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Early child second language acquisition: French gender in German children*

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This study investigates the acquisition of grammatical gender in French by German L1 children (age of onset of acquisition (AO) 2;8-4,0). The analysis of spontaneous production data of 24 children gathered longitudinally and a gender assignment test administered to 8 of these children at ages 6;7-8;3 and to 9 children (AO 2,11-3;8) at ages 3;2-5;1 revealed that some of them resembled L1 learners whereas others behaved like adult L2 learners. The turning point is at around AO 3;6. AO is thus a crucial factor determining successive language acquisition.

Keywords: Child L2 acquisition, age of onset of acquisition, sensitive phases/critical periods, grammatical gender, L2 French

1. Acquisition types - different populations?

The goal of this study is to contribute to a better understanding of similarities and differences between first and second language acquisition, focusing on the role of age of onset (AO) as a possible cause of qualitative differences in the knowledge acquired by learners of these acquisition types. The question thus is whether the linguistic behaviour of different populations reflects not only quantitative differences like rate of development or frequency of use of particular phenomena but also qualitative ones: most importantly whether they use constructions not attested in the speech of other populations, proceed through distinct developmental sequences, or ultimately attain different grammatical knowledge systems. It is doubtful whether all acquisition types discussed in the literature, e.g., monolingual (L1) and bilingual (2L1) first, child (cL2) and adult (L2) second language acquisition, naturalistic and instructed learning, third language and heritage language acquisition, do indeed exhibit qualitative differences in the sense just defined. However, this paper is primarily concerned with cL2 learners who are contrasted with (2)L1 on the one hand and with L2 on the other, in an attempt to determine whether observable similarities and differences are due to variation in AO.

It goes without saying that the populations under discussion differ in more respects than AO and, consequently, there exist other factors that might cause qualitative changes in what the Language Making Capacity (LMC, Slobin, 1985) accomplishes. The most obvious one, distinguishing all types of bilingualism from L1, is the presence of more than one language in the environment and the brain of a learner. Yet there exists a broad consensus that simultaneous acquisition of more than one grammatical system does not exceed the possibilities of the LMC, which can be characterized as an endowment for multilingualism. Children exposed to two or more languages from birth have been shown to be able to develop more than one native competence; see De Houwer (1995). The presence of another language is thus not an impediment to successful acquisition when the languages are acquired simultaneously from birth.

Input is another factor that might lead to differences between bilinguals and L1 learners. For those acquiring more than one language, time of exposure to each of them is necessarily reduced, as compared to monolinguals. Although this need not imply that bilinguals are exposed to a smaller amount of child-directed utterances, see De Houwer (2014), this is widely assumed to be the case. At least in settings where languages are not equally distributed among domains of daily interaction, this is a plausible assumption for the weaker language. How exactly reduced input affects acquisition is a controversial issue, especially the claim that it can result in incomplete grammars; see Montrul (2008). In fact, we are not able to determine the minimal amount of input necessary for the development of a native competence. Quantitative effects, however, are well documented. Rate of acquisition tends to be slower in the weaker language; yet this

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effect does not exceed the normal range of variation for monolinguals, and it is stronger in lexical than in grammatical development; see Hoff, Core, Place, Rumiche, Señor and Parra (2012). Nevertheless, input in interaction with AO and other factors, undoubtedly contributes to the shaping of acquisition processes.

As mentioned above, the present paper is primarily concerned with AO as a factor distinguishing acquisition types. That it does exert an influence of this kind is uncontroversial: if AO happens later in life, grammatical acquisition in this language differs from that in (2)L1 development. Not only do L2 learners draw on different knowledge sources during early phases, they proceed differently through subsequent ones, and they probably never attain full native grammatical competence (Abrahamsson & Hyltenstam, 2009). What is controversial is whether these facts reflect different underlying knowledge systems, caused by maturational changes in the brain. If, for example, parameterized principles of Universal Grammar (UG) are subject to changes due to brain maturation, as argued by Smith and Tsimpli (1995), L2 speakers cannot fix the value of a parameter not instantiated in L1, nor can they reset parameter values in which the grammars differ. Instead, they make use of other cognitive resources to compensate for those not available anymore, e.g., relying on inductive learning where triggering of implicit knowledge has become impossible; see Meisel (2011). Non-parameterized UG principles, on the other hand, constrain L2 acquisition in the same way as (2)L1 development. Thus, the solution of the controversial issue hinges on the question of whether, as suggested here, L2 learners have only partial access to UG, the knowledge that children bring to the task of acquisition, or whether they continue to have full access to UG, as claimed by Schwartz and Sprouse (1996) and others.

At this point, I cannot engage in this discussion that has occupied a large part of generative L2 research over the past 30 years. Rather, I provide empirical evidence for similarities between acquisition types and also for differences that can plausibly be assumed to be due to differences in AO. This investigation focuses on cL2 rather than on adult L2 acquisition, the primary object of previous studies.

2. Child second language acquisition

When, in the 1970's, L2 research began investigating the mental activities underlying linguistic development rather than focusing on contrastive analyses, these studies dealt with both child and adult learners; see Lakshmanan (1994). But for many years to come, research did not analyze systematically how child learners differ from their adult counterparts and whether they still acquire language like L1 learners.

The lack of interest in these issues may have been due to the widely held view that maturational effects on the LMC emerge around age 11, as suggested by Lenneberg (1967) in his Critical Period Hypothesis (CPH). Under this assumption, analyzing learners first exposed to a language between ages 3 and 10 may seem to be of limited interest. But even by the 1980's, L2 research had revealed strong evidence for age-related changes at ages earlier than 11, see Long (1990). It became increasingly evident that the CPH needed to be revised, and not merely with respect to the critical age ranges; indeed the concept of 'critical period' itself had to be modified; see Meisel (2013).

Crucially, it has been argued that there exist several sensitive periods in language development; see Locke (1997). Consequently, critical periods are better understood as clusters of sensitive phases during which the LMC is optimally prepared to integrate new information into developing grammars. As for the age ranges during which this heightened sensitivity begins to fade out, Long (1990) identified the period around age 6–7 as one during which major changes happen. Neuroimaging as well as behavioural studies subsequently demonstrated that changes affecting morphosyntax already occur around age 4; see Meisel (1994, 2004).

In sum, although differences between successive and simultaneous acquisition of bilingualism had long been acknowledged, even in cases where AO happens well before age 11, early successive learners did not attract much attention until recently. Consequently, differences between child and adult learners have not been sufficiently explored. But cL2 only qualifies as a distinct learner population if such differences do exist. That this is indeed the case is demonstrated by Unsworth (2005) who showed that cL2 learners exhibit similarities and differences in comparison to adult L2 learners as well as to children acquiring an L1.

In order to gain further insights into the nature of cL2 acquisition, we should thus examine the period between approximately 3 and 8 years of age (AO), searching for particularities of language use attested only in cL2 and for constructions shared by two of the populations, e.g., by cL2 and aL2, but not by (2)L1. Whereas the former allow us to identify properties particular to cL2, shared phenomena can reveal shared acquisition mechanisms. Note that we do not expect to find coherent results across all domains of grammar; see Schwartz (2004). It follows from the revised CPH that cL2 should resemble L1 in some respects and adult L2 in others. In fact, individual learners, too, are predicted to differ in this way: Depending on their age at onset of acquisition, some will behave like L1 children in their acquisition of particular constructions whereas others will resemble L2 learners in this respect.

A major challenge for research on early successive acquisition is to pinpoint areas of grammar where cL2

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differs from (2)L1 and resembles aL2. Although brain maturation and age-related changes of the cognitive system have been argued to cause alterations in acquisition mechanisms, neither neurolinguistic research nor grammatical theory enable us to specify which phenomena are concerned at exactly which points of development. We must therefore search empirically for properties in which cL2 differs from L1 and possibly resembles aL2.

