



## The Oxford Handbook of Language Attrition

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### CHAPTER

## 11 First Language Attrition and Developmental Language Disorder

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### Abstract

Developmental Language Disorder (DLD) is an impairment specific to language that affects about 5% to 7% of all children, monolingual as well as bilingual. In this chapter, we aim to demonstrate that knowing more about attrition is important for accurately diagnosing bilingual children whose language abilities raise concerns and who may have DLD. The focus is on bilingual children who are raised in a migration context and whose home language, which is also their first language (L1), may be subject to attrition. We discuss whether the effects of attrition and DLD are expected to show overlap, whether they would accumulate, and whether DLD would influence attrition. In so doing, we often refer to research that has looked at the second language (L2) of bilingual immigrant children, as much less is yet known about their L1. We conclude by summarizing the main issues and suggesting promising avenues for future research.

**Keywords:** [developmental language disorder](#), [specific language impairment](#), [language attrition](#), [language delay](#), [child L2 acquisition](#), [heritage language](#)

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## 11.1 Introduction

CHILDREN who are raised in migrant families are mostly exposed to their first language (L1) from birth. This language is also referred to as their home language (Valdés, 1998) or heritage language (Valdés, 2000) (see Part V of this volume). Exposure to the language of the country they reside in typically starts later, making this language their second language (L2), and increases in frequency when children grow older and spend more time outside their homes. Previous research has demonstrated that the delayed onset of L2 exposure can lead to overlap between the language profiles of typically developing (TD) successive bilingual children in the L2 and monolingual children with Developmental Language Disorder (DLD) learning this language as their mother tongue (e.g., Håkansson & Nettelbladt, 1996; Grüter, 2005; Paradis, 2005).<sup>1</sup> In the last decades, a mounting number of studies in the field of DLD have therefore taken a particular interest in bilingualism (Paradis, 2010; Armon-Lotem, 2012), mainly focusing on successive bilingualism as a result of migration.

Research on the intersection of bilingualism and DLD has been conducted for several reasons. First, the partially overlapping language profiles of successive bilingual children without DLD and monolingual children with DLD can provide more insight into the nature of DLD. For instance, if the errors of children with DLD are similar to those made by bilingual children learning an L2, then this could suggest that the impairment affects input ↯ processing. Within this view, impaired input processing (in children with DLD) and reduced input frequency (in bilinguals) have similar effects on children's language outcomes (see Paradis, 2010, for a more detailed discussion on this topic). In addition, another more practical, but not less important, reason is related to how the effects of language impairment can be isolated and teased apart from effects of delayed L2 exposure in diagnostic settings. This is a pressing issue, due to the large numbers of bilingual children on clinical caseloads and lack of appropriate instruments for assessing language proficiency in a bilingual context (Mennen & Stansfield, 2006; Kohnert, 2010). Finally, besides studying the overlap between monolingual DLD and bilingual TD described above, investigating the combined effect of bilingualism and DLD in children who are both bilingual and diagnosed with DLD is also important, for theoretical as well as applied reasons. For example, do effects of bilingualism and DLD on language accumulate, and does bilingualism alleviate or aggravate the symptoms of DLD?

The above issues and questions concern the L2 of successive bilingual children. Less attention has been paid to the L1, and therefore to the possibility of L1 attrition, which is the particular case of language loss at the individual level (Montrul, 2008, p. 64). Like a delay in the L2, attrition in the L1 of successive bilinguals might lead to a diagnostic confound: effects of L1 attrition on children's language proficiency may resemble effects of DLD on skills in that particular language. Effects of L1 attrition and effects of DLD could also accumulate and it is possible that DLD influences the quantity and/or quality of L1 attrition in bilingual children with DLD. In this chapter, we aim to demonstrate that knowing more about attrition is important for accurately diagnosing bilingual children whose language abilities raise concerns. We discuss whether the effects of attrition and DLD are expected to show overlap, whether they would accumulate, and whether DLD would influence attrition. In so doing, we often refer to research that has looked at the L2 of bilingual immigrant children, as much less is yet known about their L1.

Section 11.2 starts with parallels between the effects of DLD and successive bilingualism on children's language abilities. Section 11.3 continues with the combined effects of DLD and bilingualism on the L1 and L2. Section 11.4 highlights factors that may increase the chances of attrition in immigrant children and that may be responsible for the diagnostic confound with DLD. In Section 11.5, issues are discussed that arise when the aim is to isolate the effects of DLD from those caused by attrition. We conclude by summarizing the main issues and suggesting promising avenues for future research in Section 11.6.

