

Natascha Müller*

Different sources of delay and acceleration in early child bilingualism

DOI 10.1515/zfs-2017-0002

Abstract: The present article argues that the two effects observed in bilingual first language acquisition, delay and acceleration, have different sources. Whereas delay can be due to cross-linguistic influence on the competence or the performance level and to the mere cognitive burden to process two languages, acceleration is always rooted in efficient computation in a non-linguistic sense. The evidence for the difference between delay and acceleration effects stems from children who are raised bilingually from birth and who are studied during spontaneous speech production. It falls out rather naturally that linguistic development is immune to acceleration, while it can be delayed in bilingual children as compared to monolinguals.

Keywords: acceleration, delay, simultaneous bilingual children, V-final stage

1 Introduction

Research in the 1980s and 1990s concentrated on the question of whether children who have been raised bilingually from birth are able to separate their two languages. This research question was mainly motivated by a joint study of Volterra and Taeschner (1978) who argued that bilingual first language acquisition was characterized by a first stage of fusion at the lexical and the syntactic level in the bilingual individual. Fusion was assumed for two reasons: (i) the bilingual German-Italian children in the study did not possess translation equivalents in order to express their communicative needs in both languages and (ii) their early syntax was observed to contain one “rule” or structure, which happens to correspond to the adult structure of one of the two languages or which deviated from the target structures of both languages (Taeschner

*Corresponding author: Natascha Müller, Romanistik/Linguistik, Bergische Universität Wuppertal, E-mail: nmuller@uni-wuppertal.de

1983). Some years later, Genesee (1989), Meisel (1989) and Paradis and Genesee (1996) presented convincing arguments in favour of the view that the two languages are acquired autonomously, both at the lexical and at the syntactic level (Genesee et al. 2004; Hakuta 1986; Meisel 1994; Wei 2004). Lleó (2002) and Lleó and Kehoe (2002) were among those researchers who added further evidence for the autonomous development of the two languages in the bilingual individual from the perspective of two phonological systems; more importantly, their evidence for separation comes from a very early age of bilingual first language acquisition. The proof of separate development was the main purpose of this research. At the same time, the existence of cross-linguistic influence was denied.

Then came a time with a considerable amount of studies showing that the two languages can develop separately in the bilingual individual, but that there is a difference between monolinguals and bilinguals. Some attribute this difference to cross-linguistic influence, i.e. the interference from the other language of the bilingual (Hulk and Müller 2000; Müller and Hulk 2000, 2001). Following the seminal work by Gawlitzek-Maiwald and Tracy (1996) and Döpke (1992, 1997, 1998), the possibility of autonomous development in the presence of cross-linguistic influence had not been called into question anymore. Cross-linguistic influence has been attested at all levels of linguistic description. Lleó and Rakow (2006) observed influence in prosody, Nicoladis (1999, 2003) argued for influence in morphology, and Müller and Hulk (2000, 2001) found cross-linguistic influence at the syntactic level. The interested reader is referred to N. Müller (2009, 2010), Nicoladis (2006: 15–17) and Tracy and Gawlitzek-Maiwald (2000) for a more detailed presentation of the literature.

Another source for a difference between monolinguals and bilinguals is the mere fact of being bilingual. In contrast to cognitive enhancement in the bilingual, linguistic performance (with the exception of meta-linguistic performance) is generally argued to be less efficient in bilinguals (cf. Bialystok 2009): Bilinguals are said to master a much smaller vocabulary than monolinguals and they perform less accurately on rapid lexical retrieval tasks.

Studying the literature on bilingualism, the sources for the difference between monolinguals and bilinguals, cross-linguistic influence and bilingualism *per se*, have to be distinguished from their effects, a disadvantage (delay) and an advantage (acceleration). The present article looks more closely at delay and acceleration effects and asks the question of whether they have the same source.

The article is structured in the following way: Section 2 defines the two effects, delay and acceleration, and delimits their extent to linguistic and cognitive domains. Section 3 is devoted to delay in spontaneous child data. The

section outlines that all kinds of sources are possible here, language dominance, cross-linguistic influence due to computational complexity or heavy processing load, and bilingualism *per se*. In spontaneous speech data, delay occurs most likely when the languages interfere due to computational complexity. Section 4 describes the less studied acceleration effects in spontaneous speech data and offers new interpretations for so-called linguistic advantages. The last section locates delay and acceleration within a theory of language.

2 The bilingual (dis)advantage resulting from transfer and the mere fact of being bilingual

Although they exclude the importance of cross-linguistic influence for their studied corpora (English-French children), Paradis and Genesee (1996) outline that cross-linguistic influence is a cover-term for three possible outcomes of the interaction of two languages in the bilingual child. First, transfer of grammatical knowledge is a possible outcome of cross-linguistic influence. The second result of language influence is acceleration. By acceleration, the authors mean that the speed of acquisition is accelerated in language A in comparison to monolinguals due to the influence of language B. The third outcome is delay, meaning that the speed of acquisition reduces in language A in comparison with monolinguals due to the influence of language B. Surprisingly, both acceleration and delay can be the outcome of transfer of grammatical knowledge. Transfer, which has the effect of speeding up the acquisition process, is called positive transfer in the literature on second language acquisition. Negative transfer is at work in cases where development is slowed down due to the transmission of grammatical knowledge from language A to language B which results in target-deviant grammatical representation in language B. However, getting rid of target-deviant structures takes time. Therefore, the acquisition process is delayed in comparison to monolinguals. In other words, the cover-terms transfer, acceleration and delay are not located at the same descriptive level. Whereas acceleration and delay are observable effects, transfer can be the source for both of them.

Both acceleration and delay can also be caused by the mere fact that the individual is bilingual. Bialystok (2001, 2009) has shown that bilingualism matters for (non-)verbal cognitive performance. It enhances executive functioning and protects against the decline of executive control during lifespan. In other words, bilinguals outrank monolinguals in tasks that demand a high degree of executive functioning. These tasks demand the inhibition of a stimulus that is

irrelevant for the task at hand and has to be suppressed in order to accomplish the task. Bilinguals have advantages over monolinguals in cognitive performance that is not based on verbal control. Bilingualism is generally said to have a bad effect on linguistic performance. Again, acceleration and delay are observable effects, the reason of which is the fact that bilinguals have to suppress competing information.

Research interested in the effects of bilingualism can be divided into psychologically and linguistically focused investigations. The examination of specific areas of cognitive functioning for evidence of the enhancing effects of bilingualism has a long tradition in psychology (cf. above and Bialystok 2001, 2009; Bialystok et al. 2007). Bilinguals are thought to be at an advantage with respect to understanding the arbitrariness of numeric symbols, performance on the *Dimensional Change Card Sort* task, ignoring misleading features of a number concept task, performance on spatial problems, performance on non-linguistic tests of creativity and geometric design, science problem-solving abilities, and reversing ambiguous figures (cf. Bialystok and Martin 2004; Bialystok 2009).