Good starting points for this quest are phenomena known to represent L2 acquisition difficulties, and recent research has indeed identified several grammatical domains in which cL2 learners behave more like aL2 learners than like L1 children. The adult L2-like properties attested in the speech of successive learners who were first exposed to the second language as of AO 3;6-4 years fall into the domains of inflectional morphology and of syntax, although some syntactic properties are affected only around AO 6 years. Since I am concerned here with the acquisition of French by German-speaking children, let me mention examples concerning these languages.

L2-like usage of grammatical morphology has been observed in the speech of early learners of French with respect to tense (Granfeldt, Schlyter & Kihlstedt, 2007; Meisel, 2008; Schlyter, 2011) and person-markings (Meisel, 2008) on finite verbs, and in the acquisition of gender (Granfeldt et al., 2007; Meisel, 2009). As for syntax, Granfeldt et al. (2007) report that cL2 learners behave like adult L2 learners in placing French object clitics in a target-deviant post-verbal position. Placement of finite verbs is another grammatical domain where cL2 resembles adult L2. Sopata (2009, 2011), for example, has shown that Polish children acquiring German (AO 3;8-4;7) use L2-like constructions, failing to place verbs in the required OV order, using target-deviant V3 orders, and moving non-finite verbs to V2 position. Kroffke, Rothweiler and Babur (2007) present similar findings from a Turkish child learning German at AO 6, whereas a learner first exposed to German at age 3 behaved like L1 children.

In sum, the areas of grammar in which successive acquisition leads to substantially different results, as compared to L1 development, include inflectional morphology and at least some aspects of syntax, although the picture is still blurred when we look at L2-like properties emerging at around AO 4. This is why I propose to take a closer look at the acquisition of grammatical gender. Not only is gender acquisition known to represent a notoriously difficult task for L2 learners in general, see Andersen (1984), this also seems to be true for early learners; see Pfaff (1992). Moreover, since grammatical gender involves morphological as well as syntactic operations, its study might shed light on the question of whether these grammatical domains are affected to the same degree by age-related changes if AO happens before 4 years.

3. Grammatical gender: The target system

Let me first summarize briefly the major properties of the gender system of the target language French and, even more briefly, those properties in which the German system differs from the French. Grammatical gender is a noun classification system (Corbett, 1991), exhibiting considerable variability across languages in how it is implemented in grammars and in how it is overtly marked. Languages exhibiting grammatical gender differ in the number of gender values, in whether gender is marked overtly and consistently, and in whether these markings appear on the noun of which gender is an inherent property (Corbett, 1991), or rather on accompanying elements like determiners or adjectives. The latter remark refers to the fact that one needs to distinguish between gender ASSIGNMENT to noun classes and gender AGREEMENT *(*or CONCORD*)*, the mechanism by which it is spread across syntactic categories; see Hockett (1958).

In grammatical terms, gender can be analyzed as an intrinsic feature of nouns (Harley & Ritter, 2002), more specifically as an interpretable feature. Gender agreement in Romance and Germanic languages is explained as a result of percolation through DP[1] , and it has been argued that an uninterpretable feature [*u*gender] on determiners (D) or adjectives (A) is deleted in the Agree relation; see Carstens (2000, 2003). Some aspects of this type of analysis are controversial, e.g., the status of the intrinsic feature as an interpretable one, or some details of the syntax of gender agreement, see Carstens (2010). In the present context, we need not be concerned with these issues. What matters is that French and German do not differ fundamentally, in this respect.

Crucial aspects of cross-linguistic variation reflect parameterized options made available by UG. Following Tsimpli (2014), a MACROPARAMETER distinguishes between grammatical gender languages VERSUS non-gender languages, whereas MICROPARAMETRIC PROPERTIES determine the number of gender values (binary VERSUS tripartite distinction), the categories on which gender is realized, and the agreement patterns. French and German are both gender languages (no macroparametric distinction) that differ with respect to microparametric options in that French distinguishes two gender values,

[1] The choice of third person singular possessive pronouns as in (i) *He$_i$ is calling his$_i$ brother* is not subject to the same syntactic constraints. It rather depends on coreference and thus on binding principles. Note that the possessive can refer to someone not mentioned in the sentence: (ii) *He$_i$ is calling her$_j$ brother*. It is therefore preferable not to speak of gender 'agreement', in this case, contrary to the terminological choice of Imaz Agirre and García Mayo (2013). See Mathiot (1979) for relevant discussion.

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Table 1. *French grammatical gender-markings.*

Category		M	F
Definite article	Sg.	le l'	la, l'
	Pl.	les	les
Indefinite article	Sg.	un	une
	Pl.	des	des
Possessive pronouns	Sg.	son	sa
	Pl.	ses	ses
Demonstrative pronoun	Sg.	ce, cet	cette
	Pl.	ces	ces
Adjectives	Sg.	petit, rouge	petite, rouge
	Pl.	petits, rouges	petites, rouges
Participles	Sg.	fait	faite
	Pl.	faits	faites

MASCULINE (masc) and FEMININE (fem), whereas German exhibits a tripartite classification, masc, fem, and NEUTER. In both languages, gender is marked on articles, adjectives and pronouns[2] .

A large array of variability also characterizes the principles of gender assignment, which depend on the nature and on the reliability of the cues offered by overt markings. Across languages, gender systems rely on semantic, phonological, morphological, and syntactic cues of extremely variable reliability – or on a mix of some or all of these. French and German are of the latter kind, using cues of all types. The most salient and consistent markings appear on singular forms of definite and indefinite articles, possessive and demonstrative pronouns, and on adjectives and French past participles; see Table 1[3]. French articles are not overtly marked for gender if the noun begins with a vowel; in this case, the preceding element is elided (e.g., *l'idée* 'the idea (f)' instead of **la idée*) or replaced by a form ending in a consonant (e.g., *mon idée* 'my idea' instead of **ma idée*). Moreover, some gender distinctions are not marked in oral speech. For example, *cet* (required when the following noun begins with a vowel) and *cette,* or *vu* 'seen (m)' and *vue* 'seen (f)' are pronounced identically.[4]

As for gender-marking on the noun itself, formal properties (phonological and morphological) conspire with semantic ones, in French as well as in German. Nouns referring to animates sometimes reflect the sex of referents, e.g., *le garçon* 'boy' – *la fille* 'girl'. Suffixes can also indicate the sex of the referents, e.g., feminine *–esse, -ine, -ice* in French. More frequently, *–e*, derived from the Latin feminine marker *–a*, is added to the noun in written language. This schwa is normally not pronounced in oral speech, but it has the effect that unpronounced final consonants of the masculine form are pronounced, as in *le sot – la sotte* 'fool', phonetically [o] > [t], or that the pronunciation of the final consonant is altered, as in *le veuf – la veuve* 'widow/er', phonetically [f] > [v]. A number of other semantic properties play a role in the attribution of grammatical gender in French, but they do not provide reliable cues overall, for they concern only a small number of nouns, and even for these, there exist numerous exceptions.

For morphologically complex nouns, derivational morphology provides the most reliable gender cues. For example, suffixes such as *–age* (*plumage* 'plumage'), *-ier* (*vinaigrier* 'vinegar jar'), *-ment*, (*logement* 'lodging'), or *–isme* (*bilinguisme* 'bilingualism') consistently mark masculine gender, and suffixes like *–tion* (*participation* 'participation'), *-té* (*bonté* 'kindness'), or *-tié* (*amitié* 'friendship') reliably mark feminine gender. Note that diminutive suffixes, which appear frequently in child-directed speech, also indicate gender unambiguously, e.g., *la fillette* 'little girl'.

In sum, derivational morphology provides the most reliable cues to gender attribution in French, and phonological and morphological properties are more successful than semantic ones. The same is true of German, and in both languages, formal properties override semantic ones when the two offer conflicting evidence. This can be illustrated by the German example *das Mädchen* 'the-neut. girl' and by French nouns like *recrue* 'recruit' or *sentinelle* 'sentry', both feminine, even when referring to male persons.