## 11.2 Overlapping profiles: monolingual Developmental Language Disorder and bilingual typical development

p. 110 DLD is an impairment specific to language that affects about 5% to 7% of all children (Tomblin et al., 1997). DLD is commonly defined as an impairment in the comprehension and, more prominently, in the production of language in children; the area that is affected most persistently by the impairment is grammar (Leonard, 2014a). A robust ingredient of the definition concerns exclusion criteria, specifying the presumed absence of another clinical condition that can adequately explain the language difficulties (Leonard, 2014a; Bishop, 2014). The inclusion criterion, the language disorder itself, is typically defined in comparison with the language skills of TD. Besides language difficulties, various studies have demonstrated that children with DLD have reduced processing abilities (Leonard et al., 2007). These limitations surface both in the verbal/auditory and in the visual domain (e.g., Ebert & Kohnert, 2011; Vugs et al., 2013; Henry & Botting, 2016). However, the magnitude of the effect of DLD on verbal processing is often larger than the effect of DLD on visual processing, and, in addition, findings in the visual domain are mixed. For instance, sustained selective attention limitations are found for auditory but not for visual stimuli (Spaulding, Plante, & Vance, 2008).

An important issue, when establishing a benchmark for DLD, is what the nature of the difference between language-impaired children and TD children actually is. Leonard (2014a) discusses different options. First of all, it could be said that DLD represents a general language delay ('not only [...] late emergence of language but also slower than average development' (Leonard, 2014a, p. 32)). However, it appears that language development in DLD is not a carbon copy of that in younger TD children. Instead, the difference between DLD and TD may be described as follows: (1) DLD may be characterized by an abnormal frequency of the same errors also found in younger children. In other words, children with DLD produce more errors than younger TD children, but the errors are the same and emerge in the same language domains. Alternatively, (2) DLD may represent an uneven profile, in that some domains are more impaired relative to TD development than others, even though the errors are generally similar. Finally, (3) the difference between children with DLD and TD children may be qualitative in nature. A qualitative difference would imply that children with DLD not only show delayed development, but also deviant development and, crucially, produce errors that are not or hardly ever found in TD children.

Rice (2012, p. 8) describes children with DLD as having a 'delayed departure', a characterization that refers to a quantitative rather than a qualitative difference. This delayed departure may, however, (come to) affect certain aspects of language, such as tense morphology, more than others, leading to an uneven profile (as described above) or, as Rice (2003, p. 71) puts it, a 'delay within a delay'.

The notion of delay is highly relevant when comparing DLD and bilingualism, as successive bilingual children experience a delay in exposure to the L2, potentially leading to (temporary) similarities between the language outcomes of monolingual children with DLD and TD age peers who are learning the language as their L2 (e.g., Håkansson & Nettelbladt, 1996; Paradis & Crago, 2000; Crago & Paradis, 2003; Grüter, 2005; Paradis, 2005). Note that these similarities are expected to be temporary as the delay in L2 children will be transient, assuming that they are equipped with well-working language learning mechanisms, whereas the language problems of children with DLD are found to be persistent (Rice, 2013).<sup>2</sup> It should be stressed that the additional ways in which monolingual children with and without DLD differ (profile difference, abnormal quantity of errors, deviant structures) are not expected to characterize TD L2 learners, although in early L2 development child L2 learners are likely to go through a phase in which their L2 shows signs of L1 transfer leading to non-target like productions (Whong-Barr & Schwartz, 2002; Zdorenko & Paradis, 2011).

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While delayed L2 development does appear to have a parallel in monolingual DLD, L1 attrition by definition does not have such a parallel because it is specific to bilingual learning contexts (see definition below). However, incomplete acquisition, another term used in research on bilingualism, and related both to (L2) delay and (L1) attrition, may be applied to DLD. Anderson (1999) defines the two notions as follows: L1 attrition occurs when L1 features are lost as a consequence of the child becoming dominant in the L2, while incomplete acquisition is defined by a failure to acquire native-like structures as a result of insufficient exposure during crucial developmental stages. Following Montrul (2008, p. 21), we assume that incomplete acquisition refers to a mature linguistic state and the outcome of language acquisition.