Carlson and Meltzoff (2008) compared nine executive function tasks and grouped them into conflict and delay tasks.¹ Only the conflict tasks revealed a bilingual advantage. The authors checked for individual deviations. Bilingual children performed better on the conflict tasks that presented a choice of competing options. Competition had to be resolved in order to give the correct response. The *Dimensional Change Card Sort* task mentioned above is a particularly appropriate conflict task for preschool children. In this task, children are given a series of cards to sort by one dimension (e.g. shape). The child is then asked to sort the cards according to a different dimension (e.g. colour). In the research by Bialystok and her colleagues, Chinese-English preschool children outranked the monolingual English children with an advantage of approximately one year. Follow-up studies with French-English bilinguals replicated the results of the previous study (cf. also Costa et al. [2008] for enhanced executive functioning in young adult Catalan-Spanish bilinguals). More importantly, the bilingual advantage was only visible in the presence of distracting stimuli. It carried over to the *Simon* task, in which the distracting stimulus and the response are in spatial conflict (Martin-Rhee and Bialystok 2008), and the *Am-*

¹ Carlson and Meltzoff (2008: 284) report “‘delay tasks’ require the children to delay/temper a prepotent response, and ‘conflict tasks’ [...] require children to make a novel response while inhibiting a conflicting, prepotent response”. They refer to a study by Carlson and Moses (2001).

biguous Figures task in which one perspective must be suppressed in order to conceive an alternative perspective (Bialystok and Shapero 2005).

It is very tempting to attribute enhanced executive functioning to experience with control over language activation/inhibition – the daily linguistic experience of bilinguals in which two competing language systems have to be handled for selection of the correct linguistic form in speech production. The constant activation of both languages (even when only one of them is used) is characteristic of bilingual language production and comprehension (De Groot and Kroll 1997 among others). Distributed activation of language has the inconvenience that interference from the language that is not relevant becomes likely. Therefore, fluent bilinguals constantly have to inhibit the activation of the non-response language (implicating frontal lobe processes). Thus it could be proposed that bilinguals who have growing experience with controlling language activation/inhibition have enhanced executive functioning – a capacity needed not only for language production/comprehension but also for other cognitive abilities.

Neuroimaging studies have demonstrated that the same regions (frontal) are activated when the bilingual speaker switches or selects the appropriate language (Hernandez et al. 2001; Price et al. 1999), and when other abilities demanding executive functioning are performed (Miller and Cohen 2001). In addition, bilinguals who speak two languages fluently have been shown to have increased density of grey matter in the left inferior parietal cortex. This evidence of structural plasticity in the bilingual brain increases with increasing proficiency in the languages and as a function of the (early) age at which the bilingual has been exposed to the second language (Green et al. 2007; Mechelli et al. 2004). Inhibitory control is the most important component of executive functioning, the latter being associated with conscious control of thought and action. Executive functioning develops over a long period of life, but its development starts very early, like language acquisition, which is one of the first cognitive abilities to develop. Children experience dramatic beneficial changes in self-control over thoughts, emotions and behaviours during their preschool years (Carlson 2005), and they have generally made enormous progress in acquiring their mother tongue(s) by the time they enter school. In sum, the large experience of bilinguals with controlling language activation/inhibition enhances executive functioning in a more general (cognitive) sense.

Experience has an accumulating effect. This effect changes behavioural, neuropsychological and structural aspects of cognitive performance. Bialystok (2009: 3) reports that video game players possess enhanced visual selective attention (Bialystok 2006): this is improved by intense training in video game playing. The same enhancing effect of extensive experience has been demon-

strated for architects, who have higher levels of visual and spatial ability than non-architects (Salthouse and Mitchell 1990). Bialystok (2009: 3) further summarizes the neuropsychological aspects of experiences. Polk and Farah (1998) have shown that Canadian postal workers who deal daily with codes containing letters and numbers have enhanced pathways between the letter and number representational systems when compared to American postal workers who deal with numeric codes only. Structural aspects of cognitive performance can change with experience as well. Maguire et al. (2000) examined London taxi drivers who train daily on route-finding and have enlarged regions of the hippocampus responsible for spatial navigation. Bialystok (2009: 3) finally mentions professional musicians, who have increased cortical representation of the four fingers of the left hand because they play string instruments for which these fingers are used to alter sound pitch and quality (Elbert et al. 1995). The link to linguistic experience is self-explanatory, given the daily experience of bilinguals of selecting the correct form between two competing language systems. It makes sense to assume that the accumulating effect that changes aspects of cognitive performance is rooted in the activation of the target language or the inhibition of the activation of the non-response language.

Experience is not only assumed to have an accumulating effect, but it can also protect against cognitive decline. There is ample evidence for the view that bilingualism helps to build a kind of cognitive reserve, which protects bilingual individuals against cognitive decline as they grow older (Bialystok et al. 2007). Accordingly, an extensive lifetime bilingual experience will help retard the decline of cognitive performance with aging.

Does the cognitive advantage of bilinguals extend to linguistic knowledge? It has been established that bilinguals outrank monolinguals in metalinguistic tasks that require inhibition or controlled attention (Campbell and Sais 1995). One example is a grammaticality-judgement task in which bilinguals can accept that anomalous sentences like “Elephants bark loudly” are grammatically correct but semantically anomalous. The task demands that one ignores the misleading stimulus from meaning which leads the monolingual child to judge the sentence as incorrect. However, psycholinguistic tasks that test knowledge of grammar are not performed better by bilinguals than by monolinguals (Bialystok 2009). To be precise, it is generally assumed in psycholinguistic literature that bilingual children have a smaller vocabulary in each language than monolinguals (Oller and Eilers 2002). The average vocabulary size is also smaller for bilingual adults. Here, the measure is access to vocabulary or lexical retrieval. The studies come to the conclusion that the negative effects of bilingualism are related to interference from the other language. Notice that most of the tasks that test language proficiency and verbal fluency are “receptive” in nature. In

other words, they measure the speed of lexical access. In linguistic studies based on spontaneous speech that investigate bilingual children longitudinally, it is far from clear whether language proficiency and verbal fluency are demonstrations of a bilingual disadvantage.

The preceding paragraphs have shown that both delay and acceleration are assumed to be effects of cross-linguistic influence or of the mere fact of being bilingual. In other words, they can be due to the influence from one language on the other (termed cross-linguistic influence here) or they can be the effects of the mere fact that we are dealing with individuals who process two languages.

The reasons why bilinguals experience deficits in the speed of lexical access are far from clear. Lexical access in bilinguals requires inhibition of the linguistic form of the non-target language. One may be inclined to argue that the daily bilingual experience of competing linguistic forms slows down lexical access, because control and resolution of competition is costly. Yet the very control mechanisms required for attention to the target language are, it has been argued (see above), the reason for bilinguals' cognitive and metalinguistic advantage. This is a somewhat paradoxical situation.

In what follows, we will apply the idea of a bilingual advantage and a bilingual disadvantage to results from investigations using spontaneous child data and try to disentangle the different sources of delay and acceleration. In a first step, we will describe the extent of some delay effects in comparison to monolingual acquisition. Second, we will take the same perspective for acceleration effects and their linguistic extent. A comparison will reveal differences between the two effects.

3 Delay in spontaneous child data

3.1 Delay within monolingual limits

Starting with delay effects, Gawlitzek-Maiwald and Tracy (1996) outlined how bilingual children cope with delay effects in the development of grammatical properties if the two languages of the bilingual individual are compared in spontaneous interaction. The delay effects occur within the range for monolingual children. When it comes to lexical and syntactic aspects of temporal and modal auxiliary verbs, for example, the authors found that German was much more advanced than English, based on the monolingual utterances in each language. When speaking English, the least proficient language in this respect, the analysed German-English child Hannah got herself out by producing mixed

utterances in which the syntactic structure containing the modal auxiliary verb was German, the more proficient language. When speaking German, the least proficient language with respect to infinitival constructions, Hannah used English to fill the gap.

