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The acquisition of Spanish and English as two first languages through the
analysis of natural interpreting in bilingual children*

Raquel Fernández Fuertes (*UVALAL*, Universidad de Valladolid)

Esther Álvarez de la Fuente (*UVALAL*, Universidad de Valladolid)

Abstract

Research on the acquisition of two first languages from birth (2L1A) has focused, among other issues, on how the grammars of the two languages being acquired interact (e.g. Bhatia & Ritchie, 2012; De Houwer, 2009; Deuchar & Quay, 2000; Döpke, 2000; Köpcke & Meisel, 1995). A case in point is natural interpreting which evidences how bilingual children exposed to two languages from birth deal with the grammatical properties of the two languages and how this leads them to potentially convey the same message in either (or both) of these languages. More specifically, as part of the simultaneous processing of their two L1s, 2L1 bilingual children have been reported to often translate between their two L1s (Álvarez de la Fuente & Fernández Fuertes, 2012, 2015; Cossato, 2008; Harris, 1980a, 1980b; Harris & Sherwood, 1978), a phenomenon that has been called natural interpreting (Harris, 1977, 2003). In this respect, natural interpreting can be included with other language contact phenomena,

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such as interlinguistic influence or code-switching, as a typical defining property of 2L1A. Therefore, in this study we aim to offer an analysis of the way in which Spanish-English bilingual children use natural interpreting in their 2L1A process by focusing on the Spanish-English bilingual corpora freely available through the CHILDES project (MacWhinney, 2000).

Keywords: L1 bilingual acquisition; natural interpreting; Spanish-English; translation pairings

The Acquisition of Two First Languages

Research on the acquisition of two first languages from birth (2L1A) has been concerned with the process of how two languages are simultaneously acquired and how they interact throughout the acquisition process (e.g. Bhatia & Ritchie, 2012; De Houwer, 2009; Deuchar & Quay, 2000; Kroll & de Groot, 2005; Silva-Corvalán, 2014)¹. In this context, different language contact phenomena, such as interlinguistic influence and code-switching, have been explored in 2L1A in different areas of research and using a wide variety of language pairs. These manifestations of how the two L1 grammars interact are reflected in different language outputs which may make bilingual development and bilingual output different from those of monolinguals.

Interlinguistic influence, as the possible influence between the two L1s being acquired, has been extensively explored by comparing bilingual to monolingual acquisition with a view to determine whether the acquisition of the two grammars triggers an acceleration or a delay which will make bilinguals different from monolinguals (Paradis & Genesee, 1996). While some find evidence for acceleration, that is, for bilinguals acquiring the adult grammar earlier than their corresponding

¹ The acronym 2L1A is commonly used to refer to bilingual first language acquisition, that is, to the simultaneous acquisition of two first languages from birth.

monolingual peers (e.g. Fernández Fuertes & Licerias, 2010, for English-Spanish; Gawlitzek-Maiwald & Tracy, 1996, for English-German; Kupisch, 2006, for German-Italian; Lleó, Kuchenbrandt, & Trujillo, 2003, for German-Spanish; to name just a few), others find evidence of delay (e.g. Müller & Hulk, 2001, for bilingualism involving a Germanic and a Romance language) or no bilingual effect at all (e.g. Licerias, Fernández Fuertes, & Alba de la Fuente, 2012, for English-Spanish; Paradis & Genesee, 1996, for English-French; Unsworth, 2003, for English-German).

Another 2L1A phenomenon that has been analyzed is code-switching, namely, the ability a bilingual speaker has to use both languages within a discourse (Cantone & Müller, 2008, p. 811). Different studies have shown that 2L1 bilingual children often code-switch (Deuchar & Quay, 2000; Fantini, 1985; Köppe & Meisel, 1995; Lanza, 1997; Licerias, Fernández Fuertes, Perales, Pérez-Tattam & Spradlin, 2008; Lindholm & Padilla, 1978; Nicoladis & Genesee, 1998, among others) both within sentences, as in (1), and between sentences, as in (2).

(1) I could see *el pino*

[I could see the pine tree] (Silva-Corvalán, 2014, p. 100; 3;4)

(2) si tú eres puertorriqueño, *your father's a Puerto Rican, you should at least*
de vez en cuando, *you know*, hablar español

[If you are Puerto Rican, your father is a Puerto Rican, you should at least
sometimes, you know, speak Spanish]

(Poplack, 1980, p. 594; 34/25)

In (1), code-switching occurs between the verb *see* and the direct object *el pino*; in (2), the conditional sentence is in Spanish (*si tú eres puertorriqueño*), and (part of) the main clause is in English (*your father's a Puerto Rican, you should at least ...*

hablar español).

As is also typical of 2L1 bilingual speech, there is evidence of a phenomenon called natural interpreting (Harris, 1977, 2003) which, like code-switching, involves the simultaneous activation and use of the two languages of the bilingual. However, it differs from code-switching in that natural interpreting implies a pairing of two outputs that refer to (potentially) the same logical form. That is, as illustrated in the child's utterance in (3), the same message is sequentially conveyed in the two languages so that one is considered to be the source language (Spanish in this case; *me los saco*) and the other the target language (English in this case; *I take them off*)².

(3) Adult: ¿Tienes que sacarte los pantalones?

[Do you have to take off your pants?]

Child: Me los saco; I take them off

(Silva-Corvalán, 2014, p. 100; 2;3.6)

In the code-switching in (1) and (2), the message is conveyed once but by using two different languages; in natural interpreting, as in (3), the same message appears twice, once in each language.