Given that derivational morphology provides the most reliable cues, gender assignment to morphologically simple nouns relies on stochastic cues. Nevertheless, generalizations about correlations between formal properties of nouns and their gender are possible, contrary to a long tradition of grammars claiming that gender- marking always had to be learned in an item-by-item fashion. Such

[2] In French, gender-marking also appears on past participles, but it is rarely detectable in oral language, and such forms are not attested in early L1 or in cL2 speech.

[3] Adapted from Möhring (2001).

[4] In German, learners arguably face an additional problem, given that elements marked for gender and number also carry case-markings; see the table below, displaying singular article forms. Although syncretism yields some homophonous forms, several of these (bold print) mark gender unambiguously, contrary to what Eichler, Jansen and Müller (2013) claim, who include singular and plural forms in this survey, although the latter do not exhibit gender cues. Moreover, *einen* unambiguously marks masculine gender, for, although the <*e*> in *–en* is phonetically reduced (*ein'n*), its pronunciation differs from that of *ein* in that it ends in geminate [n].

	Masculine		Feminine		Neuter	
	Def	Indef	Def	Indef	Def	Indef
Nominative	der	ein	**die**	**eine**	**das**	ein
Genitive	des	eines	der	einer	des	eines
Dative	dem	einem	der	einer	dem	einem
Accusative	**den**	**einen**	**die**	**eine**	**das**	ein

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Table 2. *Phonological gender regularities in French: Feminine.*

Word marker	Preferred gender[i]	Number of nouns	Examples	Exceptions[ii]
	F (442)			
[d]	~62%	714	la viande 'meat'	le sud (272) 'south'
	F (238)			
[j]	~68%	352	une abeille 'bee'	le soleil (114) 'sun'
	F (819)			
[s]	~68%	1379	la caisse 'cashbox'	le sens (531) 'sense'
	F (98)			
[v]	~69%	143	la lessive 'laundry'	le fleuve (45) 'river'
	F (551)			
[z]	~90%	612	la phrase 'clause'	le vase (61) 'vase'
	F (1762)			
[i]	~75%	2337	la souris 'mouse'	le tapis (575) 'carpet'
	F (1872)			
[õ]	~70%	2666	la raison 'reason'	le mouton (794) 'sheep'
	F (819)			
[n]	~68%	1204	la panne 'hitch'	le clown (385) 'clown'
	F (191)			
[ʃ]	~66%	290	la poche 'pocket'	le dimanche (99) 'sunday'

[i]Numbers in parentheses refer to the number of nouns for which gender is predicted correctly.
[ii]Numbers in parentheses refer to the number of exceptions for which the prediction does not hold.

regularities have been shown to exist in German (Köpcke, 1982) as well as in French (Tucker, Lambert, Rigault & Segalowitz, 1968; Tucker, Lambert & Rigault, 1977). Note that, as compared to other Romance languages where noun endings offer fairly consistent gender cues (*-o* masc, *-a* fem), they are considerably less consistent in French, but they do indicate gender with much more than chance probability, in some cases even very reliably. Since these endings are not necessarily morphemes, I refer to them as word markers, following Harris (1991).

Tables 2 and 3[5] present some of these formal properties of French nouns and indicate how they correlate with masculine or feminine gender. As becomes easily apparent, associations between word markers and feminine gender tend to be less consistent than for masculine gender. One should add that the [e], [t], and [p] are equally frequent in both gender classes and are therefore not reliable as cues for the assignment of nouns to one of them.

4. Acquisition of grammatical gender

4.1 Acquisition tasks

It follows from the preceding discussion of gender systems that learners are facing tasks of two kinds. On the one hand, parameters must be set to the values of the target system. On the other hand, assigning nouns to gender classes requires learning of form classes and lexical properties. Although, in both cases, learners need to detect cues contained in the data, triggering of knowledge provided by UG arguably requires less exposure to the data and less frequent and less salient cues than learning of properties specific to a given language; see Carroll (1989). Triggering is therefore predicted to happen faster and more uniformly across learners than inductive learning; see Meisel (2011). We can thus identify the following acquisition tasks:

i) Setting of the macroparameter, determining whether the target is a grammatical gender language. The gender languages French and German exhibit identical settings of this parameter. Lexical entries of nouns contain a classificatory, valued and arguably interpretable, gender feature in both languages.

ii) Setting of microparameters, concerning a) the number of gender values, binary in French, tripartite in German, b) the categories on which gender is realized, and c) the syntactic domains of agreement. In both languages, the unvalued uninterpretable feature [*u*gender] on articles, possessive pronouns and adjectives is valued by the valued feature on nouns, which triggers agreement in largely identical structural configurations within DP.

[5] Adapted from Müller (1987); her calculations are based on Tucker et al. (1977).

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Table 3. *Phonological gender regularities in French: Masculine.*

Word marker	Preferred gender	Number of nouns	Examples	Exceptions
	M (268)			
[f]	~89%	301	un étoffe 'cloth'	la soif (33) 'hirst'
	M (924)			
[l]	~58%	1581	le col 'collar'	la colle (657) 'glue'
	M (3974)			
[r]	~78%	5080	le timbre 'stemp'	le montre (1106) 'watch'
	M (1368)			
[ʒ]	~94%	1453	un orage 'storm'	la plage (85) 'beach'
	M (648)			
[a]	~82%	791	le caca 'crap'	la tombola (143) 'tombola'
	M (1949)			
[ã]	~99%	1963	le vent 'wind'	la dent (14) 'tooth'
	M (929)			
[ɛ̃]	~99%	938	le pain 'bread'	la faim (9) 'hunger '
	M (841)			
[o]	~97%	865	le moto 'motorbike'	la photo (24) 'photo'
	M (184)			
[ø]	~97%	189	le nœud 'node'	la queue (5) 'tail'
	M (17)			
[œ̃]	100%	017	le parfum 'perfume'	——-
	M (150)			
[u]	~88%	171	le genou 'knee'	la roue (21) 'wheel'
	M (564)			
[ɛ]	~90%	625	le mai 'may'	la baie (61) 'bay'
	M (1292)			
[m]	~92%	1406	le poème 'poem'	la plume (114) 'feather'

iii) Assigning gender to each lexical item in the vocabulary. In languages like French or German, (2)L1 children must rely on formal properties of nouns, most importantly on word markers indicating form classes (Harris, 1991). When these cues do not indicate the correct gender value, they have to resort to lexical learning.

Note that these learning tasks are virtually the same for French and German. In other languages, children face substantially different ones. Canonical cues (*-a* fem, *-o* masc) in Italian or Spanish, for example, facilitate the gender assignment task. Their consistency makes it easy to discover noun classes and to assign newly learned tokens to them. Non-canonical cues in the same languages, like Spanish *–e* in *el puente* 'the-masc bridge', take native speakers longer to process (Montrul, Davidson, de la Fuente & Foote, 2014) and lead more frequently to assignment errors by L2 learners; see Montrul, Foote and Perpiñán (2008) for Spanish and Bianchi (2013) or Kupisch, Müller and Cantone (2002) for Italian. The 'opaque' Dutch gender system (Blom, Polišenská & Weerman, 2008), represents a yet quite different and particularly challenging acquisition task. Properties of nouns do not reveal gender classes; rather, it is the inflection of attributive adjectives and the type of article that indicate the noun class (common or neuter). Blom et al. (2008) report that Dutch children initially use the definite article *de* with common as well as with neuter nouns (target *het*) and that they overgeneralize *de* until at least at age six.

Given these differences between tasks across languages, insights gained from studies of one language cannot readily be carried over to others. Learning mechanisms that are successful in Italian can fail in Dutch, and vice versa. This also means that L2 learners of a gender language whose L1 is also a grammatical gender language will not necessarily do better than those with a non-gender L1. However, if the L1 and the L2 present largely identical acquisition tasks, as is the case for French and German, gender acquisition should be facilitated – provided L2 learners do rely on L1 grammatical knowledge.