A similar idea of syntactic bootstrapping is pursued by Paradis and Genesee (1996). The authors show for the Inflectional Phrase IP that it is acquired much earlier in French than in English in monolingual as well as in French-English bilingual children. The more advanced French IP leads to code-mixing in the IP-domain, if the bilingual children are supposed to speak English, like in “*Il a finish*” (Gene, 3;1, Paradis and Genesee 1996: 19). In contrast to monolingual children who have recourse to omissions or place-holders in less developed grammatical domains, bilingual children can rely on their respective second language and use it as a device to fill the gaps of the less developed language with lexical material from the more developed one. In both studies, the outcome of cross-linguistic influence is the use of lexical material of language A when the child speaks language B.

3.2 Delay exceeding monolingual limits due to language dominance

Sometimes, delay in bilinguals may exceed the limits of monolinguals in spontaneous interactions in one language. This case is described by Bernardini and Schlyter (2004). The Swedish-Italian/French children studied by the two authors had developed one language as a weak language altogether (for language dominance in bilingual children cf. Arencibia Guerra [2008]; Hager [2014]; Schmeißer et al. [2016]), not only for some grammatical properties, as it was the case in the studies presented in the previous section. The “weak” language is less proficient and also used to a much lesser degree than the dominant language (in the child’s environment and by the child her/himself). In contrast to Gawlitzek-Maiwald and Tracy (1996), it is always language A which is “behind” language B with respect to syntactic development in Bernardini and Schlyter’s (2004) study. Especially the development of functional categories is delayed in the children’s weak language. As in the study by Gawlitzek-Maiwald and Tracy (1996) and Paradis and Genesee (1996), the children in Bernardini and Schlyter’s study use the functional skeleton of the more developed language in cases where the equivalent skeleton has not yet been developed far enough in the slower developing language (cf. also Lanza 1997 and Petersen 1988).

3.3 Delay exceeding monolingual limits due to computational complexity

Delay which is no longer within the range of monolingual limits and could therefore be rooted in the children's bilingualism is also well-attested. Bilingualism can slow down the acquisition process with respect to age of acquisition and/or MLU (Müller and Pillunat 2008): the bilingual child develops some grammatical phenomena at a later age and/or at a higher MLU than monolingual controls. Evidence comes from functional domains like the DP (Hulk 2004), the IP (Patuto 2012 for null and realized subjects), and the CP (Müller 1998). Delay effects can be independent of a balanced or unbalanced bilingual development, as measured on the basis of MLU, Upper Bound, verb lexicon in types, number of utterances used per minute, number of words used per utterance (cf. Arencibia Guerra 2008; Cantone et al. 2008; Schmeißer et al. 2016). Put differently, delay effects are observable in balanced as well as in unbalanced children (Müller and Patuto 2009).

It has been argued that delay can be related to computational complexity. Hulk and Müller (2000) and Müller and Hulk (2000, 2001) define computational complexity as the coordination of information from different modules, in their joint research from pragmatics and syntax (Müller et al. 2002). The main idea behind this kind of research is that the bilingual child will use the less complex analysis of grammatical property X as expressed in language A when using language A and when performing in language B. Complexity is a difficult linguistic concept, even more so its measurement (Newmeyer and Preston 2014). In the generative framework, computational complexity has different definitions (cf. Jakubowicz 2000), one of which is in terms of movement operations: the more movement steps are necessary in order to derive a syntactic construction, the more complex a syntactic derivation will be (Gavarró 2003).

Recently, Müller and Patuto (2009) have refined the scenario for delay effects of cross-linguistic influence. They conclude that in addition to computational complexity, the surface strings of the two languages A and B must be analysable in terms of the syntactic derivation of language A (which is less complex). This assumption excludes the possibility that bilingual children come up with analyses for the more complex language B which are also not supported by evidence from language A, the less complex language. This is the direction which Patuto (2012) pursues in her research on null and realized pronominal subjects in bilingual children. One of the main results of her investigation of German-Romance (French/Italian/Spanish) and French-Italian children is that only the German-Italian/Spanish children show signs of cross-linguistic influence in the null-subject languages Italian and Spanish: the children

use too many overt pronominal subjects (mainly of first and second person singular). The influence is absent in the Italian of the Italian-French children. Patuto (2012) outlines that German is a non-null subject language which licenses topic-drop, however, to a relatively low degree. The surface structures of the two languages, the null-subject language and the topic-drop language, correspond and the child sometimes takes the (less complex) German syntactic analysis when speaking Italian/Spanish. French, however, is neither a null-subject nor a topic-drop language. Indeed, all omissions which Patuto found in the corpus of the French adults' spontaneous speech are expletive omissions. In other words, subject arguments are never omitted in French. Put differently, the surface structures of the two languages, French and Italian, do not correspond, thus the absence of cross-linguistic influence. The effect of the influence in the case of the German-Italian/Spanish bilinguals is delay: These bilinguals have to acquire that Romance pronominal subjects of first and second person must be null if the speaker does not want to realize a contrast or a topic shift.

3.4 Delay exceeding monolingual limits due to processing limitations

Very influential studies like the one by Sorace and Filiaci (2006) and Sorace and Serratrice (2009) argue that the bilingual child makes use of a default strategy in cases when s/he cannot cope with the processing load needed to process the grammatical phenomenon or the load created by the fact that s/he has to process two languages at a time. The authors outline their processing approach for bilingual speaker at all ages, not only for bilingual children, by using spontaneous and elicited production tasks and off-line testing of the participants' interpretation of pronouns. Under this view of delay, complexity is defined in terms of the number of constraints which are required in order to process the grammatical property in question. A high number of constraints makes the language property hard to process by the bilingual child. Serratrice et al. (2004: 201) studied subject omissions in an English-Italian bilingual child (age 1;10–4;6). They argue that cross-linguistic influence will go uni-directionally from the language with fewer pragmatic constraints in the distribution of overt pronominal subjects (English) to the language where the appearance of pronominal subjects is regulated by pragmatically complex (= more) constraints, such as topic shift and focus (Italian). The coordination of syntactic and pragmatic knowledge is a demanding task for young children in general (Avrutin 1999), and even more so in the case of bilingual children since they have to evaluate competing solutions to the syntax-pragmatics problem from

two different languages. For the null-subject property, Serratrice et al. (2004) predict that cross-linguistic influence will affect Italian, the more complex language.

Cross-linguistic influence caused by processing limitations will lead to delay in the language whose processing is more complex. That the delay effects are caused by processing complexity and not by linguistic complexity can be tested, since both views make different predictions for the acquisition process. According to Serratrice et al. (2004), the presence and direction of the influence is a question of more-or-less constrained. In the case of null-subjects, the combination French-Italian should be as problematic as the combination German-Italian or English-Italian. Patuto (2012) has shown that bilingual French-Italian children do not show delay effects in their null-subject language Italian; her explanation takes into account the different linguistic systems. Thus her results represent counterevidence for the processing approach (Patuto et al. 2011).

A domain for which studies come to the conclusion that the negative effects of bilingualism are related to the mere fact of bilingualism which increases processing costs is vocabulary. Bilingual children are assumed to have a smaller vocabulary in each language than monolinguals (Oller and Eilers 2002). The average vocabulary size is also smaller for bilingual adults. Here, the measure is again access to vocabulary or lexical retrieval.