Natural interpreting of the type in (3) has been found to appear in the longitudinal spontaneous production of 2L1 bilingual children and for different language pairs (Álvarez de la Fuente, 2008, for Spanish-English; Álvarez de la Fuente & Fernández Fuertes, 2012, 2015, for Spanish-English, Spanish-Catalan and French-English; Harris, 1980a, 1980b, and Harris & Sherwood, 1978, for English-French). In addition, several studies have also dealt with how 2L1 bilingual children perform natural interpreting in experimental contexts (Álvarez de la Fuente & Fernández

² In the examples on natural interpreting, the source utterance is marked with single underlining and the target utterance with double underlining.

Fuertes, 2015, for Spanish-English; Cossato, 2008, for English-Swedish, Hungarian-Swedish and Italian-English). However, little attention has been paid to this phenomenon as part of the characterization of the 2L1 bilingual acquisition process.

From the point of view of research methodology, research being conducted regarding these and other 2L1A phenomena has been done in the light of spontaneous and experimental linguistic data. In this respect and in the case of Spanish-English bilingualism, the compilation of corpora has served as the foundation for studies such as those in Fantini (1985), Lindholm and Padilla (1978), Fernández Fuertes and Licerás (2010), Licerás, Fernández Fuertes, Perales, Pérez-Tattam, and Spradlin (2008), Licerás, Fernández Fuertes, and Alba de la Fuente (2012) and Silva-Corvalán (2014). For the study of the acquisition process, the value of longitudinal corpora is, therefore, undeniable since they provide significant insight into the linguistic development of bilingual children. In this context, the CHILDES project (MacWhinney, 2000), guided by the principle of data sharing for the study of language, is an excellent resource.

The present study uses the data available in the CHILDES project for the analysis of acquisition data in order to provide an account of the natural interpreting practices used by 2L1 Spanish-English bilingual children throughout their acquisition process. In what follows we briefly present the phenomenon of natural interpreting and then we focus on its occurrence in the four Spanish-English corpora available in CHILDES.

Natural Interpreting (NI) in the Acquisition of Two First Languages

The term *natural interpreting* (NI), previously termed *natural translation* (Harris, 1977), was proposed by the translologist Brian Harris (2003) to refer to the interpreting done by bilinguals who, in spite of not having received any academic instruction or training on translation, are able to translate in everyday and familiar

settings. Already studied in diverse works (e.g. Álvarez de la Fuente, 2008; Álvarez de la Fuente & Fernández Fuertes, 2012, 2015; Bullock & Harris, 1997; Harris, 1980a, 1980b; Harris & Sherwood, 1978; Lörscher, 1992; Malakoff, 1992; Reynolds & Orellana, 2009; Shannon, 1990; Valdés, 2003), this phenomenon has been attested in very young 2L1 bilinguals, as can be seen from examples (4) and (5), where two Spanish-English bilingual children, Manuela from the Deuchar corpus and Simon from the FerFulice corpus, translate when their parents ask them to do so at early ages (1;09 and 1;10 years old respectively).

(4) *FAT: mira M (.) qué es eso ?

[look M, what is that?]

*CHI: [- eng] nappy .

*FAT: no (.) pero también se llama +...

[no, but it is also called...]

*CHI: pañal .

[nappy]

[Manuela 1;09_ Deuchar, CHILDES]

(5) *RAQ: ese cuál es ?

[what is that one?]

*RAQ: ah@i esa es la oveja ?

[that is the sheep?]

*CHI2: sheep .

[Simon 1;10_FerFuLice, CHILDES]

Álvarez de la Fuente (2008) and Álvarez de la Fuente and Fernández Fuertes (2012, 2015) propose that NI is inherently linked to 2L1 bilingual acquisition and that it surfaces as a natural resource that young bilingual children use in order to communicate a message in their other L1, as evidenced by examples (4) and (5).

In that respect, although some studies have shown that NI is recurrently used by 2L1 bilingual children with different language pairs as a communicative strategy in their everyday bilingual contexts, few studies have focused on this capacity as part of the 2L1 bilingual acquisition process (Álvarez de la Fuente, 2008; Álvarez de la Fuente & Fernández Fuertes, 2012, 2015; Harris, 1980a, 1980b; Harris & Sherwood, 1978; Lörscher, 1992; Malakoff, 1992). Actually, 2L1A literature contains several references to the use of translation equivalents (lexical pairs or pairings) in early 2L1 bilingual acquisition as a reflection of how children can differentiate both languages from the first stages of their linguistic development (e.g. Comeau & Genesee, 2001; Deuchar & Quay, 2000; De Houwer, 2009; Döpke, 2000; Genesee, Nicoladis, & Paradis, 1995; Lanza, 2001; Nicoladis, 2001; Nicoladis & Genesee, 1996; Nicoladis & Secco, 1998; Paradis, Nicoladis & Genesee, 2000; Pearson, 1998; among others). These studies refer to translation equivalents as words from two different languages that appear in the same utterance and have the same meaning. These equivalents have been given a variety of terms, including *duplication* (Redlinger & Park, 1980), *juxtaposition* (Vihman, 1985), *self-correction* or *self-repair* (Lanza, 1997), or even a type of code mixing as they involve a change of code (Paradis, Nicoladis & Genesee, 2000).

However, these 2L1A studies do not focus on the study of NI as a typical characteristic of the bilingual acquisition process, and as a phenomenon different from code-switching (CS) in that it also reflects that children can distinguish their two languages through bidirectional translations, as evidenced by example (4) above, where the child translates from English into Spanish, and example (5), where the child translates from Spanish into English.

For this reason, a direct relationship between the NI performed by 2L1 bilingual children and the process of bilingual acquisition can be established in such a way that

the study of how 2L1 bilingual children are able to keep their two languages separate in their NI outputs can shed light on how their two languages interact and are acquired. In fact, as other phenomena that emerge in bilingual acquisition such as CS have received significant attention from researchers since they show how bilingual children mix their lexicons and the features associated with them, in the same way, NI can illustrate that they possess the bilingual awareness of dealing with two different lexicons corresponding to the same logical form (LF).

