Vietnamese Children's Interpretation of Definite Noun Phrases

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Abstract

Most work on the acquisition of definiteness examines languages with definite determiners and grammaticalized number, and finds slower acquisition of definiteness compared to number. We replicate an act-out task from Munn *et al.* (2006) testing comprehension of definites in Vietnamese – a language with neither of these characteristics. In contrast to the results from English and Spanish children, Vietnamese children are found to make few definiteness errors, instead struggling with number, casting doubt on a universal difficulty with definiteness. We argue that this difference stems from the way in which children integrate information from number and definiteness. Given a high level of task difficulty, children acquiring languages with definite determiners and grammatical number, such as English and Spanish, sacrifice definiteness in favour of number, while those acquiring Vietnamese prioritise definiteness, resulting in number errors.

Key words

Definite noun phrases, number, definiteness, plurality, pluralisers, classifiers, Vietnamese, classifier languages, first language acquisition, act out task

1. Introduction

In order to acquire the basic meanings of different types of noun phrases, children must establish mappings between sets of features (number, gender/class, definiteness, etc.) and the individual morphological pieces that make up the noun phrase (determiners, nominal inflections, etc.). This mapping is almost never one-to-one, and the fact that children still acquire these mappings quickly and efficiently is truly impressive. It is also an argument in favour of the existence of a biologically endowed capacity to learn language, which restricts the range of hypotheses that children consider when learning a language. Since the learner must be capable of acquiring any form-meaning mapping attested in natural language, our understanding of this device can be greatly enriched by studying how children acquire languages that realize the same semantic primitives in vastly different ways.

Vietnamese is a particularly useful language to study if we wish to examine how the Language Acquisition Device (LAD) handles the mapping of definiteness and number. Unlike inflectional languages with number morphology, which must encode number in nearly every noun phrase using an (at least partially) dedicated morpheme, Vietnamese does not always require number marking, and its plural morphemes – henceforth, *pluralisers* – have other properties besides encoding plurality, as their distribution depends on other syntactic and semantic properties of the noun phrase. In the same way, definiteness is not marked by dedicated determiners such as *a* and *the*, but rather with a combination of classifiers and pluralisers; for a full review, see Lê & Schmitt (2016). So it is an interesting language to compare against many Indo-European languages with overt determiners, which are far more well studied. This paper contributes data on the interpretation of singular and plural definite noun phrases by Vietnamese children ages 3 to 7 and compares their behaviour to that of children in the same age range acquiring Spanish and English.

The paper is organized as follows. We begin with a description of the acquisition problem, followed by a summary of previous findings on the acquisition of definite noun phrases and a description of how number and definiteness are realized in Vietnamese. We then present two comprehension studies that use modified versions of the task designed by Munn, Miller & Schmitt (2006) for English- and Spanish-acquiring children. Our results show an early ability to use definiteness cues and a later ability to use plural information in comprehension tasks in Vietnamese, contrasting with English- and Spanish-acquiring children who can use number early but continue to make certain definiteness errors. We close with some thoughts about how differences in the morphological realization of number and definiteness in Vietnamese, on the one hand, versus Spanish and English, on the other, could be responsible for the two different learning paths that children take.

2.   The acquisition problem

Regardless of how definiteness and number features are realized morphologically across languages, children must learn to extract the relevant information from them. To interpret a definite noun phrase in any given language, the child must combine three different pieces of information: first, the meaning of the noun and any accompanying modifiers; second, the number properties of the noun phrase; and third, the information from the definite that there is a discourse referent that *uniquely* satisfies these properties.

The uniqueness presupposition of a definite noun phrase is satisfied differently depending on the number of the noun phrase. For plural noun phrases like "the dogs next to the tree," the uniqueness presupposition is satisfied by finding a plural set of dogs-next-to-the-tree that is the maximal

set of dogs next to the tree. In contrast, to interpret a singular definite noun phrase like "the dog next to the tree," the uniqueness presupposition is satisfied by restricting the noun phrase's domain of reference to include only a single, unique dog close to the tree. This is easily satisfied in situations where there is only one dog next to the tree in the context, but if there is more than one, it is necessary to interpret the noun phrase more strictly, if the statement is to be felicitous. In other words, an implicit restriction must be added to accommodate the definite noun phrase to mean something like "the dog closest to the tree."

This rather complex coordination of different pieces of information makes the acquisition of definite noun phrases a non-trivial task – and an especially interesting case to study across languages that realize number and definiteness differently. The next section describes previous work on the acquisition of definiteness, while the following sections expand on that literature by looking at a new language: Vietnamese.

3.   Acquisition background

Previous work on the acquisition of number and definiteness markers finds that number is acquired earlier than definiteness. English-speaking children master the conceptual distinction between one and more-than-one around 20-24 months of age; see Fenson, Dale, Reznick *et al.* (1994), Barner, Thalwitz, Wood *et al.* (2007). Within the next year, i.e., by 24-36 months, they are producing the plural marker in the correct contexts and even use it in novel words; see Brown (1973), Mervis & Johnson (1991), Kouider, Halberda, Wood & Carey (2006). While not much work has been done on the acquisition of number in classifier languages like Mandarin, Korean or Japanese, the results that do exist suggest that children take a longer time to acquire plural morphology in these languages, perhaps because number is not grammaticalized and/or because number markers tend to be portmanteau morphemes; see Munn, Zhang & Schmitt (2009), Nakano, Park & Schmitt (2010).

As for definiteness, the acquisition path appears to be much more protracted. Children as old as 5 use the definite determiner to refer to non-unique objects, saying things like "Give me the ball!" even when multiple identical balls are present; see Maratsos (1976), Karmiloff-Smith (1979), Schaeffer & Matthewson (2005). However, the results from comprehension tasks indicate that children do at least understand the contrast between definites and indefinites; they are aware that definites maintain reference whereas indefinites introduce new referents; see Maratsos (1976), Karmiloff-Smith (1979), Modyanova & Wexler (2007), de Cat (2011).

A number of different hypotheses have been advanced to explain children's misuse of definites. Early proposals by Maratsos (1976) and Karmiloff-Smith (1979) suggested that errors stem from an egocentric

tendency to use definite forms for referents under the child's own focus of attention, ignoring the interlocutors' attentional state.[2] Observing that children overextend definites even when no elements are in focus, Wexler (2003, 2011) proposes alternatively that definiteness errors arise because children's initial representation of the definite determiner lacks the uniqueness presupposition – dubbed the "No Maximality Hypothesis" in Wexler (2011: 25).