Most of the tasks that test language proficiency and verbal fluency are “receptive” in nature. In other words, they measure the speed of lexical access. As for vocabulary size, recent studies examining a large (longitudinal) spontaneous speech database of 39 simultaneously bilingual children from the Wuppertal Bilingualism Group (WuBiG) clearly refute the theory of bilingual (linguistic) disadvantage (Müller et al. 2015).² The children are simultaneously bilingual (or trilingual) and were analysed longitudinally every fortnight from age 1½ up to age 5 while they interacted spontaneously with a monolingual adult in one of their two languages. These languages were German (Ger) and

² The data were collected in three research projects under the direction of Natascha Müller which have been financed by the DFG (*Deutsche Forschungsgemeinschaft*) since 1999: 1. “Frühkindliche Zweisprachigkeit: Italienisch–Deutsch und Französisch–Deutsch im Vergleich” (Hamburg, 1999–2005); 2. “Die Architektur der frühkindlichen bilingualen Sprachfähigkeit: Italienisch–Deutsch und Französisch–Deutsch in Italien, Deutschland und Frankreich im Vergleich” (Wuppertal, 2005–2008); 3. “Code-Switching bei bilingual aufwachsenden Kindern in Deutschland, Italien, Frankreich und Spanien: Italienisch–Deutsch, Französisch–Deutsch, Spanisch–Deutsch, Italienisch–Französisch, Italienisch–Spanisch, Französisch–Spanisch” (Wuppertal, 2009–2013). The current DFG financed project (since 2014): 4. “Frühkindlicher Trilinguismus: Deutsch – Französisch – Spanisch in Deutschland” under the direction of Laia Arnaus Gil and Natascha Müller investigates children raised trilingually from birth.

a Romance language (Spanish [Sp], Italian [It], French [Fr]) or two Romance languages. The children had been raised bilingually from birth in Germany or in the Romance countries. These research projects did not find any disadvantage with respect to vocabulary size in bilingual children as compared to monolinguals. There was, however, a difference with respect to the proportion of verbs and nouns in the bilinguals' active lexicons (expressed by the mean D [difference] N-V factor). Eichler (2011) found that monolingual Spanish and Italian children develop their lexicons with an articulated noun preference from the very beginning. Monolingual French children tend to have only a slight preference for nouns, whereas German children exhibit an almost symmetrical development of noun and verb types over time. Interestingly, the bilingual children show a tendency towards a more articulated noun advantage in the languages French and German. Moreover, none of the bilinguals reduced the difference between noun and verb types in those languages that show an articulated asymmetrical development in monolinguals (Italian and Spanish). Eichler (2011) investigated gender marking on determiners in mixed (spontaneously produced) noun phrases. When the gender of the mixed noun and the translation equivalent differ, the bilingual has two possibilities to mark gender on the determiner. Either the gender of the mixed noun determines gender marking on the determiner (*die*_{Ger/fem} *playa*_{Sp} 'the beach' with *playa* as a feminine noun in Spanish), or the gender of the equivalent is important for gender marking (*der*_{Ger/masc} *playa*_{Sp} with *Strand* 'beach' as a masculine noun in German). Eichler found that the importance of the gender of the equivalent diminishes when the noun-verb difference increases. She proposes a psycholinguistic explanation for her results. A small noun-verb difference is argued to be an indication of a category-neutral lexicon, whereas an articulated noun-verb difference is taken to show a lexicon that is fully specified categorically. Accessing the gender of the equivalent in a category-neutral lexicon (where gender arguably is not a nominal lexical feature) is costly. Irrespective of details of interpretation, this study – which is based on a large database indicating the bilinguals' active lexicon – illustrates that comparing monolinguals and bilinguals in an elicitation task will not suffice to reach final conclusions about the underlying mechanisms of bilingual linguistic performance.

Beyond that, an overwhelming body of research has shown that the use of lexical material from two languages in the bilingual individual is not necessarily the result of a lexical gap and therefore a lexical disadvantage (in one language). One of the most fascinating demonstrations of early lexical separation is that bilingual children make use of code-switching, a speech style characteristic of multilingual speech communities or multinational families in which multilingual children are raised. It has been shown to obey functional and

grammatical constraints (cf. Auer and Wei 2007; Bhatia and Richie 2004; Bullock and Toribio 2009; Müller et al. 2011: Ch. 5, 7; Müller et al. 2015; Paradis et al. 2000). This bilingual skill relies on control over language choice. In fact, bilingual children are already able to select the required language according to the situational context (e.g. depending on the interlocutor) at as early an age as two (Bullock and Toribio 2009; Paradis et al. 2000).

4 Acceleration in spontaneous child data

4.1 Acceleration within monolingual limits

Acceleration means that a certain linguistic property emerges in the grammar very early and generally earlier than would be the norm in monolingual acquisition. Studies which observe acceleration effects in bilinguals are rare.

One of the domains which is acquired by bilingual children in the two languages in exactly the same way as they are by respective monolinguals, namely in an accelerated or even instantaneous way, is presented by J. Müller (2009) (for bilingual German-Italian children cf. Repetto [2010]). She analyses what has been called instantaneous learning for the positioning of objects in relation to non-finite verbs in monolingual children. The Romance languages exhibit $V_{\text{erb}}O_{\text{bject}}$ order, while German is an $O_{\text{bject}}V_{\text{erb}}$ language. Bilingual children produce the target-like orders from their two-word constructions onwards.

4.2 Acceleration exceeding monolingual limits due to cross-linguistic influence?

Acceleration exceeding monolingual limits means that a certain property emerges earlier in the grammar of bilinguals than would be the norm in monolingual acquisition due to the linguistic knowledge achieved in one of the two languages. Gawlitzek-Maiwald and Tracy (1996: 920) speak of the “pooling of resources”. But this pooling of resources is generally seen as a strategy on the part of unbalanced bilingual children to fill knowledge gaps in the (overall) more slowly developing language, which may eventually speed up acquisition of one grammatical property in this so-called weak language when compared to monolinguals. This strategy allows the bilingual child to remain within the monolingual limits, not exceeding them. To be more precise, the (virtually unstudied) accelerating effect is expected to be most clearly articulated in the most unbalanced bilinguals, who exhibit an overall uneven linguistic develop-

ment. Kupisch (2006) has argued in favour of a “booster” effect in the development of determiners caused by the German-French/Italian children’s recourse to knowledge achieved on a grammatical property in the (overall) less proficient language (French/Italian) when they produce this property in the (overall) more proficient language (German). The outstanding result is that acceleration certainly cannot have knowledge gaps as its source. Lleó et al. (2003) argued for a booster effect in the acquisition of two phonological systems. Whereas German-Spanish bilingual children acquire codas as early as monolingual children in German, acquisition in Spanish is accelerated as compared to monolinguals.

There is up to now almost no indication in the literature that the bilingual advantage will deepen our understanding of language acquisition under disadvantageous circumstances (e.g. Specific Language Impairment [SLI], Attention Deficit or Hyperactivity Disorder and problems with maturity for starting school). An exception is Leuninger (2011), who recently reported that children who refused to talk during the first years of life started to use the spoken language of their environment after having been taught DGS (Deutsche Gebärdensprache, German Sign Language). Paradis (2007) comes to the general conclusion that children suffering from SLI are not overtaxed by learning two languages. Two groups of – still debated – explanations are generally differentiated for language acquisition under disadvantageous circumstances. The first group has in common that children who learn under disadvantageous circumstances have deficits in some basic cognitive and perceptual processing mechanisms, resulting in limitations of the processing speed necessary for a “normal” linguistic development. The second group sees the deficits within the domain of the specific linguistic representation. Leaving aside these approaches, researchers have more or less agreed upon a number of disrupted structures in these children, often called clinical markers. In fact, there are indications in the longitudinal studies of the normally developing 2L1 children that some grammatical domains which have been assumed to be clinical markers for language acquisition under special circumstances are acquired with ease by bilinguals. One such domain is the acquisition of the verb-second rule in German. Monolingual (normally developing and SLI) German children have been shown to pass through a target-deviant stage in which they place finite verbs at the end of the clause, i.e. *mäuschen da reinklettert* ‘little mouse there in-climbs’ (Clahsen et al. 1996: 138). Children with SLI experience particular difficulty in overcoming the “V-final-stage”, whereas normally developing bilingual children who acquire German together with a Romance language completely skip it (cf. Repetto 2010 for German-Italian children, Schmeißer and Jansen 2016 and J. Müller 2009 for German-French children). Figure 1 shows the stage in

monolingual, normally developing German children, based on the literature, in simultaneous bilingual and trilingual children from the WuBiG.