Different types of NI cases have been identified in the production of 2L1 children (Álvarez de la Fuente & Fernández Fuertes, 2015) and these include cases in which there is a pairing between the source utterance and the target utterance, as in examples (3) and (4), as well as cases in which there is a lack of correspondence between source and target utterances. There are two possible scenarios when utterances do not correspond. The first is illustrated in (6) where the source utterance provides more information than the target one and so there is a reduction in the formal structure and/or LF associated with the source utterance.

(6) *CHI: <back him> [//] put him to bed .

*GRA: mhm .

*CHI: [- spa] cama .

[bed]

[Manuela 2;05_Deuchar, CHILDES]

The second scenario would be the reverse case, as shown in (7), where the NI provided in the target utterance involves an expansion of the source utterance.

(7) *CHI1: my lollipo(p) +...

*CHI1: [% to his father] yo quiero mi chupa chuns [: chups] .

[I want my lollipop]

[Leo 3;09_FerFuLice, CHILDES]

Álvarez de la Fuente and Fernández Fuertes (2015) offer a comparison of these three NI types (i.e. pairings, reduction and expansion cases) and they conclude that pairings significantly outnumber the instances of reduction and expansion.

Although both NI and CS can be studied separately, they can surface at the same time in the process of bilingual acquisition. However, to date no studies have focused on the analysis of the relation between NI and CS as linguistic phenomena that co-exist in the 2L1 bilingual acquisition process and that can appear simultaneously in the production of bilingual children, as shown in examples (8) and (9).

(8) *CHI1: quiero@s that .

*MEL: English .

*CHI1: I want that please . [Leo 2;07_FerFuLice, CHILDES]

(9) *CHI: mami dami [= dame] coscao@c .(...)

*CHI: I want mi@s colacao . [Antonio 2;11_Pérez-Bazán, CHILDES]

In example (8) the source utterance that Leo produces (i.e. *quiero that*) includes a code-switched sentence where the verb is produced in English and the object in Spanish (marked by the symbol @s where ‘s’ stands for language switch). As his mother, Melanie, prompts him to say it all in English, he translates the verb into English, rendering the whole target utterance in just one language (i.e. *I want that please*). In example (9), Antonio, even though nobody asks him to translate, renders the same message in both languages, in a Spanish source sentence first (i.e. *mami dami coscao*) and then in an English target sentence (i.e. *I want mi colacao*), although including a code-switched Spanish possessive in the latter (i.e. *mi@s*).

These two bilingual phenomena, NI and CS, can, therefore, appear simultaneously and interact in the child bilingual discourse as two linguistic resources that are part of the bilingual faculty of 2L1 children.

Natural Interpreting in the Spanish-English 2L1 Bilingual Data in CHILDES

In order to carry out our study on NI, we analyzed the Spanish-English 2L1 bilingual data available through CHILDES (MacWhinney, 2000), focusing on the instances of NI-pairings produced by the children. First we present an NI analysis of the data from each corpus and then we offer a developmental analysis of the corpora that contain higher rates of NI (i.e. FerFuLice and Deuchar).

The Spanish-English 2L1 bilingual corpora in CHILDES. The corpora and the participants that we address in this study are summarized in Table 1. The four corpora, i.e. FerFuLice³, Ticio, Deuchar, and Pérez-Bazán, include transcribed oral spontaneous data where bilingual Spanish-English children interact with adults in everyday conversations.

Table 1.
Spontaneous data from Spanish-English CHILDES corpora

Corpus	# of children	Child's name	Age range	# of utterances	# of NI*
FerFuLice	2	Leo	1;1-6;11	22,984	54 (0.23%)
		Simon	1;1-6;11	21,255	57 (0.27%)
Deuchar	1	Manuela	1;3-2;6	2,650	17 (0.64%)
Ticio	1	Diego	1;6-1;10	1,904	1 (0.05%)
Pérez-Bazán	6	Alberto	1;3-3;0	822	4 (0.48%)
		Carla	2;0-3;3	906	7 (0.77%)
		John	2;0-3;3	884	5 (0.56%)
		Sheila	2;2-2;8	504	6 (1.19%)
		Tina	2;2-2;11	298	4 (1.34%)
		Antonio	2;11-3;1	267	2 (0.75%)
Total				52,474	157 (0.3%)

*100% = total # of utterances produced by each child

³ Though the FerFuLice corpus includes both spontaneous data and experimental data, we only analyzed production in a spontaneous context.

Information on the number of utterances produced by each child also appears in Table 1, rendering a total of 52,474 utterances in spontaneous speech, out of which 157 correspond to utterances containing NI. Since most of these NI cases are produced by the children in the FerFuLice and the Deuchar corpora, a developmental study on these corpora was also carried out. It is clear from the information in Table 1 that NI is a pervasive –albeit restricted– phenomenon.

A total of 10 Spanish-English bilingual children were analyzed. The profile of these children is similar in that they are all 2L1 bilingual children who have been exposed to the two languages from birth and in their home context. There are, however, differences among the children: since the age ranges are different across children, the amount of data available per child is not the same (e.g. Leo *versus* Antonio from the FerFuLice and the Pérez-Bazán corpora, respectively); the strategy of communication at home may vary (e.g. one-parent-one-language or otherwise, in the FerFuLice *versus* the Deuchar corpora respectively); and the home context may differ from the social context (e.g. English as a dominant language at home in Spain *versus* Spanish as the dominant language at home in England, in the FerFuLice and the Deuchar corpora, respectively).