More recent work by Drozd (2001) and Munn *et al.* (2006) proposed that children have the uniqueness presupposition but are simply unable to satisfy it when doing so requires them to implicitly restrict the domain of reference. This explains an otherwise puzzling result observed in Munn *et al.* (2006), who report that English- and Spanish-acquiring preschoolers were able to associate plural definite noun phrases like "the dogs next to the tree" with a unique plural (i.e., the maximal set) but were unable to associate singular definite noun phrases such as "the dog next to the tree" with a unique singleton set. The difference lies in the fact that the definite singular – but not the definite plural – requires the child to implicitly restrict the noun phrase's domain of reference to mean something like "the dog *closest* to the tree."

A major limitation of these proposals is that they are based almost exclusively on results from Indo-European languages, which realize definiteness through dedicated determiners (such as *the* (English) or *el/la/los/las* (Spanish)) and which also have a grammaticalized binary number distinction. In order to obtain a more complete picture of the cross-linguistic acquisition of definite noun phrases, we study the comprehension of definite noun phrases in Vietnamese – a language with neither of these properties.

4. Vietnamese noun phrases

In common with other classifier languages, Vietnamese allows bare noun phrases, which are underspecified for definiteness and number (in certain structural and pragmatic contexts: *cf.* Trinh (2011), Doan, Everaert & Reuland (this volume)). Depending on the predicate and the context in question, bare nouns can have generic, existential, indefinite and definite readings, as well as singular and plural readings. Hence, depending on the context, a bare noun like *chó* 'dog' may mean either "a dog," or "the dog," "the dogs," or just "dogs." [3]

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[2] These authors nevertheless assume different underlying reasons for children's 'egocentric' behaviour. Maratsos suggests that children are aware that definites must signal specificity of reference for speakers but not necessarily hearers, while Karmiloff-Smith suggests that children have a more deictic representation of definite noun phrases than adults do.

[3] In Vietnamese most nouns cannot enter a count structure without the help of a classifier (ex. *một *(con) chó* 'one CL dog' is ungrammatical without the intervening classifier, *con*) and are therefore considered to be mass-like; *cf.* Chierchia (1998). All the nouns tested here are

Nouns preceded by a classifier (1a) are interpreted as singular and definite.[4] This fact might make it seem as though Vietnamese classifiers are portmanteau morphemes, encoding both singularity and definiteness, but in fact, classifiers can also be found in indefinite noun phrases and in plural noun phrases. For example, adding the numeral *một* 'one' to the [CL-N] sequence forces a singular indefinite interpretation (1b); conversely, adding the pluraliser *các* triggers a plural, definite interpretation, as in (1c).[5]

(1)   a.   *con   chó*
                CL   dog
                'the dog'
        b.   *một   con   chó*
                a/one CL   dog
                'a dog'
        c.   *các   con chó*
                CAC-PL CL   dog
                'the dogs'

In Lê & Schmitt (2016), we argue that the underlying syntactic structure of phrases (1a-c) is as in (2a-c), respectively. All three structures contain the same fully articulated DP structure, consisting of: a DP layer, where (in)definiteness is interpreted; a QuantityP layer, where number is interpreted; and a ClP, which helps to mediate between the QuantityP and the bare NP that – in the typical case – cannot directly select for a QuantityP. The difference between the singular definite (CL-N) and the other two lies in the fact that the Quantity head is null rather than overt. The difference between
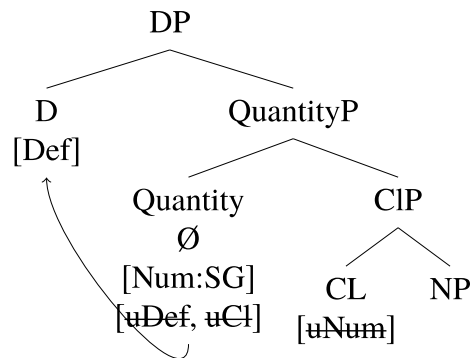
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of the type that requires a classifier to enter a count structure. It is worth mentioning, however, there exist a small number of exceptions: some nouns can appear in a count structure either with or without a classifier. Hence, some linguists have used two dimensions, rather than the usual mass-count distinction, to divide Vietnamese nouns: mass *vs.* unit [a semantic distinction] and non-count *vs.* count [a syntactic distinction]; see Cao (1998), L. K. Nguyễn (2001), Lê (2008), among others. Within this framework, all unit nouns are count nouns but not all mass nouns are non-count: a few mass nouns can enter a count structure with a classifier – in which case they behave like a 'mass' noun – or without, where they behave like a 'count' noun; see L. K. Nguyễn (2001: 222-239) for a list of such nouns. The exact number of count nouns in Vietnamese varies among authors. Cao (1998) provides a list of only 350 unit nouns in Vietnamese, which are also count nouns; Cao (1998: 268, 577-581). L. K. Nguyễn (2001) provides a list of 854 unit nouns. Both authors consider classifiers a type of unit noun. Both lists are still very small in comparison with the list of non-count mass nouns, the type of nouns that require classifiers to enter a count structure.

[4] This is different from many other classifier languages (e.g., Japanese, Korean, and Thai) which do not allow a [CL-N] sequence to appear in isolation; see Lê & Schmitt (2016: 153-154).
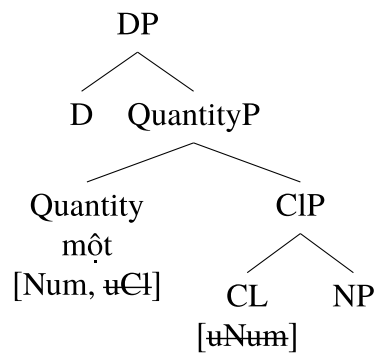
[5] Again, while other classifier languages disallow the co-occurrence of a classifier and a pluralizer in the same noun phrase, in Vietnamese, the presence of a classifier is obligatory when combining a pluralizer with a non-count mass noun.

the singular *in*definite (*một*-CL-N) and the two definite phrases is that Quantity head, although overt, fails to select for a definite D; the underspecified D head that surfaces in this position is therefore interpreted as indefinite.
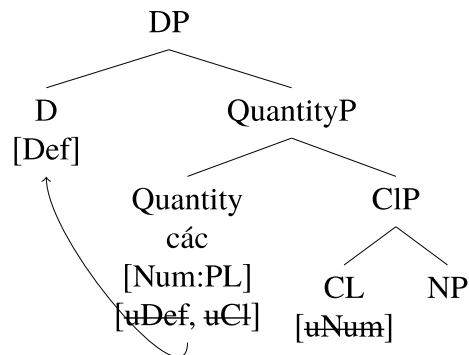
(2) a. Structure of a Vietnamese noun phrase containing [CL-N] (singular, definite):