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4.2 Empirical findings on gender acquisition

4.2.1. First language acquisition

As this short summary of acquisition tasks suggests, UG plays a crucial role in the acquisition of grammatical gender. In fact, in generative theorizing, UG has been equated with the Language Acquisition Device (LAD), and it has been hypothesized to constrain developing grammars at every point of the acquisition process. Yet since this process is shaped by domain-general as well as by domain-specific principles and mechanisms that guide children towards cues enabling them to discover formal properties of languages, the latter must also be part of the LAD; see Endress, Nespor and Mehler (2009). It is therefore preferable to distinguish between the LMC, comprising domain-specific as well as domain-general operations, and the LAD that assembles only domain-specific principles subserving exclusively the acquisition of formal properties of languages; see Meisel (2011, chapter 2).

The distinction among tasks involving the triggering of implicit knowledge provided by the LAD and others requiring inductive learning leads to different empirical predictions. Whereas the former are expected to be mastered early and with minimal variation across learners, coping with the latter is predicted to require more time and to involve learning by trial and error. Moreover, macroparameters have been argued to be set before microparameters (Tsimpli, 2014). These predictions seem to be empirically valid for monolingual as well as bilingual first language acquisition.

A brief look at findings by earlier studies investigating gender acquisition in German and French, e.g., Koehn (1994), Mills (1986), Müller (1990, 1994), Pupier (1982), substantiate this claim. Since these languages mark gender primarily on elements accompanying nouns, the focus lies on gender-markings on determiners. After an initial phase during which children do not yet use determiners, productive use sets in rapidly, once the mean length of utterances (MLU) reaches a value of approximately 2.0, at around age 2;0; see Müller (1994, p. 59). As soon as this is the case, gender is marked in both languages on definite, indefinite and possessive articles. Already during this phase, markings on definite articles are mostly correct with masculine and feminine nouns, and many of the occasional errors arguably result from overgeneralization of phonological regularities; see Müller (1994). Nouns ending in nasal vowels, for example, are assigned masculine gender, e.g., **le main* 'the-masc hand'. With indefinite articles, on the other hand, gender errors still occur for a few months. In the data of the bilingual children analyzed by Müller (1990, 1994), they fade out between age 2;6 and 3;0. Neuter gender in German is another problematic case: it emerges with considerable delay, at around 2;07 (MLU 3.6), and errors persist well into the fourth year. Interestingly, these errors consist in combining neuter nouns with masculine but not with feminine articles; see Müller (1990). Children thus seem to distinguish initially between ±feminine, differentiating only later between masculine and neuter nouns[6] .

These empirical results corroborate the predictions derived from theoretical considerations. The setting of the macroparameter happens very early and uniformly across individuals. Data from (2)L1 learners of gender languages contain evidence of gender-related noun classification as soon as children start combining nouns with other elements (MLU 2.0, at around age 2;0). Setting of the microparameters to their appropriate values requires more exposure to the data. Although categories on which gender is realized are identified early in noun phrases, target-like markings are first attested on definite articles, whereas other categories exhibit more variability for a few months, up to age 3;0, approximately. This may be due to the fact that productive use of these categories emerges gradually, confirming Mills' (1986) sequence for the acquisition of gender: definite article > indefinite article > modifiers (adjectives). The most demanding task defined by microparametric options is the one concerning the number of gender values. Whereas the binary classification is acquired easily, developing a tripartite classification turns out to be more difficult.

Mastering the task of ASSIGNING feminine and masculine gender to specific nouns requires exposure to the input data over a period of several months. Nevertheless, it seems to be a less challenging task than one might have expected, given that the frequency of errors is not very high. Müller (1987, 1990), for example, reports that once articles are used productively (2;0-2;6), it amounts to no more than 17% for definites. The higher rate (up to 36%) for indefinites during this phase, is arguably due to the fact that they are initially used as numerals. Importantly, part of the errors with definite articles result from an overgeneralization of phonological regularities. In fact, if cues relating to formal properties stand in conflict with functional ones, they rely on the former, i.e., information about formal properties overrides semantic information; see Karmiloff-Smith (1979), Pérez Pereira (1991), Carroll (1999). This is true even if semantic cues are statistically more reliable because they appear significantly more frequently in the data; see Gagliardi and Lidz (2014).

4.2.2. L2 acquisition

Gender represents a notoriously difficult learning task, even for advanced learners[7]; see Andersen (1984), Carroll

[6] This might explain why Ruberg (2013) found that some children initially used feminine and masculine forms and others only feminine and neuter ones.

[7] This is not to say that learning of gender-markings was impossible; cf. Kupisch et al. (2013). Moreover, exposure to the target over an extended period can mask critical period effects (Meisel, 2013).

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(1999), Dewaele and Véronique (2001), Montanari (2010). Particularly challenging is the task of gender assignment, the degree of difficulty depending on how gender is marked overtly; see Stöhr, Akpinar, Bianchi and Kupisch (2012). Since there exists a fairly broad consensus on these points, I refrain from summarizing specific empirical findings. Instead, I will point out five differences between L1 and aL2 acquisition, revealed by studies of French.

One difference relates to the fact that L1 children do not use determiners during an initial phase and that, subsequently, productive use sets in rapidly. L2 learners, on the other hand, use a considerable variety of gender-marked forms with different syntactic categories, already during early acquisition phases; see Stevens (1984), among others.[8] Secondly, L2 learners exhibit higher error rates in assigning gender (Andersen, 1984; Rieckborn, 2007a). Thirdly, gender errors persist for an extended period in the speech of adult L2 learners. The fourth difference is that in L2 error rates may oscillate significantly between higher and lower values. This can be illustrated by two L1 German learners of French (FH, age 32; DG, age 39), studied by Rieckborn (2007a) who recorded them over a period of 18 months, starting six (FH) and seven (DG) months, respectively, after they had moved to France. Their error rate did not decrease continuously over the period studied. Instead, missing or incorrect markings amounted to 10% after 7 months in France, 28% after 16 months, and 16% after 24 months, in the speech of DG; for FH, the error rates were 10.5% (6 months), 28% (9 months), and 25% (17 months). The fifth difference relates to error kind. Whereas in French L1 some of the gender errors are due to the overgeneralization of formal properties of nouns, adult L2 learners do not rely on these cues (Carroll, 1999); they rather tend to use initially only one gender form. Interestingly, they do not necessarily choose the same gender for definite and indefinite articles, i.e., a learner may use *le* and *une* with the same noun; see also Hawkins and Franceschina (2004).

In view of these empirically documented differences, we can now ask whether children learning a second language at an early age proceed like L1 learners or whether they resemble adult L2 learners. Before turning to our own study, it may be useful to first look at previous work on gender acquisition by cL2 learners. I will again limit this review to investigations dealing with French and German, given that the different acquisition tasks presented by other languages make a comparison difficult. Moreover, it is frequently not possible to decide whether they are analyzing gender assignment and agreement. Most importantly, it is necessary to distinguish between different ages of onset, rather than treating all learners with AO before puberty as a homogenous group.

A crucial point, considering our goal of a classification of successive language acquisition in childhood as L1 or L2 acquisition, is that previous studies demonstrated that even very young learners may encounter problems with grammatical gender. Pfaff (1992), for example, reports that Turkish L1 children, acquiring German in early childhood (AO around age 2;0), were unsuccessful in their acquisition of gender during the period studied, i.e., up to approximately age 4–5. Of particular interest for our question are the findings by Möhring (2001) who studied seven L1-German children acquiring French (AO 2;10 –3;7, 13–31 months of exposure), analyzing elicited as well as spontaneous data. Six of them behaved like (2)L1 children, whereas one child (AO 3;7, exposure 24 months) resembled adult L2 learners, suggesting that changes occur during the second half of the fourth year. Like in aL2, Möhring finds a considerable variety of gender-marked elements during an early acquisition phase. Similar results were obtained by Stevens (1984), studying L1-English children acquiring French. Möhring furthermore reported high error rates and initial use of only masculine definite articles, while indefinite articles appeared in both genders.

