SECTION B: INDIVIDUAL AND SOCIETAL MULTILINGUALISM

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Annual Review of Applied Linguistics (2013), **33**, 21–50.
© Cambridge University Press, 2013, 0267-1905/13 $16.00
doi: 10.1017/S0267190513000044

Current Issues in Multilingual First Language Acquisition

Sharon Unsworth

Multilingual first language acquisition refers to the language development of children exposed to two or more languages from birth or shortly thereafter. Much of the research on this topic adopts a comparative approach. Bilinguals are thus compared with their monolingual peers, and trilinguals with both bilinguals and monolinguals; within children, comparisons are made between a child's two (or more) languages, and between different domains within those languages. The goal of such comparisons is to determine the extent to which language development proceeds along similar paths and/or at a similar rate across groups, languages, and domains, in order to elaborate upon the question of whether these different groups acquire language in the same way, and to evaluate how language development in multilingual settings is influenced by environmental factors. The answers to these questions have both theoretical and practical implications.

The goal of this article is to discuss the results of some of this recent research on multilingual first language acquisition by reviewing (a) properties of the developing linguistic system in a variety of linguistic domains and (b) some of the characteristics of multilingual first language acquisition that have attracted attention over the past five years, including cross-linguistic influence, dominance, and input quantity/quality. Trilingual first language acquisition is covered in a dedicated section.

Worldwide, children growing up with more than one language are in the majority (Tucker, 1998), and increasing international mobility means that this fact is unlikely to change. For many children, exposure to a second language occurs once the first is already well established, whereas for others, the acquisition of two or more languages occurs (more or less) simultaneously. It is this latter situation, which we shall refer to as *multilingual first language acquisition*, that is the topic of this review.

Much of the research on multilingual first language acquisition asks whether the acquisition of multiple first languages follows the same path and time course as the acquisition of just one. The answer to this question has both theoretical and practical implications. From a practical point of view, knowing what so-called typical multilingual acquisition looks like and how this differs from typical monolingual acquisition is important in determining how to best

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

educate children growing up with more than one language, how best to assess potential language learning disabilities in this group, and, where necessary, how to determine appropriate interventions. From a theoretical perspective, the circumstances in which multiple languages are acquired differ in crucial ways from those of monolingual acquisition, and comparing the two and the extent to which they affect children's language development can shed light on important theoretical questions such as the role of input in language acquisition and how it interacts with the mechanisms driving the language acquisition process.

This review surveys research on multilingual first language acquisition conducted over the past five years (see Yip, 2013, for a review of similar issues in simultaneous bilingual acquisition). In general, it is restricted to children acquiring more than one language before age 3 years, which is often considered the dividing line between simultaneous and successive bilingual acquisition (Genesee, Paradis, & Crago, 2004; McLaughlin, 1978; but see, e.g., De Houwer, 1995, for a stricter definition). The focus is on studies conducted from a linguistic or psychological perspective, and on research addressing children's language development while they are still children rather than the ultimate level of attainment they reach as adults.

The review is divided into two parts. The first concerns comparisons between multilingual and monolingual acquisition in terms of rate of acquisition and error types and is organized according to linguistic domain, and the second considers characteristics specific to the multilingual acquisition context, such as dominance and cross-linguistic influence. As we shall see, most of the available research deals with bilingual rather than trilingual acquisition; as such, the studies on trilingual acquisition are grouped together in the final section of the second part. This review will show that there are both areas in which multilingual first language acquisition is similar to monolingual first language acquisition, such as the use of the same perceptual biases in early phonetic and phonological acquisition, as well as clear differences, such as rate of acquisition of vocabulary. Factors such as cross-linguistic influence, dominance, and differences in input quantity and quality have been put forward as explanations for these findings.

MULTILINGUAL FIRST LANGUAGE ACQUISITION IN DIFFERENT DOMAINS

The focus of this section is the extent to which language development in multilingual first language acquisition is quantitatively and qualitatively similar to that of monolingual first language acquisition. It covers each of the following linguistic domains: phonetics and phonology, vocabulary, morphosyntax, and semantics and pragmatics.

Phonetics and Phonology

Much of the recent research on multilingual first language acquisition concerns the developing perceptual abilities of bilingual infants (for overviews, see Sebastián-Gallés, 2010; Werker, 2012; Werker & Byers-Heinlein, 2008), with comparatively few studies on phonological development in early and later childhood (Fabiano-Smith & Barlow, 2010).

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

One of the first tasks facing children growing up in a multilingual setting is to distinguish and separate the speech input to which they are exposed into two (or more) languages (i.e., language discrimination). A well-established finding from earlier research in this area is that monolingual and bilingual infants show similar patterns of sensitivity to perceptual cues provided by a language's rhythmicity[1], that is, they are able to discriminate languages from different rhythmic classes at birth (e.g., Ramus, Hauser, Miller, Morris, & Mehler, 2000) and at around 4 to 5 months, they can also discriminate languages from the same rhythmic class (e.g., Bosch & Sebastián-Gallés, 2001). Furthermore, it has been observed that at birth, monolingual infants are better able to discriminate their native language from an unfamiliar language than they are able to discriminate two unfamiliar languages (e.g., Mehler et al., 1988). In a recent study comparing bilingual (English-Tagalog) and monolingual (English) infants, Byers-Heinlein, Burns, and Werker (2010) demonstrated that similar behavior exists for bilinguals. More specifically, in a preferential listening task, Byers-Heinlein et al. observed that newborn infants exposed to bilingual speech in utero demonstrated the ability to discriminate between the two languages spoken by the mother during pregnancy, but they did not show a preference for one over the other, listening to the two equally well (cf. monolinguals, who prefer their native language over an unfamiliar language). As Byers-Heinlein et al. noted, not only do these findings provide evidence that the process of bilingual acquisition has already started at birth, they also show that in the very earliest stages of language development, bilingual and monolingual children make use of the same perceptual biases (i.e., rhythm). Bilingual children have also been found to make use of certain cues used to discriminate language, namely, facial movement, for longer than monolinguals (Sebastián-Gallés, Albareda-Castellot, Weikum, & Werker, 2012; Weikum et al., 2007).

After discriminating between their two languages, children subsequently need to discriminate the relevant phonetic categories within each language. One frequently cited result from earlier research is that when acquiring two highly similar languages, bilingual infants experience a temporary delay around age 8 months, when, unlike monolinguals, they are unable to perceive certain vowel contrasts (e.g., /e/ vs. /ɛ/ in Catalan; Bosch & Sebastián-Gallés, 2003). Frequency of input and degree of overlap between phonetic ranges have been put forward as possible explanations for these findings, with the authors suggesting that the considerably higher frequency of the Spanish vowel /e/, which is phonetically very similar to the two Catalan vowels, leads to a temporary inability to make the distinction in Catalan.

More recent research on bilingual discrimination of consonants has, however challenged the generalizability of this finding, with at least two studies showing that bilinguals are able to perceive distinctions or phonemes that are realized in both languages in similar but, crucially, slightly different ways at the same age as monolinguals (Burns, Yoshida, Hill, & Werker, 2007; Sundara, Polka, & Molnar, 2008). The authors of both of these studies speculated that frequency of occurrence and distribution patterns may play a role in determining the timing of bilingual perceptual reorganization (but see Sebastián-Gallés & Bosch, 2009). Interestingly, in a more recent article, (Albareda-Castellot, Pons, &

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Sebastián-Gallés, 2011) presented evidence from an anticipatory eye movement paradigm, which suggests that contrary to their previous findings, bilingual Catalan-Spanish children are able to discriminate the /e/-/ ɛ/ contrast in Catalan. That is, the familiarization-preference procedure in previous studies may have concealed bilingual children's real abilities (Albareda-Castellot et al., 2011).

We now turn to the phonological development of older bilingual children, an area that has not been widely investigated (but see Holm & Dodd, 1999; Lleó & Kehoe, 2002). The limited number of recent studies have largely focused on two issues: whether the bilingual acquisition of speech sounds follows the same time course as for monolinguals and whether there is any evidence for transfer or cross-linguistic influence.

In a study on the production of consonants in Spanish and English, Fabiano-Smith and Goldstein (2010) found that while bilingual English-Spanish 3-year-olds showed a comparable rate of development to their monolingual peers in English, in Spanish they were slower. This difference was, however, limited to just a few manner classes, namely trills (e.g., /r/), fricatives (e.g., /s/), and glides (e.g., /w/), with other classes evidencing no differences between bilinguals and monolinguals. The authors speculated that bilingual children may be using their phonological knowledge in one language to facilitate their acquisition in the other, allowing them to acquire the two within the same timeframe as monolinguals. In a study on Russian-English bilingual children, Gildersleeve-Neumann and Wright (2010) found that bilingual children demonstrated the same level of complexity as monolinguals in their phonetic inventories of consonants (where relevant data are available; see also Fabiano-Smith & Barlow, 2010), but they made more errors with vowels, a pattern that is reminiscent of some of the aforementioned studies concerning bilingual children's early perceptual development.

These studies also found evidence—albeit limited in some cases—of cross-linguistic influence. For example, Gildersleeve-Neumann and Wright (2010) observed transfer of final devoicing from Russian to English, irrespective of the child's specific bilingual environment, and two of the eight bilingual children in the Fabiano-Smith and Goldstein (2010) study produced de-aspirated stops in English as a result of influence from Spanish (see also Gildersleeve-Neumann, Kester, David, & Peña, 2008, for more extensive evidence of transfer from Spanish to English in Spanish-English bilingual children).

To summarize, recent research into the phonetic and phonological abilities of bilingual children suggests that they are sensitive to language exposure in utero, and that they make use of the same perceptual biases as monolingual children. There is, however, some evidence for a slower rate of differentiation of certain language-specific contrasts among bilingual infants and for cross-linguistic influence in the phonological development of bilingual children. By and large, however, the perceptual and phonological development of bilingual children is similar to that of monolinguals.

Vocabulary

Within the recent research on the multilingual first language acquisition of vocabulary there have broadly speaking been two main areas of interest: (a) the

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

very earliest stages of word learning and the extent to which bilingual children make use of the same types of constraints and phonetic detail to acquire words as monolingual children (see, e.g., Vihman, Thierry, Lum, Keren-Portnoy, & Martin, 2007) and (b) children's subsequent vocabulary growth and the factors which modulate this.

A frequently studied constraint in early vocabulary acquisition is mutual exclusivity, the assumption that each object category must have a different label. This word-learning bias essentially means that when presented with a novel word in the context of one familiar and one unfamiliar object, children assume the intended referent to be the unfamiliar object; mutual exclusivity has been observed in monolingual children at age 17 months (Halberda, 2003), but there is little agreement as to its developmental origin (Werker, 2012). The results of two recent studies with bilingual and trilingual children suggest that this constraint is not as prominent in multilingual first language acquisition (Byers-Heinlein & Werker, 2009; Houston-Price, Caloghiris, & Raviglione, 2010). More specifically, it has been claimed that mutual exclusivity may be a developmental bias that emerges in monolinguals as the result of experience with one-to-one mappings: children growing up with more than one language are consistently exposed to more than one label for the same referent and consequently fail to develop this bias, or at least do not employ it to the same degree as monolinguals. Interestingly, Byers-Heinlein and Werker (2009) found the degree to which the multilingual children in their study made use of mutual exclusivity varied according to the number of languages which the child was learning, that is, whereas marginal use of this bias was detected for bilinguals, for trilinguals, it was not observed at all.