In the first edition of his seminal book, Leonard (1998) discussed the possibility that the language abilities of children with DLD ‘plateau’: ‘mastery levels are never reached [...] a plateau is reached before certain aspects of language are mastered. The basis for such arrested development is presumed to be biological age.’ (Leonard, 1998, p. 32). The latter remark echoes the notion of a critical age for language acquisition that is also often invoked to explain lack of success in L2 acquisition (Hyltenstam & Abrahamsson, 2003). In a recent article about the language development of children with DLD, Leonard (2014b) wrote:

After a period of late emergence, the pace of subsequent lexical and grammatical development does not appear to be appreciably slower than that seen in TD. However, a plateau effect may start to occur because the late start makes it difficult to reach full mastery at the age when language learning is still efficient. (p. 41)

Rice (2012, p. 8) adopts a metaphor to describe a process that closely resembles Leonard’s description. With respect to the language development of children with DLD, and the contrast with TD, she writes: ‘Their language train, however, seems to *decelerate* before reaching the final destination of the adult grammar, *not quite reaching the end goal*’ (italics added).

### 11.3 Combined effects of Developmental Language Disorder and bilingualism

p. 112 DLD is to a large degree heritable (Bishop, 2006). By implication, it affects not only monolingual but also bilingual children (Paradis et al., 2003). In bilingual children with DLD, the joint effects of impairment and bilingualism present researchers and practitioners with a challenge. After all, successive bilingual children with DLD are likely to demonstrate the phenomena that are typical of bilingual acquisition but also the symptoms of their language impairment. If the effects of impairment and bilingualism affect the same domains of language in a similar way (e.g., a negative effect), the expected net result of both effects would be the sum of both effects. One way to determine if the effects of DLD and bilingualism indeed accumulate is to use a multiple-group design in which bilingual children with DLD are compared with monolingual children with DLD on the one hand and bilingual TD children on the other hand. Adding a fourth group consisting of monolingual TD children enables comparisons of the effect size of the TD–DLD difference in a monolingual and bilingual context. Effect size is, as Paradis (2010) observed, the index that should be used to determine if bilingualism *aggravates* the effect of DLD. Such an aggravating effect is present if in the bilingual context the difference between TD and DLD is larger (as evidenced by a larger effect size) than in a monolingual context. An alleviating effect is, in contrast, shown by a smaller effect size.<sup>3</sup> It is not only relevant to ask if bilingualism aggravates the effects of DLD, but also if DLD aggravates the effects of bilingualism. This latter question is specifically relevant with respect to attrition and will be discussed in Section 11.3.2. There, we will show that the notions of delay and attrition invoke specific considerations when applied in the context of bilingual DLD.

### 11.3.1 Delay in the L2

Two Dutch studies by Verhoeven and colleagues (Verhoeven, Steenge, & Balkom, 2011; Verhoeven, Steenge, Van Weerdenburg, & Van Balkom, 2011) arrived at the conclusion that bilingual children (L2 Dutch, various L1s) with DLD have an additional disadvantage in the L2 because their Dutch language skills showed effects of bilingualism as well as effects of impairment. In this context, these effects of bilingualism, which originate in the input to bilingual children that is distributed over two languages, should not be equated with incomplete acquisition, because it is unknown whether or not children's language outcomes attested in these studies represent a mature linguistic state. Actually, because the children were rather young (6 to 9 years old) and frequently exposed to the L2, it is likely that the outcomes do *not* demonstrate incomplete acquisition but represent delayed acquisition (compared with monolinguals), caused by reduced input. It cannot be ruled out, however, that the delay will ultimately lead to incomplete acquisition. As Leonard (2014a) notes, the performance gap for bilingual children with DLD (as compared with bilingual TD children) in the studies by Verhoeven et al. was not greater than a similar gap for the monolingual DLD children as compared with their monolingual TD peers. In other words, there was no difference in effect size between monolinguals and bilinguals when comparing TD and DLD, showing that although the effects of bilingualism and DLD may add up, bilingualism does not aggravate the effects of DLD.