These findings corroborate the hypothesis that the age between 3;6 and 4 is a crucial one if onset of successive language acquisition happens during this period; see Meisel (1994, 2004). They also suggest that grammatical gender is one of the phenomena whose development is subject to age-related changes (see Meisel, 2009, 2011). However, these assumptions need further scrutiny, and this is what the study hopes to achieve, which I present in what follows.

5. A study of the acquisition of French gender by German children

5.1 Subjects and data collection

Our corpus consists of recordings of children attending the *Lycée Français de Hambourg*. They come from either French- or German-speaking families who entered the *Ecole Maternelle* (preschool) around age 3, where they normally spend six hours per day. The medium of instruction is French, except for 5 weekly lessons intended to foster the French children's knowledge of

[8] As one reviewer observed, due to the clitic nature of French determiners, L1 children acquire them as chunks together with nouns and must subsequently detach them from the nouns. Adult L2 learners, on the other hand, acquire determiners early and as independent elements; they discover their clitic status only later and must then 'attach' them to the nouns. However, this observation cannot explain the problems with gender acquisition in L2, for these elements do function as (non-clitic) determiners in the L2 and should thus trigger early acquisition of gender. Moreover, this cannot explain acquisition problems in L2 German. Yet it might help to explain higher error rates during early L2 acquisition phases, for the earlier emergence of determiners offers more opportunities to mark gender incorrectly.

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German. Once they advance to primary school (*cours élémentaire*) at age 6, both languages are taught in class: 9 hours (12 lessons) of French instruction per week for German children, and 3:45 hours (5 lessons) of German for children from French families.

The present paper reports only on the linguistic development of L1-German children acquiring French naturalistically in this institutional setting.[9] The parents filled out a questionnaire about the linguistic situation in the families. None of the children had continued contact with French outside school, and we did not include children from bilingual families. Outside the classroom, children use French as well as German on the school premises, but we could not gather information about the amount of exposure to French of individual children at these occasions.

We carried out a longitudinal study, collecting spontaneous data, and administered tests to discover regularities of gender assignment. In the longitudinal study, recordings were conducted approximately every 3 to 5 months, over a period of about two years. Altogether 35 children were recorded with first exposure to French between ages 2;8-4;0. The interviews consisted of structured interactions, carried out individually by French native speakers, each recording lasting for 20 to 30 minutes. During the first meetings children were encouraged to talk about themselves, siblings and parents; they were also shown picture cards representing activities and objects, in order to incite them to talk. Table 4 lists the 24 children analyzed for the present study. They are grouped according to months of exposure (ME) to French: Group A: <1 year, Group B: 1–2 years, Group C: 2–3 years. Within each group, they are ordered according to AO of acquisition.

5.2. The acquisition of French gender by early child second language learners

In a previous study (Meisel, 2008) analyzing the acquisition of finiteness by 10 of these children, based on the first recording of each of them, I concluded that six of these learners (Willi, Lara, Ludwig, Klaus, Jeremie, and Peer) should be regarded as L2 learners. They used adult L2-type constructions not attested in L1 speech. Subsequently (Meisel, 2009), I analyzed the acquisition of gender by these children, also based on the first recordings, arriving at the conclusion that these six children and possibly a seventh (Lars) behaved like L2 learners in this domain as well. In other words, if successive language acquisition sets in between 3;0 and 4;0, some children develop the target grammar much like L1 learners, whereas others resemble adult L2 learners, at least in some domains of grammar. In what follows, I will try to shed more light on this issue, based on a larger set of spontaneous data and on data elicited in a test designed to reveal mechanisms of gender assignment.

Children are classified as L2 learners if characteristics of adult L2 acquisition, identified in 4.2.2, are detected in their speech. More specifically, this classification relies on the following empirical criteria:

1) Error rates above 20% count as 'high'.
2) Error types, i.e., they do not result from overgeneralizations of phonological regularities of French; they rather represent overgeneralizations of one gender form.
3) Variable use of gender-markings over time, e.g., error rates do not decrease continually but oscillate between high and low figures.

5.2.1. Longitudinal study: A qualitative analysis of the spontaneous data

The goal of this analysis is to determine whether the children exhibit aL2 properties in their gender acquisition. As explained in section 2, I expect to find that some of them behave like L1 and others like L2 learners, in this respect. I therefore report briefly on the language use of individual children over time (ME 3–11, 15–24, 26–38), focusing on the criteria presented above.

The first observation is that these children do not use determiners during their first year of exposure to French, except for one child, *Julia,* who uses them already at 10 ME and a single example by *Marika*, also at 10 ME. Since determiners provide the crucial evidence for French gender acquisition, it is important to know when these elements emerge in the speech of learners. With the children studied here, this happened no later than at 15–21 ME. Although protracted acquisition has been argued to be characteristic of L2 learners, see Meisel (2011), I do not think that this criterion applies here. First of all, it is not obvious that 21 ME can indeed count as a protracted process, in comparison to L1 where productive use sets in at around age 2. Moreover, the amount of exposure to French in this immersion setting is undoubtedly reduced as compared to that in (2)L1 families; see 5.1.

Another property in which these children appear to resemble L2 learners is that they all use definite as well as indefinite articles from the start, differing in this respect from what one typically finds in L1. This, however, is a property of successive language acquisition, arguably due to the partial availability of previously acquired grammatical knowledge, but it does not necessarily imply a qualitative difference as compared to L1 development; see also footnote 8.

[9] I want to thank the children and the parents for allowing us to carry out the interviews and the teachers and the principal for the permission to do so on the school premises.

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Table 4. *The corpus: The children, their age of onset and months of exposure at the recordings.*

Child (Group)	AO	ME Rec 1	ME Rec 2	ME Rec 3	ME Rec 4	ME Rec 5
Cristina (A)	2;8	4	11	16	21	23
Wolf (A)	3;1	5	10	15	20	22
Marika (A)	3;6	5	10	15	20	22
Yann (A)	3;7	3	10	15	left school	
Julia (A)	3;7	3	10	16	20	22
Maja (B)	2;10	16	21	26	31	33
Sara (B)	2;11	16	26	31	33	
Jana (B)	3;1	17	22	27	32	34
Alf (B)	3;2	16	21	26	31	33
Martin (B)	3;2	15	18	26	31	33
Willi (B)	3;3	16	19	26	31	33
Magda (B)	3;3	15	18	26	31	
Lara (B)	3;7	16	21	left school		
Lars (B)	3;7	16	21	27		
Ludwig (B)	3;7	16	21	27	31	
Amelia (B)	3;8	16	21	26	31	
Marion (B)	4;0	16	19	26	31	
Florian (C)	3;4	28	32	left school		
Nicole (C)	3;6	28	32	38	43	
Luisa (C)	3;7	28	32	38		
Klaus (C)	3;7	28	32	38		
Vicky (C)	3;7	28	31	38	43	
Jeremie (C)	3;8	27	31	38	43	
Peer (C)	3;8	28	32	38	43	

Let us thus scrutinize the data for the L2 properties listed above, starting with the third one, variable use of acquired knowledge, referring to frequency of use of determiners and of errors in marking gender. One finds, in fact, differences across learners in how they use determiners in the required contexts. Some of them provide determiners consistently as soon as they begin to use them or soon afterwards, e.g., *Sara*, *Wolf*, *Alf, Martin, Willi*, *Julia*, *Amelia* and *Marion*. Others exhibit considerable variability, e.g., *Jana*, *Magda* and *Ludwig* omit few determiners at ME 16/15 but more frequently in later recordings, and *Maja, Marika, Lara*, *Lars, Jeremie* and *Peer* still omit them during the third year of exposure to French. This kind of variable use is normally found in L2 learners.