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                    DP
              ┌──────┴──────────┐
              D             QuantityP
            [Def]        ┌──────┴──────┐
                      Quantity        ClP
                         Ø          ┌──┴──┐
                      [Num:SG]     CL    NP
                     [uDef, uCl]  [uNum]
```

b. Structure of a Vietnamese noun phrase containing [*một*-CL-N] (singular, indefinite):

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              DP
           ┌──┴────┐
           D    QuantityP
              ┌─────┴─────┐
          Quantity        ClP
            một        ┌───┴───┐
         [Num, uCl]   CL      NP
                    [uNum]
```

6

c.   Structure of a Vietnamese noun phrase containing [*các*-CL-N] (plural, definite):

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                        DP
            ┌───────────┴──────────┐
            D                   QuantityP
          [Def]           ┌────────┴────────┐
                       Quantity            ClP
                         các          ┌─────┴─────┐
                      [Num:PL]        CL          NP
                     [uDef, uCl]    [uNum]
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Vietnamese also has a second pluraliser element *những*, which triggers a plural interpretation but whose definiteness status remains unclear. One of the most striking properties of *những* is that it imposes the additional requirement that the noun phrase be further modified; for example, (3a) would be grammatically unacceptable if it lacked the attributive adjective *to* 'big'. While all studies agree that the noun phrases pluralized by *các* are definite – see T. C. Nguyễn (1975), T. H. Nguyễn (2004), among others – most authors claim that the pluraliser *những* indicates only a subset of a given set – see Thompson (1965), T.C. Nguyễn (1975) – and that its interpretation is that of a specific indefinite; see T. H. Nguyễn (2004). However, while others argue that the interpretation of *những* varies on a continuum somewhere between indefinite and definite – see Cao (1998), Bui (2000) – Lê & Schmitt (2016) argue that noun phrases with *những* are not inherently definite, but rather vary with the context, being able to appear also in indefinite contexts such as existential sentences or question phrases, as illustrated in (3b) and (3c).

(3)   a.   *những   con   chó *(to)*
             NHUNG-PL CL   dog   big
             'the big dogs'
    b.   *Có   những   cuộc   vui   không bao giờ tàn.*
             have   NHUNG-PL CL   fun   no   always cease
             'There are fun times that never end.'
    c.   *Những   quyển sách nào   cần chuyển đi?*
             NHUNG-PL   CL   book which need move   go
             'Which books need to be moved?'

We propose the simplified structure in (4) to account for the properties of the pluraliser *những*; see Lê & Schmitt (2016: 170). A crucial point to observe is that (i) the pluraliser has a D feature but this feature is not valued

in the morpheme itself and (ii) *những* selects not for an NP but rather for a small clause of sorts, which we are here labelling as PredP.

(4)   Structure of a Vietnamese noun phrase containing [*những*-CL-N-Modifier]:
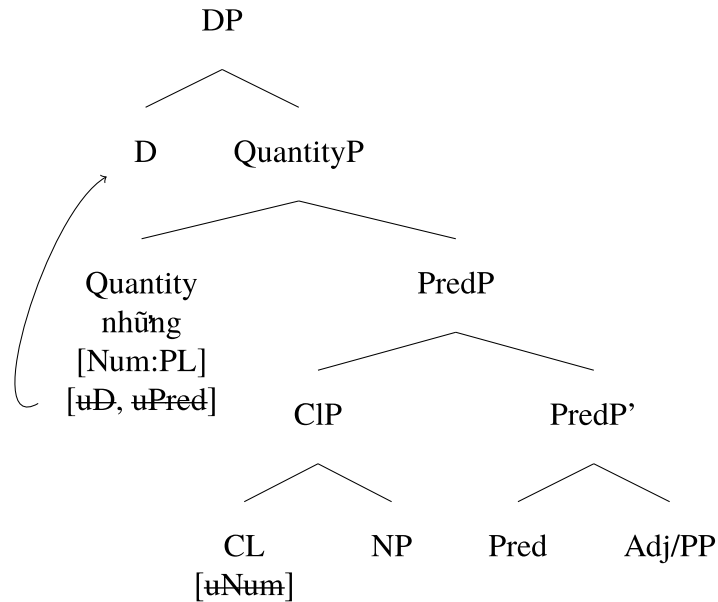
Finally, the quantifier *tất cả* 'all' can be adjoined to the pluralized DP to produce a maximal reading. Once again, if the pluraliser used is *những*, the nominal must be modified, as shown in (5b).

(5)   a.   *tất cả   các   con chó*
             all   CAC-PL   CL   dog
             'all the dogs'
       b.   *tất cả   những   con   chó   *(to)*
             all   NHUNG-PL CL   dog   big
              'all the big dogs'

With this sketch of the DP in Vietnamese, we can begin to ask whether children can associate definite noun phrases such as those in (1) and (3a) to sets with the correct number and definiteness properties.

5.   Research questions

The research reported here was concerned with three questions.

Q1: Do Vietnamese-acquiring children know number, that is, do they correctly associate [CL-N] sequences to singleton sets and [*các/những*-CL-N] sequences to plural sets?

Q2: Do Vietnamese-acquiring children know definiteness, that is, do they correctly associate both [CL-N] and [*các*-CL-N] sequences to unique sets? What about [*những*-CL-N] sequences?

Q3: How does their behaviour compare to that of children acquiring languages such as English or Spanish?

In order to answer these questions, we replicate Munn *et al.*'s (2006) task testing the comprehension of singular and plural definite noun phrases; this allowed us to make direct cross-linguistic comparisons with English- and Spanish-acquiring children.

6.   Hypotheses and Predictions

Since number restricts the potential referents for the definite noun phrase, a logical hypothesis is that number will be acquired before definiteness, across languages. If so, we would expect Vietnamese children to have the same behaviour as English- and Spanish-acquiring children who participated in this task, showing adult-like interpretation of number morphology but committing at least some definiteness errors. However, the "No Maximality" and "No Implicit Domain Restriction" hypotheses make contrasting predictions about what those definiteness errors should look like. If children lack the uniqueness presupposition (as *per* "No Maximality" – Wexler (2003, 2011)), then they may associate singular definite noun phrases to non-unique singleton sets and plural definite noun phrases to non-maximal plural sets. Alternately, if children do have the uniqueness presupposition but instead have trouble with some form of domain restriction (as *per* "No Domain Restriction" – Drozd (2001), Munn *et al.* (2006)), then they should produce more definiteness errors in the singular condition, as this requires an implicit restriction.