A fundamental building block in the development of the lexicon is the ability to associate a word and object. Typically, studies of this kind employ a so-called switch word-learning task, where infants are first habituated to two word-object combinations (Word A–Object A, Word B–Object B) and subsequently tested in a trial where one of these combinations is switched (e.g., Word A–Object B) to determine the extent to which they have learned the relevant associative link. Recent research in this domain has shown that bilinguals develop associative word learning with dissimilar words (e.g., *pok* and *lif*) at the same age as monolinguals, around 14 months (Byers-Heinlein, Fennell, & Werker, 2013), whereas when similar-sounding words (e.g., *bih* and *dih*) are employed, bilingual children successfully complete the task about 3 months later than monolinguals, at 20 months of age (Fennell, Byers-Heinlein, & Werker, 2007). This latter finding has been challenged, however: Mattock, Polka, Rvachew, and Krehm (2010) showed that when tested using stimuli that are representative of their language learning environment (i.e., stimuli which include variants from both languages), bilingual children do, in fact, demonstrate associative word learning with similar-sounding words, illustrating the importance of taking the bilingual child's language learning environment into account not only in the analysis of experimental results but also in the experimental design.

One well-established finding in the literature on bilingual children's lexical development is that while overall vocabulary levels between bilingual preschoolers and their monolingual peers are comparable, when their languages are

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

considered separately, bilingual children typically score below age-appropriate norms for monolingual children on tasks of receptive vocabulary such as the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 2007; Pearson, Fernández, Lewedeg, & Oller, 1997; Pearson, Fernández, & Oller, 1993). This finding has been attributed to the distributed characteristic of bilingual language learning; that is, children typically acquire their two (or more) languages in different contexts, often with one language restricted to use at home, and thus it is unsurprising that the words they know in a given language are generally restricted to the context in which they acquire that language (Oller, Pearson, & Cobo-Lewis, 2007).

In light of this, Bialystok, Luk, Peets, and Yang (2010) conducted a large-scale study of children between the ages of 3 and 10 years to determine whether the aforementioned bilingual-monolingual differences were also found across a wider age range and a larger number of children ($n = 1738$). In short, their results indicate that when tested using the PPVT in English, their school language, the bilingual children in all age groups scored significantly lower than monolinguals; however, once scores for school-related vocabulary were analyzed separately from home-related vocabulary items, bilingual and monolingual children's scores become much more comparable, with the difference for home-related items remaining, illustrating the context-specific nature of vocabulary acquisition in a multilingual context. As the authors concluded, "the smaller vocabulary for bilingual children in each language is not an overall disadvantage but rather an empirical description that needs to be taken into account in research designs, especially in tasks that involve verbal ability or lexical processing" (Bialystok et al., 2010, p. 530).

It is important to bear in mind that the latter study assessed children's vocabulary knowledge in one language only. Replicating earlier findings by Pearson and colleagues (1997), other recent studies have shown that once bilingual children's knowledge of both languages is taken into account, their overall vocabularies are indeed on a par with their monolingual peers, and this has been found to hold for children from low socioeconomic status (SES) families (Mancilla-Martinez, Pan, & Vagh, 2011) as well as those from a middle/high SES background (e.g., Marchman & Martinez-Sussman, 2002). As highlighted in the study by Mancilla-Martinez et al., however, how best to measure children's overall vocabulary is a complex and challenging task requiring further research.

Much of the work on bilingual vocabulary development focuses on young children, often at the preschool or kindergarten age (Barnes & García, in press; David & Wei, 2008; Dixon, 2011). There are, however, a few studies, in addition to Bialystok et al. (2010), that investigate the lexical development of older children. Both Sheng, Lu, and Kan (2011, Mandarin-English) and Gathercole and Thomas (2009, Welsh-English) found evidence for the stagnation of vocabulary development as a function of reduced input (see below for further discussion concerning effects of input quantity).

One final strand of research on bilingual lexical development concerns the link between vocabulary and other areas, namely, between vocabulary and grammar (Marchman, Martinez-Sussman, & Dale, 2004), and between vocabulary and processing (Marchman, Fernald, & Hurtado, 2010). The question of whether there

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

are strong ties between the development of the lexicon and the development of the grammar and/or processing relates to issues such as modularity, the role of domain-specific versus domain-general learning mechanisms, and maturation (Conboy & Thal, 2006). Studying the relationship between grammatical and lexical development in bilingual children can contribute to the debate about these issues because it allows us to examine both within-language and cross-language relationships while holding maturation constant, that is, the relationship between, for example, grammar and vocabulary can be ascertained within the same child for both languages; if certain developmental patterns are the result of maturation, these should—all things being equal—hold across both languages within the same child. The results of the aforementioned studies suggest that within-language ties are stronger than cross-language ties, and for the relationship between lexicon and grammar, Conboy and Thal (2006) concluded that the lack of significant cross-language relationships is incompatible with the idea that these links are the result of maturation.

To summarize, recent research on the multilingual first language acquisition of vocabulary shows that early word learning is affected by context in terms of children's sensitivity to and use of certain constraints found to be relevant to monolingual acquisition. Furthermore, vocabulary is perhaps the one area where significant and persistent bilingual-monolingual differences have been observed, although note that this concerns comparisons involving one of the bilingual's languages only.

Morphosyntax

Most of the research on the multilingual first language acquisition of morphosyntax focuses on oral production, and the results suggest that when any bilingual-monolingual differences are observed, they are generally quantitative in nature rather than qualitative, although qualitative differences have been observed. The target language properties investigated range from more general measures of grammatical ability, such as mean length of utterance (MLU), to specific aspects of the language(s) in question (e.g., clitics or subject-verb agreement).

Several studies report significant differences between bilinguals and monolinguals on general measures of grammatical ability. For example, Hoff et al. (2012) used caregiver-report data (MacArthur-Bates Communicative Development Inventory [CDI]; Fenson et al., 1993) to estimate grammatical complexity and utterance length in a group of English-Spanish toddlers in the United States (1;10 to 2;6) and their age-matched monolingual peers. They found that the monolingual children were significantly more advanced than the bilinguals, but once the bilingual children were divided into dominance groups, based on amount of input as indicated by a detailed parental questionnaire, the bilingual children with the most exposure to the language to question were no longer significantly different from the monolinguals. In a study of four Turkish-Dutch bilingual toddlers, Blom (2010) found significant bilingual-monolingual differences for MLU (in words) in Dutch, but not for Turkish (with similar findings for lexical development); she noted that the results for Turkish may have been due to the considerable variation observed in the monolingual group. This raises the

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

interesting methodological question of what should count as similarity or difference between bilinguals and monolinguals and how to deal with the individual variation that also exists among monolinguals.

In a study on the acquisition of finiteness in bilingual Basque-Spanish children, Austin (2009; see also Austin, in press; Blom, 2010) also found that the rate of root infinitives in Basque is higher for bilinguals than their monolingual peers. The term root (or optional) infinitive refers to matrix clauses where the child produces a nonfinite verb instead of the target finite form (e.g., "she eat ice cream" instead of "she eats ice cream." Austin attributes this finding to the bilinguals' comparatively limited input, which restricts the rate at which children are able to acquire the target morphologically-specified paradigm (following Blom, 2007). These findings contrast with those of Hacohen and Schaeffer (2007), who in a case study of a bilingual child growing up with English and Hebrew, found very low rates of subject-verb agreement errors in Hebrew, comparable with monolinguals (cf. the same child's use of overt subjects, which are regularly pragmatically inappropriate—see also section below on semantic and pragmatics).

Rate of acquisition differences between bilinguals and monolinguals have also been found for the use of word order cues to identify sentential subjects (Gathercole & Thomas, 2009), clitics and direct objects (Larrañaga & Guijarro-Fuentes, 2012; Pérez-Leroux, Cuza, & Thomas, 2011; Pérez-Leroux, Pirvulescu, & Roberge, 2009), and grammatical gender (Eichler, Jansen, & Müller, in press; Gathercole & Thomas, 2009; Larrañaga & Guijarro-Fuentes, in press; Nicoladis & Marchak, 2011; Unsworth, 2013). In the acquisition of grammatical gender, bilingual children have been observed to make the same type of errors as monolingual children, but for some languages at least (e.g., Welsh and Dutch), their rate of acquisition may be considerably slower than that of monolinguals, at least for those children with relatively little exposure to the language in question. For example, in a study on the acquisition of gender marking on definite determiners and adjectives by English-Dutch bilinguals aged 3 through 17, Unsworth (2013) found significant differences between bilinguals and monolinguals when matched on age; however, once matched on their cumulative length of exposure, that is, their amount of exposure over time, these differences disappeared. Once again, this finding raises important methodological questions about how bilinguals and monolinguals can be best compared; while bilinguals are often matched with monolinguals of the same age or with the same MLU, an alternative—and for some purposes, potentially more accurate—basis for comparison might be cumulative length of exposure.

Most of the attested bilingual-monolingual differences in the domain of morphosyntax are quantitative in nature, that is, bilingual children typically make the same developmental errors as their monolingual peers but to a greater—and sometimes lesser—degree. Qualitative differences, however, have been observed, too. For example, in an extensive longitudinal study of six Cantonese-English bilingual children, Yip and Matthews (2007) found that under influence from Cantonese, the bilingual children pass through a stage where they consistently use *wh*-in-situ in English questions, as in *This is what?* instead of *What is this?* As Yip and Matthews (2007) noted, monolingual children consistently

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

place *wh-* expressions in *wh-* questions in the target clause-initial position. The same authors also argued that qualitative differences may in fact underlie what at first appear to be quantitative differences: for example, in the same study of Cantonese-English bilinguals, they suggested that the use of null objects in the children's English results from transfer of the mechanism that licenses sentence topics in Cantonese to English (Yip & Matthews, 2007).

In line with much of the earlier work on the multilingual first language acquisition of morphosyntax (for reviews, see Genesee & Nicoladis, 2007; Meisel, 2004), several recent studies observed similar patterns of development between bilinguals and monolinguals. For example, in a study on the early word order acquisition of bilingual Basque-Spanish children, Barreña and Almgren (in press) observed that bilingual children showed the same word order patterns as monolingual children (i.e., predominantly verb-object [VO] in Spanish and both object-verb [OV] and VO in Basque), replicating earlier findings on bilingual French-German children (Meisel, 1989). Bonnesen (2008) also observed the target use of verb-second in German and target finite verb placement (i.e., no verb-second) in French in French-German bilingual children (see also Rothweiler, 2006, for similar findings with Turkish-German bilingual children). Finally, Hoff et al. (2012) showed that when both of a bilingual child's two languages were taken into account, bilinguals were found to produce multiword utterances at a comparable age to monolinguals. This latter study stressed the importance of assessing children in both their languages in order to make an accurate assessment of their linguistic abilities.