Figure 1 includes the name of the child, information about the language combination of each child and the time span investigated (age is given in years;months). The exact percentages have been added to the bars since numbers are very low in the multilingual children. Some multilingual children who have been raised in Romance countries with German, i.e. they received less input in German than in the Romance language (Kilian, Frank, Eric, Valentin). The figure shows that the V-final stage is skipped by all multilingual children. Bilingual enhancement opens the perspective that children who acquire a language under disadvantageous circumstances can overcome target-deviant developmental stages for that language if they become multilingual.

Is acceleration an outcome of the interaction of the two grammars or an effect of the mere fact that the child processes two languages? One could argue that skipping the V-final stage in bilingual German is due to cross-linguistic influence in the sense that the bilingual child, influenced by the Romance language, raises the finite verb into the target-like syntactic position for adult German from the very beginning because verb raising is also necessary in Romance. Significantly, Müller and Patuto (2009) show for the same children discussed in their study that half of the population of bilinguals, having all skipped the V-final stage, exhibit long-term problems with finite verb placement in German subordinate clauses. In other words, skipping the V-final stage might delay the further course of language acquisition. This is a likely consequence if the acceleration effect described here is not due to a “pooling of resources”, in the sense of early target-like verb-raising. Figure 1 also includes one monolingual German child, Cosima (cf. Jansen 2015), who patterns like the bilingual children in not showing signs of a V-final stage.

Gavarrò (2003) and Zuckerman (2001) have pointed out that economy of derivation in terms of movement steps is operative in such a way that whenever movement appears to be optional to the child, s/he will choose the derivation without movement. If this is true, the following order in the acquisition of finite verb placement in German follows: $SXV_{fin} > SV_{fin}X > XV_{fin}S$.

This is what actually happens in monolingual German children who learn a V2-language. But this order is not characteristic of the bilingual children (Repetto 2010). Not only is the first stage skipped, but there is also a difference in the time required for the acquisition of the third pattern: it takes longer in the bilingual children (cf. Patuto et al. 2011).

If economy in terms of movement steps cannot correctly predict the bilingual data, what other possibilities are there? Weyerts et al. (2002) show in three sentence comprehension tasks that native speakers of German prefer $SV_{fin}O$

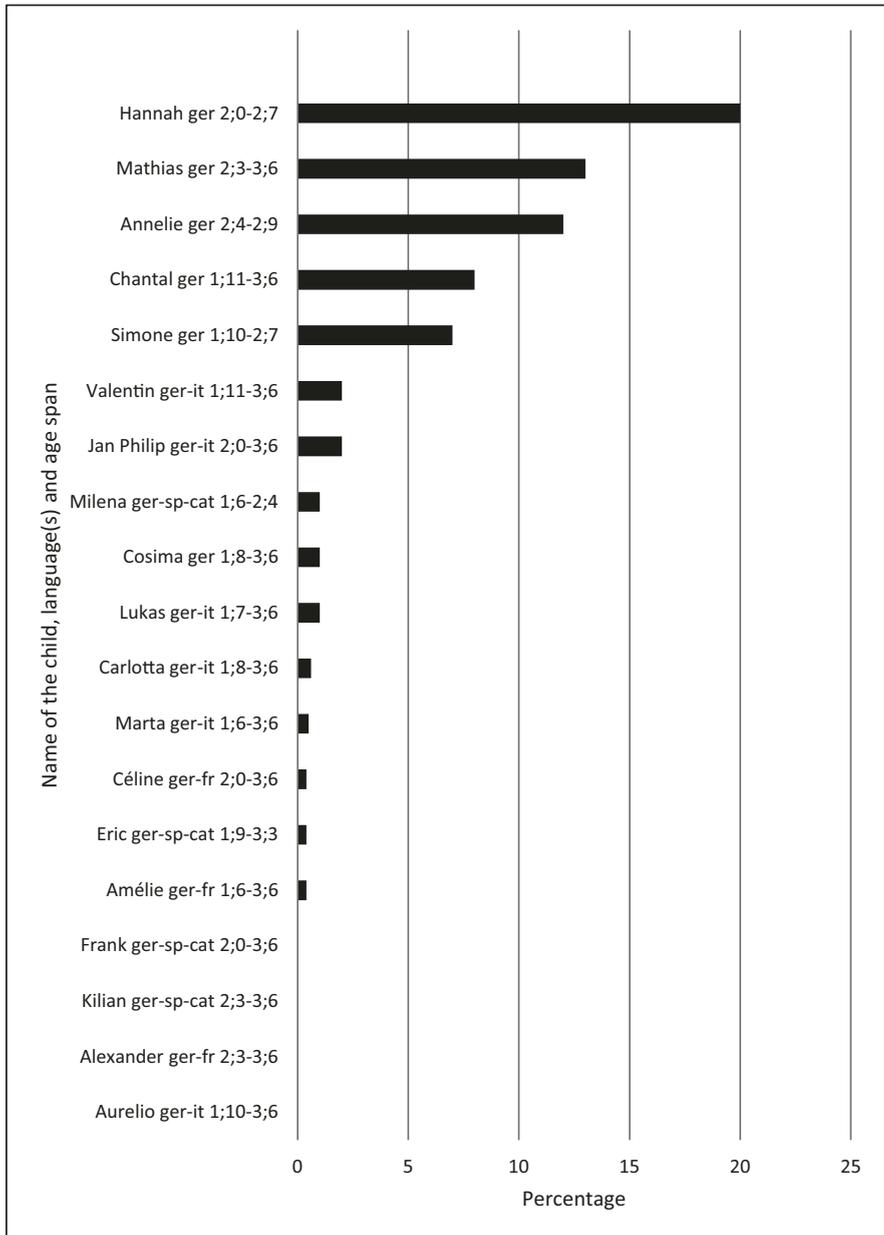


Figure 1: Percentage of finite verbs in clause-final position in German main clauses: Monolingual children and multilingual children compared, ger = German, it = Italian, fr = French, sp = Spanish, cat = Catalan.

over SOV_{fin}, both orders being grammatical in native German. In particular, the authors observed a significant increase in reading times for ungrammatical SOV_{fin} in main clauses (compared with the grammatical SV_{fin}O), but no corresponding effect of ungrammaticality for incorrect SV_{fin}O in embedded clauses (compared to the grammatical SOV_{fin}).³ Their results correspond to results from English indicating that the parser expects a finite verb (due to its importance for the construction of sentences) upon encountering a subject DP. Furthermore, SV_{fin} is beneficial in the left-to-right parsing of a sentence. There is also a typological argument which is phrased by Weyerts et al. (2002) in the following way:

The V2 construction for finite verbs [SV_{fin}O, M.] is found in head-initial languages with basic VO order (e.g. in the Scandinavian languages) and in SOV languages such as Dutch and German. Interestingly, the reverse possibility (i.e. head-initial languages with basic VO order that place finite verbs clause-finally), seems to be extremely rare cross-linguistically. (Weyerts et al. 2002: 247–248)

If SV_{fin} is beneficial and if bilinguals prefer this order, we can hypothesize that bilinguals choose the most beneficial analysis in terms of processing and therefore avoid V-final patterns, independently of the particular syntactic structure or derivational complexity of the second language. Our data provide evidence for this approach, since all bilinguals skip (only) the V-final stage, independently of the language combination, and they still have problems with the German V2 property and some of them have problems with German V-final subordinate clauses. In other words, bilingual children who learn German in contact with a Romance language prefer the SV-structure which is easier to process, and thus avoid the V-final structures common and apparently non-costly in monolingual German children. Although the processing resources of bilinguals are as great as those of monolingual children, bilinguals constantly have to process more than one language and therefore economy matters considerably in the bilingual case. This is the case when they are in the bilingual mode (cf. Grosjean 2001), and also when they have to suppress one language when they are in the monolingual mode.