On the other hand, it is also reasonable to hypothesize that the ability to use number and definiteness in comprehension tasks is partially dependent on the morphological realization of these features in the target language. For Vietnamese, this could lead to one of two scenarios. One possibility is that the general lack of a one-to-one correspondence between individual morphemes and individual number and definiteness features delays Vietnamese children's acquisition of both features. If so, they should fail to distinguish between singular and plural definite noun phrases and show no tendency to associate either one to a unique/maximal set. The other possibility is that children initially associate the classifier with definiteness, since it can appear alone in a noun phrase and yield a singular definite interpretation. If

so, they should treat any noun phrase with a classifier as definite and ignore the singular-plural distinction until later on in acquisition.

7. Experiment 1

7.1. *Subjects*

Ninety-nine children were recruited from three kindergartens in Ho Chi Minh city, Vietnam; thirty four of these children were subsequently excluded for refusing to participate or failure to name relevant animals and landmarks during the pretest. Of the remaining 65 children who completed the test, seven were excluded from analysis for failing to provide at least three out of eight correct answers during the training and control conditions.

The data presented here come from 58 subjects, including eleven three-year-olds (M=3;7, range: 3;2-3;11), twelve four-year-olds (M=4;5, range: 4;0-4;10), fifteen five-year-olds (M=5;4, range: 5;0-5;11), thirteen six-year-olds (M=6;6, range: 6;0-6;11), and seven seven-year-olds (M=7;4, range: 7;0-7;7). Eight native Vietnamese-speaking adults (ages 25 to 47), who were studying or working at Michigan State University, also participated as controls.

7.2. *Materials*

Our experiment was a replication of the act-out task reported in Munn *et al.* (2006), illustrated in Figure 1. For logistic and cultural reasons, we used a toy tree (rather than a toy barn) as one of the two landmarks; we also used animal types more familiar to Vietnamese children: *mèo* 'cat', *chó* 'dog', *gà* 'rooster', and *cá* 'fish.' Additionally, we used groups of four animals per side, rather than the original three.[6]

Figure 1. Experimental setup.

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[6] The rationale for this change was that some studies show an effect of set size on children's comprehension of definites; see Modyanova & Wexler (2007), de Cat (2011). A replication of this task, using only three animals per side, as did Munn *et al.* (2006), is discussed in section 8 below.

Participants were instructed to choose the appropriate animal or animals using prompts as in (6). Three test conditions used definite singular and definite plural noun phrases (the latter containing either the pluraliser *các* or *những*). Three control conditions used noun phrases which either lexically specified a singleton set using the numeral "one" or which lexically specified the maximal set with the quantifier "all," accompanied by a pluraliser (*các* or *những*). Target responses are shown in Table 1.

(6) Sample test item:
    a.   *Đưa cho cô*   {*ø* /***các***   /***những***}   *con chó*
        give for aunt   {ø /CAC-PL /NHUNG-PL} CL dog

             đứng   *kế*   *cái*   *cây.*
             stand   next   CL   tree
        'Give me the dog/dogs next to the tree.'

       Sample control item:
    b.   *Đưa cho cô*   {***một*** /***tất cả*** *các*   /***tất cả*** *những*}
        give for aunt   {one /all   PL /all   PL}

             con chó   *đứng*   *kế*   *cái cây.*
             CL   dog   stand   next   CL   tree
        'Give me one/all the dogs next to the tree.'

Table 1. Noun phrase types used in Experiment 1.

	Condition:	Noun phrase type	Target referent
Experimental	SG-def	CL N	closest dog
	PL-def	***các*** CL N	all the dogs
	PL-def (?)	***những*** CL N	all the dogs (?)*
Control	SG-indef 'one'	***một*** CL N	any single dog
	all + *các*	***tất cả*** *các* CL-N	all the dogs
	all + *những*	***tất cả*** *những* CL-N	all the dogs

*If *những* is indefinite, subjects could pick out non-maximal sets. However, as discussed in Lê & Schmitt (2016), there is a near-categorical preference for interpreting *những* noun phrases as definite, *contra* previous claims made in the literature; *cf.* also Doan *et al.* (this volume).

The full set of prompts was generated by crossing these six noun phrase types with four animal types and two landmark types to produce 48 items. Each child was tested on twelve items (two of each noun-phrase type) plus four fillers.

Participants were randomly assigned to one of four different versions of the 12-item test, each with a different order. In all versions, control items

were presented *after* experimental items to prevent children from developing a contrast strategy for interpreting the experimental items. In three of the four versions, experimental items were presented in blocks, with either the [*những*-CL-N] block first (version 1), the [*các*-CL-N] block first (version 2)*,* or the [CL-N] block first (version 3); items were ordered randomly within each block. In the remaining version, each block contained a [*những*-CL-N] item, a [*các*-CL-N] item, and a [CL-N] item, presented in random order. No significant differences were found between versions; therefore, we collapse them when reporting the results.

7.3. *Procedure*

The task included three phases: (i), a pretest, in which children were asked to name the animals and landmarks, and to demonstrate their understanding of the prepositional phrase *đứng kế* 'standing next to' and the overall setup, by answering the question *Đứng kế con chó/mèo/etc. là con gì?* 'What is standing next to the dog/cat/*etc*.?'; (ii), a training phase, in which children responded to prompts using the numerals 2 through 4; and (iii), the presentation of test and control stimuli. The entire procedure lasted approximately thirty minutes in total. Adults were tested, either individually or in a group, on a pencil and paper version of the task (which did not include the pretest or training phases).

7.4. *Results*

Overall, the adults performed as expected, producing 100% target responses in all control and test conditions. Importantly however, in the singular control condition (e.g., "Give me *one CL dog* next to the tree"), which had multiple potential target responses, adults chose the closest singleton dog for all trials, which is also the answer expected in the [CL-N] condition. In the plural test condition with pluraliser *những*, whose definiteness status was unclear, adults chose the plural definite response (maximal set of dogs) for all trials.

We present the children's results below, beginning with control items and then proceeding to test items.

7.4.1. *Control sentences*
Table 2 below gives the percentage and frequency of children's responses in control conditions, grouped by number (singular *vs*. plural responses) and definiteness (closest/maximal *vs*. non-closest/non-maximal responses). Expected responses are in shaded cells. Across all three conditions, children provided mostly expected responses, showing that they understood the task. In the singular control condition, children showed a distinct preference for the closest animal, similarly to adults, something which should be taken into account when assessing children's behaviour in the [CL-N] experimental condition.

Table 2. Percentage (frequency) of children's response types in control trials.

