Processing strategies used by Basque-French bilingual and Basque monolingual children for the production of the subject-agent in Basque

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We sought to describe the strategies used by 2L1 and L2 Basque-French bilingual children and monolingual Basque children to express subject-agent function in a free elicitation context in Basque. Based on a three-year longitudinal study, the analysis focused on transitive constructions requiring a subject-agent noun marked for ergative case. The results showed that the children mastered production of the ergative case marker at different ages, and used different psycholinguistic strategies to refer to the subject-agent. The majority of the bilingual children favoured topological strategy (i.e., marking of the subject-agent in the first position through subject-verb-object word order). However, the children with L1 Basque seemed to engage more in morphological strategy, through the use of the nominal ergative suffix. These data allowed us to discuss variations in the performance of bilingual children in light of the cue cost and cue validity concepts elaborated by the Competition Model applied to language production.

Keywords: sentence production strategies, early bilingual children, ergative case

1. Introduction

Cross-linguistic studies of first-language (L1) acquisition in children have demonstrated variations in acquisition patterns, depending on the structural language characteristics being acquired (e.g., Berman & Slobin, 1994; Bowerman, 1996; Hickmann, 2003). On the other hand, comparative studies of bilingual versus monolingual language acquisition conducted over the past few years have yielded inconsistent results, demonstrating both similarities and differences in children's

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language acquisition trajectories (Serratrice, 2007; Schlyter, 2011). Both types of research have highlighted variations in language acquisition.

One of the models that focuses on variation (and hence on individual performance) is the *Competition Model* (Bates & MacWhinney, 1987; Kail, 1997). While this model has mostly been implemented in studies of language comprehension, its ambition is to apply to language production as well (MacWhinney, 1997). We tested the model's predictions in a study of oral production in Basque-French bilingual children with a view to making a modest contribution to the growing body of typological data in research on language production. As stressed by Jaegger and Norcliffe (2009), psycholinguistic investigations of sentence production have so far concerned fewer than 30 languages spoken across the world, most of which are typologically close. Language-specific properties may affect various aspects of language production, such as agreement. Basque language is of particular interest in this context, as the ergative case we focused on in the present study does not exist either in French or in the other Indo-European languages generally investigated.

The aim of the present study was to provide a qualitative analysis of the strategies (topological and/or local) used by Basque-French bilingual and monolingual children to express the subject-agent in Basque and to tentatively compare their performances with very rare data from quasi-monolingual Basque children. We begin by recalling the main tenets of the Competition Model.

2. The Competition Model: A model for language comprehension and production

Inspired by the functionalist view, the Competition Model (CM) regards linguistic competence "(…) not as a set of grammatical rules but as a complex network of mappings between forms and functions" (Lambert & Kail, 2001, p. 566). It assumes that in every language, information processing is based on a number of linguistic cues linked to functions. In contrast to the huge amount of semantic and pragmatic information that is available, there are only a limited number of surface forms that can act as cues, and this number varies from one language to another. These surface forms can include lexical items, morphological information (case, agreement, etc.), word order, prosodic information such as stress or intonation patterns, semantic information (animacy, topicalization, etc.) and pragmatic information (Kail, 1997, 2002; MacWhinney, 2005a).

While this model was initially developed to explain sentence comprehension strategies from a cross-linguistic perspective (Bates & MacWhinney, 1989; MacWhinney, 1987), a more recent version of the model, known as the *Unified Model of Language Acquisition* (MacWhinney, 2005a, 2005b, 2012), included

both L1 and L2 acquisition and processing.[1] In this updated model, MacWhinney (2005b) claimed that L1 and L2 comprehension and production all rely on the same processes, determined by the principles of human cognition. Hence, the application of the Unified Model to bilingual or multilingual contexts should be particularly fruitful. Our description of this model focuses on two concepts that are of specific interest to the present study: cue validity and cue cost.

2.1 Cue validity

During the simultaneous activation of the functional and formal levels, different cues compete for function assignment. Previous research on sentence comprehension among the monolingual and bilingual speakers of various languages has shown that, depending on the language, some cues are judged to be more valid than others. This observation has given rise to the concept of linguistic cue validity, referring, as stressed by Kail (1999), to the informative value of a specific cue (e.g., pre-verb positioning) with respect to a particular communicative meaning (e.g., role of agent). It is characterized by two mandatory parameters: *availability* and *reliability*. A cue is deemed to be *available* if it is present when needed, and *reliable* when its use always and unambiguously leads to the correct interpretation. To take one of the most extensively studied examples within the context of the CM, the pre-verb position is a highly valid cue to agent identification in English. However, in languages with a more variable word order such as Italian, syntactic cues (e.g., pre-verb position) are not so reliable, and morphological cues (e.g., subject-verb agreement) are more valid, followed by prosodic cues (e.g., intonation), which play a major role in Italian (Kail, 1997; Vion & Amy, 1984). MacWhinney (2005b) provided further illustrations of the validity of cues in different languages with respect to agent identification. In Spanish, for instance, the prepositional object marker *a* is a local marker used to indicate an animate patient, while the subject is not marked. No such cue exists either in English or French, where syntactic relations are marked through subject-verb-object (SVO) word order alone. In German and Russian, the subject is referred to through case marking on the subject noun and, in German, above all on the article. In Arabic, by contrast, subject verb agreement for gender and number is a more powerful cue than case marking. In Basque, the morphological cue does not seem to be strong enough to prevail over word order, as shown by a recent study conducted with a Spanish-Basque bilingual patient with aphasia (Munarriz, Ezeizabarrena & Gutierrez-Mangado, 2016). This study reported on the differential and selective morpho-syntactic impairment observed,

1. We use the term *processing* in the psycholinguistic sense, referring to all comprehension and production processes involved in the use of language.

suggesting that morpho-syntactic cues are not equally available in the two languages. The authors surmised that the typological distance between Spanish and Basque prevents the transfer of cues from one language to the other.

What these studies conducted on language comprehension tell us is that the cues vary according to the characteristics of each specific language. It has, however, also been shown that differences may be observed between adults and children or individuals with aphasia. French adults, for instance, based sentence interpretation on the contrast between animate and inanimate nouns, even when there is competition between this cue and word order, while French children relied mainly on word order (Kail & Charvillat, 1986).