When 2L1 bilingual production is discussed, a lack of balance between the two languages of the bilingual may give rise to different results and, consequently, to different interpretations of the bilingual's production. The notion of dominance makes reference to the lack of balance between the competence 2L1 bilinguals have in their two L1s. However, there is no unified definition of dominance and so different types of diagnostics have been proposed to identify the dominant language. These include the prevalence of overall functional words from one of the two languages as well as parents' perception and amount of exposure to the two L1s (Petersen, 1988), speed of development (Wapole, 2000), relative vocabulary size in each of the two languages

(Nicoladis & Secco, 1998) or a higher Mean Length of Utterance (MLU) (Genesee, Nicoladis & Paradis, 1995; Yip & Matthews, 2006)⁴. In our case we have followed this last diagnostic (i.e. MLU) to determine dominance as well as additional external indicators such as the social context and the amount of input received in each language, where this information is available, and especially in the case of the three children for whom more data are available (i.e. FerFuLice and Deuchar corpora).

In the case of the FerFuLice corpus, the twins were born in Spain in a monolingual Spanish social context. As for the home context, the parents used the one-parent-one-language strategy from the moment the twins were born: the father is a native speaker of Peninsular Spanish and the mother a native speaker of American English. According to a parental background questionnaire and an extensive vocabulary checklist (which were passed to both parents separately when the children were 2 years of age), both children knew and produced the vocabulary items in 95% of the cases. Fernández Fuertes and Licerias (2008) offer a comparison of the twins' MLUs in both languages with the corresponding MLUs of two age-matched Spanish monolinguals and two English monolinguals that yields very similar results for both the bilingual and the monolingual children. Taking into account the information gathered both in the parental questionnaire and in the extensive vocabulary checklist, as well as the corresponding MLUs with age-matched monolingual English and monolingual Spanish children, we can conclude that the twins' proficiency in English and Spanish is quite balanced between the two languages and relatively equal to their monolingual peers in both languages.

⁴ The Mean Length of Utterance measured in morphemes (MLU) or in words (MLUw) (Brown, 1973) is the average number of morphemes/words that the speaker uses in each utterance and it has been proven to be an effective measure of linguistic development.

In the case of the Deuchar corpus, Manuela was born in the UK in an English monolingual social context. At home both parents spoke Spanish to the child and with each other: the mother is a British English native speaker and the father a Cuban Spanish native speaker. English input to the child comes from the maternal grandmother and from the caretakers in the *crèche* (Deuchar & Quay, 2000). The authors, however, refuse to state the child's dominant language because of the variety of ways the term dominance is used (p. 10). They do state that the proportion of Spanish words in an English-context is greater than that of English words in a Spanish context both at home and outside the home (p. 108). As in the CHILDES manual, at age 1;3, Manuela heard, on the average, English 48% of the time, and Spanish 52% of the time (calculated on the basis of 12 waking hours per day, 7 days per week). So it could also be assumed that this child is also quite a balanced bilingual. A comparison between the MLUw values of the children in the FerFuLice and Deuchar corpora appears in Table 9.

No information on the Pérez-Bazán corpus other than the fact that the participants are Spanish-English bilinguals in the US is provided in the CHILDES bilingual data manual. In the 0metadata file that accompanies the data, the only additional description is “children in the US learning Spanish”. We may assume from this that English is their dominant language.

The analysis of NI. In the data from the 10 2L1 bilingual children, the different instances of NI were isolated, that is, cases in which the same LF is conveyed twice as a sequence, first in one language and then in the other language (Table 2).

Table 2
Instances of NI production in 2L1 bilingual acquisition data

Corpus	Child's name	# of NI	# of pairings	# of non-pairings
FerFuLice	Leo	54	47 (87%)	7 (13%)
	Simon	57	46 (80.7%)	11 (19.3%)
Deuchar	Manuela	17	13 (76.5%)	4 (23.5%)

Ticio	Diego	1	0		1	(100%)
Pérez-Bazán	Alberto	4	3	(75%)	1	(25%)
	Carla	7	7	(100%)	0	
	John	5	2	(40%)	3	(60%)
	Sheila	6	1	(16.7%)	5	(83.3%)
	Tina	4	4	(100%)	0	
	Antonio	2	2	(100%)	0	
Total		157	125	(79.6%)	32	(20.4%)

100% = total # of NI cases produced by each child

A classification of instances of NI in terms of whether they are pairings or not (as discussed in the preceding section) reflects that pairings (79.6%) are significantly the most frequent type of NI ($p < .01$)⁵. The present analysis of NI, therefore, focuses on pairings and it aims to provide an answer to the following questions in order to further characterize the linguistic production of 2L1 children: (i) does NI-pairing involve the same form in the source and in the target utterances (i.e. form equivalence)?; (ii) are both phrasal as well as clausal structures equally involved in NI-pairing?; (iii) is NI-pairing characterized by a specific setting of variables such as directionality of the NI (i.e. from English into Spanish or from Spanish into English) or origin of the source utterance (i.e. whether the source utterance comes from the adult or from the child himself)?; and (iv) are NI and CS two phenomena that usually interact in the production of NI-pairings?

The linguistic variables. The NI-pairings found in the data have been classified in terms of the following seven criteria: (i) formal structure; (ii) form equivalence; (iii) length; (iv) adult-like *versus* non-adult-like utterances; (v) directionality; (vi) origin; and (vii) presence or absence of CS.

⁵ We have performed a series of statistical analysis (i.e. contrasts of proportions to calculate p -values) in order to detect significant differences when comparing across variable settings.

Formal structure distinguishes between phrasal (10a) and clausal (10b) structures in both the source and target utterances. In the case of phrasal structures, we have identified Determiner Phrases (DPs) (i.e. nominal structures), as in (10a), as well as Adjective Phrases (AdjPs), Adverb Phrases (AdvPs) and Prepositional Phrases (PPs).