	Condition:	*one*-CL-N	all-*các*-CL-N	all-*những*-CL-N
Response type				
Singular	Closest	87.93% (102)	7.76% (9)	9.48% (11)
Singular	Non-closest	11.21% (13)	4.31% (3)	0% (0)
Plural	Maximal	0.86% (1)	81.90% (95)	84.48% (98)
Plural	Non-maximal	0% (0)	7.76% (9)	6.03% (7)

Figure 2 divides children's responses by age group, collapsing across the two plural control conditions, that is [*all-các*-CL-N] and [*all-những*-CL-N] sequences. Even children in the youngest age group produced a majority of target responses.[7]
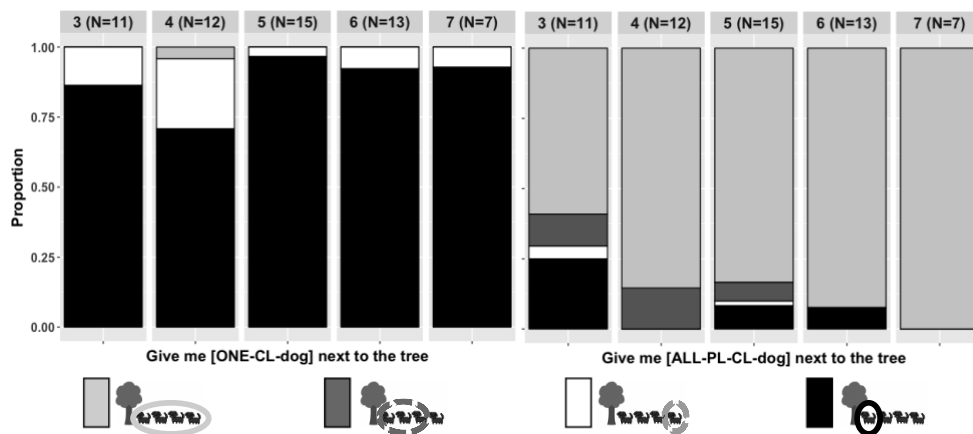
Figure 2. Proportion of children's response types, by age group, in singular control condition (left) and plural control conditions (right). See fn. 7 for key.

7.4.2. *Experimental sentences*

Table 3 presents the percentage and frequency of children's responses in the three experimental conditions. Like adults, children treated [*các*-CL-N] and [*những*-CL-N] sequences similarly, with no significant differences in the distribution of responses (χ-squared = 0.39, *df* = 3, p = 0.94). Thus, we collapse across these conditions in all subsequent analyses.

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[7] Key: response types in Figures 2, 3, 5 & 6 (below) include: singleton closest to the landmark (black), singleton but not the closest one (white), plural proper subset (medium gray) and plural maximal set (light grey).

Table 3. Percentage (frequency) of children's response types in experimental trials.

	Condition: Response type	Sg. Def. *CL*-N	Pl. Def. *các*-CL-N	Pl. Def (?) *những*-CL-N
Singular	Closest	73.27% (85)	26.72% (31)	26.72% (31)
Singular	Non-closest	7.76% (9)	0.86% (1)	1.72% (2)
Plural	Maximal	14.66% (17)	64.66% (75)	64.66% (75)
Plural	Non-maximal	4.31% (3)	7.76% (9)	6.90% (8)

Figure 3 divides children's responses by age group, collapsing across the two plural conditions. In the singular definite condition (ex. "Give me *CL dog* next to the tree"), children of all age groups produced a majority of target responses, choosing the closest dog to the tree. This is not surprising, given their preference for this response in the singular control trials. Interestingly, however, the second most common response – and therefore their most common error – was the maximal set of dogs, which is the expected answer if they are looking for a unique set, independent of number.
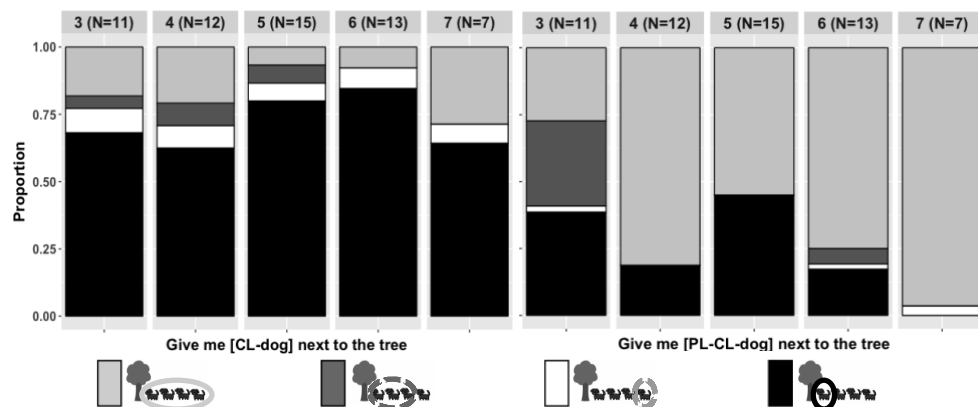

Figure 3. Proportion of children's response types, by age group, in singular (left) and plural experimental conditions (right). See fn. 7 for key.

Turning to the plural conditions (ex. "Give me *các/những CL dog* next to the tree"), we find a similar pattern. Children age four and older produced a majority of target answers, that is to say, they chose the maximal set of dogs. Just as in the singular condition, their most common error was a definite

response of the wrong number, namely the closest single dog. The three year-old children were evenly split between number and definiteness errors.[8]

We now turn to children's comprehension of number and definiteness, each property examined independently.

7.4.3. Results: Number

To address the question of whether children distinguish singular from plural definite noun phrases, we compared the proportion of plural responses provided in singular (CL-N) test conditions relative to plural (*các/những*-CL-N) test conditions, collapsing across definite and indefinite responses. Two-tailed *t*-tests revealed a significantly higher number of plural responses in plural conditions relative to singular conditions, for every age group (all $p < 0.05$).

Despite distinguishing between singular and plural, however, three- and five-year-olds produce a surprisingly low rate of plural responses in the plural conditions (59% and 55%, respectively) – at least when compared with what has been reported for children's number comprehension in other languages, as well as with their own behaviour in the control condition. Indeed, whereas Munn *et al.* (2006) report 80-95% target number responses in this task among English- and Spanish-acquiring children at ages 5 and younger, the Vietnamese-acquiring children did not reach that same level of accuracy on number until age 6; see Table 4. This is in line with what has been found for pluraliser comprehension in Mandarin, Japanese, and Korean; see (Munn *et al.* (2009), Nakano *et al.* (2010).

Table 4. Percentage of target number responses, ignoring definiteness accuracy. Comparison of English and Spanish children in Munn et al. (2006) with our Vietnamese children Experiment 1.

Language and age group	SG-Def	PL-Def
English (N=15) 3;0-5;5	83.8	81.3
Spanish (N=20) 3;2-4;11	90	95
Vietnamese (N=11) 3;2-3;11	77	59
Vietnamese (N=12) 4;0-4;10	71	81
Vietnamese (N=15) 5;0-5;11	87	55
Vietnamese (N=13) 6;0-6;11	92	81
Vietnamese (N=7) 7;0-7;7	71	96

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[8] The split mostly occurred *between*, rather than *within*, subjects. Four children were responsible for most of the plural indefinite responses, while four different children were responsible for most of the singular definite responses.

