SYNTACTIC ANALYSIS AND THE ACQUISITION OF VIETNAMESE PLURALIZERS

By

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ABSTRACT

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This dissertation focuses on the interaction between definiteness and number in Vietnamese noun phrases, as reflected through the behavior and interpretation of the two pluralizers các and những. First, I propose a unified structure for Vietnamese noun phrases in which *các/những* are quantifier-like and occupy a Quantity head. Their distributional properties are accounted for by competition between heads (các/những compete with Nums and most Qs on the Quantity head which is higher than the CL head) and by their c-selection (*nhũng* requires restriction on the noun phrase because it semantically signals a partitive relation and thus selects for a CP, while các, like Nums and other Qs, takes a CIP as complement). Meanwhile, their interpretations are accounted for by the properties of the complements they take and the feature content of each head. Second, I report the results from three experiments on the comprehension of singular and plural definite noun phrases by Vietnamese children ages 3 to 7, as well as adults. Contra results from English and Spanish, Vietnamese children in Experiment 1 and 2 make few definiteness errors, instead struggling with number, casting doubt on a universal difficulty with definiteness. In particular, during an act-out task, children acquiring languages with definite determiners and grammatical number (English, Spanish) sacrifice definiteness in favor of number, while those acquiring languages like Vietnamese prioritize definiteness, resulting in number errors. However, Experiment 3 uses a picture selection task showing that Vietnamese-speaking children do have number knowledge, specifically knowledge of the plurality of *các/những*, and that they prioritize number over definiteness in this specific design. I argue that crosslinguistic differences

in the acquisition of number and definiteness arise from how children integrate information from number and definiteness, which is task-dependent and language-specific. Copyright by NI-LA LE 2020

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Chapter 1. INTRODUCTION: THE VIETNAMESE NOUN PHRASE AND ITS PLRALIZERS

Vietnamese has two pluralizers – $c\dot{a}c$ and $nh\tilde{i}ng$, posing interesting problems for syntax and acquisition. This dissertation will focus on their syntactic behavior, semantic properties, and the acquisition of their interpretation. In particular, this work makes two contributions. First it contributes a proposal for the structure of Vietnamese noun phrase that can account for the syntactic and the semantic properties of the pluralizers. Secondly it sheds light on how Vietnamese children ages 3 to 7 and adults comprehend the interaction between definiteness and number encoded in noun phrases with and without these two pluralizers.

1.1. Vietnamese noun phrases

As Vietnamese is not a commonly studied language, this section presents a brief overview of Vietnamese noun phrases as a premise for a detailed description of the two pluralizers later. The phrase in (1) shows the linear order of a Vietnamese noun phrase with full compositional units, which is *All/most*-Pl(ural)/Num(eral)/Q(uantifier)-Foc(us)-CL(assifier)-N(oun)-Adj(ective)-Dem(onstrative)-P(repositional) P(hrase)-R(elative) C(lause).

(1) tất cả những/hai cái chiếc chén sứ Trung Quốc màu nâu hình vuông cỡ /two Foc CL bowl ceramic China color brown shape square size all **P1** đó của anh ấv mà tôi mới thấv hôm qua trung medium that of elder brother that that I just see yesterday 'all those (two) brown medium-sized square Chinese ceramic bowl sets of his that I just saw yesterday'

We can see that noun phrases in Vietnamese are also consistent with the general headinitial patterns in the language, as seen in (2) below.

(2) a.	Lan thích	rau	VP = V DP
	Lan like	vegetable	
	'Lan likes v	egetables.'	
b.	dưới ghế		PP = P DP

under chair 'under the chair'

 c. mà chú gặp hôm qua that uncle meet yesterday 'that you met yesterday'

Vietnamese is a classifier language. Most nouns in Vietnamese can combine with Qs,

CP = C TP

Nums, attributive Adjs, Dems, RCs or PPs but only through the addition of an obligatory CL.¹ The

lack of CLs yields unacceptable NPs, as illustrated in (3).

- (3) a. $m\tilde{\delta i}$ *(con) chó each CL dog 'each dog'
 - b. *hai* *(*người*) *thợ* two CL worker 'two workers'
 - c. *(*cuôn*) sách hay CL book good 'the good book'
 - d. *(*bức*) tranh này CL panting this 'this painting'
 - e. *(*cái*) *ghể mà tôi mới mua* CL chair that I just buy 'the chair that I just bought'
 - f. *(*chiếc*) xe đạp của cô ẩy CL vehicle paddle of aunt that 'her bicycle'

¹ In Vietnamese most nouns cannot enter a count structure without the help of a CL (ex. $m \hat{\rho} t^*(con) ch \hat{\rho}$ 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 in Chapter 3 and 4 are 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 CL. 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] (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 CL – in which case they behave like a 'mass' noun – or without, where they behave like a 'count' noun; see L. K. Nguyễn (2001, p. 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, p. 268, p. 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.

Although Vietnamese does not have any definite or indefinite determiners, different types of NPs show a clear division of labor among the overt morphology in terms of definite/indefinite and generic interpretations, as summarized in Table 1 below.

Table 1. Interpretations of some common Vietnamese noun phrase types

NP-type	Generic	Indefinite		Defi	nite
		Singular	Plural	Singular	Plural
Bare N	yes	yes	yes	yes	yes
CL-N	no	no	no	yes	no
<i>một</i> 'one'-*(CL)-N	no	yes	no	no	no
Num-*(CL)-N	no	no	yes	no	yes
<i>các</i> -*(CL)-N	no	no	no	no	yes
những-*(CL)-N-*(MOD)	yes	no	yes	no	yes

In common with other classifier languages such as Thai or Mandarin, Vietnamese allows bare noun phrases, which are underspecified for definiteness and number in certain structural and pragmatic contexts (Trinh, 2011), and bare nouns are compatible with a very wide range of interpretations. Depending on the predicate and the context, a bare noun can have a generic (4), existential (5), indefinite (6) or definite reading (7)**Error! Reference source not found.** Bare nouns are also neutral in number, i.e., can be understood as singular or plural, as seen in (6-7).

(4) a. *Tôi* thích chó. Ι like dog 'I like dogs.' not: 'I like a/the dog.' b. *Chó* rất trung thành. loval Dog very 'Dogs are very loyal.' c. Tôi thích gấu trắng. Gấu trắng nhìn dễ thương. bear white bear white look easy love like Ι 'I like white bears. White bears look lovely.' (5) Có chó ngoài sân. Have dog outside yard 'There is/are a dog/dogs in the yard.' (6) a. *Chó* chạy ngoài sân. outside yard Dog run 'A dog is/Dogs are running in the yard.' b. *Tôi* mới *mua* chó. I just buy dog

'I just bought dogs/a dog.'
(7) a. Bút bị gãy. Pen PAR-negative mood break 'The pen/s was/were broken.'
b. Tôi làm gãy bút. I make break pen

'I broke the pen(s).'

Despite their wide range of interpretations, bare nouns in Vietnamese seem to be most fit to generic readings, including the case of modified bare nouns, as seen in (4c). In all other contexts, there is always another structure that is preferred, probably because it is more informative. For example, in a singular definite inducing context like (8), CL-phrases are preferred compared to bare nouns such as those in (7).

- (8) a. *Cây bút bị gãy*. CL pen PAR-neg mood break 'The pen was broken.'
 - b. *Tôi làm gãy cây bút*. I make break CL pen 'I broke the pen.'

This is not uncommon: bare CL-phrases are crosslinguistically preferred over bare nouns in most singular and definite contexts (Simpson et al., 2011, p.184-90). CL-N phrases thus cannot appear in contexts where English indefinites are often used, as seen in (9a).

- (9) a. #Có [con chó] ngoài sân. Have CL dog outside yard 'There is a black dog in the yard.'
 - b. Có [*một* con chó] ngoài sân. Have one CL dog outside yard 'There is a black dog in the yard.'

Now consider [Num-CL-N] constructions like those in (9b) and (10). Although *một* 'a/one' is associated with singular interpretation like [CL-N], *một* 'a/one'-CL[N] is obligatorily indefinite. The examples in (9-10) illustrate the contrast between CL-phrases with and without Nums in terms of definiteness: while [CL-N] is banned in existential constructions (9a), [*một*-CL-N] cannot be anaphoric (10a).

(10) a. #Tôi thích [một con chó]. I like one CL dog 'I like the dog.'
b. Tôi thích [con chó]. I like CL dog 'I like the dog.'

Other phrases with Nums, except for một 'a/one,' refer to an indefinite plural set (11a) or

an anaphoric plural set (11b).²

(11)	a.	Cô	ây	có	ba	con	chó	và	hai	con	mèo
		Aunt	that	have	three	CL	dog	and	two	CL	cat
		'She h	as thre	e dog	s and	two ca	ıts'				
	b.	<i>Tôi</i>	hay	đùa	với	ba co	on	chó.	3		
		Ι	often	joke	with	three	CL	dog			
		'I oi	ften pla	ay wit	h the	three d	logs.'				

1.2. The syntax of Vietnamese pluralizers: Noun phrase projection

It is assumed that there is a well-known complementarity between grammaticalized number and CLs (Greenberg, 1972; Doetjes, 1996, 1997; Chierchia, 1998; Borer, 2005; among others). The consensus is number and classifiers perform a somewhat similar function, which would explain why languages with plural inflection on noun phrases such as English, French or Italian do not have CLs while, in contrast, classifier languages tend not to have obligatory/grammaticalized number marking. Borer (2005) proposes that both classifier marking and plural inflection perform a unique function on the count structure: they both divide 'stuff' into units,⁴ as illustrated in (12).

² Q-CL-N basically can have all interpretations that Num-CL-N can, depending on the particular Q and contexts.

³ Num-CL-N can be interpreted as definite (i.e., 'I often play with her three dogs') or indefinite (i.e., 'I often play with three dogs which are not her dogs'). However, if the speaker aims to a definite expression, this construction is less preferred than *các* (plural) or the Q *máy* (*wh*-word). ⁴ In Borer's words, they are operators that assign range to <e>DIV, the feature that heads ClP in a count structure

⁴ In Borer's words, they are operators that assign range to $\langle e \rangle_{DIV}$, the feature that heads CIP in a count structure (Chapter 4, p. 10).

(12) a. Count structure in Chinese

b. Count structure in English



(Borer, 2005, Chapter 4, p. 11)

(Borer, 2005, Chapter 4, p. 25)

Since they compete for the same position in the DP structure, CLs and number markers are different strategies different languages use to form grammatically countable units. If a language has both, CLs and number markers should not co-occur in the same noun phrase (Borer, 2005, Chapter 4, p. 8-10).