Variability within and across learners is also attested with respect to error rates in marking gender. These fluctuate strongly across and within learners. *Sara*, *Wolf*, *Florian*, *Nicole*, *Luisa* and *Vicky* use gender-markings in almost all required contexts and virtually without errors. Their error rates consistently stay below 10%, and *Florian* commits no gender errors at all. As for *Alf* and *Martin*, their error rates are high, at around 30% during the first year, but they drop to well below 10% as of 26 ME, a pattern rarely found in L2 learners. These children are therefore all classified as L1 learners in terms of error rates.

However, lack of errors cannot always be interpreted as successful acquisition. *Cristina* and *Maja*, for example, use almost no determiners, but the few examples encountered in their speech are marked correctly for gender. Yet these are probably rote-learned Det+N sequences. This suspicion is confirmed by the fact that *Maja's* error rate soars up to 16% at 31 ME when she begins to use determiners more often. Increasing or oscillating error frequencies suggest that children acquire the gender system akin to adult L2 learners. This is the case for *Maja*, *Jana*, *Willi*, *Magda*, *Marika*, *Lara*, *Klaus*, *Julia*, *Amelia*, *Jeremie* and *Peer*. The same observation applies to those whose error rate decreases but remains on a high level, namely *Lars*, *Ludwig* and *Marion*.

Although some studies rely on error rates as the only criterion for L2-like gender acquisition, e.g., Granfeldt et al. (2007), the review of L1 and L2 empirical findings has shown that the type of errors must also be taken into account, most importantly the ones specific for one learner population. Considered together, error frequency, variability of use and error type should enable us to

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decide reliably on the learner type. The few gender errors attested in the speech of *Sara* and *Wolf*, for example, are reminiscent of similar uses in L1 acquisition where the indefinite *un* has been argued to function as a morphologically invariant numeral; see Koehn (1994, p. 38) and Müller (1994, p. 59). Another type of L1-like error happens when relying on word markers leads to the wrong result, as in the speech of *Nicole*, e.g., **la soleil* 'the sun', **la savon* 'the soap'; see table 2.

Several children whose error rates make them look like L2 learners also use L2-like errors. Many of the gender errors made by *Klaus*, for example, cannot be explained in terms of phonological properties of the nouns, e.g., **le souris* 'the mouse', **le glace* 'the ice', **la elephant* 'the elephant'. The same observation applies to *Julia, Amelia*, *Jeremie*, *Peer* and *Marion*. Only in the recordings with *Julia* does one find a few gender errors with the definite article which could be accounted for by the formal properties of French nouns, see tables 2 and 3, e.g., **la garcon* 'the boy', **le orange* 'the orange', **le maman* 'the mommy', **le pomme* 'the apple', **le chaussure* 'the shoe', **le giraffe* 'the giraffe'. But this partly due to the fact that at 16 ME she overuses the masculine article, having overused the indefinite feminine article (23 out of 30 tokens) during the first year. Moreover, most of her errors with definite articles violate the French phonological regularities, e.g., **la pain* 'the bread', **la copain* 'the buddy', **la éléphant* 'the elephant', **la grand frère* 'the big brother', **la canard* 'the duck', **la papa* 'the daddy', **la gateau* 'the cake', **le souris* 'the mouse', **le banana* 'the banana'. Other L2-type learners, too, overuse one article form, e.g., *Jana* prefers the indefinite masculine and the definite feminine determiner, *Lars* the indefinite masculine article, *Ludwig* and *Marion* the indefinite feminine form, and *Amelia* overuses the masculine forms of both the definite and the indefinite article, which sometimes happen to be the correct choices.

To sum up, applying the criteria defined above, most of the 24 children can be identified with reasonable certainty as L1- or L2-type learners with respect to gender acquisition; see Table 5[10] for a summary of the results. Only error rates during the first year sometimes stand in conflict with the other two criteria. In these cases, I decided to rely on qualitative rather than on quantitative criteria. *Alf* and *Martin* have therefore been classified as L1-type learners in spite of early high error rates, whereas *Maja* and *Magda* are considered to be L2 learners, although their error rates are low. This also means that there remain doubts with respect to *Cristina's* status as an L2 learner. She was last recorded at 23 ME, and we therefore do not know how her French developed afterwards. She may just be a slow learner, and this may also be the case with *Maja*.

[10] + indicates that this property is attested in the children's speech, - that it is not present, and blank that the data do not reveal the kind of use.

Table 5. *L2 properties.*

Child	AO	High error rate	Variable use	Error types
Cristina	2;8	+		
Maja	2;10	-	+	L2
Sara	2;11	-	-	L1
Wolf	3;1	-	-	L1
Jana	3;1	+	+	L2
Alf	3;2	+	-	L1
Martin	3;2	+	-	
Willi	3;3	+	+	
Magda	3;3	-	+	
Florian	3;4	-	-	L1
Nicole	3;6	-	-	L1
Marika	3;6	+	+	
Luisa	3;7	-	-	
Vicky	3;7	-	-	L1
Lara	3;7	+	+	L2
Klaus	3;7	+	+	L2
Yann	3;7	+		
Julia	3;7	+	+	L2
Lars	3;7	+	+	L2
Ludwig	3;7	-	+	L2
Amelia	3;8	+	+	L2
Jeremie	3;8	+	+	L2
Peer	3;8	+	+	L2
Marion	4;0	+	+	L2

5.2.2. Longitudinal study: Discussion

I believe that these findings support the claim that some of the children of our corpus acquire grammatical gender like French L1 children, whereas others behave like adult L2 learners. Importantly, most of the ones classified as cL2 learners started to acquire French at AO 3;7 or later. I will return to this issue. However, almost all of those classified as child L2 learners acquired at least part of the determiner system and some of the gender-markings. This could be interpreted as a corroboration of the hypothesis that L1 parameter settings can be activated in L2 grammars; see Franceschina (2005) or Hawkins and Franceschina (2004). Identifying French as a grammatical gender language should thus not be difficult. In fact, most aspects of the gender system relating to parametric options should be unproblematic for German learners, for, with respect to microparametric settings, French and German differ in only one of the properties investigated, namely in that French is a binary system, lacking neuter[11]. Theoretical

[11] German learners might therefore be expected to introduce distinctions in noun classifications that are not required by the target system, or they might merge masculine and neuter, since we have seen that, in L1

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considerations thus lead to the prediction that gender assignment is the major difficulty for child or adult L2 learners of French.

However, a closer look at the data raises doubts as to whether the cL2 learners actually rely on systemic knowledge of French grammatical gender in their language use. This suspicion arises in view of the fact that, after more than 24 months of exposure, not all of them use both gender forms of definite and indefinite articles, let alone other gender-marked elements. It is strengthened by the observation that both gender forms of articles are combined with the same noun, as in *le/la souris* 'the mouse'*, un/la maison* 'a/the house', and, when a noun is resumed by a pronoun, conflicting choice of gender can again happen, e.g., *la souris il fait . . .* 'the-fem mouse, he makes'*, la fenêtre il est cassé* 'the-fem window, he is broken' (*Jeremie*). One also finds overuse of one form, e.g., *le* or *une* (*Willi, Klaus*). These kinds of linguistic behaviour suggest that these gender-markings do not reflect knowledge of the target grammatical system. In other words, errors of these types should not occur if learners analyzed the various forms as encoding grammatical gender and if the syntactic operation of gender agreement was in place. It rather seems that these cL2 learners acquired the gender-marked elements by lexical learning, in an item-by-item fashion, but did not activate the agreement operation in the appropriate structural configuration, for, if this was the case, we should find instances of correct agreement in cases of incorrect gender assignment, e.g., **le/*un/*petit souris* 'the/a/little mouse'. The fact that our data do not contain this kind of evidence may be a shortcoming of our corpus. In fact, based on production data, it is notoriously difficult to distinguish between effects of gender assignment and agreement. For the time being, however, my conclusion is that the available data do not support the claim that L2 learners can easily activate L1 parameter settings when developing L2 grammars.