7.4.4. Results: Definiteness

Turning to the second research question, we assessed Vietnamese children's comprehension of definiteness by examining the proportion of definite responses they produced in the test conditions, whether plural (i.e., the maximal set) or singular (i.e., the closest animal to the landmark). For convenience, we refer to these as plural definite and singular definite responses, although we are aware that, strictly speaking, such terms are our interpretation of children's behaviour. Figure 4 presents the proportion of plural definite responses in grey and singular definite responses in black. Children showed a strong tendency toward definite responses – even if these responses did not always match the number of the noun phrase in question. Even the 3-year-olds produced a majority of definite responses (86.3% in the singular condition and 65.9% in plural conditions).
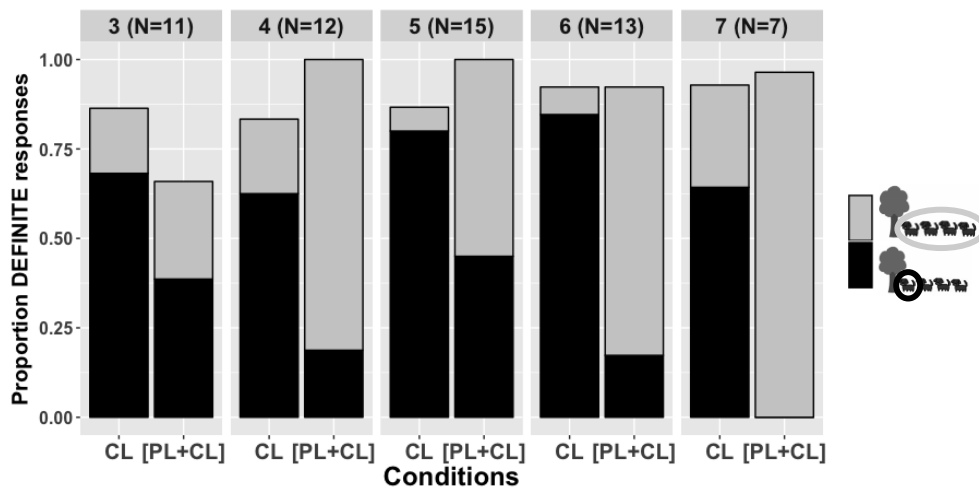

Figure 4. Proportion plural maximal responses (grey) and singleton responses closest to the landmark item (black) in experimental conditions: CL-N (singular, definite; left) and PL-CL-N (plural, right). See fn. 7 for key.

To check for developmental trends in the rate of what we refer to as definite responses, we ran a two-way ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5, 6, 7) as a between-subjects factor. There was a significant effect of age group (F = 8.049, p < 0.001), reflecting an overall increase in definite responses over time, as well as a significant interaction between condition and age group (F = 4.219, p < 0.01). Sub-*t*-tests between age groups, using Bonferroni-adjusted alpha levels of 0.005 per test (alpha 0.05 divided by 10 comparisons) revealed that the rate of definite responses produced in singular conditions remained equally high across age groups (all *t* > -0.952, all p > 0.346), while in plural conditions 3-year-olds produced fewer definite responses relative to other age groups (all *t* < -3.245, all p < 0.002). In sum, the overall rate of definite responses remains

high over the course of development, with only 3-year-olds producing fewer definite responses than the rest—and then only in the plural conditions.

What does change over the course of development appears to be the ratio of *plural* definite responses (in grey) relative to *singular* definite responses (in black). In the plural conditions, the ratio of plural definite responses increases from 41.38% among 3-year-olds to 100% among 7-year-olds, as children gradually learn that [*các*-CL-N] and [*những*-CL-N] sequences encode plurality. In the singular conditions, the ratio of plural maximal responses remains low throughout, between 7.69% (5-year-olds) and 30.77% (7-year-olds), as even the youngest children seem to assume that [CL-N] sequences are to be interpreted as definite and singular.

7.5. *Discussion*

The major difference between our results and those of Munn *et al.* (2006) is that Vietnamese children commit number errors rather than definiteness errors. Spanish- and English-acquiring children from Munn *et al.* (2006) produced number-target responses across singular and plural conditions and failed to produce definite responses in the singular definite condition. In contrast, the children in our study committed more number errors but have a preference for answers that are compatible with a definite interpretation in both the singular and the plural condition.

However, one might argue that the reason that the Vietnamese children in our study produced target responses in the singular definite condition is being overinterpreted, since that is their default preference also for the indefinite singular control. Recall that in the singular *in*definite control conditions of our study, both adults and children showed a distinct preference for the animal closest to the relevant landmark—even though an equally acceptable response would have been to choose any other single animal on that side of the display. Carried over to the definite singular experimental condition, this default preference may have resulted in children choosing the right response for the wrong reasons.

But why should Vietnamese children have a default preference for the animal closest to the landmark, while the English- and Spanish-acquiring children showed a preference for the animal closest to themselves? Perhaps our decision to use four animals per landmark rather than three made a difference. After all, the animal closest to the participant is the animal farthest from the landmark, and if four animals are used instead of three, this may put that animal into a grey area no longer considered close enough to count as "next to" the landmark. To see if this manipulation made a difference, we repeated the study once more, this time with three animals per side.

8. Experiment 2

8.1. *Subjects*

Fifty-six children were recruited from kindergartens in Ho Chi Minh City, Vietnam, with two exclusions for refusal to participate and twelve exclusions for failure to provide at least two correct responses for the six control trials. The remaining 42 children (mean: 4;5, range: 2;7-5;6, 22 males) comprised twelve three-year-olds (M=3;3, range: 2;7-3;11), fifteen four-year-olds (M=4;5, range: 4;0-4;10), and fifteen five-year-olds (M=5;4, range: 5;0-5;7). The adults included twenty participants ages 17 to 42 (four males) from Ho Chi Minh City.

8.2. *Methods*

The materials and design were identical to those of Experiment 1, except that three animals instead of four were presented next to each landmark, and the training phase was omitted.

8.3. *Results*

Adults produced 100% target responses in all control conditions. In the singular control condition (ex. "Give me *one CL dog* next to the tree") where both definite and indefinite singular responses were acceptable, adults once again showed a preference for the closest single dog, which is the answer compatible with the definite singular response, choosing it 87.5% of the time. In the experimental conditions, adults produced slightly fewer target responses as compared to Experiment 1. Nevertheless, accuracy was still very high, with 82.5% correct in the singular definite condition, 92.5% correct in the plural definite condition with pluraliser *các*, and 90.0% correct in the plural definite condition with pluraliser *những*.

