-like
2037		Target-like Bare forms	Target-like	Target-like Bare forms	Target-like
2077		Target-like Bare forms	Target-like	Target-like	Target-like
2082		Target-like Bare forms	Target-like	Target-like	Target-like
2125		Target-like Bare forms	Target-like	Target-like	Target-like
2141		Target-like Bare forms	Target-like	Target-like	Target-like
2089		No data	Target-like Bare forms	Target-like Bare forms	Target-like
2086		No data	Target-like Bare forms	Target-like	Target-like
2139		No data	Target-like Bare forms	Target-like	Traget-like
2035		Target-like	Bare forms	Target-like	Target-like
2112		Target-like	Target-like	Target-like Bare forms	Target-like
2033		Target-like	Target-like Bare forms	Target-like	Target-like
2050		No data	Bare forms	Target-like	Target-like
2039		Infinitival	Bare forms	Target-like	Target-like

2029	Infinitival	Target-like Bare forms Infinitival	Target-like	Target-like
2088	No data	Target-like Infinitival	Target-like	Target-like
2028	Target-like Bare forms Infinitival	Target-like Bare forms	Target-like	Target-like
2085	No data	Target-like Bare forms Infinitival	Target-like	Target-like
2140	Target-like Substitutions	Bare forms	Target-like	Target-like

Table B.6. Individual developmental paths of monolingual children (n=21) in acquisition of subordinate clauses.

	T1	T2	T3	T4
Age	3;9	4;3	4;8	5;9
1011	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-V2
1012	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf	No data
1013	Vf *weil*-Vf	Vf V2 *weil*-Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf
1014	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf *weil*-V2
1015	Vf *weil*-Vf	Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf
1097	Vf *weil*-Vf	Vf V2 *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
1130	Vf *weil*-Vf	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf
1079	Vf	Vf	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
1080	Vf	Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-V2
1109	*weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf
1144	*weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf	No data
1110	*weil*-V2	Vf *weil*-Vf	Vf *weil*-V2	Vf *weil*-V2
1095	*weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
1078	Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf

1120	Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
1135	Vf *weil*-V2	Vf V2 *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2
1001	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *wegen*-V2
1022	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf	Vf *weil*-Vf
1023	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
1024	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf *weil*-V2
1026	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-V2	No data

Table B.7. Individual developmental paths of eL2 children (n=25) in acquisition of subordinate clauses.

Age	T1 3;9	T2 4;3	T3 4;8	T4 5;9
2029	Non subordinate clauses	Non subordinate clauses	Vf *weil*-Vf	Vf
2035	Non subordinate clauses	Non subordinate clauses	Vf *weil*-Vf	Vf *weil*-Vf
2037	Non subordinate clauses	Vf	Vf V2	Vf *weil*-Vf
2088	Non subordinate clauses	*weil*-Vf	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2
2119	Vf *weil*-Vf	*weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-Vf
2036	Non subordinate clauses	Non subordinate clause	*weil*-V2	Vf *weil*-Vf *weil*-V2
2050	Non subordinate clauses	Non subordinate clauses	*weil*-V2	Vf *weil*-Vf *weil*-V2
2049	Non subordinate clauses	*weil*-V2	*weil*-Vf *weil*-V2	Vf *weil*-Vf
2051	Non subordinate clauses	*weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2
2082	Non subordinate clauses	*weil*-V2	Vf *weil*-Vf	Vf *weil*-V2
2061	*weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
2125	*weil*-V2	V1	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
2112	*weil*-V2	*weil*-V2	Vf *weil*-V2 V2	Vf *weil*-V2
2033	Non subordinate clauses	Non subordinate clauses	*weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
2086	Non subordinate clauses	Non subordinate clauses	*weil*-Vf *weil*-V2	Vf *wegen*-V2

2089	Non subordinate clauses	*weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2	Vf *wegen*-V2
2121	*weil*-Vf *weil*-V2	Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf *weil*-V2
2039	Non subordinate clauses	Non subordinate clauses	Vf *weil*-V2	Vf *weil*-Vf
2139	Non subordinate clauses	Non subordinate clauses	Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
2140	Non subordinate clauses	Non subordinate clauses	V2	Vf V2
2141	Non subordinate clauses	Non subordinate clauses	V2	Vf *weil*-V2
2028	Non subordinate clauses	Vf V1	V1	Vf *weil*-V2
2077	V1 V2 *weil*-V2	Vf V2 *weil*-V2	Vf V2 *weil*-Vf *weil*-V2	Vf *weil*-Vf *weil*-V2
2127	V1 *weil*-V2	V1 V2 *weil*-Vf *weil*-V2	Vf *weil*-Vf	Vf *weil*-Vf *weil*-V2
2085	Non subordinate clauses	Non subordinate clauses	Vf *weil*-Vf *weil*-V2	Vf *wegen*-V2