2.2 Cue cost

Complementing the notion of cue validity, the idea of a cue processing cost was first mooted by Kail (1999, 2002). This concept is based on the hypothesis that topological processing, which requires cues to be used with reference to their context (e.g., word order), entails a higher cognitive cost than local processing, based on a feature (e.g., animacy) that can be used without taking the linguistic environment into account (Amy & Vion, 1986, p. 378). In other words, according to the principle of cue location (Kail & Fayol, 2000, p. 25), local processing is less costly in cognitive terms than topological processing. This claim is based on cross-linguistic developmental studies comparing languages with case marking (e.g., Turkish) and morphologically poor languages (e.g., English). Results showed that local processing involving case marking (e.g., Turkish) is more efficient than topological processing based on word order (Amy & Vion, 1986). These authors also found evidence suggesting that children move away from topological (global) processing towards local (analytical) processing during development, similarly to French-speaking children, who rely more and more (from age 6 onwards) on animacy to identify the agent function (Kail & Fayol, 2000). When the syntactic word order cue is replaced by the lexical-semantic cue of animacy, children's processing gets closer to the local processing used by French-speaking adults (Kail, 2004). In summary, the choice of a local cue allows the speaker to eliminate the context and thus reduce the load carried by working memory. With reference to data comparing French and Spanish, as well as results for Italian and Serbo-Croatian, Kail hypothesized that topological cues "require additional mental operations to compare and cross-reference the elements held in short-term memory" (Kail, 2012, p. 607). Some linguistic structures are hence more complex to process and require additional cognitive resources.

While all these findings were yielded by studies of language comprehension, MacWhinney (1997) stressed that the CM can also be applied to language

production, as sentence production involves activating meaning and function in a way similar to comprehension.

2.3 Application of the Competition Model to language production

In accordance with most models of language production, MacWhinney (2005a) described sentence production as involving four steps: message formulation, lexical activation, morphosyntactic arrangement and articulatory planning. In MacWhinney's terminology, each step provides an *arena* for competition between items. For example, in the arena of message formulation, different communicative goals compete, and winning goals are initialized and topicalized. Different forms therefore compete to be assigned a function, the winner being the most reliable one.

Based on this model, several studies have focused on production strategies, including Sridhar (1989) for topicalization strategies and Bates and Devescovi (1989) for complex sentences in English and Italian. The latter authors, for instance, described considerable structural differences between the two languages with respect to sentence planning. In English, SVO word order imposes the production of the subject before the verb, whereas Italian speakers, in conversational contexts with multiple speakers, tend to prefer left dislocations of OVS or OSV structure, where the subject is placed in second or third position. In other words, in Italian, there is a sort of competition during the elaboration of the surface order of the syntactic components.

More recently, Wang and Xu (2015) investigated the cues used by L2 learners of Mandarin (animacy and word order), with L1 English or Japanese to interpret and produce passives in their L2 Mandarin. Results indicated that beginning L2 learners (both English and Japanese L1 speakers) produced more notional passive sentences than *bei* passive sentences, while advanced learners behaved like native speakers. Hence, word order, pragmatic factors and, most importantly, L2 exposure may affect L2 learners' cue preferences, in line with the predictions of the CM.

In the present study, we applied the CM to data on oral language production in bilingual and monolingual children speaking Basque and French. After outlining some general characteristics of the Basque language, we present our research questions with respect to the two concepts of the CM described above.

3. Ergative case marking in Basque and its acquisition

Basque is an ergative language that distinguishes two types of subjects which are assigned different cases. The subject of intransitive verbs, as well as the object of transitive verbs, takes the absolutive case (no morpheme -Ø, see (1)), whereas the

subject of transitive verbs takes the ergative case, represented by the morpheme *-k*, as in (2), (Hualde & Ortiz de Urbina, 2003).[2]

(1) Gizona-Ø jin da.
man.det-abs come.perf. aux.be
'The man has come.'

(2) Gizona-k gatua-Ø ikusi du.
man.det-erg cat.det-abs see.perf. aux.have
'The man has seen the cat.'

Moreover, ergativity in Basque is characterized by double marking, involving not only nouns but also verbs. Basque verbs allow for synthetic as well as periphrastic constructions, the latter being more common. In periphrastic constructions, the verb root is marked for aspect (perfective, imperfective or future) and the auxiliary is marked for person, number, and tense. The person marker in the auxiliary may refer to: (1) the subject of an intransitive verb or the direct object of a transitive verb (absolutive case); (2) the subject of an action (ergative case); or (3) the recipient of either a transitive or an intransitive verb (dative case).

Additionally, Basque is a pro-drop language, which allows subject noun phrases or pronouns to be omitted in so far as they are expressed via morphological cues associated with the verb. Finally, canonical word order in Basque is SOV but this order is relatively free, given that case marking clearly indicates the syntactic function of each component. Accordingly, a sentence composed of a subject *gizon* 'man', a verb *ikusi* 'see' and an object *gatu* 'cat' can take several word orders in Basque: SOV (2), SVO (2a), OSV (2b), OVS (2c) and VSO (2d), without modifying any syntactic functions. However, these sentences are not pragmatically equivalent in Basque.

	S	V		O
(2a)	Gizona-k	ikusi	du	gatua-Ø.
	Man.det-erg	see.perf.	aux.have	cat.det-abs
	"The man has seen the cat."			
	O	S	V	
(2b)	Gatua-Ø	gizona-k	ikusi	du.
	Cat.det-abs	man.det-erg	see.perf.	aux.have
	"The cat, the man has seen it."			

2. Please note that the examples given in this paper reflect a dialectal variety used in France (Navarrese-Labourdin dialect).

	O	V		S
(2c)	Gatua-Ø	ikusi	du	gizona-k.
	Cat.det-abs	see.perf.	aux.have	man.det-erg
	"The cat, he has seen it, the man."			

	V		S	O
(2d)	Ikusi	du	gizona-k	gatua-Ø.
	See.perf.	aux.have	man.det-erg	cat.det-abs
	'He has seen it, the man the cat.'			

As stressed by Stoll and Bavin (2013), the acquisition of the ergative system represents a real challenge for children, who have to determine, on the basis of their linguistic input, how semantic roles (agent, recipient and theme) are related to syntactic relations (subject, object) as well as to morphological markers.