p. 113 In a recent study, we compared 5- to 6-year-old bilingual and monolingual children with DLD and TD, learning Dutch as their L2 (bilinguals) or L1 (monolinguals). The four groups were matched on age, non-verbal intelligence and also socio-economic status to the extent that this was possible. The bilingual TD and DLD groups were furthermore matched on amount of exposure to Dutch. We found that the bilingual DLD group was outperformed by the bilingual TD group as well as by the monolingual DLD group, both on Dutch inflectional morphology and Dutch receptive vocabulary tasks, confirming that effects of bilingualism and impairment add up (Blom & Boerma, 2017; but see Paradis, 2007; Gutiérrez-Clellen et al., 2008; Rothweiler et al., 2012). For receptive vocabulary, but not for grammatical morphology, the effect of impairment was larger in the bilingual than in the monolingual sample, as shown by comparisons of the effect sizes of DLD in bilingual and monolingual contexts. This led us to the conclusion that bilingualism—or rather reduced input in one language—can aggravate the effects of language impairment in the domain of vocabulary. Because vocabulary is a moving target, as it continues to grow (Brysbaert et al., 2016) and contrasts in this respect with inflectional morphology, reduced input may have more of an impact on vocabulary development than on the development of grammatical morphology. In line with this idea, Chondrogianni & Marinis (2011) observed that in a sample of Turkish children learning English as their L2, vocabulary was affected by environmental factors such as mother's proficiency and English use in the home, whereas tense morphology was not.

### 11.3.2 L1 attrition

The conditions under which the L1 of immigrant children is learnt are often less favourable than those for the L2, because the L1 is used by a limited number of people, in a limited number of domains, and proficiency in the L1 is often valued less by dominant societal norms than L2 proficiency (see Section 11.4.3). The result of such a bilingual learning situation is ‘subtractive bilingualism’ (Wong-Fillmore, 1991), which refers to the process in which the L2 is learnt at the expense of the L1 and gradually replaces the L1, resulting in incomplete L1 acquisition and attrition. This will affect the L1 development of bilingual TD children and bilingual children with DLD alike, but it may not affect them in equal measure. As discussed earlier, incomplete L1 acquisition as observed in bilinguals is at first glance not unlike what we see in DLD (‘not quite reaching the end goal’), but the cause of incomplete acquisition in DLD is not primarily a lack of exposure in a crucial developmental phase. Rather, it is a diminished ability to learn language that prevents children from reaching a sufficient language level in a crucial developmental phase. In bilingual DLD, this diminished ability may be coupled with a diminished window of opportunity if input in a particular language is reduced and children stop being abundantly exposed to one of their languages. It is conceivable that these two factors, which are internal and external to the child respectively, add up and lead to a more incomplete L1 acquisition in bilingual DLD than in bilingual TD (or monolingual DLD). Also, internal factors could enlarge the effects of external factors, leading to aggravation of L1 attrition in bilingual DLD compared with bilingual TD.

To our knowledge, there is hardly any research on attrition in children with DLD, but, with respect to the influence of DLD on attrition, a comparison of two cases by Restrepo & Kruth (2000) may be insightful, keeping in mind that observations based on cases cannot be generalized to the population. Restrepo & Kruth (2000) followed two 7-year-old Spanish-English bilingual children in the United States, one with and one without DLD, over a period of one year. Despite similar patterns of exposure, the child with DLD appeared to lose Spanish faster in comparison with the TD child, as indicated by a decrease in sentence length and a faster increase in errors with grammatical gender and verb inflection. The same errors were also attested in other TD children, but these children seemed to show a more protracted pattern of attrition (cf. Anderson, 2012), suggesting that DLD affects quantitative aspects of attrition and speed more than qualitative aspects of attrition (such as the types of errors).

## 11.4 Factors influencing L1 attrition in bilingual children

Attrition does not necessarily affect all bilingual migrant children. One factor that influences attrition, which is part of the definition by Anderson (1999), is dominance. A dominant bilingual is ‘someone with greater proficiency in one of his or her languages’; who ‘uses it significantly more than the other language(s)’ (Li, 2000, p. 6). L1 attrition happens as the result of becoming dominant in the L2 (Anderson, 1999), a dominance shift which, in turn, is caused by more exposure to and use of the L2. In addition, there are other factors that might contribute to attrition in the L1. If the effects of attrition are exacerbated by a language impairment (Section 11.3.2), these factors likely have an even larger effect on the L1 abilities of bilingual children with DLD. Moreover, it is important to be aware of these factors when deciding on (the level of) attrition and comparison with appropriate norms, which is an issue we turn to in Section 11.5. Below, the role of age of exposure to the L2, a child-internal factor, and socio-economic status and L1 status, two child-external factors, will be discussed. This is by no means an exhaustive list of factors, but they are chosen as an illustration and because these factors have been investigated in recent research on children becoming bilingual in immigration settings.