There is also a theoretical argument against the view that acceleration is an effect of cross-linguistic influence. If it is true that bilingual children find

³ One reviewer notices that this order is grammatical with so-called bridge-verbs in German: *Sie sagte, sie gehe in die Stadt* 'She said she would go downtown'. Placing the finite verb clause-finally is possible in exclamatives which are generally analysed as root clauses: *Wie interessant das ist!* 'How interesting this is'. Future research will have to take into consideration this variety of verb placement patterns and investigate to what extent it may have influenced the results.

the least complex (in a linguistic sense) syntactic analysis comfortable and will use it in a language which provides evidence for that analysis, but which also requires a more complex syntactic derivation, then the reverse scenario cannot be true at the same time.

If the analysis of delay and acceleration in bilingual language production as presented here is cogent, it would then generally be the case that the course of language acquisition cannot be speeded up with respect to the discovery of a particular grammatical analysis. It can be delayed, though. From the perspective of a theory of language acquisition, this result is welcome once the assumption is plausible that the learner is conservative and changes grammar only if needed.

If acceleration is never due to cross-linguistic influence, it should be observable in all kind of bilinguals, balanced and unbalanced. It should also be independent of the language combination. Delay may or may not depend on the language combination and should be observed in a more articulated manner in the balanced bilinguals.

5 Final remarks on delay and acceleration within a theory of language

The analysis of bilingual children's spontaneous language production reveals that the two effects discussed in the literature, delay and acceleration, are likely to stem from different sources. Whereas delay may be an observable outcome of cross-linguistic influence, the interference from one of the bilingual child's languages, acceleration exceeding the monolingual limits can be explained with the principles of efficient computation which are not language-specific and which are probably not even specific to the faculty of language (in the sense of Chomsky's [2005] third factor). It is rooted in the child's choice of efficient computation in a non-linguistic sense, the consequence of which is that the speed of acquisition looks accelerated to the linguist if compared to monolingual children. It has been argued that bilinguals outrank monolinguals in tasks that demand a high degree of executive functioning. Choosing the most efficient computation may figure among such tasks. If it is true that bilingual children find the least complex (in a linguistic sense) syntactic analysis comfortable and will use it in a language which shows evidence for that analysis, but which also requires a more complex syntactic derivation, then the reverse scenario cannot be true at the same time.

The line of reasoning in the present article fits into the view generally agreed upon by many acquisitionists that there is a fixed schedule for language acquisition in a strict linguistic sense. Whatever the reason for this strict schedule is (maturation ranges among the discussed reasons), its existence implies that the child (monolingual or bilingual) can either adhere to it or lag behind. The present view of the bilingual production data fits into this picture which sees children as conservative learners who disfavour computationally complex derivations and linguistic analyses which go beyond the target (Gavarrò 2003). Reasonably, the ultimate goal of language acquisition is not a record time, but to achieve the target grammar(s) completely.

One reviewer correctly points out that the analyses presented here make strong claims concerning computation. It would therefore be necessary to broaden the analyses of child data: until now, mainly production data have been considered and the claims made here are restricted to language production. Future research should consider the possibility to analyse spontaneous language comprehension. The review of the literature on the bilingual (dis)advantage seems to suggest that accessing language comprehension through elicitation tasks will be insufficient to unfold delay and acceleration effects in language comprehension of bilingual children.

Acknowledgments: I want to thank two anonymous reviewers for their valuable comments and in particular Ira Gawlitzek for her comments concerning the contents and the language.

References

- Arencibia Guerra, Lastenia. 2008. *Sprachdominanz bei bilingualen Kindern mit Deutsch und Französisch, Italienisch oder Spanisch als Erstsprachen*. Wuppertal: Bergische Universität Wuppertal dissertation.
- Auer, Peter & Li Wei (eds.). 2007. *Handbook of multilingualism and multilingual communication*. Berlin & New York: Mouton de Gruyter.
- Avrutin, Sergey. 1999. *Development of the syntax-discourse interface*. Dordrecht: Kluwer.
- Bernardini, Petra & Suzanne Schlyter. 2004. Growing syntactic structure and code-mixing in the weaker language: The Ivy Hypothesis. *Bilingualism: Language and Cognition* 7(1). 49–69.
- Bhatia, Tej K. & William C. Richie (eds.). 2004. *Handbook of bilingualism*. Oxford: Blackwell.
- Bialystok, Ellen. 2001. *Bilingualism in development. Language, literacy, and cognition*. Cambridge: Cambridge University Press.
- Bialystok, Ellen. 2006. Effect of bilingualism and computer video game experience on the Simon task. *Canadian Journal of Experimental Psychology* 60(1). 68–79.