- (10) a. *FAT: papa (.) eso qué es ?
 [daddy, what is that?]
 *CHI: [- eng] mm: table .
 *FAT: [- eng] table ?
 *CHI: mesa . [Manuela 1;09_Deuchar]
- b. *FAT: qué es esto ?
 *CHI: what (i)s this ? [Alberto 2;01_Pérez-Bazán]

Form equivalence between both utterances shows whether the same form is used in both the source and the target utterance, as illustrated in (10), or not, as in (11).

- (11) *CHI2: toma@s .
 [here you have]
 *MEL: how do you say toma@s ?
 *CHI2: he(re) . [Simon 2;07_FerFuLice]

NI does not necessarily involve adult-like structures, so utterances were also classified in terms of whether they were adult-like, as shown in (10b) and (11), or not, as in (10a), where the determiner should have been made explicit in both the source and target utterances (*¿eso qué es? Una mesa; what is this? A table*), and (12) where the verb in both the source and target utterances should have been inflected (e.g. *have finished*).

- (12) *CHI2: yo@s no finish .
 *MEL: how do you say yo@s no finished in English ?

*CHI2: I(am) not finish . [Simon 2;07_FerFuLice]

Given the two languages involved in NI, directionality could be either from English into Spanish (10a) or from Spanish into English (10b).

In terms of the origin of the source utterance, two possibilities are found: that both the source utterance as well as the NI or target utterance are produced by the child, as in (11), an instance termed by Harris (1980b) as *auto-translation*; and that the child is translating a source utterance produced by other speaker, as in (10b). In the case of auto-translations, these could be produced on the child's own initiative, as in (3), or induced by the adult, as in (8).

Interaction between NI and CS was also marked to distinguish examples like (8) and (9) above, where CS appears in a NI context, from the rest of the examples, where no CS is present, in order to determine the role of CS in NI.

NI data analysis in the three bilingual corpora.

Formal structure and form equivalence. The classification of the data in terms of form equivalence, that is, whether an equivalent (10) or a non-equivalent form (11) is used in the NI-pairing, yields very clear results: only one instance of lack of form equivalence appears in the data (example 11). This shows that children are conservative in terms of form when performing NI in that they respect the form of the source utterance when producing the target utterance. That is, if the source utterance is a DP, the target utterance is also a DP and the same in the case of a clausal source utterance.

With regard to the nature of the equivalent structures involved in NI-pairings, Table 3 shows the equal distribution between phrasal and clausal structures in both source and target utterances (10a and 10b).

Table 3
Equivalent NI-pairings at the clausal and phrasal levels

	Clausal level	Phrasal level				Other
		DP	AdjP	AdvP	PP	
FerFuLice	53	31	2	2	0	4
Deuchar	1	12	0	0	0	0
Pérez-Bazán	7	7	1	1	1	2
Total	61 (49.2%)	50 (40.4%)	3 (2.4%)	3 (2.4%)	1 (0.8%)	6 (4.8%)

100% = 124 NI-pairings (equivalent)

When comparing the total number of clausal and phrasal NI-pairings, the difference is not significant ($p=.30$), that is, when NI occurs, it equally affects phrases (mainly DPs and to a much lesser extent AdjPs, AdvPs and PPs) and clauses. This shows that children are not merely duplicating vocabulary items, as suggested in previous studies (e.g. Lanza, 1997; Redlinger & Park, 1980; Vihman, 1985).

Forms other than phrases and clauses also appear in the data and these have been classified under “other”. These cases amount to 4.8% of the total production and they refer to NI involving interjections (e.g. *goodbye-adiós*), onomatopoeic forms (e.g. *wow wow-guau guau* as in the sound a dog makes) and some formulaic expressions (e.g. *thank you, thanks*).

Length of the source utterances. The analysis in terms of form is further explored by measuring the length of the source utterances, as in Table 4.

Table 4

Length of the source utterance in the production of NI-pairings

	1 word	2 words	3-4 words	5-6 words
FerFuLice	58	25	6	4
Deuchar	10	3	0	0
Pérez-Bazán	9	5	5	0
Total	77(61.6%)	33(26.4%)	11(8.8%)	4(3.2%)

100% = 125 (non-equivalent + equivalent cases)

More than half of the NI-pairing source utterances correspond to 1-word utterances and, given that the rate of form types is equally distributed between clausal and phrasal structures (Table 3), this shows that not only noun pairs are part of the NI activity. So in terms of length, there is a significant preference for 1-word utterances

($p < .01$) although longer ones appear in the data as well. This again points to these bilinguals not merely producing vocabulary pairs (Harris, 1980a).

Adult-like versus non-adult-like utterances. In the classification of NI-pairings in terms of their conformity to the adult grammar (example 11 *versus* 12), adult-like source and target utterances outnumber the non-adult-like ones, as shown in Table 5. Here only the source utterances produced by the child are considered.

Table 5
Adult-like versus non-adult-like production in NI-pairings

	Adult-like	Non-adult-like			
		Different specification	Omission	Null Subject	Other
Source utterance	77 (83.7%)	3 (3.2%)	9 (9.8%)	1 (1.1%)	2 (2.2%)
Target utterance (NI)	92 (73.6%)	7 (5.6%)	19 (15.2%)	5 (4%)	2 (1.6%)

100% in source utterances produced by the child = 92
100% in target utterances (NI) = 125

The analysis of the sources utterances produced by the child, as in Table 5, shows that adult forms significantly outnumber non-adult ones ($p < .01$). A closer look at the scarce non-adult-like forms reveals that most ungrammatical cases are associated with the omission of functional categories (null inflection and mostly null determiners, as (10a) shows) ($p < .01$ in all the pairwise comparisons between the four non-adult-like types). Therefore, the omission that characterizes the initial stages of child production is also reflected in these children's NI output.