To summarize, while there is considerable evidence that the multilingual first language acquisition of morphosyntax by and large follows the same developmental path as monolingual first language acquisition, where differences are observed, recent research continues to show that they are mostly quantitative rather than qualitative in nature. These differences have been attributed to a wide range of factors, including cross-linguistic influence, dominance, and amount and type of input, each of which will be discussed in turn below.

Semantics and Pragmatics

Studies on the multilingual first language acquisition of semantics and/or pragmatics are few and far between. Much of the work in this area has been conducted by Sorace, Serratrice, and colleagues in relation to the interface hypothesis (Sorace, 2011), and has compared bilingual children's acquisition of the syntax-semantics versus syntax-discourse interface; in addition, a number of recent studies have investigated the acquisition of scrambling.

In a study on the acceptability of plural Noun Phrase (NP) subjects in generic and specific context, Serratrice, Sorace, Filiaci, and Baldo (2009) found that English-Italian bilingual children overaccepted (ungrammatical) plural bare plurals in generic contexts in Italian, as in **In genere squali sono pericolosi* ("In general sharks are dangerous"; cf. monolinguals who consistently rejected such sentences). A comparable group of Spanish-Italian bilinguals were shown to behave significantly more like the Italian monolinguals, suggesting that typological relatedness (Spanish is more similar to Italian than English) is another factor that

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

should be taken into consideration when assessing bilingual children's language abilities and, more specifically, the likelihood of cross-linguistic influence.

The results concerning the bilingual English-Italian children's sensitivity to specificity and genericity contrast with their use of subject pronouns. In a study with the same children, Sorace, Serratrice, Filiaci, and Baldo (2009) found that both English-Italian and Spanish-Italian children overaccepted overt subject pronouns referring to a pragmatically inappropriate topic subject antecedent in Italian when compared with monolinguals. The bilingual children thus showed similar response patterns, irrespective of their other language. This led Sorace and Serratrice (2009) to the conclusion that the crucial factor in determining the extent of bilingual-monolingual differences is not typological relatedness, although this clearly plays a role, but whether the linguistic property being acquired involves an internal (syntax-semantics) or external (syntax-discourse) interface (see Sorace, 2011, and commentaries in the same volume for more on this matter). Note, however, that results from a recent study on German-Italian and French-Italian bilinguals do not tally with this claim: While in line with previous findings, Schmitz, Patuto and Müller (2012) observed the overuse of subject pronouns in Italian by those children acquiring German as the other language, while the children acquiring French as the other language were similar to monolinguals (i.e., they did not overuse subject pronouns in the same way as the other groups).

Two recent studies have investigated the acquisition of scrambling and, more specifically, the interpretive constraints associated with scrambled indefinite objects.[2] In a study on the acquisition of scrambling in Ukrainian, Mykhaylyk and Ko (2010) showed that bilingual English-Ukrainian children passed through the same stages of development as monolingual children, and that, like monolingual children, their scrambled indefinite objects were restricted to a specific or wide-scope interpretation, as the target adult language required. Similar results were found for English-Dutch bilinguals by Unsworth (2012): Like monolinguals, the vast majority of bilingual children in this study were able to consistently interpret scrambled indefinites in negative sentences as taking a specific or wide-scope interpretation by the age of 6 years old (see Lee, Kwak, Lee, & O'Grady, 2010; O'Grady, Kwak, Lee, & Lee, 2011, for related work on scope preferences in Korean-English heritage speakers). As Unsworth (2012) noted, this finding is all the more striking given the paucity of scrambled indefinite objects in the input.

To summarize, while recent research has started to explore the multilingual first language acquisition of semantics and pragmatics, the number of studies is very limited and the results are mixed.

CHARACTERISTICS OF MULTILINGUAL FIRST LANGUAGE ACQUISITION

The existence of quantitative and/or qualitative differences between bilingual and monolingual language acquisition has been attributed to a number of characteristics typical of the multilingual setting. Thus, the existence of another language developing concomitantly may lead to cross-linguistic influence; typically, one language is stronger than the other; and the quantity and quality of the input to which multilingual children are exposed may differ from monolinguals.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

This part addresses each of these characteristics in turn, with a final section considering the effect of acquiring more than two languages simultaneously (i.e., bilingual vs. trilingual acquisition).

Cross-linguistic Influence

Whereas the focus of earlier research on multilingual first language acquisition was on the question of whether a bilingual child's two languages developed as one or two systems (De Houwer, 1990; Meisel, 1989; Volterra & Taeschner, 1978), it is generally assumed today that children separate their two languages from very early on, but that some level of interaction between the two may nevertheless occur (Paradis & Genesee, 1996). Much of the research over the past 15 years or so has sought to define the linguistic conditions under which such interaction (or cross-linguistic influence, as it is commonly called) manifests itself and what factors modulate its occurrence.

The most prominent proposal concerning the linguistic conditions is that of Hulk and Müller (2000; see also Müller & Hulk, 2001), who proposed that for cross-linguistic influence to occur, two conditions must be fulfilled: (a) The target language property should involve the syntax-pragmatics interface or C-domain, and (b) there should be surface overlap. Thus if language A offers evidence for more than one grammatical analysis for the target language property in question, and language B reinforces one of these analyses, cross-linguistic influence is "probable" (Müller & Hulk, 2001, p. 2; see Döpke, 1998, for a similar proposal). Research conducted since this proposal was first advanced has shown that condition (a) is too strict, in that cross-linguistic influence has been observed in other areas such as narrow syntax, syntax-morphology, and syntax-semantics-lexicon; (e.g., Argyri & Sorace, 2007; Liceras, Fernández Fuertes, & Alba de la Fuente, 2011; Pérez-Leroux et al., 2011), but that condition (b) seems to hold (Foroodi-Nejad & Paradis, 2009; Hacohen & Schaeffer, 2007; see Schmitz et al., 2012, for a proposed revision to the original formulation of this condition).

An interesting test case for any account of cross-linguistic influence comes from bimodal bilingual acquisition; that is, children who grow up with one spoken and one signed language, as do hearing children of deaf adults, or *codas*/*kodas*, as they are often called (see e.g., Petitto et al., 2001). Research on coda development is still in its infancy, but in a series of recent studies, Chen Pichler, Lillo-Martin, and colleagues, have started to explore the topic of cross-linguistic influence in this population. For example, in a study on the acquisition of *wh*-questions in bilingual children acquiring English and American Sign Language (ASL) or Brazilian Portuguese and Brazilian Sign Language (Libras), Lillo-Martin, Koulidobrova, de Quadros, and Chen Pichler (2012) found evidence for cross-linguistic influence in both directions: in line with the findings for English in the English-Cantonese bilinguals of Yip and Matthews (2007), the bilingual toddlers produced significantly more non-sentence-initial *wh*- questions—grammatical in both of the sign languages—than their monolingual English-speaking and Brazilian Portuguese-speaking peers, and concomitantly, in their sign languages, they produced proportionally more sentence-initial *wh*- phrases than their monolingual peers, arguably as a result of their simultaneous exposure to English.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Cross-linguistic influence may manifest itself as delay or acceleration (Paradis & Genesee, 1996), sometimes simultaneously (Brasileiro, 2009). As this review illustrates, most of the studies that found bilingual-monolingual differences have observed delay (i.e., a slower rate of acquisition for bilinguals), although it is important to note that this is for a specific and limited number of properties of language only, not a general bilingual delay (cf. Gathercole, 2007). There are, however, a handful of studies that found evidence for acceleration, that is, a faster rate of development in bilinguals when compared with their monolingual peers. For example, Kupisch (2007) observed that German-Italian bilingual children acquire German determiners faster than most monolingual German children. Her explanation for this finding is was based on the notion of complexity; that is, she argued that the German determiner system is more complex than the Italian one because it contains more types, each type encodes numerous formal features, and the form-function mapping is opaque. Consequently, monolingual German-speaking children typically produce determiners later than monolingual Italian-speaking children. In the case of the bilingual children in her study, the presence of a simpler system, which already had determiners in place, facilitated the development of the more complex determiner system in German. Kupisch also suggested that such cross-linguistic influence only takes place in unbalanced bilingual children when the dominant language, in this case Italian, is the facilitating language.

Another example of acceleration is found in a recent study by Liceras et al. (2011; see also Meroni, Unsworth, & Smeets, 2013), who argued that the presence of two different copulas in Spanish, *ser* and *estar*, facilitates the acquisition of the copula in English, such that the bilingual English-Spanish children in their study had lower rates of copula omission than had been observed for monolinguals (Becker, 2004). Finally, on a more general note, in a study on the complexity of phonetic inventories, Fabiano-Smith and Barlow (2010) suggested that the observation that bilingual children achieve the same level of complexity within each of their two languages within the same timeframe as monolingual children could be interpreted as evidence for cross-linguistic influence in the form of accelerated development, that is, the complexity developed in one language may bootstrap development in the other (following Gawlitzek-Maiwald & Tracy, 1996).

To summarize, although recent research has helped refine the conditions that drive cross-linguistic influence and further documented how such influence manifests itself, many outstanding issues remain. It is, for example, clear that the conditions on cross-linguistic influence—however they are formulated—are sufficient but not necessary. Not all children exhibit cross-linguistic influence even when the relevant conditions are met (Gathercole, 2007). The answer to the question of how best to predict which individual children will evidence cross-linguistic influence remains elusive. A recent study by Hauser-Grüdl, Arencibia Guerra, Witzmann, Leray, and Müller (2010) suggested that fluency, as measured by number of words produced per minute, may also play a role in predicting cross-linguistic influence. Two of the most common predictors discussed in the literature are, however, dominance and relative amount of exposure, sometimes with the latter being used as a proxy for the former.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Dominance

How to measure dominance, broadly defined as "the condition in which bilingual people have greater grammatical proficiency in, more vocabulary in, or greater fluency in one language or simply use one language (i.e., the dominant language) more often" (Genesee et al., 2004, p. 80), remains a controversial issue in the literature on multilingual first language acquisition. While it is clear that most bilingual children are dominant in one of their languages, and that this can and often does change over time (e.g., Yip & Matthews, 2007), the extent to which dominance can (systematically) predict and explain children's language outcomes remains unclear (for recent discussions, see Bedore et al., 2012; Cantone, Müller, Schmitz, & Kupisch, 2008).

As the definition above indicates, dominance can be defined and subsequently operationalized in terms of children's relative competence or proficiency in their two (or more) languages, or in terms of their relative use (see Yip & Matthews, 2006, for relevant discussion). Proficiency-based variables commonly used as measures of dominance include MLU, upper bound (i.e., longest utterance[s] in a recording), the number of multimorphemic utterances (Genesee, Nicoladis, & Paradis, 1995), and, more recently, increases in the noun and verb lexicon (Kupisch, 2007, 2008) and vocabulary size (Foroodi-Nejad & Paradis, 2009). Measures of dominance based on language use include number of utterances, fluency (based on parental report, Foroodi-Nejad & Paradis, 2009; Hauser-Grüdl et al., 2010), and amount of exposure (e.g., Argyri & Sorace, 2007).