Developmental data involving ergative languages provide evidence for the role of input in the acquisition of ergative case marking. First, Allen (2013) showed that children aged 2;0–3;6 years acquiring Inuktitut tend to avoid the production of ergative morphology, owing to the absence of such structures in the discourse of adults and older children. The author explained that the Inuktitut-speaking adults used the detransitivizing structures for two argument propositions more frequently than transitive structures that require ergative morphology. Similarly, "ellipsis of core arguments and optionality of ergative morphology in Warlpiri reduce the availability of the ergative case marker" (Bavin, 2013, p. 114). The optional nature of ergative marking use therefore seems to play a decisive role in its acquisition in Inuktitut and Warlpiri. In Hindi too, the relative infrequency of perfective transitive verbs (requiring the use of the ergative case) in adults may explain the rareness of ergative marking in children's verb production (Narasimhan, 2013).

As far as the Basque language is concerned, case and agreement seem to develop more slowly in Basque-Spanish bilinguals than in Basque monolinguals, and more errors are observed in production (Austin, 2013). These results confirm those of earlier studies suggesting that the acquisition of the ergative case in Basque is problematic for bilingual and monolingual children (Barreña, 1995; Ezeizabarrena & Larrañaga, 1996; Ezeizabarrena, 2012; Huarte, 2007). Most authors seem to agree that the acquisition of the ergative case takes place in several stages (Huarte, 2007). The earliest productions of Basque-speaking children generally comprise two words (nouns, verbs, adjectives or adverbs) without any morphological marking (case, aspect, etc.) or auxiliaries. The emergence of the ergative case within noun morphology takes place when utterance length and complexity start to increase – at around age 2;4, according to Barreña (1995) and Huarte (2007). However, production of the ergative case is still irregular at this

age (Ezeizabarrena, 2012) and, according to Huarte (2007), involves a great many omissions but no substitutions. The latter assertion is based on the observation that children who frequently omit the ergative marking from the subject of transitive verbs, rarely use the ergative suffix instead of the absolutive or dative case marking, meaning that they do not overgeneralize. Additionally, their errors always concern the ergative and never the other two cases.

Furthermore, it should be recalled that the Basque language involves a double marking of the three cases: absolutive, ergative and dative. Developmental data show that the acquisition of ergative marking of the verb precedes ergative marking of the noun phrase through the use of the auxiliary *edun* 'to have' (Ezeizabarrena & Larrañaga, 1996; Ezeizabarrena, 2012), while the production of the suffix *-k* in noun morphology is only attested a few months later. This suggests a hierarchy of acquisition proceeding from verb to noun morphology.

Case agreement of auxiliaries also seems to follow a specific timeline (Austin, 2012; Barreña, 1995; Ezeizabarrena, 1996). With respect to the third person singular, the progression is as follows: absolutive or intransitive auxiliary *da;* ergative or transitive auxiliary *du*; dative or ditransitive auxiliary *dio*. Verb agreement with the absolutive case emerges at around 1;6 years, with the ergative case at around 2;0 years and with the dative case between 2;0 and 3;0 years (Austin, 2012). This raises the question of whether the acquisition sequence for verb agreement is also valid for noun case marking which would involve the acquisition of the absolutive case -ø, followed by the ergative *-k* and finally by the dative *-i*.

Several hypotheses have been put forward to explain the developmental orders of acquisition of the ergative marker. With respect to verb morphology, it is unlikely that frequency of input alone could explain the hierarchy between the markers; empirical data do not show any correlations between the morphemes produced by adult speakers and those that first emerge in children's speech. Austin (2012) has therefore proposed that inflectional morphemes are characterized by a hierarchical complexity, which is more likely to explain the order of emergence of case markers.

For noun morphology, a syntactic account based on the *Maturational Hypothesis* (Barreña, 1995; Ezeizabarrena & Larrañaga, 1996) assumes that functional projections assigning case may not yet be fixed at this stage since Universal Grammar is subject to maturational processes. Furthermore, the inconsistency of the ergative marker in Basque is suggested as a possible explanation of the difficulty in producing ergative case marking in the nominal domain (Ezeizabarrena, 2012). On the other hand, the phonological hypothesis put forward by Elosegi (1998 in Huarte, 2007) posits that the absence of ergative markers may be linked to their context, i.e., the final position in the noun phrase. However, if this were the case, and the absence of ergative markers was due to the difficulty of producing

the voiceless velar stop /k/ in final position, we would expect similar problems to occur with nouns marked with the definite plural article *-ak* or with the partitive case – (*r*)*ik*. On this point, Huarte (2007) conducted an experiment to test comprehension of the ergative case in 29 Basque-Spanish bilingual children aged 2;4–2;9 years. A picture recognition task was used with three types of stimuli inserted into transitive sentences: (1) noun phrases with the absolutive morpheme *-ø*; (2) noun phrases with the ergative morpheme *-k*; and (3) noun phrases with an ungrammatical non-sense morpheme *-l*. For example, the word *krokodilo* 'crocodile' was presented either as: *krokodiloa-ø*, *krokodiloa-k*, or as *krokodiloa-l*. Results showed that the children were able to distinguish elements that play a functional role as agent or patient in Basque from elements that do not, as they chose the correct drawings for the conditions with the ergative and absolutive cases significantly more often. In analysing these results, Huarte advocated a phonological rather than a maturational explanation, considering that *-k* is a final voiceless stop that is a marked option within the sonority hierarchy and, moreover, is only found in final coda positions.

A purely maturational account has also been questioned by the results of a recent study on ergative acquisition in Basque-French bilingual children (Duguine et al., 2014). This longitudinal multiple case study documented major inter-individual differences and task effects in the production of the ergative morpheme. These were attributed by the authors to the interaction of multiple factors such as frequency of use of the Basque language, amount and nature of input, and other environmental factors that have been shown to play a major role in bilingual development. Additionally, the structural complexity of the ergative case and the cognitive load of its processing were put forward as possible reasons for the omission of the ergative marker by some of the Basque-French bilingual children. According to Duguine (2015), bilingual and monolingual children do not appear to have any difficulties with the understanding of the two types of morphemes in Basque, either the marked (ergative) option or the unmarked one (absolutive case). Similarly, in controlled production tasks, they do not appear to have any greater difficulties with the absolutive plural form (*-ak-ø*), than with the ergative singular (*-a-k*), which has the same surface form and could be a source of confusion. However, it has been reported that bilingual children may display difficulties in producing the ergative marker, compared with monolingual children, who seem to master the ergative case at an earlier age. Additionally, the author argued that children who encounter problems with the ergative case resort to avoidance strategies consisting, for example, in the omission of the ergative morpheme when using an SVO word order, with the subject-agent in first position. These data, collected via a formal language task, suggest that a topological (syntactic) strategy may prevail over a local (morphological) strategy.