The prediction, on the other hand, that gender assignment constitutes a particularly difficult task for L2 learners is strongly corroborated, as should have become evident from the discussion of our empirical findings. Most importantly, formal properties of nouns do not play a significant role, if any, in cL2 acquisition, neither the ones offered by the French target system, nor the ones of the L1 German system. Moreover, formal properties do not override functional ones, as opposed to what has been reported for L1 development. These observations lead to the question of what principles or generalizations cL2 learners rely on in the acquisition of grammatical gender. It is difficult to offer a satisfactory answer. Quite obviously, semantic criteria do not play a decisive role, as is evidenced by the following examples *mon Schwester* 'my-masc sister', *le madame* 'the-masc lady', *une frère* 'a-fem brother', *le maman* the-masc mom'. Transfer from L1 cannot serve as an explanation, either, as is shown by Rieckborn (2007b). She analyzed 17 children of our corpus and concluded that transfer could account for maximally 24% of the incorrect gender-markings.

To conclude, based on the results of the corpus analysis it is not possible to identify principles guiding child L2 learners' acquisition of grammatical gender. My tentative conclusions, therefore, is that gender assignment is the result of lexical learning, item by item. If correct, this makes these children look even more like adult L2 learners.

5.2.3. Experimental data: Testing gender assignment with nonce words

In addition to samples of spontaneous speech, we collected and analyzed experimental data testing children's ability to assign gender to French nonce words. This test is designed to reveal whether children rely on formal properties of nouns in assigning gender.

The experimental design is inspired by a test developed by Karmiloff-Smith (1979), studying monolingual French children[12] . The experimenter shows the child a card with two pictures of an unknown object in different colours or different sizes and introduces a nonce word when referring to one item which is distinguished by the relevant property while hiding the other one:

Experimenter:	Ce sont des fasines. 'These are fasines' (The experimenter hides one of the two items.)
Experimenter:	Qu'est-ce que j'ai fait? Qu'est-ce que j'ai caché? 'What did I do? What am I hiding?'
Child :	Tu as caché la fasine verte/la petite fasine. 'You are hiding the green/small fasine'

According to Karmiloff-Smith (1979, p. 160), children are most sensitive to phonological clues for gender assignment up to approximately age 6. Subsequently, they still rely on word markers, but the success rate drops below 100% which they had reached before that age. This has to be taken into account in interpreting our results. At the time of testing, the children of the longitudinal study were between 6;07 and 8;03 years old. We therefore tested another group of children from the *Lycée Français de*

development, differentiation of these two classes is difficult. However, the data do not contain evidence for either of these possibilities.

[12] I want to thank Annette Karmiloff-Smith for allowing us to use her stimuli and her experimental design.

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Table 6. *Nonce words: Test 1.*

Masculine suffix	Feminine suffix	Arbitrary suffix
bicorn	podelle	fodire
plichon	forsienne	coumile
golcheau	bicrienne	taninque
coumeau	goltine	chalique
fasien	fasine	fadiste
maudrier	plichette	
forsien	coumette	
maudrier	bravaise	
bravais		
brouguin		
chalois		

Hambourg, who were younger but had not participated in the longitudinal study.

Let us first look at the results obtained by the older children. We were able to test eight of the children who participated in the longitudinal study. According to the analysis presented above, they are child L2 learners. The nonce words presented to them were selected from those created by Karmiloff-Smith (1979, p. 153) who classified these words as favouring masculine, feminine or no particular gender, respectively, depending on word markers[13]. Table 6 lists all nonce words used in our test; the results are summarized in Table 7.

Table 7 displays the frequency with which the children assigned gender in accordance with word markers. *Willi* is the most successful child on this test, scoring 100% for both genders. This confirms his classification as an L2 learner who exhibits some L1 properties. Most of the other children encountered more difficulties in assigning feminine, as was also observed by Karmiloff-Smith (1979). In fact, the positive results are primarily due to the overgeneralization of the masculine form. It can therefore be argued that *Maja*, *Magda, Lars*, *Peer* and *Marion* do not rely on formal properties of nouns in determining gender assignment.

As for *Jana* and *Jeremie*, they have now made progress, after well over three years of exposure to French, even if they do not fare equally well with both genders. In view of this limited success with one gender, it is doubtful whether this result is an indication that they rely on noun properties. At an age of testing well beyond the six-year limit set by Karmiloff-Smith (1979), this test may not provide reliable insights into the nature of the underlying mechanisms of gender assignment. Rather, the effects of these mechanisms may be masked by those resulting from lexical learning after an extended time of experience with the L2.

Let us therefore turn to the test administered to younger children who fall within the age range indicated by Karmiloff-Smith (1979). Here, we used a different set of stimuli, i.e., 24 nonce words designed to trigger either masculine or feminine gender. In choosing the stimuli, we relied on the correlation between the final sound of a noun and its gender, as suggested by Tucker et al. (1977). The 24 test items, presented together with 6 gender-neutral nonce words and 6 French nouns, represent 8 different word markers, 4 favouring masculine and 4 triggering feminine gender. We presented 3 examples of each marker, thus 12 masculine and 12 feminine ones. Table 8 lists the nonce words used in the test, and Table 9 displays the French nouns used as stimuli[14].

The overall results, summarized in Table 10, show that, except for *Pascal* (18/24), the children assigned the predicted gender as expected only 14/24 times or less. This amounts to little more than to chance response patterns. Note that *Anton* (1 ME!) does not fare worse than *Emma* (26 ME) or most children at 14–15 ME. Four children overgeneralize one form: *Eike* (*un* on all 24 stimuli), *Dennis* (17 *une*), *Nico* (22 *le*), and *Emma* (18 *le*, 2 *un*, thus 20 masculine forms). In these cases, the frequency of correct assignment is, of course, not meaningful. Note that children do not generally do better on one of the two genders; rather, some are more successful with masculine gender assignment (e.g., *Janina*), others with feminine (*Conny*). There seems to be no general pattern adopted by individual learners, except for overgeneralization. Only *Pascal* might be argued to make use of formal cues when assigning gender.

Let us therefore have a look at the correlation between word markers and gender of nonce words and at gender assignment to existing nouns; see Tables 11 and 12. Again, we find that some learners do better with word markers favouring masculine gender and others with those favouring feminine gender. Moreover, it is NOT the case that certain word markers trigger correct responses by all or by none of the children. Remember, finally, that some of the positive results are due to the overgeneralization of a gender form, e.g., *Nico* who uses almost exclusively *le*.

Interestingly, Nico, who does not seem to make use of formal cues at all, appears to be the most successful child with existing French nouns. This, however, is due to his

[13] Note that the predicted gender is not always identical to the one predicted by Tucker et al. (1977) who relied only on the final sound; [õ], for example, favours (70%) the assignment of feminine gender, and [l] triggers weakly (58%) masculine gender.

[14] These nouns are high-frequency items, selected because they are likely to be familiar to children of this age. The feminine ones end in sounds favouring masculine gender, and vice versa, in order to avoid a possible effect of the formal cues for gender assignment. In other words, if they are assigned the target gender, we may assume that they have been learned by experience.