- Bialystok, Ellen. 2009. Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition* 12(1). 3–11.
- Bialystok, Ellen & Michelle M. Martin. 2004. Attention and inhibition in bilingual children: Evidence from the dimensional change card sort task. *Developmental Science* 7(3). 325–339.
- Bialystok, Ellen & Dana Shapero. 2005. Ambiguous benefits: the effect of bilingualism on reversing ambiguous figures. *Developmental Science* 8(6). 595–604.
- Bialystok, Ellen, Fergus I. M. Craik & Morris Freedman. 2007. Bilingualism as a protection against the onset of symptoms of dementia. *Neuropsychologia* 45(2). 459–464.
- Bullock, Barbara E. & Almeida Jacqueline Toribio (eds.). 2009. *The handbook of code-switching*. Cambridge: Cambridge University Press.
- Campbell, Ruth & Efisia Sais. 1995. Accelerated metalinguistic (phonological) awareness in bilingual children. *British Journal of Developmental Psychology* 13(1). 61–68.
- Cantone, Katja F., Tanja Kupisch, Natascha Müller & Katrin Schmitz. 2008. Rethinking language dominance in bilingual children. *Linguistische Berichte* 215. 307–343.
- Carlson, Stephanie M. 2005. Developmentally sensitive measures of executive function in preschool children. *Developmental Neuropsychology* 28(2). 595–616.
- Carlson, Stephanie M. & Andrew N. Meltzoff. 2008. Bilingual experience and executive functioning in young children. *Developmental Science* 11(2). 282–298.
- Carlson, Stephanie M. & Louis J. Moses. 2001. Individual differences in inhibitory control and children's theory of mind. *Child Development* 72(4). 1032–1053.
- Chomsky, Noam. 2005. Three factors in language design. *Linguistic Inquiry* 36(1). 1–22.
- Clahsen, Harald, Sonja Eisenbeiß & Martina Penke. 1996. Lexical learning in early syntactic development. In Harald Clahsen (ed.), *Generative perspectives on language acquisition*, 129–159. Amsterdam: Benjamins.
- Costa, Albert, Mireia Hernández & Núria Sebastián-Gallés. 2008. Bilingualism aids conflict resolution: Evidence from the ANT task. *Cognition* 106(1). 59–86.
- Döpke, Susanne. 1992. *One parent, one language: An interactional approach*. Amsterdam: Benjamins.
- Döpke, Susanne. 1997. Is simultaneous acquisition of two languages in early childhood equal to acquiring each of the two languages individually? In Eve V. Clark (ed.), *Proceedings of the 28th Annual Child Research Forum*, 95–112. Stanford, CA: CSLI Publications.
- Döpke, Susanne. 1998. Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language* 25(3). 555–584.
- Eichler, Nadine. 2011. *Code-Switching bei bilingual aufwachsenden Kindern: Eine Analyse der gemischtsprachlichen Nominalphrasen unter besonderer Berücksichtigung des Genus*. Tübingen: Narr.
- Elbert, Thomas, Christo Pantev, Christian Wienbruch, Brigitte Rockstroh & Edward Taub. 1995. Increased cortical representation of the fingers of the left hand in string players. *Science* 270(5234). 305–307.
- Gavarrò, A. 2003. Economy and word order patterns in bilingual English-Dutch acquisition. *Bilingualism: Language and Cognition* 6(1). 69–79.
- Gawlitzeck-Maiwald, Ira & Rosemary Tracy. 1996. Bilingual bootstrapping. *Linguistics* 34(5). 901–926.
- Genesee, Fred. 1989. Early bilingual development: One language or two? *Journal of Child Language* 16(1). 161–179.

- Genesee, Fred, Johanne Paradis & Martha Crago. 2004. *Dual language development and disorders: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes.
- Green, David W., Jenny Crinion & Cathy J. Price. 2007. Exploring cross-linguistic vocabulary effects on brain structures using voxel-based morphometry. *Bilingualism: Language and Cognition* 10(2). 189–199.
- de Groot, Annette M. B. & Judith F. Kroll (eds.). 1997. *Tutorials in bilingualism*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Grosjean, François. 2001. The bilingual's language modes. In Janet Nichol (ed.), *One mind, two languages: Bilingual language processing*, 1–22. Oxford: Blackwell.
- Hager, Malin. 2014. *Der Genuserwerb bei mehrsprachig aufwachsenden Kindern – Eine longitudinale Untersuchung bilingualer und trilingualer Kinder der Sprachenkombinationen deutsch-französisch/italienisch/spanisch, französisch-italienisch/spanisch und deutsch-spanisch-katalanisch*. Wuppertal: Bergische Universität Wuppertal dissertation. <http://elpub.bib.uni-wuppertal.de/edocs/dokumente/fba/romanistik/diss2014/haber/da1401.pdf> (30 January 2017).
- Hakuta, Kenji. 1986. *Mirror of language: The debate on bilingualism*. New York: Basic Books.
- Hernandez, Arturo E., Mirella Dapretto, John Mazziotta & Susan Bookheimer. 2001. Language switching and language representation in Spanish-English bilinguals: An fMRI study. *NeuroImage* 14(2). 510–520.
- Hulk, Aafke. 2004. The acquisition of the French DP in a bilingual context. In Philippe Prévost & Johanne Paradis (eds.), *The acquisition of French in different contexts. Focus on functional categories*, 243–274. Amsterdam: Benjamins.
- Hulk, Aafke & Natascha Müller. 2000. Cross-linguistic influence at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition* 3(3). 227–244.
- Jakubowicz, Cecilia. 2000. Functional categories in (ab)normal language acquisition. In I. Lasser (ed.), *The process of language acquisition. Proceedings of the 1999 GALA Conference*, 165–202. Frankfurt/M.: Lang.
- Jansen, Veronika. 2015. *Dislokation im bilingualen Erstspracherwerb. Eine Untersuchung am Beispiel deutsch-französischer Kinder*. Berlin & New York: de Gruyter.
- Kupisch, Tanja. 2006. *The acquisition of determiners in bilingual German-Italian and German-French children*. München: Lincom Europa.
- Lanza, Elizabeth. 1997. *Language mixing in infant bilingualism: A sociolinguistic perspective*. Oxford: Clarendon Press.
- Lleó, Conxita. 2002. The role of markedness in the acquisition of complex prosodic structures by German-Spanish bilinguals. *International Journal of Bilingualism* 6(3). 291–313.
- Lleó, Conxita & Margaret Kehoe (eds.). 2002. On the interaction of phonological systems in child bilingual acquisition. [Special issue]. *International Journal of Bilingualism* 6(3). 233–237.
- Lleó, Conxita & Martin Radow. 2006. The prosody of early two-word utterances by German and Spanish monolingual and bilingual children. In Conxita Lleó (ed.), *Interfaces in multilingualism*, 1–26. Amsterdam: Benjamins.
- Lleó, Conxita, Imme Kuchenbrandt, Margaret Kehoe & Cristina Trujillo. 2003. Syllable final consonants in Spanish and German monolingual and bilingual acquisition. In Natascha Müller (ed.), *(In)vulnerable domains of multilingualism*, 191–220. Amsterdam: Benjamins.

- Leuninger, Helen. 2011. Vergebärdler. Oral paper presented at the University of Wuppertal.
- Maguire, Eleanor A., David G. Gadian, Ingrid S. Johnsrude, Catriona D. Good, John Ashburner, Richard S. Frackowiak & Christopher D. Firth. 2000. Navigation-related structural changes in the hippocampi of taxi driver. *Proceedings of the National Academy of Science of the United States of America* 97(8). 4398–4403.
- Martin-Rhee, Michelle & Ellen Bialystok. 2008. The development of two types of inhibitory control in monolingual and bilingual children. *Bilingualism: Language and Cognition* 11(1). 81–93.
- Mechelli, Andrea, Jenny T. Crinion, Uta Noppeney, John O'Doherty, John Ashburner, Richard S. Frackowiak & Cathy J. Price. 2004. Structural plasticity in the bilingual brain. *Nature* 431(7010). 757.
- Meisel, Jürgen M. 1989. Early differentiation of languages in bilingual children. In Kenneth Hytlenstam & Loraine Obler (eds.), *Bilingualism across the lifespan: Aspects of acquisition, maturity, and loss*, 13–40. Cambridge: Cambridge University Press.
- Meisel, Jürgen M. (ed.). 1994. *Bilingual first language acquisition. French and German grammatical development*. Amsterdam: Benjamins.
- Miller, Earl K. & Jonathan D. Cohen. 2001. An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience* 24. 167–202.
- Müller, Jasmin. 2009. *Spracheneinfluss im Bereich der OV/VO-Stellung. Ein Vergleich von Deutsch mit Französisch*. Wuppertal: Bergische Universität Wuppertal MA thesis.
- Müller, Natascha. 1998. Transfer in bilingual first language acquisition. *Bilingualism: Language and Cognition* 1(3). 151–171.
- Müller, Natascha. 2009. Language development in simultaneous bilingual children. In Susan Foster-Cohen (ed.), *Language acquisition*, 243–272. Houndsmills/Basingstoke/Hampshire: Palgrave Macmillan.
- Müller, Natascha. 2010. Introduction au plurilinguisme. In C. Weth (ed.), *Apprentissage interculturel et introduction au plurilinguisme*. Studienbrief Französisch.
- Müller, Natascha & Aafke Hulk. 2000. Cross-linguistic influence in bilingual children: Object omissions and root infinitives. In S. Catherine Howell, Sarah A. Fish & Thea Keith-Lucas (eds.), *Proceedings of the 24th annual Boston University Conference on Language Development (BUCLD 24)*, 546–557. Somerville, MA: Cascadilla Press.
- Müller, Natascha & Aafke Hulk. 2001. Cross-linguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition* 4(1). 1–21.
- Müller, Natascha & Marisa Patuto. 2009. Really competence-driven cross-linguistic influence in bilingual first language acquisition? The role of the language combination. In Petra Bernardini, Verner Egerland & Jonas Granfeld (eds.), *Mélanges plurilingues offerts à Suzanne Schlyter à l'occasion de son 65^{ème} anniversaire* [Études Romanes de Lund 85], 299–319. Lund: Lunds Universitet.
- Müller, Natascha & Antje Pillunat. 2008. Balanced bilingual children with two weak languages: A French-German case study. In Pedro Guijarro-Fuentes, María Pilar Larrañaga & John Clibbens (eds.), *First language acquisition of morphology and syntax: Perspectives across languages and learners*, 269–294. Amsterdam: Benjamins.
- Müller, Natascha, Katja Cantone, Tanja Kupisch & Katrin Schmitz. 2002. Zum Spracheneinfluss im bilingualen Erstspracherwerb: Italienisch – Deutsch. *Linguistische Berichte* 190. 157–206.
- Müller, Natascha, Tanja Kupisch, Katrin Schmitz & Katja Cantone. 2011. *Einführung in die Mehrsprachigkeitsforschung. Deutsch, Französisch, Italienisch*. 3rd edn. Tübingen: Narr.