In a similar vein, an electrophysiological experiment conducted by Erdocia et al. (2009) with 33 native-speakers of Basque yielded evidence that, in a comprehension task, participants prefer the simpler, canonical SOV word order, even in a free word order language, suggesting that the higher syntactic complexity of the non-canonical word order (OSV) induces a higher processing cost.

4. The study

The present investigation focused on the 'free word order' feature of the Basque language. This feature implies that there is competition between the syntactic cue (word order) and the morphological cue (ergative case), i.e. a topological and a local cue, for the expression of the subject-agent. Previous studies have shown that for other morphological rich languages there is a preference for the use of the local cue (Amy & Vion, 1986). Kail (2000) has explained this observation with the locality processing principle implying that local morphological processing is more economical in terms of cognitive load than topological syntactic processing. Furthermore, it has been shown that French-speaking children have a preference for the topological strategy based on the SVO word order when it comes to identifying the agent in a comprehension task, at the expense of lexico-semantic cues (Kail & Charvillat, 1986).

The present study challenges the locality processing principle in an investigation of Basque-French bilingual children, a language pair not yet investigated, in order to see whether bilingual children show the same preference as Basque monolinguals (i.e., use of the local strategy) or if cross-linguistic influence plays a role (i.e., use of the topological strategy as in French).

Additionally, the focus on the Basque language allows us also to investigate the additional competition arising in the Basque language from double-marking of two local cues, namely: the nominal ergative marking (suffix *-k*) and the verbal ergative marking. Verbal marking is acquired earlier than nominal marking by Spanish-Basque bilingual children (Ezeizabarrena & Larrañaga, 1996; Ezeizabarrena, 2012), but do French-Basque children follow the same developmental trajectory for the acquisition of the verbal ergative morpheme?

But above all, the aim of the study is to challenge the locality processing principle, observed in studies based on language comprehension tasks, with language production data. Indeed, Duguine (2015) showed that in a constrained ergative case production task Basque-French bilingual children seem to prefer the topological SVO strategy, rather than the morphological cue. But it is not clear yet what happens in a less constrained production task. Do bilingual and/or monolingual children show a 'natural' preference for word order or for case marking?

5. Method

The case study methodology we used here is frequently employed in studies of bilingual development to collect qualitative data (De Houwer, 2009). It is also an interesting means of providing data on less well documented languages, (Basque in our case), although the findings can only be generalised to a limited extent.

5.1 Participants

We report on data from a longitudinal study of seven children with three different linguistic profiles: five Basque-French bilingual children, two of whom had acquired both languages simultaneously, and three sequentially (the L1 being either Basque or French) and two monolingual Basque children. The children had a mean age of 5;0 at the first data collection point. The selection criteria for the bilingual children took into account the sociolinguistic situation and modes of transmission of Basque and French in the French part of the Basque Country. With a few exceptions,[3] French is present in most of the Basque families living in France. Accordingly, the French language is naturally passed down in the family, together with the Basque language. Basque may additionally be accessed through contact with Basque grandparents or other family members, or through childcare provided in the Basque language. In recent years, the Basque language has been included in school curricula in three types of programmes: (1) introduction to Basque within the general curriculum; (2) bilingual sections; and (3) Basque immersion programmes. Children can thus benefit from formal instruction in Basque at different levels of intensity. French is only introduced in the second year of primary school, at roughly age 7.

The five bilingual participants in our study had the following profiles (Table 1): Child 1 (girl; age at first session: 5;0) and Child 2 (boy; age: 5;0) were simultaneous bilinguals, as they had acquired both Basque and French from birth in the family. They used Basque at school, in an immersion programme. Child 3 (girl; age: 6;0) was a sequential bilingual with L1 French (her parents spoke French at home), who had been acquiring L2 Basque in an immersion school since 3 years old. Child 4 (boy; age: 6;3) and Child 5 (boy; age: 5;4) were also sequential bilinguals, but their first language was Basque, spoken to them by both their parents, with French being mainly used at school (together with Basque in a bilingual section) from 3

3. Some Basque families deliberately make a Basque-only choice. Basque is used in the family domain (with parents, siblings, grandparents, etc.), but also in the public domain, with the children going to an immersion school (*ikastola*) and using Basque for all extra-scholar activities (Basque recreation centre providing all kinds of leisure and sports activities).

years onwards. The first four children were followed longitudinally in three annual sessions, whereas Child 5 only took part in the final session. This child joined the sample only at the end of the data collection process, but given the specificity of his linguistic profile, we decided to add his data to the longitudinal sample.

Table 1. Participants's linguistic profile

Bilingual profile	**Simultaneous bilinguals**		**Sequential bilinguals**			**Basque monolinguals**	
			L2 Basque	**L1 Basque**	**L1 Basque**		
Child	1	2	3	4	5	6	7
Sex	F	M	F	M	M	M	F
Age at Session 1 (years;months)	5;0	5;0	6;0	6;3	5;4	4;3	6;0
Environment	rural	urban	urban	rural	rural	rural	urban
Language used by mother	Basque	Basque	French	Basque	Basque	Basque	Basque
Language used by father	French	French	French	Basque	Basque	Basque	Basque
Language used between parents	French	French	French	F > B	F > B	Basque	Basque
Number and	0	3	2	2	2	3	2
Position among siblings	1	2	2	1	1	1	1
School language	Basque	Basque	Basque	F & B	F & B	Basque	Basque

Note. F: Female; M: Male; F > B: Dominant use of French; F & B: equivalent use of French and Basque

The control participants in this study were two monolingual or quasi-monolingual Basque children who had hardly any contact with French, particularly Child 6 (boy; age: 4;3). This child lived in a rural environment, and his parents and other close family members talked to him exclusively in Basque. He attended a monolingual Basque school in the same village, and was reported to have no interaction with French-speaking monolinguals. His exposure to French therefore seemed minimal (no French television or books at home). Child 7 (girl; age: 6;0) had a similar linguistic background, except that she lived in an urban environment where she can be assumed to have had a little more exposition to French. While she may have some receptive skills in French as an overheard language in the broader environment, her productive skills in French were very poor.