Once one or more measure have been selected, a further consideration is how it should be used. One approach is to use the children's scores on the selected measure(s) to calculate what is called a *balance score* (Cantone et al., 2008), whereby scores from language A are subtracted from the scores from language B, and any differences are assumed to indicate dominance (Bedore et al., 2012; Pérez-Leroux et al., 2011). The extent to which a given difference can justifiably be taken as an indicator of dominance will, of course, depend on the measure and the range of attested scores; it is, however, sometimes far from clear how large a difference needs to be in order to be able to speak of dominance. One approach is to compare children's scores statistically and only count significant between language differences as indicators of dominance (Yip & Matthews, 2006), or—when using standardized scores—to see whether children reach age-appropriate monolingual norms for one language, but not the other. Despite these complications, using such differential scores for MLU, as advocated by Yip and Matthews (2006), makes it possible to compare children with the same language combination and at the same time circumvent the problem of the cross-linguistic validity of MLU as a measure of morphosyntactic complexity.

As illustrated in the preceding section, dominance has been put forward by some researchers as an explanatory factor for certain instances of cross-linguistic influence (Yip & Matthews, 2007). Others, however, have demonstrated that cross-linguistic influence can occur independent of language dominance (Hulk & Müller, 2000), and it has also been claimed that dominance may predict cross-linguistic influence, but the extent to which this is the case is moderated by other factors, such as linguistic complexity (Kupisch, 2007)

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

and the minority or majority status of the languages in question (Foroodi-Nejad & Paradis, 2009). More specifically, Foroodi-Nejad and Paradis investigated the role of dominance as a predictor for cross-linguistic influence in the acquisition of compound nouns in Persian-English bilinguals whose exposure to Persian was restricted to home and who were learning English at daycare. Dominance effects were observed for Persian but not for English, and Foroodi-Nejad & Paradis suggested that this asymmetry may have been due to the majority language status of English and the fact that for all the children, this was an ascending language, whereas Persian was, for some children at least, in the process of stagnating.

Dominance has also been found to correlate with language mixing. That is, bilingual children have been found to use more mixed language utterances in their less dominant language (Kupisch, 2008), although again, this effect has been found to interact with other factors, namely sociolinguistic context (Paradis & Nicoladis, 2007). More specifically, in a study on the language-mixing patterns of French-English bilingual children in a minority-French region of Canada, Paradis and Nicoladis observed that the English-dominant children produced mixed language utterances more frequently in a French context than the French-dominant children did in an English context, reflecting the sociolinguistic characteristics of this community, namely, that almost all French-speaking adults are bilingual, whereas many English-speaking adults are not.

To summarize, while there exists no consensus concerning how best to operationalize dominance, this property of multilingual first language acquisition has been linked to rates of mixing and to the direction of cross-linguistic influence; furthermore, other factors such as sociolinguistic setting have been found to moderate the effects of dominance.

Input Quantity

On the assumption that bilingual children are awake for the same number of hours as monolingual children and that their caregivers vary in talkativeness to the same extent as caregivers of bilingual children, we can safely assume that, on the whole, bilingual children will be exposed to less language input than monolinguals. Furthermore, given the numerous factors affecting bilingual language environments, considerable heterogeneity exists within the bilingual population, too. For example, in a recent study on English-Dutch simultaneous bilinguals growing up in comparable sociolinguistic contexts in the Netherlands, Unsworth (2013) found that the average weekly proportion of language exposure in Dutch varied from 8% to 93%. Such variation has been put forward to explain observed differences in rate of acquisition between bilinguals and monolinguals, as well as differences between bilinguals. For example, recent research on multilingual first language acquisition has claimed that differential effect of amount of input on rate of acquisition for general measures of vocabulary and grammar (Barnes & García, in press; David & Wei, 2008; Hoff et al., 2012; Place & Hoff, 2011; Thordardottir, 2011), aspects of morphosyntax such as verbal morphology (Blom, 2010; Nicoladis, Palmer, & Marentette, 2007; Paradis, 2010; Paradis, Nicoladis, Crago, & Genesee, 2011) and grammatical gender (Gathercole & Thomas, 2009; Unsworth, 2013), as well as phonological abilities, including the

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

discrimination of certain phonemes (Sundara, Polka, & Genesee, 2006) and the ability to liaise and elide (Nicoladis & Paradis, 2011).

Studies vary as to whether children's language abilities are measured directly or indirectly, using, for example, parental report measures such as CDI, and whether they concentrate on one domain in depth (e.g., Thordardottir, 2011) or compare different domains (Bohman, Bedore, Pena, Mendez-Perez, & Gillam, 2010; Gathercole & Thomas, 2009; Hoff et al., 2012). Typically, amount of input is estimated on the basis of extensive parental (and sometimes teacher) questionnaires (e.g., Gutiérrez-Clellen & Kreiter, 2003; Paradis, 2011) or by using some other measure as a proxy (e.g., vocabulary abilities, see Nicoladis & Paradis, 2011). Other more detailed approaches include asking caregivers to keep a language exposure diary (De Houwer & Bornstein, 2003; Place & Hoff, 2011) or using new recording and automated analysis technology such as Language Environment Analysis (LENA) (see e.g., Oller, 2010, for the use of LENA to measure input in a trilingual setting).[3]

De Houwer (2007) assessed the relation between language input patterns and children's language proficiency on a very general level using data from a large-scale survey of family language use in Flanders, Belgium. In the families (n = 1899) examined, De Houwer found that children were most likely to speak both the minority and the majority language when both parents spoke the minority language and at most one parent spoke the majority language at home. Similarly, in a study of the vocabulary development of bilingual kindergarten children in the multilingual context of Singapore, where English is the language of schooling, Dixon (2011) found that children whose primary caregiver at home spoke English only, or English plus the home language (Mandarin, Malay, or Tamil) scored significantly higher than those children whose primary caregiver spoke the home language only. Children's home language vocabulary was also found to be a significant positive predictor of their English vocabulary, in line with Cummins's (2000) interdependence hypothesis, the idea that while a child's two languages may have different surface features, they share a common underlying proficiency (see also Scheele, Leseman, & Mayo, 2010).

One finding replicated in several studies is that differences between monolingual and bilingual children are often restricted to the children's less dominant language; that is, when bilingual children are compared with monolingual children in their dominant language, such differences disappear (Hoff et al., 2012; Paradis, 2010; Paradis et al., 2011). In Hoff et al. (2012), for example, bilingual English-Spanish toddlers with at least 70% exposure to English were found not to significantly differ from monolinguals on measures of grammatical complexity and vocabulary (see Barnes & García, in press, for similar findings using CDI data from Basque). Thordardottir (2011), on the other hand, found that the bilingual French-English 5-year-old children in her study reached age-appropriate monolingual norms for receptive vocabulary after having received at least 40% exposure or more to the language in question, whereas for expressive vocabulary, this figure was slightly higher at 60%. Given that these two studies examined different stages of development (toddlers vs. school-aged children) using different methods (parental report vs. standardized tests), it is not clear that their results are directly comparable. One noteworthy aspect of Thordardottir's (2011)

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

study is its novel approach, namely, the use of curve-fitting analysis to detect both linear and nonlinear relationships between input quantity and language outcomes (see also Bedore et al., 2012).

A factor related to input quantity that is sometimes incorporated into investigations of multilingual first language acquisition is children's output. More in particular, Pearson (2007) discussed an input-proficiency-use cycle as a means of relating the two, whereby children who hear more input become more proficient in the language in question, and this, in turn, leads to more use, which subsequently invites more input. A number of recent studies have found that output is indeed a significant predictor of bilingual children's language outcomes. For example, Hammer et al. (2012) observed that both amount of input and output (or usage, in their terms) was significant predictor of bilingual Spanish-English children's vocabulary and narrative skills abilities. These results are broadly in line with those of Bohman et al. (2010), although this study found differential effects on children's input and output across different domains. More specifically, in an assessment of the morphosyntactic and semantic abilities of (a large number of) bilingual children in both their languages (English and Spanish), Bohman et al. observed that input quantity was a significant predictor of whether children scored zero or one or more on a language screening test, which they interpreted as an indicator of initial language learning, whereas output was a significant predictor of higher scores. The authors thus concluded that although input seems to be important in establishing initial knowledge in a language, using the language (i.e., output) is important in adding to that knowledge. Furthermore, different factors were found to affect different domains; for example, initial development on semantics was related to input more than output, whereas morphosyntax was related to both. Bohman et al. suggested that this is due to the need for practice in order to use inflectional morphology productively.

Unsworth (2013) also observed differences between different linguistic domains with respect to the role of input were also observed in Unsworth's (2013) study on the acquisition of grammatical gender by bilingual English-Dutch children. More specifically, she found that whereas children's scores for gender marking on definite determiners with neuter nouns (gender attribution) were best predicted by amount of input (at time of testing and over time), the only significant predictor for children's scores for gender marking on adjectives (gender agreement) was their scores on definite determiners. Unsworth argued that the effect of input on definite determiners was due to the Dutch gender system, which—as a result of very few systematic cues for neuter—necessitates that children attribute gender more or less on a noun-by-noun basis for neuter, thereby requiring considerable exposure for acquisition to take place, whereas gender agreement, a purely morphosyntactic process, is not (directly) affected by differences in input quantity because once the relevant grammatical features and rules have been acquired, they are applied automatically where required (see also Bianchi, 2013).

The theoretical importance attributed to the relationship between amount of input and children's language development depends on one's theoretical persuasion. Several studies (Gathercole & Thomas, 2009; Hammer et al., 2012; Paradis, 2010; Paradis et al., 2011) have argued that input effects in multilingual

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

first language acquisition offer support to the usage-based or constructivist approach to language acquisition (Tomasello, 2003). Oversimplifying somewhat, the general idea is that if language is acquired in a piecemeal fashion on the basis of the input, as is claimed in this approach, we can expect an effect of relative amount of input for bilingual children for both vocabulary and grammar (see e.g., Gathercole, 2007). According to these researchers, the observation that such effects exist—and as we have seen in this section, they often do—offers support to this account of language acquisition.

It is, however, important to note that many (but not necessarily all) of the linguistic properties tested in many of these studies, such as verbal morphology and vocabulary, would be expected to involve a significant input component on any approach to language development. In order to systematically investigate the theoretical importance of input in multilingual first language acquisition, and what this means for theories of language acquisition, it is necessary to examine a number of specific linguistic properties from the same and from different linguistic domains within the same children and relate these to particular theories concerning the exact role of amount of input for those specific properties of language. Furthermore, any account that crucially relies on input quantity also needs to be able to explain the similar rates of acquisition observed for bilingual and monolingual children in many cases (Paradis et al., 2011): Even if it is the bilingual children with the most amount of input who are indistinguishable from monolinguals, their total amount of input will still remain significantly lower than that of (many) monolinguals.