Even though recent work has shown that many classifier languages also have plural morphemes (aka 'pluralizers'), in general their optionality and their behavior still confirm the above typological claim: they do not co-occur with CLs at all (in the case of *-men* in Mandarin or *-ner* in Armenian) or they cannot appear with CLs in the same noun phrase (in the case of *-tachi* in Japanese or *-tul* in Korean) (Kang, 1994; Cheng & Sybesma, 1999; Fehri & Vinet, 2004; Nakanishi & Tomioka, 2004; Borer, 2005; Bale & Khanjian, 2008; Kim, 2008; Park, 2008; Li, 1999; Gebhardt, 2009; Nomoto, 2013). In addition, unlike plural morphemes in most inflectional languages, pluralizers in most classifier languages are port-manteau morphemes which carry more than just a plural feature. More importantly, as shown in Table 2 (synthesized from Cheng & Sybesma, 1999; Bale & Khanjian, 2008; Kim, 2008; Park, 2009; Nomoto, 2013), classifier languages that have pluralizers do not behave all alike.

Combination⁵	PL+N	PL+ CL+N	Num+N	Num+CL+	Num+PL+	CL+N
				Ν	Ν	
Armenian	\checkmark	*	\checkmark	\checkmark	\checkmark	*
Japanese/Korean	\checkmark	*	*	\checkmark	*	*
Mandarin	\checkmark	*	*	\checkmark	*	✓ (indef)
Persian	\checkmark	*	√ ⁶	\checkmark^7	\checkmark	*
Vietnamese	*	\checkmark	*	\checkmark	*	✓ (def)

Table 2. Pluralizers, numerals and classifiers: Co-occurrence across languages

There are a few characteristics that set the Vietnamese pluralizers – $c\dot{a}c$ and $nh\tilde{u}ng$ – apart from their counterpart in other classifier languages. First, while the N-PL phrases are completely grammatical in other classifier languages (see Table 2 and examples (13a-e)), Vietnamese pluralizers need to be licensed by independent overtly marked CLs (13f-g).

(13)	a.	<i>hovanoc-ner</i> (Armenian) umbrella-PL '(tha) umbrallas'	b.	kodomo-tachi child -PL '(the) shildren'	(Japanese) c.	<i>cha-tul</i> car-PL	(Korean)
	d.	<i>haizi-men</i> (Mandarin) child-PL	e.	ordæk <i>-ha</i> duck -PL	(Persian)	(the) cars	
		'(the) children'		'(the) ducks'			
	f.	các *(con) vit	g.	những *(con) vi	t màu xám		
		PL CL duck		PL CL du	ıck grey		
		'the ducks'		'the ducks that an	re grey'		

Second, these pluralizers are not always optional in Vietnamese. *Các* and *những* are obligatory in certain contexts. Noun phrases with just a CL in Vietnamese must be interpreted as definite and singular (as in Cantonese). To obtain a plural interpretation of CL-N phrases (which cannot be pluralized in Cantonese), one of the pluralizers *các* or *những* has to be added, as demonstrated in example (14).

(14)	a.	con	chó	тựс
		CL	dog	ink
		'the	black dog'	

⁵ Word order is ignored here.

⁶ Although Persian has a CL system, it is arguable that it is a typical classifier language: the appearance of the CL is not obligatory in most numeral constructions (Gebhardt, 2009:210).

⁷ Except for 'one' -yek.

b.	con chó n	пựс		đó	
	CL dog i	nk		that	
	'that black o	log'			
c.	các/những	con	chó	тựс	
	PL CL	dog	ink		
	'the black d	ogs'			
d.	các/những	con	chó	тựс	đó
	PL	CL	dog	ink	that
	'those black	dogs	,		

Another construction that requires the presence of *các* or *những* is noun phrases containing 'all' or 'most,' as examplified in (15).

 (15) tất cả / hầu hết các/những chiếc thuyền gỗ all / most PL CL boat wood 'all (of the) / most wooden boats'

The obiligatory of the two pluralizers *các and những* in certain linguistic expressions as such and the requirement that they must appear together with a CL in a noun phrase indicate that pluralizers in Vietnamese should not be treated as adjuncts as suggested for other classifier languags by Wiltschko (2008) but rather as part of the extended projection of the noun. In particular, the dissertation proposes that the pluralizers *các/những* occupy a Quantity head in the DP. I also proposed the [uD] feature and c-selection differences between *các* and *những* account for the differences in their interpretation and distribution. The two Vietnamese pluralizers indeed are not identical. The pluralizer *những* requires that the noun phrase is modified. Noun phrases with *những* can have generic, indefinite, or definite readings. The pluralizer *các,* on the other hand, does not need modification and never has indefinite readings, but allows generic interpretation only if there is some sort of modification. We will dive deep into these differences in Chapter 2, where I provide the projection of *các* and *những* in a noun phrase and how much of the structure can account for their interpretation.

1.3. The acquisition of Vietnamese pluralizers: Number and definiteness interaction

From the acquisition perspective, the two pluralizers *các* and *những* pose interesting issues of how a child learn the features associated to them in particular and the noun phrases with and without these pluralizers in general. In order to acquire the basic meanings of noun phrases, children of any language 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 favor 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 a (at least partially) dedicated morpheme, Vietnamese does not always require number marking, and its pluralizers 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 *the*, but rather with a combination of classifiers and pluralizers. So it is an interesting language to investigate and compare against many Indo-European languages with overt determiners, which are far more well studied. In particular, the experimental results reported in this dissertation reveal how a Vietnamese-speaking

child learn the features associated with the pluralizers *các* and *những*, casting doubt on a universal difficulty with implicit domain restriction in child acquisition of definiteness. Instead, I suggest that the challenge lies in simultaneously coordinating number and definiteness and that the fact languages encode the same semantic primitives in different ways has consequences for how children interpret and prioritize these semantic features.

1.4. Structure of the dissertation

My dissertation is concerned with the syntactic behavior, semantic properties, and the acquisition of Vietnamese pluralizers *các/những*. Chapter 2 aims at investigating the differences between *các* and *những* and provide a nominal structure that can acount for their properties and those differences. The next two chapters address the question how Vietnamese children and adults interpret noun phrases with and without these two pluralizers in experimental settings. In particular, Chapter 3 provides details how they performed in two act-out tasks while Chapter 4 presents the results from a picture selection test. Chapter 5 concludes the dissertation with a summary of the findings made by this dissertation and suggestions for further research.

Chapter 2. A SYNTACTIC ANALYSIS OF VIETNAMESE PLURALIZERS

2.1. Introduction

There has been almost no work that solely focuses on the pluralizers *các* and *những*, so our understanding of their behavior is very limited and not very clear. While all studies that roughly mentioned these pluralizers are unanimous in saying that *các* is definite (Nguyen, T. C., 1975; Diep & Hoang, 1998; Nguyen, H. T., 2004 among others), the literature is divided with respect to the status of *những*. Most authors claim that *những* indicates only a subset of the whole given set (Thompson, 1965; Nguyen, T. C., 1975) and thus it is not a true definite (Nguyen, H. T., 2004), but some other linguists argued the interpretation of *những* varies on a continuum between indefinite and definite (Cao, 1998; Bui, 2000a).

Given the little amount of literature on this topic, this chapter aims to provide a detailed description of the syntactic and the semantic properties of the pluralizers *các* and *những* and develop an analysis that accounts for those properties in order to achieve a better understanding of these morphemes in particular and Vietnamese noun phrases in general in light of current theoretical findings about plurality in other classifier languages as well as in comparison to plural markers in inflectional languages. In particular, I address the two following questions:

(16) Questions:

- a. What are the similarities and differences between the two pluralizers in Vietnamese?
- b. What is the structure and interpretation of noun phrases with these pluralizers?

In answering those questions, I am going to make three claims. The first claim is that much like pluralizers in other classifier languages, *các/những* are also portmanteau morphemes and carry a plural (PL) and a determiner (D) feature of some sort. However they do not have an inherent classifier feature, as argued for other languages (Cheng & Sybesma, 1999; Bale & Khanjian, 2008;

Park, 2008; Gebhardt, 2009; Nomoto, 2013), but rather must combine with a classifier phrase. Second, they are quantifier-like and compete with numerals (Num) and most quantifiers (Q) in the structure. The third claim is that *những* requires restriction on the noun phrase in order to establish a partitive relation between a proper subset and a set established in the discourse, and this semantic property reflects in its syntactic requirement of a PredP as its complement.

This chapter is organized as follows. Section 2.2 describes the syntactic behavior and semantic properties of the two lexical pluralizers *các* and *những* from a descriptive perspective. In Section 2.3, I develop an analysis that could account for the syntactic and (begin to account) for the semantic properties of these pluralizers, and compare it to current proposals for plurals in other languages. Section 2.4 offers my preliminary conclusions on the research questions of this chapter and discusses some remaining issues.

2.2. The syntactic and semantic properties of Vietnamese pluralizers

Các and *những* combine with CL to derive plural noun phrases. They both (i) require a CL in the noun phrase, (ii) cannot co-occur with Nums and most Qs, except for *tất cå* 'all' and *hầu hết* 'most,' for which either of the pluralizers has to be present, and (iii) are definite-like, similar to pluralizers in other classifier languages. In terms of differences, *những* is more restricted than *các*. *Những* has to be licensed by some sort of restrictive modification, while *các* does not need one, and the behavior of *các* is consistent with it being definite whereas the interpretations of *những* can vary. This section will describe the distributional properties and the interpretation of these two pluralizers.

2.2.1. Distributional properties

2.2.1.1.Nhũng requires restriction on the noun phrase

Although *những* seems to have a much higher frequency than *các* (Bui, 2000a, p. 11), its distribution in fact is more restricted grammatically: in addition to the presence of a CL, *những* needs to be licensed by some kind of modifier, such as attributive Adjs (17), Dems (17), RCs (17) or PPs (17).

(17)	a.	những	cuốn	sách ha	<i>y</i>			
		PL	CL	book goo	od			
		'good bo	ooks'					
	b.	những	bức	tranh	này			
		PL	CL	panting	this			
		'these pa	aintings	,				
	c.	những	cái	ghế	mà	tôi	mới	mua
		PL	CL	chair	that	Ι	just	buy
		'the chai	rs that]	l just bou	ıght'			
	d.	những	chiếc	xe	đạp	của	cô	ây
		PL	CL	vehicle	paddle	of	aunt	that
		'her bicy	cles'					

In contrast to *nhũng*, the pluralizer các does not require any restriction on the noun phrase

as illustrated in (18).

(18) a. *những con chó PL CL dog '(the) dogs'
b. các con chó PL CL dog 'the dogs'

This shows that các and những must be syntactically and semantically different from each other.

2.2.1.2.Các and những co-occur with classifiers

Similar to other units in a noun phrase such as Qs or Nums, các and những can combine

with the noun only if a CL is present, as shown in (19).