- Müller, Natascha, Laia Arnaus Gil, Nadine Eichler, Jasmin Geveler, Malin Hager, Veronika Jansen, Marisa Patuto, Valentina Repetto & Anika Schmeißer. 2015. *Code-Switching: Spanisch, Italienisch, Französisch. Eine Einführung*. Tübingen: Narr.
- Newmeyer, Frederick J. & Laurel B. Preston (eds.). 2014. *Measuring grammatical complexity*. Oxford: Oxford University Press.
- Nicoladis, Elena. 1999. "Where is my brush-teeth?" Acquisition of compound nouns in a French-English bilingual child. *Bilingualism: Language and Cognition* 2(3). 245–256.
- Nicoladis, Elena. 2003. Cross-linguistic transfer in deverbal compounds of preschool bilingual children. *Bilingualism: Language and Cognition* 6(1). 17–31.
- Nicoladis, Elena. 2006. Cross-linguistic transfer in adjective-noun strings by preschool bilingual children. *Bilingualism: Language and Cognition* 9(1). 15–32.
- Oller, Kimbrough D. & Rebecca Eilers (eds.). 2002. *Language and literacy in bilingual children*. Bristol: Multilingual Matters Ltd.
- Paradis, Johanne. 2007. Bilingual children with specific language impairment: Theoretical and applied issues. *Applied Psycholinguistics* 28(3). 551–564.
- Paradis, Johanne & Fred Genesee. 1996. Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition* 18(1). 1–25.
- Paradis, Johanne, Elena Nicoladis & Fred Genesee. 2000. Early emergence of structural constraints on code-mixing: Evidence from French-English bilingual children. *Bilingualism: Language and Cognition* 3(3). 245–261.
- Patuto, Marisa. 2012. *Der Erwerb des Subjekts in (Nicht-)Nullsubjektsprachen: die Rolle des Spracheneinflusses und der Sprachdominanz bei bilingual deutsch-italienisch, deutsch-spanisch und französisch-italienisch aufwachsenden Kindern*. Tübingen: Narr.
- Patuto, Marisa, Valentina Repetto & Natascha Müller. 2011. Delay and acceleration in bilingual first language acquisition: The same or different? In Esther Rinke & Tanja Kupisch (eds.), *The development of grammar: Language acquisition and diachronic change. Volume in honor of Jürgen M. Meisel*, 231–261. Amsterdam: Benjamins.
- Petersen, Jennifer. 1988. Word-internal code-switching constraints in a bilingual child's grammar. *Linguistics* 26(3). 479–493.
- Polk, Thad A. & Martha J. Farah. 1998. The neural development and organization of letter recognition: Evidence from functional neuroimaging, computational modelling, and behavioural studies. *Proceedings of the National Academy of Sciences of the United States of America* 95(3). 847–852.
- Price, Cathy J., David W. Green & Roswitha von Studnitz. 1999. A functional imaging study of translation and language switching. *Brain* 122(12). 2221–2235.
- Repetto, Valentina. 2010. *L'acquisizione bilingue: l'ordine dei costituenti della frase e loro realizzazione morfologica in italiano e in tedesco*. Wuppertal & Napoli: Bergische Universität Wuppertal & Università di Napoli dissertation.
- Salthouse, Timothy A. & Debora R. Mitchell. 1990. Effects of age and naturally occurring experience on spatial visualization performance. *Developmental Psychology* 26(5). 845–854.
- Schmeißer, Anika & Veronika Jansen. 2016. Finite verb placement in French language change and in bilingual German-French language acquisition. In Katrin Schmitz, Pedro Guijarro-Fuentes & Natascha Müller (eds.), *The acquisition of French in its different constellations*, 10–42. Bristol: Multilingual Matters Ltd.
- Schmeißer, Anika, Malin Hager, Laia Arnaus Gil, Veronika Jansen, Jasmin Geveler, Nadine Eichler, Marisa Patuto & Natascha Müller. 2016. Related but different: The two concepts

- of language dominance and language proficiency. In Carmen Silva-Corvalán & Jeanine Treffers-Daller (eds.), *Language dominance in bilinguals: Issues of operationalization and measurement*, 36–65. Cambridge: Cambridge University Press.
- Serratrice, Ludovica, Antonella Sorace & Sandra Paoli. 2004. Cross-linguistic influence at the syntax-pragmatics interface: Subjects and objects in English-Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition* 7(3). 183–205.
- Sorace, Antonella & Francesca Filiaci. 2006. Anaphora resolution in near-native speakers of Italian. *Second Language Research* 22(3). 339–368.
- Sorace, Antonella & Ludovica Serratrice. 2009. Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism* 13(2). 195–210.
- Taeschner, Traute. 1983. *The sun is feminine. A Study on language in bilingual children*. Berlin: Springer.
- Tracy, Rosemary & Ira Gawlitzek-Maiwald. 2000. Bilinguismus in der frühen Kindheit. In Hannelore Grimm (ed.), *Enzyklopädie der Psychologie: Theorie und Forschung*. Vol. 3: *Sprachentwicklung*, 495–535. Göttingen: Hogrefe.
- Volterra, Virginia & Traute Taeschner. 1978. The acquisition and development of language by bilingual children. *Journal of Child Language* 5(2). 311–326.
- Wei, Li (ed.). 2004. *The bilingualism reader*. London: Routledge.
- Weyerts, Helga, Martina Penke, Thomas Münte, Hans-Jochen Heinze & Harald Clahsen. 2002. Word order in sentence processing: An experimental study of verb placement in German. *Journal of Psycholinguistic Research* 31(3). 211–268.
- Zuckerman, Shalom. 2001. *The acquisition of 'optional' movement*. Groningen: Rijksuniversiteit Groningen dissertation.