5.2 Task and procedure

Data were elicited through the narratives of the *Frog, Where Are You?* picture book (Mayer, 1969). Composed of 24 black-and-white drawings, this wordless book traces the adventures of a boy and his dog as they try to find a frog that has escaped through the window (Berman & Slobin, 1994; Akinci & Jisa, 2001). As noted by Akinci (1999), the frog story has been used extremely frequently in cross-linguistic studies. It has allowed data to be collected in more than 30 languages around the world, contributing to the identification of linguistic universals as well as language specificities. Our aim was to longitudinally observe the production of ergative markings through relatively free elicitation. The children performed the same task once a year for three years in a row. The instruction given in Basque was: *Ixtorio bat da. Kondatu behar dautazu zer pasatzen den* 'This is a story. You have to tell me what happens'. The children's oral narratives were recorded, transcribed and annotated following the norms used in the CHILDES database (MacWhinney, 2000).[4]

6. Results

With respect to the type of data collected in this task, it is striking that the responses produced by the children were more descriptive than narrative. For each of the 24 drawings, the children produced one sentence (involving no more than two juxtaposed or coordinated phrases) with textual organisation being local rather than following a narrative script. This observation, however, is consistent with the developmental trajectory for narratives proposed by Berman and Slobin (1994) for children with a mean age of five years.

As there were no constraints in the narrative task, the children had several options for describing the events shown in the pictures, including using elliptical type structures (i.e., with null subjects) or intransitive sentences that do not require the use of the ergative case. In the latter case, for example, the aspectual intransitive verb *ari izan* 'to be + progressive' can be used to describe an action and hence replace the transitive verb. The phrase *mutikoak so egiten du* 'the boy looks', in which the verb is transitive and the subject is marked with the ergative case, can be turned into *mutikoa so egiten ari da* 'the boy is looking', with an intransitive verb and the subject marked with the absolutive case.

4. The Basque-Duguine corpus is available here : http://childes.talkbank.org/access/Frogs.

Furthermore, many of the intransitive structures used by the children were presentatives such as *bada* 'there is', based on the intransitive verb *izan* 'to be', a very frequent and highly idiomatic structure in the narrative speech of young children.

With respect to the elliptical structures used together with transitive verbs, we distinguished between 'grammatical' ellipses of the subject commonly used by native speakers (e.g., *(nik) ez dakit* '(I) I do not know'), and subject ellipses that are aimed at avoiding the production of the ergative case. The latter may be purely strategic (as an avoidance strategy) or may rely on an anaphoric narrative process, where the subject is not repeated if it has already been mentioned. Accordingly, the phrase *mutikoa lo da* 'the boy sleeps' that was produced for one of the pictures, could have been followed by *ikusten du* '(he) sees' for the next picture, with no repetition of the subject *mutiko* 'boy'. More generally speaking, juxtaposition – or coordination – of two SNs also allows for the subject to be omitted within the second SN (e.g., *mutikoa erori da eta ikusten du* 'the boy has fallen and (he) sees').

Taken together, the data showed that transitive sentences with an SVO-, SOV- or SV-type subject (and ergative marking) are not systematically produced in such a task. As a consequence, production may greatly vary not only between children, but also from one year to another, as shown below.

The analysis of the corpus involved in several steps. First, all transitive verbs were extracted and the obligatory contexts for the use of the ergative marker (/k/ suffix) were determined. These contexts could be either SVO, SV, S, SOV, or right dislocations of the subject such as VOS, VS, etc. As for transitive SV-type structures with no direct object, these are complex verb structures based on the verb *egin* 'to do/to make' and a noun describing the action (e.g., *salto egin*, literally 'to do a jump/jump', *korrika egin* 'to do a race/run, *lo egin* 'to do a sleep/sleep'). We also observed transitive verbs, sometimes used with complementizers marked with either inessive case (*n*-suffix, indicating place: e.g., *begiratu zapetan* 'to look into the shoe'), or the adlative case (*-ra* suffix indicating destination: e.g., *ikusi gibelera* 'look back'), or single verbs with no direct object, (e.g., *deitu* 'to cry', *segitu* 'to continue'). Additionally, there were full noun phrases (type S- : overt subject) requiring the ergative. For instance, the response to the occasional question *nor<u>k</u>* 'who'? from the experimenter had to be marked with the ergative suffix *-k, mutikoa-k* 'the boy'. This first classification step allowed us to establish the number of errors in obligatory contexts for ergative marking affecting the subject of a transitive verb.

6.1 Data from Session 1

The data gathered in Session 1 (see Table 2) showed that the children produced far fewer transitive verbs with a subject than transitive verbs with a null subject. It should be borne in mind that, as is typical for narration tasks (Hickmann,

2003), a large proportion of the structures produced by the children contained a null subject. This was to be expected, given that Basque is a pro-drop or null subject language.

Table 2. Results of Session 1

	Simultaneous bilinguals		**Sequential bilinguals**			**Basque monolinguals**	
			L2 Basque	**L1 Basque**	**L1 Basque**		
Child	1	2	3	4	5	6	7
Sex; Age at Session 1	F; 5.0	M; 5.0	F; 6.0	M; 6.3	M	M; 4.3	F; 6.0
Total Transitive verbs / Total Verbs	24 / 51 (47%)	23 / 53 (43%)	22 / 41 (53%)	21 / 35 (60%)	–	7 / 65 (10%)	17 / 40 (42%)
Obligatory contexts of ergative subject agreement	3 / 24 (12%)	9 / 23 (39%)	5 / 22 (22%)	4 / 21 (19%)	–	1 / 7 (14%)	8 / 17 (47%)
Morphological ergative marking (local strategy)	0 / 3	0 / 9	0 / 5	0 / 4	–	1 / 1	8 / 8
Syntactic ergative marking (topological strategy)	1 S*VO 2 S*V	5 S*VO 3 S*V 1 S*OV	2 S*VO 3 S*V	1 S*VO 3 S*V	–	1 SV	5 SVO 2 SV 1 SOV

Note. F: Female; M: Male; S: Subject (with ergative case); S*: Subject (without ergative case); V: Verb; O: Object

The bilingual children relied mainly on subject omission structures, (cf. (3), (4) & (5)), as did the two monolingual children, albeit to a lesser extent.

O (Object) V (Verb)

(3) Apoharmatu bat so egiten dute.
Toad a look.imperf. aux.have
'They look at a toad.'