(19) *các/những* *(*con*) *chó mực* PL CL dog ink '(the) black dogs'

Because of the inherent plural meaning, the pluralizers must have a plural feature. However, the fact that they co-occur with CL suggests that *các* and *những* are not plural morphemes in the sense of Borer (2005): they are not in the same position as CLs. Rather, they must be higher in the DP structure.

2.2.1.3.Các and những cannot co-occur with numerals and most quantifiers

The pluralizers $c\dot{a}c$ and $nh\tilde{t}ng$ show a mixed behavior with Qs. They can combine with the Qs $t\dot{a}t c\dot{a}$ 'all' and $h\dot{a}u h\dot{e}t$ 'most,' which select for plural and maybe plural definite phrases as in (20). Once again, if the pluralizer used is $nh\tilde{t}ng$, the nominal must be modified, as shown in (20).

(20)	a.	tất cả	các	chiếc	thuy	vền		
		all	PL	CL	boa	t		
		'all of th	le boa	ts'				
	b.	hầu hết	các	chiếc	thuy	vền		
		most	PL	CL	boa	t		
		'most of	the b	oats'				
	c.	tất cả/hờ	ầu hết	các/nl	hững	chiếc	thuyền	gõ
		all /m	ost	PL		CL	boat	wood
		'all/mos	t of (t	he) woo	den bo	oats'		

In fact, the pluralizers are not optional in these noun phrases; they are syntactically obligatory for $t\hat{a}t \ ca$ 'all' and $h\hat{a}u \ h\acute{e}t$ 'most': without $c\acute{a}c/nh\widetilde{u}ng$, those NPs in (20) become unacceptable, as demonstrated in (21).

(21) **tất cả/hầu hết chiếc thuyền gỗ* all /most Cl boat wood 'all/most (of the) wooden boats'

Meanwhile, $c\dot{a}c/nh\tilde{t}ng$ cannot co-occur with other Qs, such as $m\dot{a}y$ 'some' or $v\dot{a}i$ 'several,' as shown in (22).

thuyền các/những chiếc gõ (22)a. **mây* PL CL boat wood some 'some wooden boats' b. *vài các/những chiếc thuyền gõ PL several CL boat wood 'several wooden boats'

In relationship with Qs, các and những behave to a certain extent as cardinal numbers.

Examples in (23) show that numerals in Vietnamese also cannot co-occur with most Qs, except

for 'all.'

(23)	a.	tất cả	năm	chiếc	thuyền	gỗ	
		all	five	CL	boat	wood	
		'all of fi	ve wood	den boats	,		
	b.	*hầu hết	t /mấy	/vài	hai chiế	ếc thuyền	gõ
		most	/some	/several	two CL	boat	wood

On the other hand, both các and những cannot co-occur with cardinal numbers, as

illustrated in (24).

(24)	a.	*hai	các/nhi	ững	con	chó	тựс
		two	PL		CL	dog	ink
		'two black do	ogs'			-	
	b.	*các/những	hai	сог	ı chó	тựс	
		PL	two	CL	dog	ink	
		'two black do	ogs'				

Hence, while các and những are not in the complementary distribution with CLs (as shown

in Section 2.2.1.2), they seem to compete with Nums and most Qs (but not with 'all' and 'most'). This leads me to treat them as Qs or Ds, instead of plural morphemes, and also suggests that *all* and *most* are high Qs in comparison to other Qs and also higher than *các/những* and cardinal numbers in the tree.

2.2.2. The interpretation

In this section I discuss these pluralizers's plural interpretation and their D-linking interpretation.

2.2.2.1.Plurality

These pluralizers are obligatory not only for 'all' and 'most' but also for the plural interpretation of CL-phrases. In Vietnamese, nouns preceded by a classifier (25) are consistently interpreted as singular and definite and can be pluralized by adding *các/những*, as in (25).

- (25) a. *con chó (mực)* CL dog ink 'the (black) dog'
 - b. *các con chó* PL CL dog 'the dogs'
 - c. *những* con chó mực PL CL dog ink 'the black dogs'

Similarly, [CL-N-Dem] is singular while [*những-/các*-CL-N-Dem] is plural.

- (26) a. *con chó này* CL dog this 'this dog'
 - b. *các* con chó này PL CL dog this 'these dogs'
 - c. *những* con chó này PL CL dog this

'these dogs'As we have seen everytime one of these pluralizers is present we have a

plural interpretation. But what is the interpretation of the plural? Nomoto (2013) claims that pluralizers in classifier languages are a 'genuine plural,' i.e. always have a more-than-one interpretation (Nomoto, 2013, p.102), unlike English plurals, which allow a one or more-than-one interpretation. According to Sauerland et al. (2005), the more-than-one interpretation arises as an implicated presupposition due to competition with a presupposition of the singular. Consider (27) and (28).

(27) Q: 'Do you have daughters?'A: 'Yes, I have one daugher.'

(28) I didn't see dogs last night.

The answer to the question in (27) shows that the interpretation is not obligatorily a morethan-one interpretation. Similarly, one cannot say (28) if they saw even one dog in the yard. Additionally, English plurals can behave as dependent plurals, as illutstrated (29). Dependent plurals are interpreted as distributed singular indefinites.

(29) a. Unicycles have wheels.
b. Unicycles have a wheel.

(Minor, 2014, ex. 1 & 2)

Another ability of English plural as a dependent plural is that it allows a long distance dependency (Minor, 2014, p. 14-5). For example, if Bob wants Bill to marry Ann, who happens to be a famous linguist, and Kate wants Bill to marry Jane, who is also a well-known linguist, a plural form of *linguist* can be used in English (30) but prohibited in Vietnamese (30).

- (30) a. Bob and Kate both want Bill to marry famous linguists.
 - b. *#Bob và Kate muốn Bill cưới những nhà ngôn ngữ học nổi tiếng.* Bob and Kate want Bill marry PL CL language study famous

In Vietnamese, the plural noun phrases are banned in questions of the type in (31), presumably because *các/những* are discourse linked and tend to be interpreted as definite. In (32), the pluralizers are also odd, presumably because it is definite-like, as we will see in the next section. And although Vietnamese speakers cannot say (32) if they saw even one dog, just exactly like (28) for English, the reason is very different: the pluralizers require a maximal plural set given in the discourse.

(31)không? a. *Cô* сó gái con Aunt have child female no 'Do you have daughters?' b. **Cô* сó các/những đứa gái không? con child Aunt have PL CL female no 'Do you have daughters?'

(32) a. Có chó (mực) ngoài sân. Have dog ink outside yard 'There is/are (a) black dog(s) in the yard.' các/những con chó mực ngoài b. **Có* sân. CL dog ink outside yard Have PL 'There is a black dog in the yard.' c. Hôm qua tôi không thấy các/những con chó mực. Yesterday I no see PL CL dog ink 'I didn't see THE black dogs yesterday.' In (33) we see that các/những cannot have a dependent reading. In the cases of (31-33), a

bare noun is preferred.

 Human horse have one Cl horn 'Unicorns have a horn.' b. *Nhân mã có các/những cái Human horse have Pl Cl 		
'Unicorns have a horn.' b. * <i>Nhân mã có các/những cái</i> Human horse have Pl Cl		
b. * <i>Nhân mã có các/những cái</i> Human horse have Pl Cl		
Human horse have Pl Cl	sừng	to
	horn	big
'Unicorns have big horns.'		

These fact seem to indicate it is impossible to use *các/những* in the contexts that facilitate the one or more-than-one interpretation of the pluralizers and therefore I suggest that they are only interpreted as more-than-one.

So far, my observations have shown *các* and *những*, on one hand, have inherent plural interpretations, and on the other hand, do not behave exactly as plural markers in traditional sense. This may come from the fact that they, like the plural morphemes in other classifier languages, are also portmanteau morphemes (morphemes that encode more than one piece of information, cf. Peters, 1997). In particular, besides number features, they contain in/definite information.

2.2.2.D-linking properties

Both *các* and *những* must be D-linked, referring to a set in the discourse, as shown by the contrast between (34) and (34).

(34) a. Situation 1: X asks for blue pens in a store.

	Answer:	*Tiệm	có	/không	bán	các/những	cây	bút	xanh.	
		Store	yes	/no	sell	PL	CL	pen	blue	
	'The store does/doesn't carry blue pens.'									
b.	Situation	2: She ji	ust b	rought fiv	ve dogs	home (some a	are bla	ck, so	me are white).	

✓ Các/những con chó mực đang ngủ.
 PL CL dog ink Prog sleep
 'The black dogs are sleeping.'

The morpheme *các* is always compatible with a definite interpretation in the sense of satisfying familiarity and maximality (Heim, 1991). As it denotes familiarity, *các* cannot appear

in existential sentences like (35) and requires discourse anaphora - it is discourse dependent, e.g.,

(36) cannot be said out of blue.

(35)	Ngày xửa ngày xưa	có *cá	c chàng	hoàng tử	rất	thích	ngựa.
	Once upon a time	have PL	CL	prince	very	like	horse
	'Once upon a time,	there were	princes th	nat really lik	ted ho	rses.'	

(36) Cô ây nuôi năm con chó.
 Aunt that raise five CL dog
 'She has five dogs and one cat.'

	She has hive dogs and one call	
a.	Các con chó rất trung thành.	b. # <i>Các</i> con chó màu đen.
	PL CL dog very loyal	PL CL dog color black
	'The dogs are very loyal.'	Intended: 'Some (two, three, or four) of the dogs are black.' OK: 'The dogs are black.'

An indefinite reading is impossible when $c\dot{a}c$ precedes CL-N: it cannot introduce a set of entities in the discourse, which makes (35) ungrammatical. $C\dot{a}c$ also imposes a maximality restriction. It cannot refer to a subset of the entities previously mentioned, as shown in (34b), but must pick the whole set in the discourse (36) (differing from *some*) and therefore does not behave as a demonstrative, explaining why (37) is unacceptable, but (37) with $d\dot{o}$ 'that' is acceptable.

(37) a. *Các con chó đang ngủ, các con chó đang giõn.
PL CL dog Prog sleep PL CL dog Prog play
'*The dogs are sleeping, the dogs are playing.'
vs. 'Some dogs are sleeping, some dogs are playing.'

b. Các con chó đó đang ngủ, các con chó đó đang giõn.
PL CL dog that Prog sleep PL CL dog that Prog play
'Those dogs are sleeping, those dogs are playing.' (with pointing)

In addition to being discourse-anaphoric, [*các*-CL-N] can also be used in all other primary situations licensing the use of definite determiners in English, French and many other languages (Simpson et al., 2011, p. 172): it can refer to entities which have not been mentioned explicitly but are visible and uniquely identifiable for both speaker and hearer (38), and *các* noun phrases are felicitous in bridging contexts (38) and (38) as well as for culturally unique, familiar entities (38).