In theoretical approaches such as the generative/nativist paradigm, where input is argued to underdetermine the unconscious knowledge children acquire (Chomsky, 1959), the observation that relative amount of input predicts language outcomes in multilingual first language acquisition presents a challenge. This is not necessarily because there is no role for input on this account—to the contrary, no generativist would deny that input in one (or more) language(s) is crucial for acquisition to take place—but rather, because there is no clear theory on how exactly input interacts with children's innate knowledge such that development occurs.[4]

To summarize, faster rates of development in bilingual children often correlate with relative amount of input, and this has been observed for the acquisition of vocabulary and certain aspects of morphosyntax, most typically verbal morphology. This observation has been argued to provide evidence for a constructivist or usage-based theories, but more data from a wider range of linguistic phenomena are needed to test this and other approaches to language acquisition more thoroughly.

Input Quality

Bilingual children's language exposure varies not only in amount but also in type, that is, in terms of quality as well as quantity, and to a certain extent, the two are inextricable (Paradis, 2011). Various factors may contribute to qualitative input differences in multilingual first language acquisition. These include the richness of children's language input, defined as input from a variety of difference

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

sources, (e.g., TV, reading, friends, etc.; Jia & Fuse, 2007), the variety of speakers providing language input (Place & Hoff, 2011), the types of activities for which the language is used (e.g., Scheele et al., 2010), whether input-providers speak a standard or nonstandard variety (Cornips & Hulk, 2008; Larrañaga & Guijarro-Fuentes, 2012), and whether they are native or nonnative speakers (Place & Hoff, 2011), as well as the number and type of literacy-related activities (Scheele et al.). As for input quantity, there are differences between bilingual children that also exist among monolingual children and have been found to affect monolingual language acquisition (e.g., socioeconomic status, Hoff, 2006), and there are also differences that are specific to bilingual acquisition, such as code mixing (Byers-Heinlein, 2013). A number of recent studies have started to explore the extent to which variation in bilingual children's input quality affects their language development.

In an investigation of bilingual Spanish-English toddlers using language diary data, Place and Hoff (2011) examined the relation between children's grammatical and lexical development, as measured by the CDI, and several qualitative input factors, including the proportion of English or Spanish input provided by native speakers, the number of different speakers providing input in a given language. and the number of conversational partners with whom the child exclusively spoke English or Spanish. For Spanish, none of these factors were found to correlate with language outcomes, but as the authors noted, this was likely due to the limited variance in both predictors and outcome variables for this language. For English, all three factors correlated significantly with vocabulary, and importantly, this held when amount of exposure was held constant; for grammatical complexity, there were significant correlations with the number of different speakers and the number of exclusively English conversational partners. Place and Hoff concluded that the finding that variability in speakers is positively related to vocabulary and grammar may reflect the need for "exposure to variability in the signal in order to extract the categories that will support later recognition and production," as has been suggested for phonological and lexical learning (e.g., Singh, 2008, quoted in Place & Hoff, 2011, p. 1847). Furthermore, the findings concerning nonnative input suggest furthermore that "non-native input is less useful to language acquisition than native input" (p. 1847—see also Hammer, Davison, Lawrence, & Miccio, 2009). As the authors noted, however, their study did not identify why this should be the case.[5]

The possible effect of nonnative exposure on children's language development has also been investigated for phonemic differentiation. More specifically, Ramón-Casas, Swingley, Sebastián-Gallés, and Bosch (2009), in a series of experiments assessing children's ability to detect mispronounced /ɛ/ and /e/ vowels in Catalan, found that whereas monolinguals were sensitive to such mispronunciations, bilingual Catalan-Spanish toddlers and preschoolers—and in particular those with more exposure to Spanish than Catalan—were not. The authors suggested that exposure to similar mispronounced vowels in the accented speech of their nonnative Catalan-speaking parent may mean that bilingual children have "learned to overcome variation in these sounds" (p. 116).

The existence of within-speaker variation is not specific to the bilingual context, and in certain circumstances, exposure to nonnative input may also be

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

a factor to consider in monolingual settings. Exposure to mixed language utterances is, however, almost certainly a characteristic that is exclusive to the multilingual setting. In a recent study, Byers-Heinlein (2013) investigated the relation between exposure to differing degrees of language mixing and children's vocabulary size in English. The findings showed that while controlling for amount of exposure, gender, the child's age, and the balance between a child's two languages in terms of exposure, higher rates of language mixing by parents predicted smaller receptive vocabularies at age 1.5 years and marginally smaller productive vocabularies at age 2. Byers-Heinlein speculated that language mixing may have an adverse effect on children's speech perception abilities, which in turn may mean that new words are less readily detected, which consequently results in a smaller vocabulary size. Whether this explanation holds water upon further investigation remains to be seen, but the Language Mixing Scale that Byers-Heinlein developed and extensively tested as part of this study will surely become a very useful tool for future research into this particular aspect of input quality in multilingual first language acquisition.

To summarize, research on the effects of input quality on multilingual first language acquisition is relatively new and has largely focused on the role of nonnative exposure. The findings available thus far suggest that nonnative input may be less beneficial than native input, and exposure to nonnative input may affect the developmental path which children follow.

Bilingual versus Trilingual First Language Acquisition

Most of the research on multilingual first language acquisition concerns bilinguals rather than trilinguals. The study of trilingual first language acquisition is, however, potentially relevant and informative from both a theoretical and practical perspective. Hoffman (2001) distinguished five different types of trilinguals, including children growing up with two languages at home that are different from the language of the wide community, bilingual children who become trilingual via immigration, and third language learners. Given that the topic of this review is multilingual first language acquisition, this section is limited to the first type, (i.e., children who grow up with three languages more or less simultaneously). As we shall see, research on early trilingual development is still in its infancy. Most studies involve observational case studies, often with rather little (linguistic) data (Hoffman, 2001). Much of the work adopts a comparative approach, contrasting trilingual development with bilingual, and sometimes monolingual, development. Research thus far has focused on two topics: the question of early language differentiation and the potential effect of reduced input on trilingual children's language development.

In a series of articles, Montanari (2009a, 2009b, 2010, 2011) provided evidence of early differentiation in the language development of a trilingual Tagalog-Spanish-English child at the pragmatic, phonological, lexical, and syntactic level. The child was exposed to Tagalog by her mother and maternal grandparents, to Spanish by her father and paternal grandparents, and to English from her older sister and indirectly from family conversations, which occurred in English. Her direct exposure to Tagalog (approximately 48%) during the period of

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

study was thus greater than the other two languages (approximately 29% for Spanish and approximately 23% for English). The data in each of these articles concerned her language development up to the age of 2. Montanari (2009a) examined the child's earliest multiword utterances and found that these followed the appropriate relative argument-predicate ordering in each of her three languages, (i.e., predicate-argument for Tagalog, argument-predicate for English, and both orders for Spanish). Furthermore, the child's mixed utterances are shown to result from vocabulary gaps rather than the use of a unified system, in line with previous research. Quay (2008) also used mixed utterances as a means of showing early language differentiation. Quay found that a trilingual Mandarin-Japanese-English child adapted her rate of mixed utterances and the languages used in those mixed utterances to the language preferences and abilities of her interlocutor. In other words, her different mixing patterns across languages provided evidence of her early language separation (see also Quay, 2010).

Montanari (2010) provided a detailed analysis of the early lexical development of the same trilingual Tagalog-Spanish-English child, showing that translational equivalents were used from early on, as early and at the same rate as has been observed by bilinguals. However, the extent to which the child learned equivalent words in all three of her languages reflected the relative exposure patterns to these languages (i.e., while there were numerous Tagalog-English and Tagalog-Spanish doublets, the number of English-Spanish doublets was limited). Interestingly, the rate at which the child formed a triplet was twice as quick as the rate at which she formed a doublet. This, Montanari noted, is in line with Lanvers's (1999) bilingual lexical bootstrapping hypothesis, the idea that knowledge of a concept in one language facilitates the acquisition of the label for that concept in the other. In the case of trilinguals, Montanari argued, familiarity with learning equivalents may have also expedited development of triplet forms. This could be viewed as cross-linguistic influence manifesting itself as acceleration.

Finally, with respect to the child's early phonological development, Montanari (2011) found that the trilingual child's early word-initial consonants followed the language-specific gestural properties (e.g., appropriate place and manner of articulation) of each of her three languages. Furthermore, the child's consonantal systems were not only differentiated but also fairly advanced when compared with monolinguals. Montanari (2011) suggested that this may have been due to heightened sensitivity to language and its properties as a result of early multilingual exposure. In a study on the phonological development of a trilingual Spanish-Mandarin-Taiwanese child, Yang and Zhu (2010) also observed early differentiation as evidenced by different rates of acquisition in the three languages, sometimes for the same phoneme.

Trilingual children have to divide their time across three languages and thus may have even more reduced input than many bilingual children, at least in one of their three languages. The question of how this comparatively limited input affects trilingual children's language development—as investigated for bilinguals when compared to monolinguals—has also been addressed in the recent literature on early trilingual acquisition. Given that the relative amount of input was not directly reflected in the relative rate of acquisition in the three

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

languages acquired by the child in their study, Yang and Zhu (2010) noted that the relationship between amount of input and rate of acquisition is clearly not a direct one. Furthermore, given that the child's development was very much like that of monolingual children with respect to age of acquisition, rate of acquisition, and error patterns, Yang and Zhu stressed that the inevitable reduction in input for trilingual children does necessarily lead to slower acquisition. Similar conclusions were drawn by Montanari (2009a, 2009b, 2010, 2011).

In a study on the linguistic development of a bilingual child acquiring Basque, Spanish, and English, Barnes (2011; see also Barnes, 2006) addressed the role of input in trilingual first language acquisition from a slightly different perspective. She highlighted the fact that many trilingual (and in many cases, bilingual) children receive exposure to one and possibly two of their languages from just one person (i.e., the parent speaking a language that is not spoken outside the home). As such, the child may acquire aspects of the language in question that are marked by the specific characteristics of the person providing the input (e.g., sex and age). In a similar vein to Place and Hoff (2011), reviewed in the preceding section, Barnes suggested that in order to become fully competent users of the language in question, children may need exposure from a wider variety of sources.

On a more general level, in a large-scale survey on multilingual families De Houwer (2004) also analyzed language use in trilingual families ($n = 244$). In line with the findings for bilingual families, De Houwer found that parental input patterns were related to children's abilities in the two minority languages. More specifically, when neither parent spoke Dutch at home, and both parents spoke both minority languages, there was a three in four chance that at least one of the children in the family spoke all three languages (i.e., the two minority languages plus Dutch). De Houwer's findings for trilingual families are thus in line with those reported above for bilingual families.