V

(4) Xekatzen dute
Look.imperf. aux.have
'They look for him.'

V O

(5) Eta hor begiratzen du xakurra.
And here look.imperf. aux.have dog.det-abs
'And here he looks at the dog.'

With respect to the ergative case, we observed a clear distinction between the four bilingual children, who did not produce the ergative case, and the two monolingual Basque children, who produced case marking for all transitive verb-subject occurrences, although these were rather scarce in number.

This is illustrated by the comparison of (6), (7) and (8): in (6) and (7), the ergative case marking is lacking whereas it has been correctly produced in (8).

(6) Haurra* begiratzen du igela.
Child.det* look.imperf aux.have frog.det-abs
'The child looks at the frog.'

(7) Xakurra* korrika egiten du.
Dog.det* run.imperf aux.have
'The dog runs.'

(8) Mutikoa-k ikusten du ziloa.
Boy.det-erg see.imperf aux.have hole.det-abs
'The boy sees the hole.'

We interpreted ergative case production as a local processing strategy, which is supposed to be cognitively less demanding than a topological strategy (Kail, 2000). The data, however, showed that the children did not necessarily produce ergative case marking. A closer look at the utterances they produced indicated that these mainly featured an S*VO word order (ergative case omitted). This means that the four bilingual children tended to rely on a topological strategy, as in (6), which has an S*VO word order. Although the subject *haurra* 'the child' is not marked for the ergative case, as it is placed in the first position before the transitive verb *begiratzen* 'to look', indicating its role of agent, it is easily distinguishable from the object *igela* 'the frog'. The topological strategy is thus particularly appropriate when both noun phrases refer to animates. It appears from the data that the bilingual children had a preference for the topological strategy with omission of the ergative case.

That said, one of the bilinguals (Child 2) produced a S*OV-type sentence with omission of the ergative case (9), where the assignment of semantic roles was ambiguous owing to the presence of animate entities (*xakurra* 'the dog' and *erleak* 'the bees'). The analysis of sentence components showed that the difference between the subject-agent and object-patient was instantiated through number marking (singular and plural), both in nominal and verbal morphology.

(9) Xakurra* erleak nahi ditu harrapatu.
Dog.det* bee.det-abs want aux.have catch
'The dog wants to catch the bees.'

In this example, the infix *-it-* in the auxiliary is related to the plural object *erleak* 'the bees'. The child preferred to use the local marking here, in order to account for the semantic roles of agent and patient, but he used the local S*VO strategy to comment on the next picture, as shown in (10):

(10) Xakurra* nahi du ooino harrapatu erleak.
Dog.det* want aux.have again.adv catch bees.det-abs
'The dog wants to catch bees again.'

We can see here that the infix *-it-*, indicating the plural object, has disappeared (i.e., an agreement error). The S*VO word order means that the subject-agent *xakurra* 'the dog' is in first position, and the patient *erleak* 'the bees', in the post-verbal position.

With respect to the controls, the Basque-speaking monolingual (Child 6) used mainly elliptical structures without a subject. This child also made extensive use of intransitive sentences introduced by *bada* 'there is'. His production was therefore poor with respect to transitive verbs (10%). However, in the only occurrence of an obligatory context for the ergative case in his corpus, the case marking (local cue) was correctly produced. Moreover, the local cue appeared in a sentence with SV(O) word order as can be seen in (11), hence combining two linguistics processes: topological and local.

(11) Ahuntzak uzten du erortzerat.
Goat.det-erg let.imperf aux.have drop.adlatif
'The goat drops him.'

Even though his production provided evidence of only one occurrence of the ergative case marking, this cue seemed to have been acquired by this child, as was confirmed outside the experimental task.

The other monolingual (Child 7) used the ergative case marking for both the noun and the SVO word order, therefore using, both local and topological strategies as shown in Table 2. There was, however, one example featuring the SOV structure, (i.e., canonical word order in Basque), where the subject was marked for the ergative case:

(12) Mutikoak eskuak sartzen ditu sudurrean.
Boy.det-erg hands.det-abs put.imperf. aux.have nose.ines.
'The boy puts his hands in the nose.'

Unlike the bilingual (Child 2) who produced the same S*OV utterance, the monolingual (Child 7) used the ergative case in this context.

6.2 Data from Session 2

One year later, in Session 2, the difference between the monolingual and bilingual children persisted (Table 3). However, the data showed that one of the bilinguals (Child 3) with L2 Basque had started to produce the ergative case correctly, as in (13), even though there were many overgeneralizations where the ergative case was applied to intransitive noun phrases that actually required the absolutive case, as shown in (14) *igelak* for *igela* 'the frog' and (15) *xakurrak* for *xakurra* 'the dog'. Although these can be regarded as errors, they above all show that the child was in the process of acquiring the rule about the use of ergative case marking for the subject of a transitive verb. We counted a total of 12 overgeneralisations during Session 2, most of which concerned the second part of the narrative (Pictures 16–24), and there were 10 errors for these 12 occurrences.

(13) Mutikoa-k lo egiten du.
Boy.det-erg sleep.imperf aux.have
'The boy is sleeping.'

(14) Igelak* joaiten da.
Frog.det-ERG go.imperf aux.be
'The frog is going.'

(15) Xakurrak* erortzen da.
Dog.det-erg fall.imperf aux.be
'The dog is falling.'

The other bilingual children, including the sequential bilingual with L1 Basque (Child 4), still failed to produce any ergative case markings.

During the second session (Table 3), the two simultaneous bilinguals (Children 1 & 2) and the sequential bilingual with L1 Basque (Child 4) continued to rely solely on a topological strategy, with omission of the ergative case. However, the production of the sequential bilingual with L2 Basque (Child 3) henceforth matched the production of the Basque-speaking monolinguals (Children 6 & 7), making concomitant use of both strategies.