(38) a. *Đưa* búa. tôi các cây Give I PL CL hammer Pass me the hammers.' b. 'She just bought a new tea set yesterday...' Các cái tách hơi hé. PL CL cup rather small 'The teacups are pretty small.' c. *Các* quyển sách toán ở chỗ nào? PL book math at place which CL 'Where are the math books?' (asking a librarian) d. Chiến tranh giữa các vì sao War between PL CL star 'The war between the stars (Star wars)'

As for *những*, the data is not as clear. The behavior seems more mixed. As shown in (32b) above, *những* is compatible with anaphoric readings. The examples in (39) show that *những* can also appear to entail maximality in the sense that it can refer to the whole set of contextually unique items.

- (39) a. Các/những bức tranh trên tường vừa được tháo xuống.
 PL CL painting on wall just PAR-positive remove down
 'The paintings on the wall were taken down.'
 - b. Cô ấy tháo các/những bức tranh trên tường xuống. Aunt that remove PL CL painting on wall down 'She took the paintings on the wall down.'

Like *các, những* refers to the entire set, i.e., all the pictures on the wall, not some of them.

Further evidence for the definite-like nature of $nh\tilde{t}ng$ is that $nh\tilde{t}ng$ can be interchangeable with $c\dot{a}c$ in all contexts in (38), as long as some kind of modification is provided, as illustrated in (40) below.

(40) a. Đưa tôi những cây búa màu đỏ.
 Give I PL CL hammer color red
 'Pass me the red hammers.'

b. 'She's just bought two tea sets. One is made in Japan, the other one is made in Vietnam...'

Những cái tách Nhật hơi bé. PL CL cup Japan rather small 'The teacups in the Japanese set are pretty small.'

c. *Những quyển sách toán ở chỗ nào?* PL CL book math at place which 'Where are the math books?' (asking a librarian)

d. chiến tranh giữa những vì sao đêm war between PL CL star night 'The war between the night stars'

Furthermore, just as các in (37), những creates a contradictory statement in the same

context, as seen in (41), because it also imposes a maximality restriction.

- (41) *Những con chó mực đang ngủ, những con chó mực đang giỡn.
 PL CL dog ink Prog sleep PL CL dog ink Prog play
 '*The black dogs are sleeping, the black dogs are playing.'
 - vs. 'Some dogs are sleeping, some dogs are playing.'

However, there seems to be a different nuance between definite-like nature of nhũng and

that of các. Consider (42) and (42).

- (42) a. Cô ấy không làm các/những chiếc bánh nhân đậu đỏ. Aunt that no make PL CL cake filling bean red 'She didn't make the red bean cakes (that you see on the table).'
 - b. Cô ấy đã không làm **những**/*các chiếc bánh mà cô hứa. Aunt that ASPECT no make PL CL cake that aunt promise 'She didn't make the cakes she promised to.'

While both $c\dot{a}c$ and $nh\tilde{u}ng$ are allowed in (42) which presupposes the existence of the red bean cakes, only $nh\tilde{u}ng$ is grammatical when there is no existence presupposition of the nominal description, as illustrated in (42). This distinction is even clearer in where we negate the statements in (42), as in (43).

(43) Cô ấy không làm **những**/***các** chiếc bánh mà cô không hứa. Aunt that no make PL CL cake that aunt no promise 'She didn't make the cakes she didn't promise to.'

According to Coppock & Beaver (2015), some definites have unique presupposition, but no existence presupposition. Thus, definites that carry an existence presupposition are determinate while definites that "have existence as an at-issue entailment" are indeterminate (Coppock & Beaver, 2015, p. 396). Assuming this distinction, the difference between (42) and (42) suggests *các* is always determinate while *những* has both uses.

Another relevant argument Coppock & Beaver (2015) has made is that an expression that may not be inherently definite can behave like a definite if they are typically determinate. The authors then use possessive descriptions in English to demonstrate, showing how they behave as if they have a denotation of type e in argument positions, yet predicative possessives pattern with predicative indefinites rather than predicative definites (Coppock & Beaver, 2015, p. 417-418). Similarly, despite the fact that *những* can appear in typical definite contexts as shown in (40), noun phrases with *những* in predicative possitions, as seen in (44) can act more like indefinite expressions, e.g., *some* or predicative possessives, while *các* still behave like *the* in these contexts.

(44)a. Các/những con chó trong chuồng là những/*các con thú cung của tôi và CL dog in cage PAR PL CL animal treasure of I and PL các/những con chó bên ngoài là những/*các con thủ cung của tôi. PL CL dog side out PAR PL CL animal treasure of I 'The dogs in the cage are my pets and the dogs outside are my pets.' Compared to:

b. 'The dogs in the cage are some pets I own and the dogs outside are some pets I own.'

c. '*The dogs in the cage are the pets I own and the dogs outside are the pets I own.'

Những is also compatible with many other typical indefinite constructions. It can appear with *wh*-phrases while *các* cannot:

nói **những/*các** (45) a. *Cô* ây gì? Aunt that say PL what 'What did she say?' b. *Cô* άv đi những/*các đâu? PL where Aunt that go 'Where did she go?' (speaker's assumption: She had to go to more than one place)

Những can appear in 'there are...' expressions but các would yield ungrammatical

sentences:

 (46) Có những/*các nỗi đau không bao giờ nguôi. Have PL CL hurt no ever cease
 'There are pains that never end.'

The pluralizer nhũng can also allow generic readings with individual-level predicates, like

those in (47), while [các-CL-N] does not have this interpretation (48), unless there is a modifier

of some sort on the noun phrase, as seen in (49).

(47)	a.	<i>Những</i> PL	<i>con chó</i> CL dog	<i>mực</i> ink	<i>thường</i> usually	<i>trung thành</i> . loyal
		'Black do	gs are usual	ly loyal.		
	b.	Tôi i	thích nhữ	ng con	n chó	тựс.
		I like	PL CL	dog	g ink	
		'I like bla	ck dogs.'			
(48)	a.	#Các d	con chó	thường	trung t	thành.
		PL O	CL dog	usually	loyal	
		'Dogs are	usually loy	al.'		
	b.	#Tôi thi	ích các	con c	hó.	
		I lik	ke PL	CL d	og	
		'I like dog	gs.'			
(49)	a.	Các d	con chó	тựс	thường	trung thành.
		PL O	CL dog	ink	usually	loyal
		'Black do	gs are usual	ly loyal.	,	
	b.	Tôi i	thích các	con	chó n	nực.
		I 1	like PL	CL	dog i	nk
		'I like (the	e) black dog	gs.'		

These examples in (49) show that restriction on the noun phrase not only licenses the presence of *những* in an NP, but also allows the generic interpretation of *các*. Therefore, if there is restriction on the NP, *các* and *những* allow both generic and non-generic definite readings, depending on the contexts, especially when they combine with 'most' (50) (in which a pluralizer is obligatory, as discussed in Section 2.2.1.3) or attitude verbs (51).

- (50) a. Hầu hết các/những tòa nhà cao tầng có thang máy. Most PL CL house tall floor have ladder machine 'Most các/những tall buildings have elevators.'
 b. Reading 1: As for tall buildings, most have elevators.
 - *Reading 2:* Most of the tall buildings (e.g., on campus) have elevators.
- (51) a. Tôi thích các/những con chó mực. I like PL CL dog ink 'I like các/những black dogs.'
 b. Reading 1: I like whatever dogs that are black.
 - *Reading 2*: There are specific black dogs I like.

In the first reading of both examples (50) and (51), các/những-CL-N-MOD can denote a

kind: tall buildings or black dogs, especially if they are said out of blue. However, given the right

contexts, they can also be interpreted as definites, e.g., the tall buildings (on this campus) or the

black dogs (among all the dogs presented to me). Again, in (51), bare N-MOD would be much

preferred compared to các/những-CL-N-MOD for the generic reading.

The summary of the syntactic and semantic properties of *các/những* is in Table 3 below.

NHỮNG CÁC Co-occur with 'all/most' yes yes Co-occur with other quantifiers no no Co-occur with numerals no no Require classifiers yes yes Require restriction on the NP yes no Require D-linked yes yes Have existential presupposition no yes Co-occur with *wh*-elements yes no Appear in '*there are*...' construction yes no

Table 3. The properties of các and những
Table 3 (cont'd).

Allow generic reading	yes	no ⁸
Co-occur with kinship terms ⁹	no	yes

2.3. The structures of *các* and *những*

The syntactic distribution and semantic properties of $c\dot{a}c$ and $nh\tilde{u}ng$ as described above suggest the proposed structures have to be able to account for the following three properties:

- i. the obligatory co-occurrence of *các/những* and CLs;
- ii. the competition between *các/những* and numerals as well as the obligatoriness of *các/những* after 'all/most' and in plural noun phrases when there is a CL;
- iii. their syntactic and semantic differences, including the fact that *những* requires restriction on the noun phrase.

The structure of Vietnamese noun phrases and pluralizers will follow an analysis based on

minimalist assumptions as implemented by Adger (2003) in order to account for the distributional

properties of two pluralizers (Section 2.2.1) and the issues of modification and of interpretation

(Section 2.2.1.1 and 2.2.2). Given the fact that in analyzing Vietnamese NPs, we cannot apply

common syntactic tests such as movement (all types of nominal modifiers are on the right) or

ellipsis (the only thing can be elided in a noun phrase with pluralizers is the noun¹⁰) and there are

no morphological markings in the language (e.g., no overt agreement or obligatory number

markers), we have to propose structures based on their semantic properties and distributional

behavior. In other words, the structures for *các* and *những* have to satisfy the following criteria:

⁸ In general, except in the presence of modification.

⁹ This point will be discussed in the next section.

¹⁰ While it is possible to elide noun together with adjective in (a), for noun phrases with pluralizers in (b), only noun can be elided.

a. Tôi mua mấy con chó trắng và cô ấy cũng mua mấy con.
 I buy some CL dog white and aunt that also buy some CL
 'I bought some white dogs and she also bought some (white dogs).

b. *Tôi muốn mua các/những con chó trắng và cô ấy cũng muốn mua các/những con *(trắng)* I want buy PL CL dog white and aunt that also want buy PL CL white 'I want to buy THE white dogs and she also wants to buy THE *(white dogs).

(52) a. Những:

- (i) word order (cf. example in (1))
- (ii) restriction requirement
- (iii) plural interpretation; incompatibility with numerals
- (iv) interpretation ((in)definite, generic)
- b. *Các:*
 - (i) word order (cf. example in (1))
 - (ii) no restriction requirement
 - (iii) plural interpretation; incompatibility with numerals
 - (iv) interpretation (generic/definite if modified, otherwise definite)

2.3.1. The obligatory co-occurrence of các/những and CLs

In the literature, after Borer's (2005) and many others' claim regarding to the complementarity between plural markings and CLs, the existence of pluralizers in classifier languages has been accounted for in two ways. The first approach is the modifier analysis proposed by Wiltschko (2008), followed by Butler (2011) and many others. According to them, plurals in different languages differ along two dimensions: how the plural is merged and where it is merged into the structure, as summarized in (53) and (53) respectively.