In the case of the target utterance, that is, the actual NI-pairing, the same distribution between adult-like and non-adult-like structures that was found with the source utterances appears: adult forms outnumber non-adult forms ($p < .01$); and omissions are the most frequent non-adult forms ($p = .006$). When comparing source and target utterances significant differences appear as children produce more adult-like source utterances than non-adult-like ones ($p = .03$).

Directionality. The directionality of NI-pairings is shown in Table 6 (examples in 10).

Table 6

Directionality in the production of NI-pairings

	English-Spanish	Spanish-English
FerFuLice	24	69
Deuchar	8	5
Pérez-Bazán	6	13
Total	38 (30.4%)	87 (69.6%)

Overall NI from Spanish into English seems to be significantly more frequent ($p < .01$). This is the directionality clearly shown in the case of the FerFuLice and the Pérez-Bazán corpora. However, in the case of the Deuchar corpus, taking into account the low production rate, Manuela's NI-pairings seem to favor NI from English into Spanish. Given the difference between both corpora in terms of the language of the community (Spanish in the FerFuLice corpus and English in the Deuchar corpus), we wonder whether it is the majority language, as the language spoken in the community, that marks the directionality of NI as it often serves as the source language when performing NI. We do not want to infer here that it is also a matter of dominance necessarily, though, since these children could be termed as balanced bilinguals given the description of their linguistic background presented above. In the case of the Pérez-Bazán corpus, the preference for English as the target language could be linked to dominance, if we assume they are English-dominant bilinguals.

Origin. When considering the origin of the NI-pairings, as in Table 7 and examples (3), (8) and (10b), there is a significant preference for auto-translation ($p < .01$), that is, for NI of source utterances produced by the child himself.

Table 7

Origin of the source utterance in the production of NI-pairings

	Auto-translation		Others' utterances
	Own initiative	Induced	
FerFuLice	25	43	25

Deuchar	8	3	2
Pérez-Bazán	9	4	6
Total	92 (73.6%)		33 (26.4%)

In the case of auto-translation, a distinction between NI-pairings produced as a result of an explicit request to translate and NI-pairings resulting from the child’s own initiative renders interesting results: no significant differences appear when comparing auto-translation done of the child’s own initiative (42 out of 92 cases = 45.7%; as in examples 5, 7, 9 and 10b) and auto-translation induced by another speaker (50 out of 92 cases = 54.3%; as in examples 4, 8, 11 and 12) ($p=.11$). This suggests that, when the child translates what he himself has said, he does so equally as often when he is prompted to translate and when he wants to do so himself.

Presence or absence of CS. Finally, with respect to the incidence of CS in NI contexts (8 and 9), the data in Table 8 suggest that, although both phenomena are related as we discussed in the preceding sections, they are in fact independent manifestations of the two languages of the bilingual being simultaneously active in the output. That is, NI does not generally involve CS, as there is a significant preference in the three corpora for the production of NI without CS being present ($p<.01$).

Table 8
NI and CS: the source of the utterance

	No CS		CS in source		CS in target
	Child source	Adult source	Child source	Adult source	
FerFuLice	44	21	22	3	3
Deuchar	8	2	0	0	3
Pérez-Bazán	9	6	2	0	2
Subtotal	61 (48.8%)	29 (23.2%)	24 (19.2%)	3 (2.4%)	8 (6.4%)
Total	90 (72%)		35 (28%)		

As illustrated in the production subtotal, there are significantly more cases of CS in the source utterance (21.6% in the source *versus* 6.4% in the target) ($p=.0002$) which suggests that when performing NI the child is turning a bilingual source utterance into a

monolingual target utterance. However, when analyzing the three corpora separately, this tendency seems to be so only in the case of the FerFuLice corpus.

NI data analysis: developmental approach. The developmental analysis was performed on data from the two larger corpora (i.e. FerFuLice and Deuchar) and three developmental stages were determined (approximately 18 months each), as in Table 9.

Table 9

NI in developmental production

Stage	Corpus	Age range	MLU _w range (English)	MLU _w range (Spanish)	# of NI-pairings
1	FerFuLice	1;1-2;6	1,000-2,500	1,000-3,000	28
	Deuchar	1;3-2;6	1,000-2,943	1,250-2,029	13
2	FerFuLice	2;7-4;0	1,000-8,761	1,588-4,930	58
3	FerFuLice	4;1-5;5	1,000-8,867	1,805-6,319	7

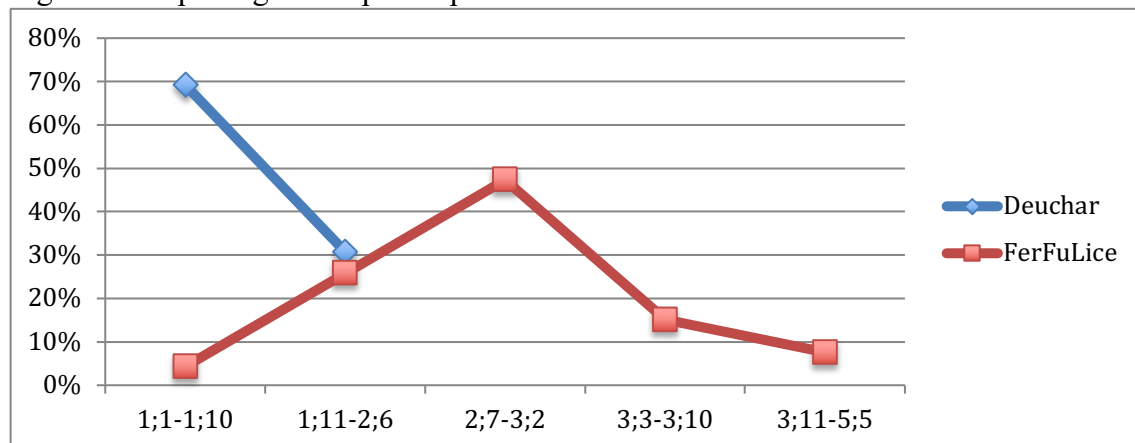
In the case of the MLU_w, both the lowest and the highest values are indicated for each stage. In the case of stage 1, while children in both corpora (2 children in FerFuLice and 1 child in Deuchar) have a similar MLU_w range in English, in Spanish, Simon and Leo reach a higher MLU_w than Manuela. In stages 2 and 3 only data from the FerFuLice corpus appear, as longitudinal data from the Deuchar corpus ends at 2;6. In these last two stages, the highest MLU_w values are reached in stage 3. When comparing the highest MLU_w values in English and Spanish at each stage, it seems that English development is less gradual than Spanish and that English sentences are also longer than Spanish ones. However, we do not consider this to be anomalous but rather reflective of the difference between these two languages and the fact that we are measuring length in terms of words. For instance, an utterance like *they will sing* has a 3-word-length value in English but a 1-word length value in Spanish (*cantarán*). A measure in terms of morphemes could yield different results but none of these corpora are suitable to do this computation.