### 11.4.1 Age of exposure to L2 and L1 development

Recently, Bedore et al. (2016) explored the extent to which age of exposure to L2 English impacts the development of L1 Spanish in Spanish-English bilingual children in Grade 1, with an average age of 82 months, and Grade 3, with an average age of 106 months. Their findings suggest that children who start acquiring English the earliest scored the lowest on Spanish, indicating that early L2 exposure may come at a cost to the acquisition of the L1. From the perspective of distributed input this pattern is not surprising. When L2 exposure starts, input becomes divided across languages and this might prevent children from acquiring new grammatical constructions in their L1 (Montrul, 2008). An early age of L2 exposure may particularly diminish a child's chances of acquiring those L1 constructions that tend to be acquired late. The consequence could be that the earlier a child's attention shifts to the L2, the earlier L1 development may come to a halt (stagnation) and may, subsequently, start to show attrition. At this point we want to emphasize that this is one developmental scenario out of many, as L1 development in successive bilingual children does not necessarily stagnate, but could also continue to grow at a slower pace due to an increase of L2 exposure. Stagnation is, moreover, not necessarily followed by attrition, but could also lead to incomplete acquisition, which is a relatively stable state. In addition, growth, incomplete acquisition, and attrition could co-occur in an individual child. A child may show growth on one aspect of language, incomplete acquisition on another and at the same time lose other aspects of the L1 (Montrul, 2008).

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### 11.4.2 Socio-economic status: parent-child interaction and L1 development

Children from low socio-economic status (SES) homes, whose parents have a background of low education, income and/or occupational prestige, have been found to lag behind in their language outcomes compared with children from higher SES homes (see, e.g., Hoff, 2006, for an overview). Maternal education, specifically, may influence vocabulary development, regardless of culture (Hoff & Tian, 2005). The seminal study by Hart & Risley (1995) suggested that the smaller vocabularies of children from lower SES families are related to parent-child interaction patterns. The importance of parental input in explaining the effect of SES was further confirmed by Huttenlocher et al. (2010), who observed that SES effects on lexical, constituent, and clausal diversity in children's language are, in part, mediated by caregiver speech.

Independent of impairment or reduced input in bilingual contexts, SES is a factor that may prevent children from reaching language milestones, even though the effect of SES may not be as persistent as suggested by some studies and could influence certain aspects of language more than others (Letts et al., 2013).

Accumulating effects of low SES and DLD were not found in the study by Roy & Chiat (2013), who observed similar language profiles across children with DLD from high and low SES families. However, effects of bilingual exposure and SES may add up: in a study by Calvo & Bialystok (2014), bilingual children growing up in working class families scored lower on receptive vocabulary tests than monolingual children from working class families, but also lower than bilingual children from middle class families and monolingual children from middle class families. If the effects of reduced exposure in bilingual contexts and low SES add up, the prediction could be that incomplete acquisition and attrition are more prominent in children from lower SES backgrounds than in children from higher SES backgrounds.

Low SES can be more prevalent among certain groups of immigrant children. For instance, in the Netherlands, many unskilled Turkish and Moroccan migrant workers came to the country because of labour migration and family reunification (Swanenberg, 2012). In these families, low SES may go hand in hand with limited stimulation in the L1, in particular when the L1 is further suppressed due to an increase of L2 exposure when the children growing up in these families start to attend school. However, low SES has also been found to be associated more with L1 than L2 use at home, at least by Turkish mothers in the Netherlands (Prevo et al., 2014; but see Goldberg et al., 2008, for a somewhat different pattern in migrant

mothers in Canada), suggesting that low SES can also create a relatively favourable context for L1 development and may reduce L1 attrition.