(53) Parameters of plural markings



(Wiltschko, 2008, p. 688)

In languages where plural is non-inflectional or optional (e.g., classifier languages), the pluralizers can be adjoined at different levels: at the root (e.g., in Halkomelem, according to Wiltschko (2008)), n, #, or D (e.g., in Yucaltec Maya, according to Butler (2011)). In languages where plural is grammaticalized, plural is merged as a head. Nevertheless, the idea that pluralizers in classifier languages are modifiers seems to be unable to account for the restriction requirement of *những* (if *những* is a modifier, why does it require the head noun to be modified?) and the obligatoriness of *các/những* with certain Qs (but not all of them) and in some other contexts in Vietnamese (cf. Section 2.2.1.3 and 2.2.2.1).

The second approach is proposed by Gebhardt (2009) in his dissertation on Persian DPs. As this is a feature-based analysis, he proposes that CLs always have an [Individuation] feature, while a plural has a [Group] feature which entails [Individuation]. He argues that there are two separate functional phrases, NumP and ClP, and whether a plural can co-occur with a CL or not in a language depends on whether the two features project on the same phrase or different phrases (Gebhardt, 2009, p. 23-24).

Inspired by this approach and based on the fact that $c\acute{ac}/nh\widetilde{u}ng$ precede an obligatory CL in the DP, I propose that $c\acute{ac}/nh\widetilde{u}ng$ are inserted higher than CIP and that they have a [uCl] feature which makes the presence of a CL obligatory for them. In other words, pluralizers in Vietnamese co-occur with CLs because they have a [uCl] feature instead of having a classifier feature, unlike some other languages where the pluralizer has many restrictions that suggest they are port-manteau morphemes with PL + CL and also some D features. This again means that the plural morphemes in Vietnamese are inserted higher in the tree (assuming Distributed Morphology), as shown in the diagram (54):

(54) Step 1



2.3.2. The competition between các/những and numerals/most Qs

Given the linear order and the fact that *các/những* (and Nums alike) require CLs following them and are syntactically obligatory after *tất cå* 'all,' while they both cannot co-occur with other Qs or Nums, we can project *các/những* lower than 'all' and 'most' (high Qs) and, as argued above, higher than CL. Following Gebhardt (2009), we then can push this speculation a step further by proposing, in fact, *các* and *những* occupy the same head as Nums and low Qs in the DP, as demonstrated in (55).

(55) Step 2



This projection is compatible with the following descriptive generalizations. First, *các/những* can co-occur with CLs because they do not compete with CL for the same head; instead, these pluralizers, low Qs, and Nums in Vietnamese are in a complementary distribution on a 'Quantity' head (cf. Schmitt and Munn, 2002; Munn and Schmitt, 2005; Gebhardt, 2009 for 'fused' phrases). Second, the Quantity head contains the singular/plural distinction. In particular, recall that in Vietnamese, [CL-N] and [CL-N-Dem] are always singular and *các/những* is required to

derive their pluralized counterparts. A possible way to implement this is that singular is represented by a null morpheme while *các/những* is associated with a plural feature ([PI]) and is obligatory to pluralize a noun phrase if there is a CL. Consequently, CLs are not singular by itself, but rather have a [u#] feature that will be valued by the Quantity head. On the other direction (i.e. in order to account for why the pluralizers, and other Qs and Nums alike, require a CL), there must be a [uCl] on the Quantity head, which may be equivalent to [u-indiv] in Gebhardt's (2009) analysis. Third, 'all' and 'most' require *những, các*, or a Num because they are high Qs and select for plurals (or look for a [Group] feature, if we assume Gebhardt (2009)). Since 'all' and 'most' are high Qs, which is merged higher in the tree than the Quantity head, they can combine with Nums or low Qs as long as there is no semantic conflicts. As a result, the fact 'all'/'most' can combine with *các/những* but not other Qs is because of a semantic reason which may also be reflected in the syntax: Besides [PI] feature, *các/những* can be interpreted as definite which make them a good fit for 'all' and 'most', while other Qs cannot be interpreted as definite (other meanings) clashing with the semantics of 'all' and 'most.'

2.3.3. The differences between các and những

As discussed in Sections 2.2, *các* and *những* are syntactically and semantically different from each other with respect to the following:

(56) (i) *những* cannot occur in unmodified noun phrases while *các* does not require any restriction on the NP;
(ii) *các* is always definite and may allow a generic reading, while *những* can associate with a wide range of interpretations (generic, indefinite, or definite).

For the issues of interpretation, I will assume an analysis where definiteness is a property of D in the same way as kind level interpretations are properties of D, and các and những as the Quantity head have different features that permit certain combinations and block others. The structure for các then is as straightforward as seen in (57).

(57) *Các*'s structure



As described in Section 2.2.2.2, *các* noun phrases are always interpreted as definite. I implement this by suggesting that *các* has a [uDef] which must agree with a definite feature in D. An alternative is to have *các* raise to D to be interpreted as definite. For concreteness I assume the former. Also, different from *nhũng*, the D in *các* structure is a 'true' definite, which has both uniqueness and existential presuppositions (cf. Example (42)).

With respect to *nhũng*, which requires restriction on the noun phrase, it is neccessary to look at the literature on the phenomenon 'licensing by modification' which is in fact very common crosslinguistically (Mathieu, 2012; Nomoto, 2013; Leu, 2015; Kayne, 2015). This phenomenon includes two types: semantic and syntactic. The semantic licensing by modification often occurs as the ability of modifiers to allow definite nominal expressions to be associated with either generic or indefinite readings. Examples for this type are the cases of plurals in Japanese, Malay, and to some extent in Mandarin, whose definite interpretations disappear in the presence of modifiers (Nomoto, 2013, p. 123-130). The syntactic licensing of modification, on the other hand, happens when modifiers can restore the grammaticality of otherwise unacceptable structures. The bare

classifier construction in Thai, de nominals in French, or English one belong to this type (Jenks, 2012; Mathieu, 2012; Kayne, 2015). The properties of các and những, as summarized in (56), seem to suggest that Vietnamese has both types of licensing by modification in NPs: syntactic (in the case of những which is simply ungrammatical in unmodified noun phrases) and semantic (in the case of các which does not allow generic readings unless the noun phrase is modified).

Following Kayne's (1994) analysis that adnominal adjectives derives from relative clauses, we propose that the fact những needs to be licensed by modification of some sort while các does not reflects the difference in these pluralizers' c-selections: những selects relative clauses (i.e., a CP) as its complement, as shown in (58), while các (and Nums and other Qs alike) selects for ClPs (cf. (57)). Therefore, while *các* has a [uCl] feature, which will be valued by a CL in its complement, *những* possesses an interpretable [uC] feature in addition to that [uCl] feature.

(58) *Những*'s structure



The tree in (59) demonstrate the fundamental difference between $c\dot{a}c$ and $nh\tilde{u}ng$ in a modified NP: the modification is of the complement of $nh\tilde{u}ng$'s, but not in the case of $c\dot{a}c$. In other

words, in [*những*-CL-N-MOD], ClP and MOD forms a constituent which is the complement of *những*; whereas in [*các*-CL-N-MOD], *các* and ClP are a constituent, not ClP and MOD.



(59) *Các*'s structure with MOD

In both structures in (58) and (59), CL is projected low. This assumption is supported by the fact that in ellipsis, only the sister of CL (i.e., the NP) can be elided, not anything else, as illustrated in (60).

(60) Tôi thích các/những con thuyền màu đỏ, không thích các/những con _____
 I like PL CL ship color red no like PL CL
 màu xanh
 color blue
 'I like (the) red ships, not (the) blue ones'

The requirement of modification can be considered a syntactic reflection of the semantic function of the pluralizer *những*: *những* noun phrases should be thought of as a partitive of sorts, (e.g., '*những* CL book thick' would be thought as 'the thick books among the books in the discourse'). In other words, semantically, *những* with [PI] feature signals that the set picked out from the whole set in the discourse is a plural set. This is implemented technically through feature checking: *những* has a [PI] feature and thus check uninterpretable number in its complement as it

raises. It also has a [uCl] feature like $c\dot{a}c$. The ClP raises to [Spec, CP] because of the EPP feature of CP. The raising of ClP in the case of $nh\tilde{u}ng$ in (58) and of QuantityP in the case of $c\dot{a}c$ in (59) are to ensure the linear order of a modified NP in Vietnamese: if there is an overt C, the Quantity head and the ClP has to precede the C, as illustrated in (61):

(61) *các/những* cánh diều <u>mà</u> màu đỏ PL CL-swing kite that color red 'the kites that are red'

The complement of *nhũng* has to be a CP/Predicate phrase (PredP), not an unmodified NP, in order to create a subset from a potential larger set denoted by the unmodified noun phrase; otherwise we could end up with 'the books in the set of the books in the discourse'. There is some independent evidence for this hypothesis. First, *nhũng* can occur with *wh*-phrases to derive '*which* of the x' expressions, as shown in (62). Second, *nhũng* cannot appear with kinship terms (used as personal pronouns), as seen in (63), because it would be weird to have *you of the set of you* or *them of the set of them*.

(62)	a.	Cô	thích	những	quyển	sách	nào?					
		Aunt	like	PL	CL	book	which					
		'Whicl	h (of the	e) books	do you l	ike?'						
	b.	Cô	thích	đi	những	đâu?						
		Aunt	like	go	PL	wher	e					
		'Whicl	h (of the	e) places	do you l	ike to	go?'					
(63)	a.	Cô	có	thích	chó	тựс	không?					
		Aunt	yes	like	dog	ink	no					
		'Do yo	ou (SG)	like blac	k dogs?	,						
	b.	[<i>Các/*</i>	'những	bác	gái	dễ	thương]	có	thích	chó	тựс	không?
		PL		pronour	n female	easy	v love	yes	like	dog	ink	no
		'Do yo	ou, love	ly ladies,	like bla	ck dog	gs?'					

If this approach is correct, we can understand the interpretative effects of the restriction which can perhaps explain the confusion in the literature with respect to the interpretation of $nh\tilde{u}ng$ (definite or indefinite). Furthermore it makes the differences of $nh\tilde{u}ng$ with respect to $c\dot{a}c$, namely its unacceptability with pronouns and the acceptability with wh-phrases, quite clear.