With respect to the production of NI-pairings, in stage 1 production is similar in both corpora, which suggests that no difference in the NI-pairing production appears among the children (though there could be differences in the NI-pairing distribution as we have seen in the overall data analysis). This means, then, that the differences we found between the two corpora in the overall production in the previous section could be attributed to the different age range investigated in the two corpora.

In the FerFuLice corpus, NI-pairings increase in stage 2 but decrease in stage 3. This could reflect the children's internalization of the one-parent one-language communication strategy.

The distribution of the NI-pairings across the investigation period in both corpora appears in Figure 1.

Figure 1. NI-pairing development production



Deuchar: 100% = 13

FerFuLice: 100% = 93

In stage 1, there is an inverted pattern in that while Manuela's NI-pairing production drops, that of the twins increases. However, they both reach similar production levels at the age of 2;6. As for Manuela, data are not available after this initial stage, and therefore we do not know what subsequent pattern the child exhibits. In the case of the FerFuLice corpus, there is a reduction in the number of NI-pairings by the end of the study period. In fact, from 5;5 to 6;11 no spontaneous NI production is

evident and thus the last age range represented in Figure 1 is 3;11-5;5. This could be linked to the nature of the linguistic context in which translation is no longer part of the children's daily interactions. This contrasts with what other studies have detected in the case of the so-called child brokers in the US (e.g. Reynolds & Orellana, 2009; Valdés, 2003).

With regards to the form (i.e. phrasal or clausal) of NI-pairings, in stage 1 significantly more of the structures translated are phrases ($p=.0002$) and this is so for both corpora (8 clausal *versus* 16 phrasal structures in the FerFuLice corpus; and 1 clausal *versus* 12 phrasal ones in the Deuchar corpus). In stage 2 most are clauses ($p<.01$) (41 *versus* 16); and no differences appear in stage 3 where, out of the 7 cases produced, 4 correspond to clausal structures and 3 to phrasal.

As for length, given that most NI-pairings are 1-word (Table 4), the analysis of the 10 instances of NI that are 3-4 and 5-6 words shows that, in terms of development, longer structures are mainly produced in the last stages, and they only correspond to clauses (not to phrases). In particular, only 1 structure longer than 2 words appears in stage 1 and in the FerFuLice corpus, and the rest in stage 2 (5 cases) and stage 3 (4 cases). This suggests that linguistic development in the two languages, as measured by utterance length, is also reflected in NI production.

The omission of functional categories, mainly determiners and verbal inflection, that yields non-adult-like structures is very much restricted in the case of the NI-pairing production (Table 5). Developmentally, these omission cases are concentrated in the initial stages (19 in stage 1, 12 in stage 2 and 0 in stage 3), and no differences appear between the two corpora in stage 1 in this respect ($p=.38$). This links NI production with the children's general production in the progressive adoption of the adult grammar.

As for directionality, no significant differences between English-Spanish (18 cases) and Spanish-English NI-pairings (23 cases) appear overall in stage 1 ($p=.13$). When comparing across the two corpora (8 and 10 English-Spanish cases, and 5 and 18 Spanish-English cases in the Deuchar and FerFuLice corpora, respectively), a similar proportion of both directionalities is also found ($p=.06$) but not when comparing each directionality in the corpora: Manuela shows no preference but the twins prefer Spanish-English. In stage 2, the Spanish-English directionality is significantly favored by the children in the FerFuLice corpus ($p<.01$) (47 out of 58) which implies a consolidation of a tendency already observed in the FerFuLice children in stage 1 (in fact a significant difference across the two stages appears; $p=.003$). Out of these 47 cases, 38 are induced by the mother so that the children comply with the one-parent-one-language strategy. No differences appear in stage 3 where out of the 7 cases produced, 4 are Spanish-English and 3 English-Spanish.

With respect to the person producing the source utterance (i.e. origin), the preference for auto-translations (Table 7) is already seen from stage 1 where these NI-pairings are significantly preferred in both corpora ($p=0.004$). This is consolidated in stage 2 where only auto-translations have significantly increased (from 17 to 48 cases; $p=.04$). In stage 3 no tendency could be seen given the scarce number of cases (out of the 7, 3 are auto-translations). This again suggests that NI-pairings are, in fact, part of the simultaneous development of the two languages of these bilinguals in that they translate as part of their bilingual capacity and not only because they are prompted to.

The use of CS in the NI production of these children is, as we have previously discussed (Table 8), very reduced. With respect to the source utterances produced by the adults, CS never appears linked to NI in the case of the Deuchar corpus and only once in the case of the FerFuLice corpus. Related to the use of CS in the children's NI-

pairings, Manuela always uses CS in her target utterances (never in her source ones), indicating that, when translating, she does not translate the source utterance entirely and thus CS appears in the target, as shown in (13).