The question of whether there is cross-linguistic influence in early trilingual acquisition has received little attention (cf. adult L3 acquisition, Rothman & Halloran, this volume). Interestingly, however, one of the few studies addressing this issue (Kazzazi, 2011) examined compound nouns in two Persian-English-German trilingual children and found similar patterns of cross-linguistic influence as observed for bilingual children (Foroodi-Nejad & Paradis, 2009). In this particular case, two of the children's three languages (English and German) behave similarly with respect to the linguistic property in question; it is logically possible that more complex situations may arise, where all three languages differ. To what extent such a situation would affect the degree of cross-linguistic influence is unclear, but the variation in language combinations and dominance patterns that the trilingual context offers will surely offer a fruitful area for testing many of the proposals concerning cross-linguistic influence developed on the basis of bilingual data.

To summarize, recent research suggests that trilingual first language acquisition proceeds in much the same fashion as bilingual and monolingual first language acquisition, but the available data are from just a handful of children. As Montanari (2009a, 2009b, 2010) noted, in order to evaluate the wider validity of the findings and claims observed thus far, more (larger-scale)

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

studies are needed with children learning both typologically related and unrelated languages.

CONCLUSIONS AND FURTHER DIRECTIONS

In conclusion, while in many cases multilingual first language acquisition proceeds within the same timeframe and by and large at the same rate as monolingual first language acquisition, numerous quantitative and—to a lesser degree—qualitative differences exist between language development in bilinguals and monolinguals. Multilingual first language acquisition is a complex process that is affected by a range of factors, including the amount and type of available input, the combination of languages being acquired and their typological relatedness, and children's relative proficiency in the two or more languages. Furthermore, some areas of language, such as vocabulary, are more susceptible to bilingual-monolingual differences than others.

The study of multilingual first language acquisition has the potential to offer unique insights into how language development proceeds and, more specifically, the role of input quantity and input quality in this process. In doing so, it may shed light on one of the central debates in linguistics, namely, whether language acquisition is based on innate linguistic structures interacting with the input or whether it is built on the basis of input using domain-general cognitive and communicative skills. Furthermore, a more complete understanding of multilingual first language acquisition is necessary to be able to advise parents, educators, and clinicians on how best to assess and facilitate bilingual children's language development.

Before we can achieve these goals, more research is necessary. Most of the studies addressing the role of input quantity and quality depend on parental report data, either to measure children's language outcomes or to derive predictor variables; the findings of these studies need to be corroborated with behavioral data and direct observations of input quantity and quality. Furthermore, longitudinal data are needed to reinforce claims made about causality and to determine whether in certain contexts the complex interplay of internal and external factors in bilingual acquisition may change over time and for different age groups (and, if so, how). In addition, for a more complete understanding of this interplay of factors, it would be desirable to collect data across a wide range of linguistic domains within the same group of children. Finally, more studies employing experimental techniques and collecting cross-sectional data in addition to longitudinal case studies are needed for a systematic investigation of trilingual first language acquisition, an area that has thus far attracted little attention.

NOTES

1 The world's languages are traditionally divided into three rhythmic classes: stress-timed (e.g., Dutch), syllable-timed (e.g., French), and mora-timed (e.g., Japanese).
2 Scrambling involves the reordering of sentential constituents such that, for example, the direct object appears to the left of sentential negation when it is usually placed

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

to its right. It exists in Dutch, German, Ukrainian, Russian, and Japanese, among other languages.

3 When examining the differential effect of amount of input on multilingual first language acquisition, most researchers operationalize amount of input in terms of *relative* rather than *absolute* amount of input (but see De Houwer, 2011).

4 One promising account in this regard might be Yang's (2002) variational learning model, although to my knowledge, this has yet to be applied to bilingual or second language acquisition.

5 Several studies investigating the language development of successive bilingual or second language children—and therefore strictly speaking outside the remit of this review—have observed that when nonnative-speaker mothers provide input, their relative proficiency is related to their children's language development (Chondrogianni & Marinis, 2011; Hammer et al., 2012; Paradis, 2011).

ANNOTATED BIBLIOGRAPHY

Bialystok, E., Luk, G., Peets, K. F., & Yang, S. (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition*, *13*, 525–531.

This article examines the receptive vocabulary development of a large (n = 1738) sample of bilingual (English plus another language) children. Analyzing children's scores on the standardized PPVTs, the authors reported consistent bilingual-monolingual differences with monolinguals outperforming bilinguals in English. This difference was largely restricted to words associated with a home rather than school context, and it was not affected by the specific other language being acquired by the bilingual children.

Paradis, J. (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism*, *1*, 213–237.

This article investigates the impact of a variety of internal (e.g., age, language aptitude) and external (e.g., length of exposure, richness of language environment) factors on early successive bilingual acquisition. Using a series of regression analyses to analyze the relative contribution of each of these factors on children's acquisition of English vocabulary and verbal morphology, Paradis found that child-internal factors explained more variance in outcomes than child-external factors and, in particular, language aptitude as measured by phonological short-term memory and the specific properties of the children's other language were found to be significant predictors.

Place, S., & Hoff, E. (2011). Properties of dual language exposure that influence two-year-olds' bilingual proficiency. *Child Development*, *82*, 1834–1849.

This article is one of the few studies up to now that systematically explore the role of input quality in bilingual language acquisition. It examines how 2-year-old bilingual English-Spanish children's morphosyntactic and vocabulary development data collected using parental report relate to language environment data collected using a language diary. In line with previous work, the results show that relative amount of input is a significant predictor of (some of the) children's outcomes and in addition, specific properties of the input were also found to affect children's language development. These properties were the number of conversational partners with whom the children spoke English, the number of different speakers providing English input, and the proportion of English input provided by native speakers.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Yip, V., & Matthews, S. (2007). *The bilingual child: Early development and language contact*. Cambridge, UK: Cambridge University Press.

This book consists of a detailed longitudinal investigation of the language development of a group of bilingual English-Cantonese children growing up in Hong Kong. It looks at a number of linguistic phenomena where the two languages differ, including wh- questions, null objects, and relative clauses, and considers whether this affects the bilingual children's development relative to monolinguals. The study is couched in generative linguistic terms, and in addition to the detailed data analysis, more general issues related to bilingual language development, including cross-linguistic influence, dominance, and how to measure it, are also discussed.

REFERENCES

Albareda-Castellot, B., Pons, F., & Sebastián-Gallés, N. (2011). The acquisition of phonetic categories in bilingual infants: New data from an anticipatory eye movement paradigm. *Developmental Science*, *14*, 395–401.

Argyri, E., & Sorace, A. (2007). Crosslinguistic influence and language dominance in older bilingual children. *Bilingualism: Language and Cognition*, *10*, 79–99.

Austin, J. (2009). Delay, interference and bilingual development: The acquisition of verbal morphology in children learning Basque and Spanish. *International Journal of Bilingualism*, *13*, 447–479.

Austin, J. (in press). Markedness, input frequency, and the acquisition of inflection: Evidence from Basque/Spanish bilingual children. *International Journal of Bilingualism.*

Barnes, J. (2006). *Early trilingualism: A focus on questions*. Clevedon, UK: Multilingual Matters.

Barnes, J. (2011). The influence of child-directed speech in early trilingualism. *International Journal of Multilingualism*, *8*, 42–62.

Barnes, J., & García, I. (in press). Vocabulary growth and composition in monolingual and bilingual Basque infants and toddlers. *International Journal of Bilingualism.*

Barreña, A., & Almgren, M. (in press). Object-verb and verb-object in Basque and Spanish monolinguals and bilinguals. *International Journal of Bilingualism.*

Becker, M. (2004). Copula omission is a grammatical reflex. *Language Acquisition*, *12*, 157–167.

Bedore, L. M., Pena, E. D., Summers, C. L., Boerger, K. M., Resendiz, M. D., Greene, K., … Gillam, R. B. (2012). The measure matters: Language dominance profiles across measures in Spanish-English bilingual children. *Bilingualism: Language and Cognition*, *15*, 616–629.

Bialystok, E., Luk, G., Peets, K. F., & Yang, S. (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition*, *13*, 525–531.

Bianchi, G. (2013). Gender in Italian-German bilinguals: A comparison with German L2 learners of Italian. *Bilingualism: Language and Cognition*, *16*, 538–557.

Blom, E. (2007). Modality, infinitives and finite bare verbs in Dutch and English child language. *Language Acquisition*, *14*, 75–113.

Blom, E. (2010). Effects of input on the early grammatical development of bilingual children. *International Journal of Bilingualism*, *14*, 422–446.

Bohman, T. M., Bedore, L. M., Pena, E. D., Mendez-Perez, A., & Gillam, R. B. (2010). What you hear and what you say: Language performance in Spanish-English bilinguals. *International Journal of Bilingual Education and Bilingualism*, *13*, 325–344.