### 11.4.3 Language status and L1 development

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In many cases, the L1 of migrant children, also labelled minority language, lacks a high social status—and is thus low in prestige in the host country, in sharp contrast to the majority language, which is the language used in educational settings and official media. This applies to, for instance, Spanish or Somali children in the United States or Turkish children in the Netherlands and Germany. As a result, there are fewer opportunities for those children to develop and use the L1, and fewer resources are available to support their L1 development compared with the L2. For instance, literacy may be exclusively associated with the language of school, which is the L2. Reading and literacy-related activities will therefore often be done in the L2, supporting L2 rather than L1 development (Prevo et al., 2014). Moreover, high proficiency in the L1 is generally not highly valued, unlike reaching a high language level in the L2. This situation is the typical subtractive context in which the L2 is likely to replace the L1, as described earlier (Section 11.2.2). This contrasts with additive contexts in which the acquisition of L1 is supported and can facilitate L2 learning, as in, for instance, Canada where both French and English are majority languages (Baker, 2011).

The effect of L1 status varies across minority languages, as illustrated in a study by Scheele et al. (2010), who investigated vocabulary development in the L1 and the L2 of bilingual Turkish-Dutch and Moroccan-Dutch (L1: Tarifit-Berber) preschoolers. The Dutch vocabulary scores of the Turkish children were lower than those of the Moroccan children, which was related to the more frequent use of Dutch in the Moroccan homes. This difference between the Moroccan and Turkish migrant families can be explained by a myriad factors (Laghzaoui, 2011). Tarifit-Berber is a predominantly oral rather than written language in which fewer resources (books, television) are available than in Turkish. Its prestige is moreover low and, in the Moroccan community in the Netherlands, Dutch is often used to communicate among each other because the different Berber varieties are not mutually intelligible. As a consequence, attrition may happen more often and to a larger extent in Moroccan individuals who learn Tarifit-Berber as their L1 than in Turkish individuals. To our knowledge, there is, however, no research that has systematically compared the levels of attrition across speakers of Tarifit-Berber and Turkish in the Netherlands.

Language shift, the loss of the L1 that concerns an entire speech community (Fishman, 1972; Lambert & Freed, 1982), may also be more prominent in the Moroccan than in the Turkish community in the Netherlands. If language shift occurs in an immigrant community, it creates different characteristics in the child's language input, which is relevant for every child learning a language, but could create a specific risk for children with DLD. Restrepo et al. (2011) approach bilingual DLD from the perspective of Dynamic Systems Theory. Crucially, in that framework,

language abilities in multilingual children change depending on the quantity and quality of input needed to induce a change. When input is strong, language changes can be positive on all the languages that the child speaks, but they can also be negative for one language and positive for the other. (p. 515)

When we consider language shift, the quantity and quality of the input may be at stake. Since children with DLD already have more difficulty learning language, this can be a serious threat to the acquisition of the L1 and, as a consequence, it might affect children with DLD even more strongly than their TD peers. However, given the sparseness of relevant research specifically addressing the impact of these variables in bilingual DLD, predictions can only be tentative.



## 11.5 Isolating the effect of Developmental Language Disorder

Successive bilingual children experience a delay in L2 exposure. In such cases, evaluating the child's abilities in the L1 (in which they have had input from birth) could be more insightful than assessing the L2. However, like L2 assessment, L1 assessment is not always straightforward. In this section, we discuss the ways in which attrition may complicate L1 assessment. In addition, possible alternatives are described when reliable assessment cannot be ensured, either in the L1 or in the L2.

### 11.5.1 Assessing the L1: comparing an individual child using appropriate norms

In order to isolate effects of DLD from effects of attrition or bilingual development in a more general sense, information could be gathered on estimated language dominance, as attrition typically happens in a situation when the L2 becomes dominant (Anderson, 1999). Many children who become bilingual in immigration contexts are more dominant in their L1 at younger ages. They gain experience with the L2 when they spend more time outside their homes in educational settings and have increased interactions with the broader community, most typically leading to a dominance shift (see Kohnert, 2010, and references cited therein). The timing of this dominance shift, and the associated likelihood that a child may show attrition, will thus depend on the child's age of L2 exposure as well as the amount of exposure to and use of both languages. Consequently, it is of paramount importance to collect relevant background information on a child's linguistic environment as part of a multilingual anamnesis. On top of this, isolating effects of DLD requires a comparison with normative data collected from TD bilingual children with the same language background and level of attrition. However, in particular, degree of attrition is hard to assess and measuring dominance might, in this case, be an alternative.