Children's responses in the control conditions are reported in Table 5. Within the singular control conditions, an ANOVA with age group (3, 4, 5) and experiment (Expt.1, Expt.2) as between-subjects factors reveals no significant difference in the rate of target responses. Nevertheless, the reduction of animals in the display does seem to have diminished children's default preference for the closest dog; children chose this response 67.86% of the time, down from 85.53% by 3-5-year olds in Experiment 1. This is confirmed with an ANOVA comparing the rate of definite responses (i.e., single closest dog or maximal set of dogs) in the singular control condition provided by 3-, 4- and 5-year-olds across the two experiments, which revealed a significant difference between the two experiments ($F = 3.948$, $p < 0.05$) and a main effect of age group ($F = 5.806$, $p < 0.01$).

Within the plural control conditions, an ANOVA with age group (3, 4,5) and experiment (Expt.1, Expt.2) as between-subject factors reveals a

main effect of age (F = 6.677, p < 0.01), but crucially no main effect of experiment on the rate of target responses. There was a significant interaction between age group and experiment (F = 7.072, p < 0.001), such that 4-year-olds produced more target responses in Experiment 1 relative to Experiment 2 (t (104.98) = -3.10, p < 0.01), but this was the only age group within which there was a significant difference. Figure 5 divides children's responses by age group, collapsing across the two plural control conditions ([all-*các*-CL-N] and [all-*những*-CL-N] sequences).

Table 5. Percentage (frequency) of children's response types in control conditions.

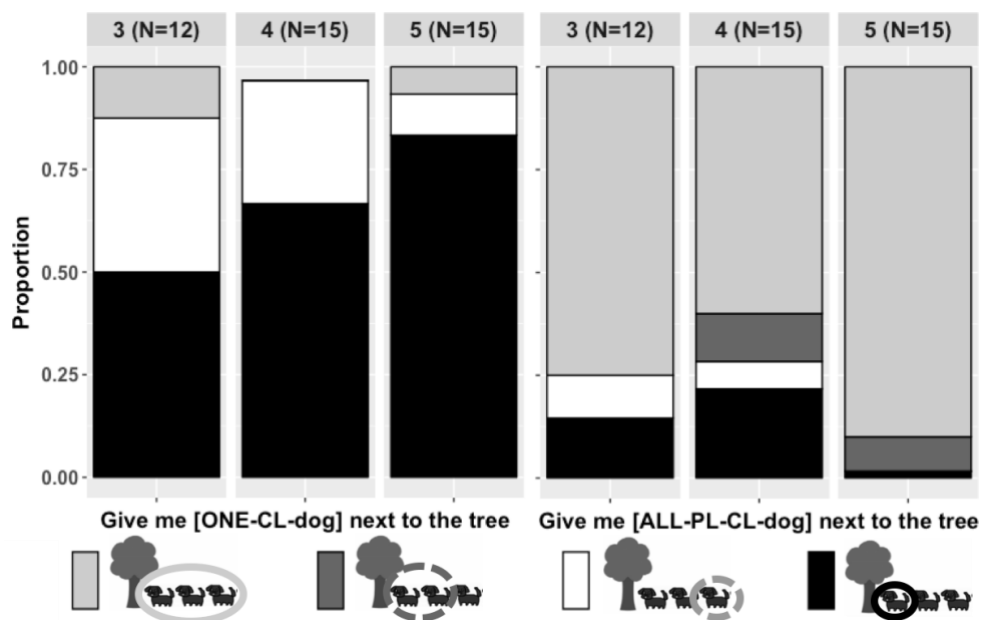|	Condition:	*one* CL N	all *các* CL N	all *những* CL N
Response type				
Singular	Closest	67.86% (57)	11.91% (10)	13.1% (11)
Singular	Non-closest	25.00% (21)	5.96% (5)	4.77% (4)
Plural	Maximal	5.96% (5)	76.20% (64)	73.81% (62)
Plural	Non-maximal	0% (0)	5.96% (5)	8.34% (7)
Plural	Other	1.20% (1)	0% (0)	0% (0)

Figure 5. Proportion of children's response types, by age group, in singular control condition (left) and plural control conditions (right). See fn. 7 for key.

Children's responses in the experimental conditions are shown in Table 6 and the division by age group is reported in Figure 6. In the singular definite condition, children once again produced mostly target responses (70.24% target, compared to 71.05% by 3-5-year olds in Experiment 1). That is, despite the change in children's default preference in the singular *in*definite condition, their performance in the singular *definite* condition remains unchanged when the number of animals in the display is reduced. A two-way ANOVA with age group (3, 4, 5) and experiment (Expt.1, Expt.2) as between-subjects factors revealed no difference between the two experiments in the rate of closest to the landmark responses provided in the singular definite condition, although there was a main effect of age ($F = 3.351$, $p < 0.05$).

In the plural definite conditions with pluralisers *các* and *những*, children produced far fewer target responses compared to children from Experiment 1 (23.81-32.15% target responses in the two plural conditions, as compared with 55.26% for the 3-5-year olds in Experiment 1). However, the pattern of their responses was qualitatively the same, in that their most common error was to produce a maximal response of the wrong number, rather than a plural, non-maximal response. The *overall* rate of definite responses (i.e., singular closest and plural maximal responses) remained fairly high, especially considering that children in Experiment 2 were younger (between 79.79-80.95% of children's responses in the plural conditions qualified as either definite singular or definite plural, compared to 90.13% for the 3-5-year olds in Experiment 1).

Table 6. Percentage (frequency) of children's response types in experimental trials.