(13) *CHI: other picture .

*MOT: other [>] pictures .

*GRA: you [<] other picture .

*CHI: otra@s picture . [Manuela 1;09_Deuchar]

As for Simon and Leo in stage 1, no such preference is found and CS appears in both source and target utterances. The proportion of CS in NI increases in stage 2 for these two children, although contrary to Manuela in stage 1, this appears in the source utterance, as in (8) above, which means that they translate from a source utterance involving CS to a monolingual target utterance. The number of NI cases involving CS is very low (28 out of 106 total, 26.4%) and these disappear in stage 3. This could be accounted for either in terms of the independence of NI and CS or in terms of CS not being a common practice in either the social or the home context of either of these three children.

Conclusions

In the context of the 2L1A research that focuses on the possible ways the two languages of a bilingual interact, the present study has analyzed the phenomenon of NI, an understudied language contact phenomenon that involves the activation and presence of the two languages of the bilingual in the child's output (e.g. Harris, 1980a; Lörcher, 1992; Malakoff, 1992). In particular, NI appears when the same LF form is conveyed twice, once in each of the languages of the bilingual so that the source utterance is in one language and the target utterance in the other. The NI cases we have considered involve those in which the source utterance is provided by either the child himself or by

a different interlocutor (e.g. another child or an adult) and in which the target utterance (i.e. the actual instance of NI) is provided by the child. The focus of the study is based on a specific type of NI, the so-called NI-pairings, which have been shown to be the most frequent type in the NI production of bilingual children (Álvarez de la Fuente & Fernández Fuertes, 2015).

The characterization of the NI phenomenon and, in particular, of the NI-pairings leads to the following conclusions in the light of the results obtained. From the point of view of NI-internal properties, these Spanish-English 2L1 bilingual children respect the formal structure of the source utterance and, when performing NI, these NI-pairings equally involve different phrasal as well as clausal structures which come mainly from Spanish source utterances. From the point of view of the origin of the NI activity, these 2L1 bilingual children tend to translate into one of their L1s what they themselves have just said in their other L1. When considering NI as a language contact phenomenon related to CS though independent from it, the combination of both CS and NI in NI seems to mainly affect the source utterance which points to NI as a phenomenon rendering monolingual utterances. For both of the corpora, a reduction of NI-pairings is seen at the end of their respective study periods which we have linked to the type of social and home context. General language developmental traits are reflected in both corpora longitudinally: in the case of the NI-pairings forms, more phrasal structures are produced in stage 1 and more clausal ones in stage 2; longer NI-pairings (i.e. involving more words) appear in the last stages; and the omission of functional categories in the NI-pairing production is concentrated in the initial stages. The main difference between both corpora lies in the directionality of NI-pairings, a fact that we suggest could be linked to the community language and, in the case of the FerFuLice corpus, to the mother's reinforcement of the one-parent-one-language strategy.

Our study, therefore, provides a more in-depth analysis of the use of translation equivalents, lexical pairs or pairings (e.g. Comeau & Genesee, 2001; Deuchar & Quay, 2000; De Houwer, 2009; Döpke, 2000; Genesee, Nicoladis & Paradis, 1995; Lanza, 2001; Nicoladis, 2001; Nicoladis & Genesee, 1996; Nicoladis & Secco, 1998; Paradis, Nicoladis & Genesee, 2000; Pearson, 1998, among others). These had been acknowledged to occur in the production of 2L1 children but had not been further explored. In this respect, our study provides an analysis of instances of NI in terms of both their context of use (e.g. interlocutor prompting NI, interlocutor contributing the source utterance), as well as their internal grammatical configuration (e.g. formal structure, form equivalence between source and target text) and characterizes the NI phenomenon as part of the idiosyncrasy of the bilinguals' linguistic development.

Although more analyses on NI are needed that consider, for instance, other language pairs, the present study points to how NI can enrich the characterization of 2L1 bilingual grammars and how these grammars interact and are combined in the spontaneous production of bilingual children when they activate and simultaneously put to use their two L1s in their linguistic output.

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3(2), 97–116.

Resumen. La investigación sobre la adquisición de dos lenguas maternas (L1s) desde el nacimiento se ha centrado, entre otros temas, en cómo las gramáticas de las lenguas interaccionan (p.ej., Bhatia y Ritchie, 2012; De Houwer, 2009; Deuchar y Quay, 2000; Döpke, 2000; Köppe y Meisel, 1995). Un ejemplo de ello es la interpretación natural que pone de manifiesto cómo los niños bilingües perciben y utilizan las propiedades gramaticales de las lenguas y cómo esto les puede llevar a producir el mismo mensaje en una de las dos lenguas o en las dos. Más concretamente, varios estudios demuestran que, como parte del procesamiento simultáneo de sus dos L1s, los niños bilingües traducen entre sus dos L1s (Álvarez de la Fuente y Fernández Fuertes, 2012, 2015; Cossato, 2008; Harris, 1980a, 1980b; Harris y Sherwood, 1978), un fenómeno que se ha denominado interpretación natural (Harris, 1977, 2003). En este sentido la interpretación natural se añade a otros fenómenos del contacto de lenguas, como la influencia interlingüística y la alternancia de códigos, como característica definitoria del proceso de adquisición de dos L1s. En este contexto, este trabajo ofrece un análisis acerca de cómo los niños bilingües español-inglés utilizan la interpretación natural en el proceso de adquisición simultánea de las dos lenguas y se centra en los corpus bilingües español-inglés disponibles a través del proyecto CHILDES (MacWhinney, 2000).

Palabras clave: adquisición bilingüe de lenguas primeras; interpretación natural; español-inglés; emparejamientos de traducción