### 11.5.2 Assessing the L1: linguistic markers and valid tools

When assessing the L1, it is important to be aware of the fact that the effects of DLD and attrition might be easily confounded because they can affect the same areas. For instance, errors with verb inflection are not only linguistic markers of DLD in Spanish, but they are also a characteristic of children who undergo loss of Spanish (Anderson, 2012). Not all linguistic markers that are indicative of DLD in monolingual contexts can thus be generalized to L1 assessment in bilingual contexts, *unless* appropriate normative data are available. Note that the same holds for the assessment of the L2 of bilingual children, as a delayed L2 development can also show similarities with an impaired language development (as described in Section 11.2).

p. 118 Moreover, the L1 in the host country may be subject to language change as a result of language contact. The implication is that the validity of assessment tools for the L1 created in the country of origin is restricted in the host country. For example, in Turkish, transitive verbs mark the direct object with accusative case, depending on the position of the object and definiteness. Case marking is vulnerable in DLD across many languages, including morphologically rich languages (Leonard, 1998), and might be seen as a clinical marker. However, in Turkish multiword expressions as spoken in the Netherlands, accusative case can also be omitted or substituted, presumably under the influence of Dutch, which has no case marking (Doğruöz & Backus, 2009). Because the input (and thus the target language) properties may thus differ between Turkish speakers in Turkey and the Netherlands, assessment tools developed in Turkey may lack validity in the Dutch context. Note that this process of language change is not necessarily equated with language shift, as the Turkish community has a strong tendency to maintain their L1 (Backus, 2005).

### 11.5.3 Possible alternatives: measures that are insensitive to L1 attrition (or L2 delay)

The ideal situation, in which a child's level of attrition is estimated correctly and relevant normative data and assessment tools are available, is often out of reach. The question arises as to what professionals could do if reliable assessment in the L1 or in the L2 cannot be ensured. In this section, we review two possible alternatives.

One option is the use of language processing measures instead of standardized tests of vocabulary and grammar, which are based on previous knowledge and thus are crucially susceptible to effects of input (i.e., experience with the language) (Campbell et al., 1997; Kohnert et al., 2006). Knowledge-based measures may underestimate the language learning abilities of children who have less experience with the target language, in particular bilinguals, because knowledge of one specific language is tested (Restrepo & Silverman, 2001). Processing-based measures, in contrast, tap into the cognitive underpinnings of language and are less biased towards language-specific knowledge (Chiat, 2015). Factors like attrition will therefore affect performance on processing-based measures to a lesser extent than performance on knowledge-based measures. Taking this idea one step further, Chiat (2015) developed a non-word repetition task—a processing-based measure that taps into verbal short-term memory—that includes features that are common across languages, enabling children to use knowledge that is not specific to the L1 or the L2. In a study by Boerma et al. (2015), bilingual children did not differ from monolingual peers on this 'quasi-universal' task, but performed more poorly on a non-word task that was based on Dutch phonotactics. The quasi-universal non-word repetition task was insensitive to the effects of bilingualism but sensitive to DLD, and its diagnostic validity was excellent in both a monolingual and bilingual context.

Another type of task that may support the identification of DLD in bilingual child populations is a narrative task. Narrative tasks can target a story's microstructure, focusing on a child's linguistic expression of story events, or macrostructure which refers to the structure of the story, including plot elements such as the goals of the protagonists (Stein & Glenn, 1979). In contrast to microstructure, measures of narrative macrostructure are relatively independent of experience in a specific language and do not disadvantage p. 119 bilinguals (Pearson, 2002; Hipfner-Boucher et al., 2015), which may be explained by the finding that, unlike in microstructure, linguistic factors do not predict children's expression of the macrostructure of a story (Blom & Boerma, 2016). Instead, cognitive limitations, and specifically sustained attention, have been found to influence performance on narrative macrostructure (Blom & Boerma, 2016). While sustained attention is compromised in children with DLD (Ebert & Kohnert, 2011), it is not affected by bilingualism (see Bialystok et al., 2008). Hence, even when there is attrition, bilingual TD children may still perform well on a narrative task when analysed on the macrolevel. Bilingual peers with DLD, however, might perform more poorly due to limitations in sustained attention. A study by Boerma et al. (2016) confirms these predictions. Large negative effects of DLD were found on the measures of narrative macrostructure, whereas no effects of bilingualism emerged. As a result, the diagnostic validity of the narrative task was adequate in both a monolingual and bilingual context.