In sum, although *các* and *những* are both a Quantity head which explains their non-cooccurrence with Nums and Qs, they select for different complement types. The wide variety of interpretations that *những* noun phrases can associate with comes from the fact that *những* selects for a CP as its complement, not a CIP complement like *các*, and that *những* itself does not have a definite feature and must check some D features (i.e., it has a [uD]) with a D. The empty D has a maximality presupposition and will impose the maximality on its complement (the modified set). In contrast, D that is compatible with *các* has a [uDef] feature and when D is definite, it must enter an agreement relation with features on the Quantity head.

Although we do not have a complete semantic analysis for these pluralizers, we believe that the structure we propose allows for a formal semantic analysis to be quite straightforward. One issue that is particularly puzzling is the nature of the empty D in *các* and *những*. It is unclear at this point whether they can be the same with the differences being purely the types of complements they take or whether they are semantically different, with one (i.e., *các*) having an existence presupposition and the other (i.e., *những*) not needing to, although it seems likely to be the case. Furthermore, the ability of *các* NPs to be generic still needs further research but it is not uncommon crosslinguistically for modified DPs to allow more readings.

2.4. Conclusion and discussion

Vietnamese has two lexical items that have an inherent plural feature and occupy the same position with Nums and most Qs in a noun phrase: $c\dot{a}c$ and $nh\tilde{u}ng$. My dissertation is not so concerned with their categorical labels,¹¹ but their syntactic behavior and semantic properties

¹¹ Therefore, they have been simply called 'pluralizers' throughout the dissertation, instead of any syntactic labels, although the proposed analysis suggests they are in fact Qs.

instead. In terms of similarities, both of them require a CL (unlike plural morphemes in some other classifier languages), cannot co-occur with Nums or most Qs (except for high Qs 'all' and 'most'), are obligatory in a pluralized version of [CL-N] or [CL-N-Dem] constructions, and must satisfy discourse linking requirements. However, they differ in several ways. Besides the presence of a CL, there is no additional syntactic licensing requirement for *các* to pluralize a noun phrase while *những* only appears in modified noun phrases. In terms of interpretation, *các* is consistently definite in the sense of familiarity and maximality, and can combine with pronouns whereas *những* can vary among indefinite, definite, and generic, and can occur in indefinite expressions like *wh*-phrases or '*there are*...' but cannot co-occur with pronouns.

The chapter proposes a unified DP structure for *các/nhũng* in which they are quantifierlike and occupy a Quantity head. Within this proposal, their distributional properties are accounted for by competition (*các/nhũng* compete with Nums and most Qs on the Quantity head which is higher than the CL head) and by their c-selection properties (*nhũng* requires restriction on the noun phrase because it selects for a CP and therefore does not directly select for a CIP, while *các*, like Nums and other Qs, takes a CIP as complement). Meanwhile, their interpretations are explained by the properties of the complements they take and the feature content of each head. In other words, agreement should come only after selection, i.e., how *các/nhũng* enter agreement with the feature in D depends on whether it selects for a CP or CIP and which feature it looks for in a D. My analysis also allows for a partitive interpretation of *nhũng* (as part of a larger set in the discourse).

While this analysis is incompatible with the idea that plural markers in classifier languages are always modifiers (Wiltschko, 2008; Butler, 2011) for several reasons mentioned in Section 2.3.1, it is not against the typological claim that there is the complementarity between plurals and CLs (these pluralizers are not really plural markers anyway) and follows Gebhardt's (2009)

proposal of crosslinguistic variation in which plurals and CLs being on different heads/phrases is one possibility. Although there are still some loose ends, because Vietnamese is a noninflectional language, this chapter offers the very first attempt investigating the properties of *các/những* under generative grammar framework and helps expand our current knowledge of the typology of number markings in particular and of noun phrases in general. In addition, it has some implications from the acquisition perspective. First, as we have the co-occurance between the pluralizers and CL as agreement (cf. (57) and (58)), if a child does not know the plural feature of *các/những*, then they may interpret CL as singular, which is the reading a CL-N gets. Second, if a child has not yet acquired the structure of *các/những*, then they may interpret the pluralizer and rely on what they seem to know that CL-N is definite. In contrast, if they have the knowledge that the pluralizer is a Quantity head are not clear about its features, we may observe mixed behavior, which we indeed see in 3-year-olds in the experiments reported in Chapter 3 and 4.

Chapter 3. THE ACQUISITION OF PLURAL AND SINGULAR DEFINITE NOUN PHRASES IN VIETNAMESE

3.1. Introduction

This chapter reports two comprehension experiments to explore Vietnamese-speaking children acquisition's of number and definiteness of noun phrases with and without a pluralizer. As the first acquisition study of pluralizers and the features associated with them in Vietnamese, the results will expand the current literature on the acquisition of singular/plural distinction and allow us to examine the interaction of number and definiteness, contributing towards a more complete picture of the cross-linguistic acquisition of these semantic features as well as the mapping between them and the individual morphological pieces that make up noun phrases. It also provides some empirical observations that can contribute to the controversial issue related to the status of the pluralizer *những* in the literature of Vietnamese linguistics.

The target linguistic expressions in the reported studies are [CL-N] (singular, definite) and [*các/những*-CL-N] (plural, definite/specific) and the chapter is concerned with three questions specified in (64).

- (64) General research question: What are Vietnamese children's interpretations of the three target noun phrases [CL-N], [các-CL-N], and [những-CL-N]?
- **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.** Can Vietnamese-acquiring children integrate these two features in interpreting noun phrases with pluralizers?
 - (i) How do they handle the interaction between number and definiteness?
 - (ii) How is their behavior compared to the behavior of children acquiring languages such as English, Spanish, or Mandarin?

The chapter is organized as follows. I begin with a description of the acquisition problem,

followed by a summary of previous findings on the acquisition of definite noun phrases. I then

present two comprehension experiments, which are replications of an act-out task first designed by Munn, Miller & Schmitt (2006) for English- and Spanish-acquiring children, addressing all three questions above.

3.2. The acquisition problem

Regardless of how definiteness and number features are realized morphologically across languages, children must learn to extract these types of information from the input. To interpret a definite noun phrase in any given language, the child must have at least three different pieces of information: first, the meaning of the noun and any accompanying modifiers; second, whether the noun phrase is singular or plural; and third, how to identify the discourse referent that *uniquely* satisfies these properties, in accordance with the uniqueness presupposition carried by the definite feature.

The uniqueness presupposition of a definite noun phrase is satisfied differently depending on its number. For plural definite 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 maximal. 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 as if it had an extra restriction, an implicit restriction that can 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. In particular, Vietnamese children seem to face additional challenges in their path of mastering definite noun phrases in comparison to children speaking inflectional languages like English or Spanish. First, as Vietnamese pluralizers of *các* and *những*, put in the simplest way, can be thought of as a combination of definite and plurals, their correct interpretation from the acquisition point of view requires children to know that these morphemes carry two pieces of information. In other words, unlike learning plural markers in languages that have a dedicated plural morpheme, the acquisition of the pluralizers in Vietnamese (and in most other classifier languages) means to learn both their plural and definite features¹². Second, because number is not obligatorily marked in the noun phrase, the learner has to figure out the discourse functions of the pluralizers.

Section 3.3 below reviews previous acquisition work on classifiers (which take part in singular, definite noun phrases in Vietnamese) (3.3), plurality and the complex nature of plural morphemes in classifier languages (3.3.1), definiteness (3.3.3), and the interaction between these two features (3.3.4).

3.3. Acquisition background

3.3.1. The acquisition of classifiers

Studies on CLs in many languages, including Cantonese, Mandarin, Thai, Japanese, Korean, and Malay, suggest that CLs appear in children's production between age 2 and 3 (Yamamoto, 2005; Erbaugh, 1986; Tuaycharoen, 1984; Sanches, 1977, and others). Previous work provide evidence that default CLs are acquired earlier than more semantically restricted CLs in

¹² Again, as discussed in Chapter 2 and also in Lê & Schmitt (2016), despite what the literature has claimed before, there is a near-categorical preference for interpreting *những* nouns phrases as definite.

terms of both production and comprehension. Children often overuse the default CLs, even up to age 6 to 7 (Carpenter, 1987; Fang, 1985; Hu, 1993; Loke, 1991; Ying et al., 1983). Cross-linguistically, animate CLs are also reported to be used appropriately and acquired earliest (Gandour et al., 1984; Uchida & Imai, 1996; Tse et al., 2007, and others). And all studies suggest that children do know the syntactic position of CLs (Erbaugh, 1982; Wong, 1998).

Tran (2011) is the first and the only study on the acquisition of Vietnamese as a first language until now. Her results are consistent with some previous findings in other classifier languages: Vietnamese-speaking children master the general and the animal CLs earlier than other CLs and often omit CLs in numeral phrases. However, compared to children acquiring other classifier languages, they do not overuse default CLs as much, showing a higher rate of correct specific classifier use. She suggests that this, together with the very prevailing occurrence of CL-N combinations in the youngest children's speech, provides evidence that at an early stage, CL-N sequences in Vietnamese are often acquired as inseparable linguistic chunks, in favor of Poon's (1980) and Fang's (1985) proposals. I suspect another reason for this difference could be the amount of CLs in Vietnamese, which is quite large compared to some other classifier languages, and thus they might constitute a semi-lexical class, not function words (Cao, 1998; L. K. Nguyễn, 2001, Lê, 2008). Tran's findings would also need further research because they are drawn from a very small number of subjects (four children who were aged from 1;11 to 2;5). In addition, this is mainly a corpus study interested in syntactic errors and order of acquisition of different types of CL-phrases and, therefore, all of the participants are not in the age range within which, as studies of other classifier languages have shown, the semantic properties of CLs are critically developed, which is between 3 and 6 years old (Matsumoto, 1985b; Erbaugh, 1986; Li et al., 2009; Cheung et al., 2010).

3.3.2. The acquisition of plurality

The distinction between singular and plural sets can be expressed in different ways in different languages, such as lexical quantifiers or morphology on the nouns, verbs, adjectives, or determiners. In terms of interpretation, plural markers can be interpreted as 'one and more-thanone' in some languages like English (e.g., *I didn't eat cookies*) or always as 'more-than-one' in some other languages such as Korean or Japanese (Kim J., 2008; Nomoto, 2013; Liter et al., 2017). In terms of morphology, there is a tendency that plural is the element morphologically marked in the plural/singular pair. If a language chooses to morphologically mark only one side of this distinction, plural will be the one bearing the overt morphology (Corbett, 2000).

Many studies of English plurality have suggested that (i) English-speaking children master the conceptual distinction between one and more-than-one around 20-24 months of age (Fenson et al., 1994; Barner et al., 2007), and (ii) within the next year (24-36 months) they learn to produce the plural marker in correct contexts and even use it to learn novel words (Brown, 1973; Mervis & Johnson, 1991; Kouider et al., 2006). Previous work also suggest that English plural morphemes are not acquired equally. Children are more sensitive with plurality marked lexically (e.g., *Look, there ARE SOME blickets*) than plurality only marked by bound morphemes (e.g., *Look at the blicketS*) (Kouider et al., 2006; Wood et al., 2009). Davies (2017) shows that 24-month-olds' ability to use plurals in comprehension varies depending on which plural allomorph is used. Thanks to the longer duration of [-s], which may enhance its perceptual salience, children seem to be able to use it by 24 months, but fail on the [-z].