Table 3. Results of Session 2

	Simultaneous bilinguals		**Sequential bilinguals**			**Basque monolinguals**	
			L2 Basque	**L1 Basque**	**L1 Basque**		
Child	1	2	3	4	5	6	7
Sex; Age at Session 2	F; 6.0	M; 6.0	F; 7.0	M; 7.3	M	M; 5.3	F; 7.0
Total Transitive verbs / Total Verbs	18 / 35 (51%)	19 / 50 (38%)	25 / 47 (53%)	20 / 27 (74%)	–	13 / 40 (32%)	18 / 45 (40%)
Obligatory contexts of ergative subject agreement	8 / 18 (44%)	4 / 19 (21%)	17 / 25 (68%)	2 / 20 (10%)	–	4 / 13 (30%)	14 / 18 (77%)
Morphological ergative marking (local strategy)	0 / 8	0 / 4	14 / 17	0 / 2	–	4 / 4	14 / 14
Syntactic ergative marking (topological strategy)	5 S*VO 3 S*V	3 S*VO 1 S*V	2 S*VO 1 S* 7 SVO 6 SV 1 S	2 S*VO	–	4 SVO	10 SVO 3 SV 1 S

Note. F: Female; M: Male; S: Subject (with ergative case); S*: Subject (without ergative case); V: Verb; O: Object

6.3 Data from Session 3

Production of ergative case markings was observed in the sequential bilinguals with L1 Basque (only occasionally in Child 4, but fairly systematically in Child 5, who was tested for the first time in this session) and also occasionally in the sequential bilingual with L1 French (Child 3; still with five overgeneralizations). The simultaneous bilinguals (Children 1 & 2) still did not produce any ergative case markings. It should also be noted that even the children who produced the ergative case did not do so systematically, for in the three sequential bilinguals and the monolingual (Child 6), omission errors co-occurred with correct productions. Variability between the children was also illustrated by the fact that the sequential bilingual (Child 5), who was tested for the first time during this session, was already regularly producing the ergative case, even though he was only 5;6 years old. This was a striking finding as none of the other bilingual children produced ergative case markings in Session 1 (i.e., when they were aged around 5 years). This suggests that Child 5 was the only bilingual child to resemble the monolingual children in terms of the acquisition rates established for Basque, which indicate that the ergative case starts to be acquired at the age of 2 years (Barreña, 1995).

The final session saw little change in most of the children, except for the sequential bilingual with L2 Basque (Child 3), who started to use both strategies (i.e., omission of ergative case with a topological strategy, and ergative case marking (local strategy) combined with a topological strategy). Mastery of the ergative case was not, therefore, complete at this point in time. This third and final session also included data from a new participant -a sequential bilingual- with L1 Basque who relied on both topological and local strategies like the monolingual Basque speakers, even though he was only 5;6 years old at the time. It should be recalled that neither the simultaneous bilinguals nor the sequential bilingual (Child 4) with L1 Basque used a local strategy at a similar age (see results for Session 1). Further investigation of Child 4's language context, however, revealed that his mother was a late bilingual who did not use the ergative case herself. Child 4 was therefore exposed to a large proportion of Basque input containing no ergative markings. The quantitative and qualitative characteristics of the speech directed towards a child may play a major role in bilingual language development, and require specific attention.

Table 4. Results of Session 3

	Simultaneous bilinguals		**Sequential bilinguals**			**Basque monolinguals**	
			L2 Basque	**L1 Basque**	**L1 Basque**		
Child	1	2	3	4	5	6	7
Sex; Age at Session 3	F; 7.0	M; 7.0	F; 8.0	M; 8.3	M; 5.4	M; 6.3	F; 8.0
Total Transitive verbs / Total Verbs	19 / 36 (52%)	17 / 30 (56%)	25 / 57 (43%)	21 / 30 (70%)	14 / 47 (29%)	12 / 30 (40%)	14 / 24 (58%)
Obligatory contexts of ergative subject agreement	2 / 19 (10%)	0 / 17 (0%)	18 / 25 (72%)	6 / 21 (28%)	8 / 14 (57%)	8 / 12 (66%)	0 / 14 (0%)
Morphological ergative marking (local strategy)	0 / 2	0 / 0	8 / 18	1 / 6	7 / 8	8 / 8	0 / 0
Syntactic ergative marking (topological strategy)	1 S*VO 1 S*V	0	6 SVO 1 SV 1 S 4 S*VO 4 S*V 1 S*OV 1 S*	1 SVO 2 S*VO 1 S*V 2 S*V	5 SVO 2 SV 1 S*VO	4 SVO 2 SOV 2 SV	0

Note. F: Female; M: Male; S: Subject (with ergative case); S*: Subject (without ergative case); V: Verb; O: Object

6.4 Summary of the results

In summary, the results of the narration task in Basque suggest that the differences in ergative case production were related to the children's profiles: monolingual versus bilingual, and, for the bilinguals, sequential versus simultaneous. Those children who had acquired Basque as their sole L1 for at least 2 or 3 years (as was the case for the sequential bilinguals) seemed to produce the ergative case earlier than those who had acquired Basque either simultaneously with French (Children 1 & 2) or sequentially as L2 (Child 3). This suggests that massive input in Basque (as in monolingual acquisition) at an early age favours the acquisition of ergative case marking.

We observed considerable inter-individual variation among the children, with ergative case marking on nouns being acquired much earlier by the two monolingual Basque children than by the bilingual children, irrespective of age at first exposure to Basque. If the use of a morphological strategy based on the ergative suffix was more economical or more valid, this seemed to apply only to the monolingual children. As in more controlled language tasks, the bilingual children showed a preference for the topological strategy based on an SVO word order, where the first position of the subject indicates the agent of the action. Both the monolinguals and the sequential bilingual (Child 5), who only took part in Session 3, used double marking, relying on both local and topological strategies.

Generally speaking, the children who took part in our study did not produce any errors concerning the verb, with the exception of the bilingual (Child 2) who produced one error with respect to agreement between the auxiliary and the plural object. For all the other children, production of transitive verbs involved either the inflected auxiliary *du* '(he/she/it) has', when the ergative subject and absolutive object were both singular (cf. (6), (7), (8)), or the form *dute* '(they) have' when the ergative subject was plural and the absolutive object singular (cf. (3), (4)). Furthermore, as in (9) and (12), *ditu* '(he/she/it) has' was used for agreement when the ergative subject was singular and the absolutive object plural.

With respect to the double marking of the noun and the verb with the ergative case, and the hypothesis that acquisition of verbal ergative marking precedes nominal ergative marking (Ezeizabarrena & Larrañaga, 1996; Ezeizabarrena, 2012), the absence of ergative case marking on the noun by the bilingual children suggests that the verb cue (systematically produced in all the three sessions) was more valid than the noun cue. This finding applied to all the children, both monolingual and bilingual.