In general, in this section we showed that tasks which require less language-specific knowledge (or less experience with a specific language) are more valid indices of impairment in a bilingual child than tasks that do require such knowledge in those cases where reliable assessment in either the L1, due to attrition, or the L2, due to delay, is not reliable. These tasks should, however, not be used as stand-alone tools, and, instead, the use of multiple instruments is recommended.

## 11.6 Concluding remarks

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In this chapter, we discussed attrition in relation to DLD, asking the question whether the effects of attrition and DLD would show overlap, whether they would accumulate and whether DLD could influence attrition. What emerged from this discussion is a potentially very interesting and urgent field of study, but one in which hypotheses have to be pieced together on the basis of evidence from various subfields that have until now not been directly associated: L2 development, L1 attrition, and language impairments such as DLD. Another issue that we discussed and that directly relates to our topic is the possibility that L1 attrition leads to a diagnostic confound due to the fact that both L1 attrition and DLD affect children's language level, albeit for different reasons. Because of a dearth of research on L1 attrition in the context of DLD, our point of departure was often research on the L2 of bilingual immigrant children. This research could be informative because the same mechanism—limited exposure and usage—underlies both L1 attrition and L2 delay. Moreover, linguistic phenomena that are susceptible to attrition effects might also be prone to delay, following the 'last in, first out' principle that follows from the regression hypothesis (Jakobson, 1941). This hypothesis states that those linguistic features which are learned last are the first to show attrition, and vice versa (Keijzer, 2007). However, an important difference between L1 and L2 development concerns the conditions under which the two languages are learnt, which are often more favourable for the L2 and more adverse for the L1 in migrant families.

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Because of their language impairment, children with DLD may need more input to reach, or maintain, the same language level as their TD peers (e.g., Gray, 2003; Rice et al., 1994; Riches et al., 2005; for a meta-analysis, see Kan & Windsor, 2010). We hypothesized ↪ that, consequently, the L1 may erode relatively fast in children with DLD. This effect may be modulated by language-level and child-level factors, both internal and external, such as input-dependency of linguistic phenomena, age of L2 exposure, socio-economic status, and status of the L1. Understanding more about L1 attrition is furthermore relevant for diagnostic purposes, as overlap between the effects of L1 attrition and DLD could create a diagnostic confound. Regarding the diagnosis of DLD in bilingual contexts, it is generally recommended that both the L1 and L2 are assessed. However, like delays in the L2, attrition in the L1 presents a complicating factor that clinicians need to be aware of, because of the possibility that it renders L1 normative data unreliable and assessment tools in the L1 invalid. For this reason, new instruments have been developed that are sensitive to the effects of DLD, but relatively insensitive to the child's knowledge of a specific language and, therefore, to effects of bilingualism. That these instruments are promising has been shown by the equal performance of monolinguals and successive bilinguals in their L2. Future research has to show if the outcomes are indeed replicated for their L1, regardless of L1 attrition. Moreover, to fully understand the interaction of L1 attrition and DLD, future studies need to longitudinally follow the L1 and L2 development of bilingual children with and without DLD, next to systematically keeping track of patterns of L1 and L2 exposure and use. Although L1 attrition may even then be difficult to disentangle from incomplete acquisition, language shift, and language change, longitudinal work would be a good starting point to investigate this understudied reality. It may allow us to identify a plateau in the L1, determine if children's development stabilizes after reaching the plateau or if linguistic features start to show attrition due to L2 dominance, and keep track of the speed with which attrition takes place. Such longitudinal research might inform us about the nature of attrition in children with DLD and allow us to address attrition in this group in a more direct manner than we were able to do in this chapter, due to the present lack of resources.

## Notes

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- 1 In keeping with a recent proposal (Bishop, 2017), we decided to use the term DLD. Other commonly used terms are Specific Language Impairment (SLI), Primary Language Impairment (PLI), or Language Impairment (LI).

- 2 For this reason, Reilly et al. (2014) explicitly recommend against the use of the notion 'delay' in relation to DLD.
- 3 If the effects of impairment and bilingualism are in opposite directions, it is possible that bilingualism reduces the effect of DLD. In this case, the difference between TD and DLD is smaller in a bilingual than in a monolingual context. Such an effect might happen if transfer or cross-linguistic influence in bilinguals leads to accelerated language development.