On the other hand, children speaking classifier languages such as Mandarin, Japanese, or Korean do not have the adult-like interpretations of the pluralizers until much later, i.e., between 6 and 8 years old (Kim J., 2008; Nakano et al., 2009; Munn et al., 2009; Li et al., 2009). That plural morphemes in classifier languages are difficult for children to acquire as such may be due to a number of different reasons. First, there is more information than just number itself associated with plural morphemes in these languages, such as classifier (e.g., animacy), definiteness, or uniform versus associative interpretation (Zhang, 2006; Munn et al., 2009; Li at al., 2009; Nakano et al., 2009; Kim M., 2011; Kim et al., 2014). In that sense, they behave like portmanteau morphemes, and portmanteau morphemes are known to be challenging for children (cf. Peters, 1997). Another reason is that plurals in these languages are not as frequent and are optional – the characteristics that have been shown to delay children's ability in associating a morpheme with its correct interpretation. For example, the work by Miller (2007), Miller & Schmitt (2009), and Miller & Schmitt (2012) show that children speaking Mexican Spanish, which marks plural morphology systematically and obligatorily, are able to use plural morpheme is sometimes not overtly present in the input under the lenition process with all syllable-final [-s], on the other hand, take longer to master plural morphology.

Figure 1 from Nakano et al. (2009) below illustrates the timeline of acquisition of plural morphology in languages with consistent and variable input, showing that children have difficulties to learn variable plural morphology and it is even harder for them to acquire pluralizers that are not only optional but have extra constraints/information besides number.



Figure 1. Acquisition timeline of plural morphology by language (Nakano et al., 2009, p. 5)

3.3.3. The acquisition of definiteness

Many studies have shown evidence that children do not always use definites like adults. Children up to the age of 5 often incorrectly use the definite determiner to refer to non-unique obejcts, saying things like *Give me the ball!* even when multiple identical balls are present (Maratsos, 1976; Karmiloff-Smith, 1979; Schaeffer & Matthewson, 2005). However, comprehension tasks indicate that children do at least understand the contrast between definites and indefinites, i.e., they are aware that definites maintain reference while indefinites introduce new referents (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) suggest 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 ('egocentrism' – Maratsos, 1976, p. 63; Karmiloff-Smith, 1979, p. 72).¹³ Observing that children still overextend definites even when no elements are in focus, Wexler (2003, 2011) proposes alternatively, that their errors are due to the

¹³ These authors nevertheless assume different underlying reasons for children's 'egocentric' behavior. 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.

lack of the uniqueness presupposition of the definite (dubbed the 'no Maximality Hypothesis' – Wexler, 2011, p. 25).

More recent work has proposed that children have difficulties in finding a right domain for determiners (Drozd, 2001; Miller & Schmitt, 2004; Munn et al., 2006). Definites have a uniqueness presupposition: a definite noun phrase refers to a unique set in the discourse (Kadmon, 1990; Heim, 1991; Roberts, 2003 among others). From the acquisition point of view then, the correct interpretation of a definite derives from two factors: (i) knowing that definites presuppose there is a relevant maximal set in the discourse that satisfies the restriction of number (e.g., a single unique item for a singular definite noun phrase) and (ii) being able to pick out the right domain in which maximality is defined. The 'no Implicit Domain Restrictions' hypothesis, as we will call it, argues that children have the uniqueness presupposition but experience problems restricting the domain of reference to satisfy it. This explains an otherwise puzzling result observed in Munn et al. (2006), who report that English- and Mexican-Spanish-acquiring preschoolers were able to associate plural definite noun phrases like the frogs next to the barn with a unique plural (i.e., the maximal set) but were unable to associate singular definite noun phrases like the frog next to the barn 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 frog closest to the barn* in a scenario in Figure 2.



Figure 2. Experimental setup in Munn et al. (2006)

De Cat (2011), while agreeing with Munn et al. (2006) that children seem to struggle to restrict the domain of reference or the relevant set in order to accommodate uniqueness, also argues

this reflects different phases in children's computational ability development rather than a linguistic deficit. She lists the following as characteristics of a deficient linguistic representation: (1) a fairly uniform response pattern within each age group, (2) with a clear developmental trend across groups, (3) no lingering of errors after a certain age, and (4) for some type of deficit, an overall poor performance with close to 100% error rate at least in some conditions, especially in the youngest age groups (de Cat, 2011, p. 147). She then examines previous studies and showed the lack of those signs from their results. In particular, she pointed out that in addition to clear task effects, "a clear tendency towards adult-like performance (...) with random variation across age groups (...) and a lingering of 'errors' lasting until around 9 or possibly 11 years of age" can be observed in all studies surveyed (de Cat, 2011, p. 148), and as such these behavior are aligned with a computational deficit, not a linguistic deficit.

3.3.4. The interactions between number and definiteness

Previous work on the acquisition of number and definiteness markers, as seen in Sections 3.3.1 and 3.3.3, has either directly or indirectly pointed out that definiteness is acquired much later than plurality. Few work in some classifier languages seem to suggest the same order of acquisition (Munn et al., 2009; Nakano et al., 2009). For instance, in a Truth Value Judgement Task (TVJT), Munn et al. (2009) report that while Mandarin-speaking children between 7 and 10 year olds interpreted the pluralizer *-men* in a way compatible with them having a maximal presupposition, 5- and 6-year-olds understood the singular-plural distinction¹⁴, but did not treat it as maximal. This development pattern supports the previous findings that component features of portmanteau

¹⁴ They barely treated *-men* as plural, however. They said 'No' to the use of the pluralizer in the singular condition only 25.7% of the time. Yet, this rate was reported as significantly different from the percentage of No responses in the plural condition (6.4%).

morphemes seem to be learned separately and that the acquisition of definiteness is more protracted than plurality. Also, children at 4 and younger did not distinguish the plural from the singular condition in their study, nor did they comprehend the maximality of *-men*, confirming the acquisition delay for pluralizers in comparison to that of grammaticalized plural markers in Western European languages.

Most of the previous work on definites, however, overlooks the inevitable interaction between number and definiteness in a definite phrase. As such, some studies do not hesitate to draw general claims on the acquisition of definites only by testing singular definite phrases (Schafer & de Villiers, 2000; Wexler, 2003; Modyanova & Wexler, 2007; among others) or from tasks that were not identical across number conditions (Karmiloff-Smith, 1979). Munn et al. (2006) has found one of rare contexts in which both the definite plural and definite singular NPs are equally felicitous and provided evidence for the difference in children's comprehension of definites in singular and plural. In particular, the singular condition in the context in Figure 2 requires extra work in order to satisfy the restriction, since *next to* is not enough to identify the proper item, unlike the plural condition. Therefore, the former is more difficult for children to calculate the correct referent. De Cat (2011) seems to also suggest that definiteness itself is not a problem for children; as mentioned above, she argues the computational process is the issue.

Vietnamese, as well as other classifier languages, makes an interesting case study for the interactions between number and definiteness. The acquisition of pluralizers in these languages requires children to learn more than just the number feature, unlike the case of plural markers in English and other languages with grammaticalized number. In other words, it is necessary to establish that a study of pluralizers in classifier languages is not simply a study of plurality, but of (plural) definite noun phrases (and maybe of more other semantic primitives, depending on a

specific language). In particular, this chapter while focusing on the acquisition of the pluralizers $c\dot{a}c$ and $nh\tilde{t}ng$ offers evidence from Vietnamese in line with de Cat's (2011) approach that coordinating simultaneously the number and definite information posed by a definite noun phrase is what children struggle with. In addition, the studies help fill in the major gap of the current literature whose findings have been based almost exclusively on results from Western European languages, which realize definiteness through dedicated determiners (e.g., the/a) and which have a grammaticalized binary number distinction. Focusing on the comprehension of definite noun phrases in Vietnamese – a language with neither of these characteristics and also less semantic restrictions on pluralizers in comparison with other classifier languages, I hope to contribute towards a more complete picture of the cross-linguistic acquisition of definite noun phrases.

3.4. 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 behavior 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: they would be able to distinguish singular from plural (one vs. more-than-one) but would not necessarily give us the right target set (i.e., they could pick out a non-unique singleton or a non-maximal set). However, the 'No Maximality' and 'No Implicit Domain Restriction' hypotheses make different 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 for at least a certain amount of times

and equally. Alternately, if children do have the uniqueness presupposition but instead have trouble with some form of domain restriction (as per 'No Implicit Domain Restriction' – Drozd, 2001; Munn et al., 2006), then they should produce more definiteness errors in the singular condition, as it 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. Most studies on definite noun phrases point towards number acquired before definiteness, a reasonable assumption for languages with grammaticalized number, but not necessarily for Vietnamese whose number information is not always marked morphologically. Vietnamese-acquiring children can behave differently from English- or Spanishspeaking children in one of the three following ways. 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 CLs with definiteness, since they can appear alone in a noun phrase and yield a singular definite interpretation. If so, children should treat any noun phrase with a CL as definite and ignore the singular-plural distinction until later on in acquisition. A third logical possibility is they link classifier with singular and have trouble interpreting a CL with a pluralizer.

In addition, Vietnamese children are expected to master *các/ những* later than their English and Spanish peers acquire plural markers, according to what has been found in previous acquisition studies of lexical pluralizers in classifier languages such as Japanese, Korean and Mandarin (Zhang, 2008; Park, 2010; Nakano et al., 2009; Kim et al., 2014). In Vietnamese, although the pluralizers are unambiguously plural, they are not obligatorily marked in every plural noun phrase because bare nouns can be interpreted as plural (or singular). This leads to two challenges for Vietnamese-speaking children from the acquisition point of view. First, the input is likely to provide the child with information for lack of plural morphology, while evidence for a pluralizer probably appears in a smaller proportion of the input (compared to bare noun phrases with plural interpretations). Second, as many studies have shown that variability in the input delays acquisition (Yang, 2002; Miller, 2007 among others, as discussed in Section 3.3.1 above), Vietnamese children seem to deal with three types of variability at once while acquiring *các/những*: (i) both a bare form and a pluralized form are associated to a plural interpretation, (ii) there are two different lexical items with the same plural feature but different restrictions (with or without modification), and (iii) *những* noun phrases are sometimes definite-like and sometimes are not (e.g., they can appear in and indefinite expressions like '*there are*' or *wh*-phrases).