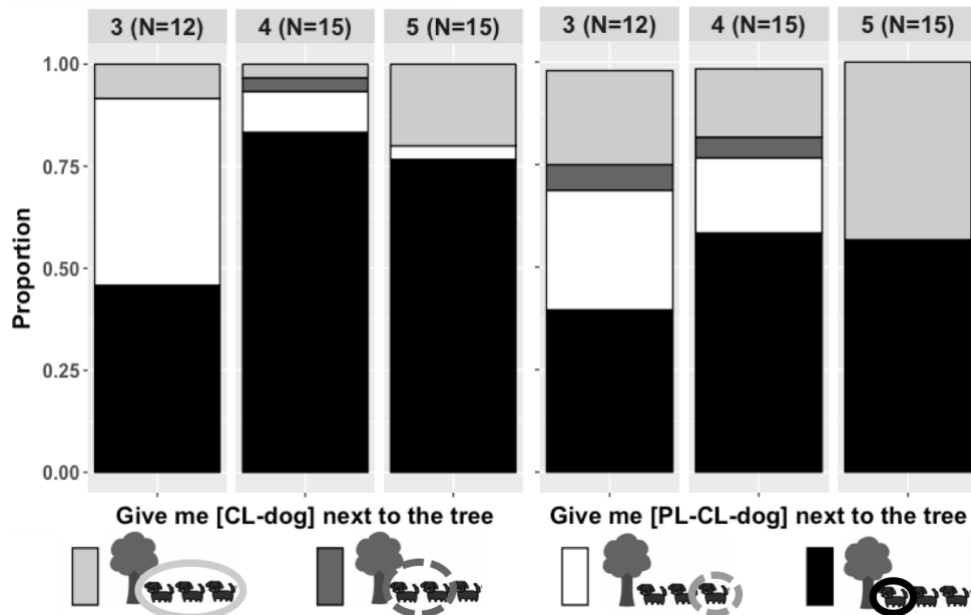| Condition: Response type		SG-def **CL** N	PL-def *các* CL N	PL-def *những* CL N
Singular	Closest	70.24% (59)	47.62% (40)	57.15% (48)
Singular	Non-closest	17.86% (15)	15.48% (13)	14.29% (12)
Plural	Maximal	10.72% (9)	32.15% (27)	23.81% (20)
Plural	Non-maximal	1.20% (1)	4.77% (4)	2.39% (2)
Plural	Other	0% (0)	0% (0)	2.39% (2)

Figure 6. Proportion of children's response types, by age group, in singular (left) and plural experimental conditions (right). See fn. 7 for key.

As with Experiment 1, we used a 2x3 ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor to test for developmental trends in the overall rate of definite responses, regardless of number. Similar to the previous experiment, there was a main effect of age ($F = 23.092$, $p < 0.001$) and no effect of condition ($F = 0.015$, $p = 0.90$), but this time there was no interaction ($F = 1.509$, $p = 0.223$). That is, children produced more definite responses as they grew older, in both conditions, not just the plural condition.

8.4. *Discussion*

In sum, children in Experiment 2 again appear to interpret singular and plural noun phrases as definite—even when the number of animals is reduced and their default preference patterns change. In the singular control condition, which allows multiple responses, children no longer showed as strong a preference for the animal closest to the tree; yet in the singular definite experimental condition, they continued to choose the singular definite response. This indicates that Vietnamese children seem to be able to restrict the reference of the noun phrase in order to satisfy the uniqueness presupposition of the singular definite noun phrase earlier than their Spanish- and English-acquiring counterparts.

For plural noun phrases like **các** *con chó đứng kế cái cây* and **những** *con chó đứng kế cái cây* 'the dogs next to the tree,' results are qualitatively

similar to the previous experiment. Vietnamese children are unlike their cross-linguistic peers in that they frequently commit number errors, despite producing an overwhelming proportion of definite responses.

9.   General Discussion

The acquisition of definite noun phrases appears to take a different route in Vietnamese than it does in English and Spanish. With respect to number comprehension, Vietnamese children's ability to associate noun phrases to sets of the correct cardinality lags behind that of English- and Spanish-acquiring children completing the same task. Namely, while they may distinguish between singular and plural noun phrases, their ability to associate plural-marked phrases (*các/những*-CL-N) to plural referents develops more slowly. We suggest this difference originates from the difference in the acquisition order of these morphemes themselves. In particular, Vietnamese-speaking children's difficulty with plurality reflects a delay in mastering these plural morphemes, which is in line with previous findings on the acquisition of pluralisers in other classifiers languages like Mandarin, Japanese, or Korean; see Zhang (2006), J. Kim (2008); Li, Ogura, Barner, Yang & Carey (2009), Munn *et al.* (2009), Nakano *et al.* (2010), Park (2010). The literature also points out a number of different reasons why plural morphemes in classifier languages are difficult four children to acquire as such, including their portmanteau-morpheme-like nature, their optionality and the variability that this entails; see Li *et al.* (2009), Munn *et al.* (2009), Nakano *et al.* (2010), M. Kim (2011), Kim, O'Grady and Deen (2012). Meanwhile, cross-linguistically animate classifiers are reported to be acquired earliest in terms of both production and comprehension; see Gandour, Petty, Dardarananda *et al.* (1984), Uchida & Imai (1996); Tse, Li & Leung (2007); Tran (2012) among others.

With respect to definiteness, on the other hand, Vietnamese-acquiring children appear to surpass their American and Mexican peers. All ages tested showed a strong tendency to associate the definite singular noun phrase with the closest animal (unique singleton set) and the plural noun phrases with the maximal set of animals (unique plural set) – even if that set did not always satisfy the number feature of the noun phrase in question.

In sum, Vietnamese children simply did not produce many definiteness errors. This raises the question of what explains the difference in behaviour across languages. That is, why do Vietnamese children succeed with definiteness and commit number errors, while Spanish- and English-acquiring children succeed with number and have problems in the singular condition?

One possibility is that the semantics of the noun phrase locative modifier might differ in Vietnamese. Maybe the phrase *đứng kế cái cây*, which we have translated as "next to the tree," really means something more

like "adjacent to the tree." However, we reject this explanation based on truth value judgments from native speakers, who answer *yes* to sentences like (7), even in the scenario where the dog with the bow is not the one adjacent to the tree.

(7) *Con   chó đeo nơ có đứng kế cái cây không?*
      CL   dog wear bow yes stand next CL tree no
      'Is the dog with the bow next to the tree?'

Figure 7. The dog with the bow is qualified as đứng kế cái cây *'next to the tree' in this scenario.*

Instead, we would like to suggest that what causes the discrepancy in performance between learners of the different languages is the information that they choose to prioritize. Specifically, we propose that when the task becomes demanding, all groups of children have difficulty simultaneously coordinating information from number and from definiteness, but, while Vietnamese-acquiring children prioritize definiteness, resulting in number errors, Spanish- and English-acquiring children prioritize number, resulting in definiteness errors. And we suggest that this difference in behaviour has to do with the fact that number is obligatorily marked on Spanish and English nouns, while in Vietnamese, number is not grammaticalized: overt number morphemes like *các/những* are not required to convey plurality, nor does their absence obligatorily convey singularity.

If we assume that Spanish-and English-speaking children prioritize number over definiteness it could be that their adult-like behaviour in the plural conditions may simply amount to a default interpretation of plural as maximal, since the maximal set is the easiest plural set to access. More studies will determine whether this reinterpretation of the plural definite results in English and Spanish has some merit. In either case, this study highlights the importance of cross-linguistic research in contributing to our understanding of how children acquire semantic concepts. Specifically, what our results suggest is that when languages encode the same semantic primitives in different ways, this has consequences for how children interpret those semantic primitives.

Acknowledgement

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