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Table 7. *Gender assignment with French nonce words.*

Child	AO	Age at testing	Masc. DET for masculine markers %	Masc. DET for masculine markers N	Fem. DET for feminine markers %	Fem. DET for feminine markers N
Maja	2;10	6;7	100	9/ 9	25	2/ 8
Jana	3;1	6;9	80	8/ 10	87.5	7/ 8
Willi	3;3	6;11	100	10/ 10	100	8/ 8
Magda	3;3	6;11	100	10/ 10	12.5	1/ 8
Lars	3;7	7;2	90.9	10/ 11	12.5	1/ 8
Jeremie	3;8	8;3	100	10/ 10	66.7	4/ 6
Peer	3;8	8;3	100	11/ 11	0	0/ 8
Marion	4;0	7;8	100	11/ 11	12.5	1/ 8

Table 8. *Nonce words: Test 2.*

Masculine suffix	Feminine suffix	Arbitrary suffix
golcheau	podaisse	gramule
coumeau	oltense	coumile
tachot	lichasse	taninque
plichage	bravaise	chalique
maudriage	soumaise	fadaste
orsiage	tatase	arbiste
voltais	tartis	
clamai	danlis	
nodrais	lavapis	
brouguin	goltane	
savin	fasène	
forsin	pertine	

Table 9. *French nouns: Test 2.*

Noun	Ending	Preferred gender
voiture	[r]	78% M
pomme	[m]	92% M
main	[ɛ̃]	99% M
soleil	[j]	68% F
poisson	[õ]	70% F
clown	[n]	68% F

Table 10. *Correct/incorrect gender assignment to nonce words.*

	Age	ME	Correct/total M	Correct/total F	Articles provided
Eike	2;11	3	-	-	un
Gina	3;7	2	2/12	5/12	le la un une
Anton	3;8	1	6/12	5/12	le la un une
Conny	2;11	15	5/12	9/12	le la une
Janina	3;1	14	10/12	4/12	le un une
Dennis	3;4	15	3/12	9/12	un une
Nico	3;8	15	12/12	2/12	le la
Pascal	3;8	15	10/12	8/12	le la
Emma	2;11	26	9/12	1/12	un une

overgeneralization of masculine articles. *Pascal*, on the other hand, the only one who seemed to rely on formal cues, does relatively poorly with existing nouns. The fact that *Pascal* does not do well here except with nonce words whereas *Nico* and, to a lesser extent, *Dennis* succeed with real nouns but not with nonce words, suggests again that gender assignment typically results from item-by-item learning. At any rate, I do not find evidence in favour of the assumption that child L2 learners rely systematically on formal cues. This conclusion is in accordance with the one drawn from the analysis of spontaneous data.

6. Conclusions and open questions

The foregoing discussion has shown that age of onset is a crucial factor determining the course and result of successive acquisition of bilingualism in early childhood. It has also shown that cL2 learners are a distinct population. Some learners resemble children acquiring a first language, others share characteristics with adult L2 learners or exhibit properties of both populations. One of the domains where cL2 learners behave like aL2 learners is grammatical gender in languages where gender assignment depends on formal cues that are only partially transparent, as in French and German.

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Table 11. *Gender assignment to specific markers of nonce words.*

Marker	Nonce word	Preferred gender	Conny	Janina	Dennis	Nico	Pascal	Emma
[ɛ]	nodrais	90% M	1/3	**3/3**	1/3	**3/3**	2/3	3/3
[ʒ]	plissage	94% M	2/3	2/3	1/3	**3/3**	2/3	2/3
[o]	golcheau	97% M	2/3	**3/3**	0/3	**3/3**	**3/3**	2/3
[ɛ̃]	brougin	99% M	0/3	2/3	1/3	3/3	**3/3**	2/3
[s]	podaisse	68% F	2/3	1/3	3/3	0/3	3/3	0/3
[n]	fasène	68% F	**3/3**	2/3	1/3	0/3	1/3	1/3
[i]	tartis	75% F	**3/3**	1/3	2/3	0/3	2/3	0/3
[z]	bravaise	90% F	1/3	0/3	**3/3**	2/3	2/3	0/3

Table 12. *Correct gender assignment to existing French nouns.*

	Conny	Janina	Dennis	Nico	Pascal	Emma
M	2/3	1/3	**3/3**	**3/3**	2/3	1/3
F	1/3	**3/3**	1/3	**3/3**	1/3	**3/3**

Although some morphological cues are fully reliable and some phonological properties indicate gender with high probabilities, gender assignment to a considerable number of nouns must be learned item-by item. Contrary to L1 children, cL2 learners rely primarily on lexical learning, ignoring the information provided by formal cues. More surprisingly, they encounter difficulties in establishing agreement relations between elements sharing gender-markings, although they could rely on L1 parameter settings. They resort instead to rote learning of word sequences, at least for an extended period in the course of acquisition.

Concerning the age range during which the LMC undergoes changes affecting the acquisition of grammatical gender, our analysis confirms the claim that the turning point is at around AO 3;6. Six of the 12 children first exposed to French at that age or earlier behave like L1 children, but none of those starting at a later age does so; see Table 13. Quite obviously, this result needs to be confirmed based on a larger data base. We should also expect to find individual differences. But the age range around 3;6 is clearly a developmental phase during which important age-related changes occur in successive language acquisition.

If it is correct that (2)L1 children rely on formal properties of nouns and on distributional properties (Art+N combinations), this confirms the assumption that L1 learners rely on discovery principles which I argued (4.2.1) to be part of the LAD. Consequently, the observed changes cannot be fully explained in terms of UG principles. Rather, if cL2 learners do not make use of formal cues, this suggests that discovery principles, too, are affected by age-related changes of the acquisition mechanisms. In order to compensate for the partial non-availability of these mechanisms, L2 learners resort to item-by-item learning, or they overemphasize functional cues to the detriment of formal ones; see Carroll (1999).

Let me finally address one more issue, related to the interpretation of 'critical periods' as clusters of sensitive phases, each defined in terms of a grammatical phenomenon that is optimally acquired during that phase. There is no a priori reason to assume that all phenomena of a cluster should be affected simultaneously by age-related changes, neither across learners nor intra-individually. The question thus is whether individual children use L2 features in some grammatical domains and L1 properties in others and to what extent learners with identical AO share L1 or L2 properties. For the time being, I can only offer a tentative answer. For 20 children of our corpus, the development of further grammatical features has been studied, scrutinizing the data for L1 and L2 properties, e.g., finiteness (Meisel, 2008) and Root Infinitives (Riedel, 2009; Preißler, 2011). These analyses suggest that, in most cases (16/20), children behave consistently, either like L1 or like L2 learners; see Table 13. The isoglosses defining sensitive phases thus seem to bundle. As for those learners where this is not the case, further research is needed in order to decide whether the observed inconsistencies reflect the variation space across and within individuals, or whether they are artefacts due to deficiencies of the analyses.

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Table 13. *Tentative classification of children as L1/ L2 learners.*

Child	(Group)	AO	Gender	RI (Riedel 2009)	Finiteness (Meisel 2008)
Cristina	**(A)**	2;8	L2?		
Maja	**(B)**	2;10	L2?	L1	
Sara	**(B)**	2;11	L1	L1	
Wolf	**(A)**	3;1	L1		
Jana	**(B)**	3;1	L2	L1	
Alf	**(B)**	3;2	L1		
Martin	**(B)**	3;2	L1		L1
Willi	**(B)**	3;3	L2		L2
Magda	**(B)**	3;3	L2		
Florian	**(C)**	3;4	L1		L1
Nicole	**(C)**	3;6	L1	L1	L1
Marika	**(A)**	3;6	L2	L2	
Luisa	**(C)**	3;7	L1	L1	
Vicky	**(C)**	3;7	L1	L2	
Lara	**(B)**	3;7	L2		L2
Klaus	**(C)**	3;7	L2	L2	L2
Yann	**(A)**	3;7	L2		
Julia	**(A)**	3;7	L2	L2	
Lars	**(B)**	3;7	L2	L1	L1
Ludwig	**(B)**	3;7	L2	L2	L2
Amelia	**(B)**	3;8	L2		
Jeremie	**(C)**	3;8	L2	L2?	L2
Peer	**(C)**	3;8	L2	L2	L2
Marion	**(B)**	4;0	L2	L1?	

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