Bonnesen, M. (2008). On the "vulnerability" of the left periphery in French/German balanced bilingual language acquisition. In P. Guijarro-Fuentes, P. Larrañaga, & J. Clibbens (Eds.), *First language acquisition of morphology and syntax: Perspectives across languages and learners* (pp. 161–182). Amsterdam, the Netherlands: John Benjamins.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Bosch, L., & Sebastián-Gallés, N. (2001). Evidence of early language discrimination abilities in infants from bilingual environments. *Infancy*, *2*, 29–49.
Bosch, L., & Sebastián-Gallés, N. (2003). Simultaneous bilingualism and the perception of a language-specific vowel contrast in the first year of life. *Language and Speech*, *46*, 217–243.
Brasileiro, I. (2009). *The effects of bilingualism on children's perception of speech sounds* (Unpublished doctoral dissertation). Utrecht University, Utrecht, the Netherlands.
Burns, T. C., Yoshida, K. A., Hill, K., & Werker, J. F. (2007). The development of phonetic representation in bilingual and monolingual infants. *Applied Psycholinguistics*, *28*, 455–474.
Byers-Heinlein, K. (2013). Parental language mixing: Its measurement and the relation of mixed input to young bilingual children's vocabulary size. *Bilingualism: Language and Cognition*, *16*, 32–48.
Byers-Heinlein, K., Burns, T. C., & Werker, J. F. (2010). The roots of bilingualism in newborns. *Psychological Science*, *21*, 343–348.
Byers-Heinlein, K., Fennell, C. T., & Werker, J. F. (2013). The development of associative word learning in monolingual and bilingual infants. *Bilingualism: Language and Cognition*, *16*, 198–205.
Byers-Heinlein, K., & Werker, J. F. (2009). Monolingual, bilingual, trilingual: Infants' language experience influences the development of a word learning heuristic. *Developmental Science*, *12*, 815–823.
Cantone, K. F., Müller, N., Schmitz, K., & Kupisch, T. (2008). Rethinking language dominance. *Linguistische Berichte*, *215*, 307–343.
Chomsky, N. (1959). A review of B. F. Skinner's *Verbal behaviour*. *Language*, *35*, 26–58.
Chondrogianni, V., & Marinis, T. (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*, 318–342.
Conboy, B. T., & Thal, D. J. (2006). Ties between the lexicon and grammar: Cross-sectional and longitudinal studies of bilingual toddlers. *Child Development*, *77*, 712–735.
Cornips, L., & Hulk, A. (2008). Factors of success and failure in the acquisition of grammatical gender in Dutch. *Second Language Research*, *28*, 267–296.
Cummins, J. (2000). *Language, power and pedagogy: Bilingual children in the crossfire*. Clevedon, UK: Multilingual Matters.
David, A., & Wei, L. (2008). Individual differences in the lexical development of French-English bilingual children. *International Journal of Bilingual Education and Bilingualism*, *11*, 598–618.
De Houwer, A. (1990). *The acquisition of two languages from birth: A case study*. Cambridge, UK: Cambridge University Press.
De Houwer, A. (1995). Bilingual language acquisition. In P. Fletcher & B. MacWhinney (Eds.), *The handbook of child language* (pp. 219–250). Oxford, UK: Blackwell.
De Houwer, A. (2004). Trilingual input and children's language use in trilingual families in Flanders. In C. Hoffman & J. Ytsma (Eds.), *Trilingualism in family, school and community* (pp. 118–137). Clevedon, UK: Multilingual Matters.
De Houwer, A. (2007). Parental language input patterns and children's bilingual use. *Applied Psycholinguistics*, *28*, 411–424.
De Houwer, A. (2011). Language input environments and language development in bilingual acquisition. *Applied Linguistics Review*, *2*, 221–240.
De Houwer, A., & Bornstein, M. (2003, April). *Balancing on the tightrope: Language use patterns in bilingual families with young children*. Paper presented at the 4th International Symposium on Bilingualism, Tucson, Arizona.
Dixon, L. Q. (2011). The role of home and school factors in predicting English vocabulary among bilingual kindergarten children in Singapore. *Applied Psycholinguistics*, *32*, 141–168.
Döpke, S. (1998). Competing language structures: The acquisition of verb placement by bilingual German-English children. *Journal of Child Language*, *25*, 555–584.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Dunn, L. M., & Dunn, D. M. (2007). *Peabody Picture Vocabulary Test (PPVT-4)* (4th ed). Minneapolis, MN: Pearson.
Eichler, N., Jansen, V., & Müller, N. (in press). Gender acquisition in bilingual children: French-German, Italian-German, Spanish-German and Italian-French. *International Journal of Bilingualism.*
Fabiano-Smith, L., & Barlow, J. A. (2010). Interaction in bilingual phonological acquisition: Evidence from phonetic inventories. *International Journal of Bilingual Education and Bilingualism*, *13*, 81–97.
Fabiano-Smith, L., & Goldstein, B. A. (2010). Phonological acquisition in bilingual Spanish-English speaking children. *Journal of Speech, Language, and Hearing Research*, *53*, 160–178.
Fennell, C. T., Byers-Heinlein, K., & Werker, J. F. (2007). Using speech sounds to guide word learning: The case of bilingual infants. *Child Development*, *78*, 1510–1525.
Fenson, L., Dale, P. S., Reznick, J. S., Thal, D. J., Bates, E., Hartung, J. P., … Reilly, J. S. (1993). *The MacArthur-Bates Communicative Development Inventories: User's guide and technical manual*. San Diego, CA: Singular.
Foroodi-Nejad, F., & Paradis, J. (2009). Crosslinguistic transfer in the acquisition of compound nouns in Persian-English bilinguals. *Bilingualism: Language and Cognition*, *12*, 411–427.
Gathercole, V. C. M. (2007). Miami and north Wales, so far and yet so near: Constructivist account of morpho-syntactic development in bilingual children. *International Journal of Bilingual Education and Bilingualism*, *10*, 224–246.
Gathercole, V. C. M., & Thomas, E. M. (2009). Bilingual first-language development: Dominant language takeover, threatened minority language take-up. *Bilingualism: Language and Cognition*, *12*, 213–237.
Gawlitzek-Maiwald, M., & Tracy, R. (1996). Bilingual bootstrapping. *Linguistics*, *34*, 901–926.
Genesee, F., & Nicoladis, E. (2007). Bilingual first language acquisition. In E. Hoff, & P. McCardle (Eds.), *Handbook of language development* (pp. 324–342). Oxford, UK: Blackwell.
Genesee, F., Nicoladis, E., & Paradis, J. (1995). Language differentiation in early bilingual development. *Journal of Child Language*, *22*, 611–631.
Genesee, F., Paradis, J., & Crago, M. (2004). *Dual language development and disorders: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes.
Gildersleeve-Neumann, C. E., Kester, E. S., David, B. L., & Peña, E. D. (2008). English speech sound development in preschool-aged children from bilingual English-Spanish environments. *Language, Speech, and Hearing Sciences in Schools*, *39*, 314–328.
Gildersleeve-Neumann, C. E., & Wright, K. L. (2010). English speech acquisition in 3- to 5-year-old children learning Russian and English. *Language, Speech, and Hearing Sciences in Schools*, *41*, 429–444.
Gutiérrez-Clellen, V. F., & Kreiter, J. (2003). Understanding child bilingual acquisition using parent and teacher reports. *Applied Psycholinguistics*, *24*, 267–288.
Hacohen, A., & Schaeffer, J. C. (2007). Subject realization in early Hebrew/English bilingual acquisition: The role of crosslinguistic influence. *Bilingualism: Language and Cognition*, *10*, 333–344.
Halberda, J. (2003). The development of a word-learning strategy. *Cognition*, *87*, B23–B34.
Hammer, C. S., Davison, M. D., Lawrence, F. R., & Miccio, A. W. (2009). The effect of maternal language on bilingual children's vocabulary and emergent literacy development during head start and kindergarten. *Scientific Studies of Reading*, *13*, 99–121.
Hammer, C. S., Komaroff, E., Rodriguez, B. L., Lopez, L. M., Scarpino, S. E., & Goldstein, B. (2012). Predicting Spanish-English bilingual children's abilities. *Journal of Speech, Language and Hearing Research*, *55*, 1251–1264.
Hauser-Grüdl, N., Arencibia Guerra, L., Witzmann, F., Leray, E., & Müller, N. (2010). Cross-linguistic influence in bilingual children: Can input frequency account for it? *Lingua*, *120*, 2638–2650.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Hoff, E. (2006). How social contexts support and shape language development. *Developmental Review*, *26*, 55–88.
Hoff, E., Core, C., Place, S., Rumiche, R., Señor, M., & Parra, M. (2012). Dual language exposure and early bilingual development. *Journal of Child Language*, *39*, 1–27.
Hoffman, C. (2001). Towards a description of trilingual competence. *International Journal of Bilingualism*, *5*, 1–17.
Holm, S., & Dodd, B. (1999). A longitudinal study of the phonological development of two Cantonese-English bilingual children. *Applied Psycholinguistics*, *20*, 349–376.
Houston-Price, C., Caloghiris, Z., & Raviglione, E. (2010). Language experience shapes the development of the mutual exclusivity bias. *Infancy*, *15*, 125–150.
Hulk, A., & Müller, N. (2000). Bilingual first language acquisition at the interface between syntax and pragmatics. *Bilingualism: Language and Cognition*, *3*, 227–244.
Jia, G., & Fuse, A. (2007). Acquisition of English grammatical morphology by native mandarin speaking children and adolescents: Age-related differences. *Journal of Speech, Language and Hearing Research*, *50*, 1280–1299.
Kazzazi, K. (2011). Ich brauch mix-cough: Cross-linguistic influence involving German, English and Farsi. *International Journal of Multilingualism*, *8*, 63–79.
Kupisch, T. (2007). Determiners in bilingual German-Italian children: What they tell us about the relation between language influence and language dominance. *Bilingualism: Language and Cognition*, *10*, 57–78.
Kupisch, T. (2008). Dominance, mixing and cross-linguistic influence: On their relation in bilingual development. In P. Guijarro-Fuentes, P. Larrañaga, & J. Clibbens (Eds.), *First language acquisition of morphology and syntax: Perspectives across languages and learners* (pp. 209–234). Amsterdam, the Netherlands: John Benjamins.
Lanvers, U. (1999). Lexical growth patterns in a bilingual infant: The occurrence and significant of equivalents in the bilingual lexicon. *International Journal of Bilingual Education and Bilingualism*, *2*, 30–52.
Larrañaga, P., & Guijarro-Fuentes, P. (2012). Clitics in L1 bilingual acquisition. *First Language*, *32*, 151–175.
Larrañaga, P., & Guijarro-Fuentes, P. (in press). The linguistic competence of early Basque-Spanish bilingual children and a Spanish monolingual child. *International Journal of Bilingualism*.
Lee, M., Kwak, H., Lee, S., & O'Grady, W. (2010). Processing, pragmatics, and scope in Korean and English. *Proceedings of 19th Japanese-Korean Linguistics Conference*. Stanford, CA: CSLI.
Liceras, J. M., Fernández Fuertes, R., & Alba de la Fuente, A. (2011). Overt subjects and copula omission in the Spanish and the English grammar of English-Spanish bilinguals: On the locus and directionality of interlinguistic influence. *First Language*, *32*, 88–105.
Lillo-Martin, D., Koulidobrova, H., de Quadros, R. M., & Chen Pichler, D. (2012). Bilingual language synthesis: Evidence from WH-questions in bimodal bilinguals. In A. K. Biller, E. Y. Chung, & A. E. Kimball (Eds.), *Proceedings of the 36th annual Boston University Conference on Language Development* (pp. 302–314). Somerville, MA: Cascadilla Press.
Lleó, C., & Kehoe, M. (2002). On the interaction of phonological systems in child bilingual acquisition. *International Journal of Bilingualism*, *6*, 233–237.
Mancilla-Martinez, J., Pan, B. A., & Vagh, S. B. (2011). Assessing the productive vocabulary of Spanish-English bilingual toddlers from low-income families. *Applied Psycholinguistics*, *32*, 333–357.
Marchman, V., Fernald, A., & Hurtado, N. (2010). How vocabulary size in two languages relates to efficiency in spoken word recognition by young Spanish-English bilinguals. *Journal of Child Language*, *37*, 817–840.
Marchman, V., & Martinez-Sussman, C. (2002). Concurrent validity of caregiver/parent report measures of language for children who are learning both English and Spanish. *Journal of Speech, Language and Hearing Research*, *45*, 983–997.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Marchman, V., Martinez-Sussman, C., & Dale, P. S. (2004). The language-specific nature of grammatical development: Evidence from bilingual language learners. *Developmental Science*, *7*, 212–224.
Mattock, K., Polka, L., Rvachew, S., & Krehm, M. (2010). The first steps in word learning are easier when the shoes fit: Comparing monolingual and bilingual infants. *Developmental Science*, *13*, 229–243.
McLaughlin, B. (1978). *Second-language acquisition in childhood*. Hillsdale, NJ: Erlbaum.
Mehler, J., Jusczyk, P. E., Lambertz, G., Halsted, N., Bertonicini, J., & Amiel-Tison, C. (1988). A precursor of language acquisition in young infants. *Cognition*, *29*, 143–178.
Meisel, J. M. (1989). Early differentiation of languages in bilingual children. In K. Hyltenstam, & L. Obler (Eds.), *Bilingualism across the lifespan: Aspects of acquisition, maturity and loss* (pp. 13–40). Cambridge, UK: Cambridge University Press.
Meisel, J. M. (2004). The bilingual child. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 91–113). Oxford, UK: Blackwell.
Meroni, L., Unsworth, S., & Smeets, L. (2013). Crosslinguistic influence in scope ambiguity: Evidence for acceleration. In S. Baiz, N. Goldman, & R. Hawkes (Eds.), *Proceedings of the 37th annual Boston University Conference on Language Development* (pp. 265–279). Somerville, MA: Cascadilla Press.
Montanari, S. (2009a). Multi-word combinations and the emergence of differentiated ordering patterns in early trilingual development. *Bilingualism: Language and Cognition*, *12*, 503–519.
Montanari, S. (2009b). Pragmatic differentiation in early trilingual development. *Journal of Child Language*, *36*, 597–627.
Montanari, S. (2010). Translation equivalents and the emergence of multiple lexicons in early trilingual development. *First Language*, *30*, 102–125.
Montanari, S. (2011). Phonological differentiation before age two in a Tagalog-Spanish-English trilingual child. *International Journal of Multilingualism*, *8*, 5–21.
Müller, N., & Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and Cognition*, *4*, 1–21.
Mykhaylyk, R., & Ko, H. (2010). Optional scrambling is not random: Evidence from English-Ukrainian acquisition. In M. Anderssen, K. Bentzen, & M. Westergaard (Eds.), *Variation in the input: Studies in the acquisition of word order* (pp. 207–240). Dordrecht, the Netherlands: Springer-Verlag.
Nicoladis, E., & Marchak, K. (2011). Le carte blanc or la carte blanche? Bilingual children's acquisition of French adjective agreement. *Language Learning*, *61*, 734–758.
Nicoladis, E., Palmer, A., & Marentette, P. (2007). The role of type and token frequency in using past tense morphemes correctly. *Developmental Science*, *10*, 237–254.
Nicoladis, E., & Paradis, J. (2011). Learning to liaise and elide *comme il faut*: Evidence from bilingual children. *Journal of Child Language*, *38*, 701–730.
O'Grady, W., Kwak, H., Lee, O., & Lee, M. (2011). An emergentist perspective on heritage language acquisition. *Studies in Second Language Acquisition*, *33*, 223–245.
Oller, D. K. (2010). All-day recordings to investigate vocabulary development: A case study of a trilingual toddler. *Communication Disorders Quarterly*, *31*, 213–222.
Oller, D. K., Pearson, B. Z., & Cobo-Lewis, A. B. (2007). Profile effects in early bilingual language and literacy. *Applied Psycholinguistics*, *28*, 191–230.
Paradis, J. (2010). Bilingual children's acquisition of English verb morphology: Effects of language exposure, structure complexity, and task type. *Language Learning*, *60*, 651–680.
Paradis, J. (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism*, *1*, 213–237.
Paradis, J., & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or independent? *Studies in Second Language Acquisition*, *18*, 1–25.
Paradis, J., & Nicoladis, E. (2007). The influence of dominance and sociolinguistic context on bilingual preschoolers' language choice. *International Journal of Bilingual Education and Bilingualism*, *10*, 277–297.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Paradis, J., Nicoladis, E., Crago, M., & Genesee, F. (2011). Bilingual children's acquisition of the past tense: A usage-based approach. *Journal of Child Language*, *38*, 544–578.
Pearson, B. Z. (2007). Social factors in childhood bilingualism in the United States. *Applied Psycholinguistics*, *28*, 399–410.
Pearson, B. Z., Fernández, S. C., Lewedeg, V., & Oller, D. K. (1997). The relation of input factors to lexical learning by bilingual infants. *Applied Psycholinguistics*, *18*, 41–58.
Pearson, B. Z., Fernández, S. C., & Oller, D. K. (1993). Lexical development in bilingual infants and toddlers: Comparison to monolingual norms. *Language Learning*, *43*, 93–120.
Pérez-Leroux, A. T., Cuza, A., & Thomas, D. (2011). Clitic placement in Spanish-English bilingual children. *Bilingualism: Language and Cognition*, *14*, 221–232.
Pérez-Leroux, A. T., Pirvulescu, M., & Roberge, Y. (2009). Bilingualism as a window into the language faculty: The acquisition of objects in speaking-speaking children in bilingual and monolingual contexts. *Bilingualism: Language and Cognition*, *12*, 97–112.
Petitto, L. A., Katerelos, M., Levy, B. G., Guana, K., Tétreault, K., & Ferraro, V. (2001). Bilingual signed and spoken language acquisition from birth: Implications for the mechanisms underlying early bilingual language acquisition. *Journal of Child Language*, *28*, 453–496.
Place, S., & Hoff, E. (2011). Properties of dual language exposure that influence two-year-olds' bilingual proficiency. *Child Development*, *82*, 1834–1849.
Quay, S. (2008). Dinner conversations with a trilingual two-year-old: Language socialization in a multilingual context. *First Language*, *28*, 5–33.
Quay, S. (2010). Trilingual toddlers at daycare centres: The role of caregivers and peers in language development. *International Journal of Multilingualism*, *8*, 22–41.
Ramón-Casas, M., Swingley, D., Sebastián-Gallés, N., & Bosch, L. (2009). Vowel categorization during word recognition in bilingual toddlers. *Cognitive Psychology*, *59*, 96–121.
Ramus, F., Hauser, M. D., Miller, C., Morris, D., & Mehler, J. (2000). Language discrimination by human newborns and by cotton-top tamarin monkeys. *Science*, *288*, 349–351.
Rothweiler, M. (2006). The acquisition of V2 and subordinate clauses in early successive acquisition of German. In C. Lleó (Ed.), *Interfaces in multilingualism: Acquisition, representation, and processing* (pp. 93–115). Amsterdam, the Netherlands: John Benjamins.
Scheele, A. F., Leseman, P. P. M., & Mayo, A. Y. (2010). The home language environment of monolingual and bilingual children and their language proficiency. *Applied Psycholinguistics*, *31*, 117–140.
Schmitz, K., Patuto, M., & Müller, N. (2012). The null-subject parameter at the interface between syntax and pragmatics: Evidence from bilingual German-Italian, German-French, and Italian-French children. *First Language*, *32*, 205–238.
Sebastián-Gallés, N. (2010). Bilingual language acquisition: Where does the difference lie? *Human Development*, *53*, 245–255.
Sebastián-Gallés, N., Albareda-Castellot, B., Weikum, W. M., & Werker, J. F. (2012). A bilingual advantage in visual language discrimination in infancy. *Psychological Science*, *23*, 994–999.
Sebastián-Gallés, N., & Bosch, L. (2009). Developmental shift in the discrimination of vowel contrasts in bilingual infants: Is the distributional account all there is to it? *Developmental Science*, *12*, 874–887.
Serratrice, L., Sorace, A., Filiaci, F., & Baldo, M. (2009). Bilingual children's sensitivity to specificity and genericity: Evidence from metalinguistic awareness. *Bilingualism: Language and Cognition*, *12*, 239–257.
Sheng, L., Lu, Y., & Kan, P. F. (2011). Lexical development in Mandarin-English bilingual children. *Bilingualism: Language and Cognition*, *14*, 579–587.
Singh, L. (2008). Influences of high and low variability on infant word recognition. *Cognition*, *106*, 833–870.
Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*, 1–33.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press