7. Discussion

The case study methodology we used provided us with detailed observations of the specific developmental trajectories of monolingual and bilingual children under investigation here. While these remain largely qualitative and cannot necessarily be generalized, they allow for tentative interpretations and raise interesting new research questions about the validity of the concept of cue cost in language comprehension and production.

7.1 Local strategy (ergative noun marking) versus topological strategy (word order)

The bilingual children in our study who omitted the ergative case generally adopted the S*VO syntactic schema corresponding to the agent-action-patient semantic order. Information on agency was clearly indicated by the position of the subject (in first position), thus reducing the need for morphological marking of the subject. The children seemed to prefer the syntactic cue (word order) to the morphological cue (ergative suffix) for marking the agent function. In other words, the Basque-French bilingual children opted for a topological strategy rather than a local one, illustrating the vulnerability of morphological cues through their omission of the ergative case. This choice may be made because the syntactic structure is less cognitively demanding than morphological marking. However, this would go against Kail's (1997, 2002) hypothesis about the cost of cue processing, which assumes that local processing demands fewer cognitive resources than topological processing. It should be recalled that, with topological processing, the cue has to be used in relation to its entire context (e.g., word order), whereas local processing is based on a single marker or characteristic, whose use does not involve the linguistic context (e.g., animacy). This hypothesis was based on results obtained from Turkish monolingual children showing the efficiency of case marking with respect to word order. The data yielded by our study, however, suggest the opposite, as the Basque French bilingual children showed a preference for topological processing (SVO word order) over local processing (ergative marking), even though the latter allows for greater freedom with respect to word order (e.g., SOV). One possible explanation for these results lies in the influence of the other language spoken by the bilingual children. It may be that the fixed word order of French imposes the SVO schema on Basque. This hypothesis is all the more likely given that the children were more exposed to French than to Basque. However, the production of the two monolingual Basque children argues against this interpretation, as they used both local (ergative marking on the subject) and topological (SVO order) strategies, without any exposure at all to French in the case of Child 6.

This observation suggests that the results have a more complex interpretation. We cannot exclude the possibility of a link to the preferred word order in oral Basque speech. Furthermore, it should be recalled that Kail's (1997, 2002) hypothesis was based on data from comprehension tasks only. It may well be that comprehension and production tasks differ on cognitive load. In particular, whereas topological processing imposes a high cognitive load on working memory in sentence comprehension, the opposite is probably true for language production, and vice versa for local processing. This would be in line with another possible explanation, which has a psycholinguistic grounding as well as a linguistic one. In the light of Dordain and Nespoulous's (1992) assumption of a link between structural complexity and procedural load, the children's difficulty producing the ergative marking on nouns may be due to the structural complexity of the ergative case, resulting in a higher number of mental operations and thus an increase in cognitive load. Nespoulous (1996) underlined the vulnerability of morphology compared with syntax in the productions of aphasic patients. However, the expression of ergativity in Basque cannot be reduced to the production of a morphological marker, as a number of psycholinguistic operations are required to achieve the syntactic agreement of the verb, representing high levels of processing and high processing costs. It may be that when children focus their attention on these agreement processes, their limited cognitive resources lead them to neglect the morphological information, thus resulting in omission of the ergative case. This hypothesis deserves further scrutiny, especially with respect to the type of production involved. According to Kolk (2001), the errors made by children (without language disorders) mostly stem from limited processing capacities, which are probably attributable to the immaturity of children's brain and their limited linguistic experience. Since it is not unlikely that more demand is placed on the cognitive resources of bilingual children than of monolingual children (e.g., Marian & Shook, 2012), the former may develop preferences for less demanding strategies that work for both languages.

7.2 One local strategy (ergative noun marking) versus another local strategy (ergative verb marking)

It is also interesting to note that the bilingual children had difficulty with ergative case marking on the noun, but never on the verb. Our data clearly show that the verbal ergative cue is acquired well before the noun cue corroborating Austin's (2013) results. The Competition Model predicts that several cues will compete for function assignment during the simultaneous activation of the functional and formal levels. Use of the ergative case as a formal cue, specifying the agent function through morphological cues affecting the verb and/or subject noun, is a good illustration of this competition. Our results suggest that the information value of

the verbal ergative cue is greater than that of the noun cue, given the high number of omissions of the ergative noun suffix. But can we therefore conclude that the verb cue is more valid (Kail, 1999) than the noun cue? It should be borne in mind that a valid cue is one that allows for a correct and unambiguous interpretation. However, the problem may arise precisely from the existence of two possible interpretations of the morpheme *-ak*, as this suffix can indicate either the definite singular determinant (*-a*) in the ergative case (*-k*) or the definite plural determinant (*-ak*) in the absolutive case (*-Ø*). Hence, to avoid confusion, children at an early developmental stage may interpret *-ak* solely as a definite plural determinant and assign the expression of the ergative case to the verb rather than the noun. In terms of validity (Kail, 1999), this would make the verbal ergative cue more valid than the noun cue, and explain why it is acquired first.

8. Conclusion

Similarly to what has been observed in controlled production (Duguine, 2015), the Basque-French bilingual children in our study eliciting less constrained language production tended to adopt a topological strategy based on word order to mark the subject-agent function, rather than a local strategy based on the production of ergative morphemes. Accordingly, the natural tendency would be not to rely on case marking, at least in production tasks. We argue that their preference for the topological strategy was probably not due to cross-linguistic influence from French, as the Basque monolinguals also relied on the topological strategy in addition to the local strategy.

Hence, taking into account production data allows us to further qualify Kail's hypothesis of cue cost. Recall that Kail (2000; 2012) proposed a higher cognitive load for local cues on the basis of studies of children's language comprehension, where topological processing has been shown to be more economical. On the contrary, our data suggest that producing the ergative case has a higher procedural cost than relying on word order, hence the high number of omissions of the morphological marker. A simultaneous bilingual child may therefore have to contend with a greater cognitive load for processing the ergative case, than a sequential bilingual with L1 Basque, as acquiring Basque on its own during early childhood favours the automatisation of the processing of complex structures such as the ergative case. If the cognitive cost is too high for the child, it is still possible to implement linguistic strategies that reduce this cost and preserve intelligible communication (as many of the children do when they rely on elliptical structures).

Further psycholinguistic studies including also data from Basque adults are needed to unravel the complexity of ergative agreement in Basque. The present

investigation paves the way to examining not only the production of intransitive utterances in different contexts, but also the strategies used when children perform the same task in French.

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