Sorace, A., & Serratrice, L. (2009). Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism*, *13*, 195–210.

Sorace, A., Serratrice, L., Filiaci, F., & Baldo, M. (2009). Discourse conditions on subject pronoun realization: Testing the linguistic intuitions of bilingual children. *Lingua*, *119*, 460–477.

Sundara, M., Polka, L., & Genesee, F. (2006). Language-experience facilitates discrimination of /d-d/ in monolingual and bilingual acquisition of English. *Cognition*, *100*, 369–388.

Sundara, M., Polka, L., & Molnar, M. (2008). Development of coronal stop perception: Bilingual infants keep pace with their monolingual peers. *Cognition*, *108*, 232–242.

Thordardottir, E. (2011). The relationship between bilingual exposure and vocabulary development. *International Journal of Bilingualism*, *15*, 426–445.

Tomasello, M. (2003). *Constructing a language*. London, UK: Harvard University Press.

Tucker, G. R. (1998). A global perspective on multilingualism and multilingual education. In J. Cenoz & F. Genesee (Eds.), *Beyond bilingualism: Multilingualism and multilingual education* (pp. 3–15). Clevedon, UK: Multilingual Matters.

Unsworth, S. (2012). Testing for crosslinguistic influence and exposure effects in the bilingual acquisition of specific indefinite objects. In A. K. Biller, E. Y. Chung, & A. E. Kimball (Eds.), *Proceedings of the 36th annual Boston University Conference on Language Development* (pp. 633–645). Somerville, MA: Cascadilla Press.

Unsworth, S. (2013). Assessing the role of current and *cumulative* exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism: Language and Cognition*, *16*, 86–110.

Vihman, M. M., Thierry, G., Lum, J., Keren-Portnoy, T., & Martin, P. (2007). Onset of word form recognition in English, Welsh, and Welsh-Welsh bilingual infants. *Applied Psycholinguistics*, *28*, 475–493.

Volterra, V., & Taeschner, T. (1978). The acquisition of and development of language by bilingual children. *Journal of Child Language*, *5*, 311–326.

Weikum, W. M., Vouloumanos, A., Navarra, J., Soto-Faraco, S., Sebastián-Gallés, N., & Werker, J. F. (2007). Visual language discrimination in infancy. *Science*, *316*, 1159.

Werker, J. F. (2012). Perceptual foundations of bilingual acquisition in infancy. *Annals of the New York Academy of Sciences*, *1251*, 50–61.

Werker, J. F., & Byers-Heinlein, K. (2008). Bilingualism in infancy: First steps in perception and comprehension. *Trends in Cognitive Sciences*, *12*, 144–151.

Yang, C. (2002). *Knowledge and learning in natural language*. Oxford, UK: Oxford University Press.

Yang, H., & Zhu, H. (2010). The phonological development of a trilingual child: Facts and factors. *International Journal of Bilingualism*, *14*, 105–126.

Yip, V. (2013). Simultaneous language acquisition. In F. Grosjean & L. Ping (Eds.), *The Psycholinguistics of Bilingualism* (pp. 119–136). Oxford, UK: Wiley-Blackwell.

Yip, V., & Matthews, S. (2006). Assessing language dominance in bilingual acquisition: A case for mean length utterance differentials. *Language Assessment Quarterly*, *3*, 97–116.

Yip, V., & Matthews, S. (2007). *The bilingual child: Early development and language contact*. Cambridge, UK: Cambridge University Press.

https://doi.org/10.1017/S0267190513000044 Published online by Cambridge University Press