On the other hand, the particularities of Vietnamese pluralizers may help Vietnamesespeaking children learn them a bit faster than Mandarin, Japanese, or Korean children. Beside definiteness, the lexical pluralizers in those classifier languages are said to have some additional restrictions applying only to humans (Mandarin) or animates (Japanese). They also allow associative interpretations (in the case of Japanese, Mandarin, and Korean) (Zhang, 2008; Munn et al., 2009; Li et al., 2009; Nakano et al., 2009; Kim M., 2011; Kim et al., 2014). *Các* and *những* neither allow associative readings nor have an animacy, which might make the task of acquiring their semantics a little less complex. Also, they are not completely optional in the input: they are required to pluralize a noun phrase if a CL is present (such as CL-N or CL-N-Dem) and are obligatory in the presence of *all* or *most*. With respect to maximality, the literature on Vietnamese predicts a whole set to be picked out for *các* while *những* allows a choice of a plural subset in addition to a whole set. We may also see some differences in the acquisition path of *những* compared to that of *các* for two reasons. As *những* has a higher frequency in the input than *các* (Bui, 2000a, p. 11), children might start learning *những* earlier. On the other hand, the interpretations of *những* which are more complicated and less consistent than *các* may delay the adult-like version of this pluralizer for children.

3.5. Experiment 1

In these two experiments, we replicate Munn et al.'s (2006) task testing the comprehension of singular and plural definite noun phrases because this will allow us to make direct crosslinguistic comparisons with English- and Spanish-acquiring children. Experiment 1 is completely identical to their experiment while Experiment 2 modifies the size of the sets in the set up and includes the participation of older Vietnamese children (6- and 7-year-olds).

3.5.1. Experimental setup

The scene includes a toy house and a toy tree apart from each other. For logistic and cultural reasons, the experiment uses a toy tree, rather than a toy barn as in Munn et al. (2006), as one of the two landmarks and the four animal types are more familiar to Vietnamese children: meo 'cat', cho' 'dog', ga 'rooster', and ca' 'fish.'¹⁵ There are 6 identical toys per type. Six animals of the same type are divided in two groups: three of them line up next to the tree while the other three line up next to the house.

¹⁵ Animal nouns require the same CL *con*, which is a general CL for animate entities. As shown in Tran (2011), this together with CL *cái* (the general CL for inanimate entities) are the earliest to be acquired by children. It is likely that children in our study know the CL *con*, i.e., it is not a confounding factor influencing their performance, given they are much older than the participants in her research who were aged from 1;11 to 2;5.



Figure 3. Experimental setup

Participants' task is to pick out a set of animal(s) next to either the tree or the house corresponding to what they heard. In this scenario, a definite singular expression (i.e., bare CL-phrases) has to refer to the one closest to the tree/house (dog number 1 or 6 in Figure 3) while a definite plural noun phrase (i.e., *các*-CL-N) picks out all three toys close to the tree/house (e.g., a set that includes dog number 4, 5, and 6). If *những* actually indicates a subset of entities like how it has been described in the literature, participants can also pick two out of three animal toys (e.g., a set of dog number 5 and 6).

3.5.2. Participants

Fifty-six Vietnamese-speaking children ages 2;7 to 5;7 were recruited from two kindergartens in Ho Chi Minh city (Vietnam) in 2015,¹⁶ with two exclusions for refusal to complete the task 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). Twenty-two adults from the same city were also recruited during the summer of 2015. Results from twenty of them (ages 17 to 42; 4 males) are

¹⁶ One autistic child at the age of 6;10 who was also tested for courtesy is not included.

presented as the target grammar.¹⁷ All child and adult participants did not receive any compensation.

3.5.3. Materials

Participants were instructed to choose the appropriate animal or animals using prompts as in (65) and (66). Three test conditions use definite singular and definite plural noun phrases (the latter containing either the pluralizer *các* or *những*). Three control conditions use noun phrases which either lexically specified a singleton set using the numeral *one* or lexically specified the maximal set with the quantifier *all*, accompanied by a pluralizer (*các* or *những*). Target responses are shown in Table 4.

(65) Example test items:

a.	Đưa	cho	cô	con	chó	đứng	g kế	cái	nhà			CL (SG-def)
	Give	for	aunt	CL	dog	stand	d nex	t CL	house			
	'Give	me tł	ne dog	g next	to the	e hous	se.'					
b.	Đưa	cho	cô	các		con	chó d	tứng	kế	cái	nhà	các (PL-def)
	Give	for	aunt	CAC	-PL	CL	dog s	stand	next	CL	house	
	'Give	me tł	ne dog	gs nex	t to tł	ne hou	ıse.'					
c.	Đưa	cho	cô	nhữn	ıg	СС	on ch	ó đứ	ng kế	ć co	hi nhà	những (PL-In/Def)
	Give	for	aunt	NHU	NG-	PL C	L do	g sta	nd ne	ext C	L hous	e
	'Give	me (s	some	of) the	e dog	s next	to th	e hous	e.'			
(66)	Exam	ple co	ontrol	items	:							
a.	<i>Đưa</i> Give	<i>cho</i> for	<i>cô</i> aunt	<i>một</i> one	<i>con</i> CL	<i>chó</i> dog	<i>đứn</i> g stan	g <i>kế</i> d nex	<i>cái</i> t CL	<i>nhà</i> hous	e	one (SG-Indef)
	'Give	me a	dog n	ext to	the l	nouse.	.'					
b.	Đưa	cho	cô	tất cả	i các	con	chó	đứng	kế	cái	nhà	all + <i>các</i> (Maximal)
	Give	for	aunt	all	PL	CL	dog	stand	next	CL	house	
	'Give	me a	ll the	dogs r	next t	o the l	house	.'				

¹⁷ Two adult participants who did not get all control items correct were excluded. One of those also shared with the experimenter that she was sleepy while taking the test.

c. Đưa cho cô tất cả những con chó đứng kế cái nhà
all + những (Maximal)
Give for aunt all PL CL dog stand next CL house
'Give me all the dogs next to the house.'

	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 $(?)^{18}$
Control	SG-indef 'one' all + <i>các</i> all + <i>những</i>	một CL-N tất cả các-CL-N tất cả những-CL-N	any single dog all the dogs all the dogs

Table 4. Noun phrase types used in Experiment 1

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 participant was tested on 12 items (two of each noun phrase type) plus four simple yes-no question 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 [*nhũng*-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 [*nhũng*-CL-N] item, a [*các*-CL-N] item, and a [CL-N] item, presented in a random order. One filler item followed after every four tested items. No significant differences were found between versions; therefore, I collapsed them when reporting the results.

¹⁸ If *những* is indefinite, participants could pick out non-maximal sets. However, as discussed in previous chapter and in Lê & Schmitt (2016), there is a near-categorical preference for interpreting *những* noun phrases as definite, contra previous claims made in the literature (i.e., *những* is indefinite).

3.5.4. Procedure

The task includes two phases: (i) a pretest (familiarization), in which children are asked to name the animals and landmarks, and to demonstrate their understanding of the prepositional phrase *dúrng kế* 'standing next to' and the overall setup, by answering the question *Đúrng kế con chó/mèo/*etc. *là con gì?* 'What is standing next to the dog/cat/ect.?', and (ii) the presentation of test and control stimuli. The entire procedure lasts approximately 30 minutes. Children were tested individually and videotaped¹⁹ (as parents consented). Adults were tested, either individually or in a group, on a pencil and paper version of the task without the pretest phase.²⁰ The adults' results would provide an estimate goal of child language development.

3.5.5. Coding of responses

In the response sheet, the items in the display were numbered from 1 to 6 from left to right. The experimenter recorded child participants' responses on the sheet by noting down the item number(s) they gave her. The responses were then transferred to a spreadsheet for coding. Each response was coded into one of the five categories: 'SG closest' (item 1 or 6), 'SG non-closest' (item 2, 3, or 4, 5), 'PL maximal'²¹ (all three items as 1+2+3 or 4+5+6), 'PL non-maximal' (two items 1+2, 2+3, 1+3, 4+5, 5+6, or 4+6), and 'PL others' (e.g., 3+4, 3+4+5, 1+2+3+4+5+6). All responses were also marked as target in three different dimensions: number (regardless of definiteness), definite (regardless of number), and both (which is a 'correct response' in a lay term), listed in Table 5 below.

¹⁹ Videotapes were sometimes used to verify coding of the data.

²⁰ Adults participated in another experiment right after in the same single section. That experiment also examines definite properties of *các* and *những* using the TVJT design similar to Munn et al. (2009).

²¹ Definite expressions have a uniqueness presupposition, denoting a *unique* set (either a *unique* singular set or a *unique* plural set). To be precise, however, this chapter will henceforth use the term 'unique' for the former and 'maximal' for the latter.

Table 5. Coding target responses

Condition	Response	Target referent						
(2 trials each)		Number	Definite	Both number ar	nd definiteness			
CL-N	Participant's	SG		Sg. Def. (unique)	1 / 6			
<i>các-</i> CL-N	choice,	PL	'SG closest'	Pl. Def. (maximal)	1+2+3 / 4+5+6			
những-CL-N	coded as the	PL	(item 1 or 6);	Pl. Def. (maximal)	1+2+3 / 4+5+6			
	item's		'PL					
one	number	SG	maximal'	any Sg.	1, 2, 3 / 4, 5, 6			
all + các	(e.g., 1, or	PL	(1+2+3 or	Maximal	1+2+3 / 4+5+6			
all + những	1+2, or	PL	4+5+6)	Maximal	1+2+3 / 4+5+6			
	1+2+3).							

3.5.6. Results

3.5.6.1.Adults

The percentage and frequency of adults' responses in each condition, grouped by number (singular vs. plural responses) and definiteness (closest/maximal vs. non-closest/non-maximal responses), are shown in Table 6. Expected responses are in shaded cells.

Table 6. *Percentage (frequency) of adults'* (N = 20) *response types*

(i) Control s	entences								
Cond	lition (40 responses each):	Sg. Indef.	Maximal	Maximal					
Response ty	pe	one-CL-N	all-các-CL-N	all-những-CL-N					
Singular	Closest	87.50% (35)	0% (0)	0% (0)					
Singular	Non-closest	12.50% (5)	0% (0)	0% (0)					
Plural	Maximal	0% (0)	100% (40)	100% (40)					
Plural	Non-maximal	0% (0)	0% (0)	0% (0)					
(ii) Experime	(ii) Experimental sentences								
Con	dition (40 responses each):	Sg. Def.	Pl. Def.	Pl. Def. (?)					
Response		CL-N	<i>các-</i> CL-N	những-CL-N					
Singular	Closest	82.50% (33)	5% (2)	5% (2)					
Singular	Non-closest	10% (4)	0% (0)	0% (0)					
Plural	Maximal	7.50% (3)	92.50% (37)	90% (36)					
Plural	Non-maximal	0% (0)	2.50% (1)	5% (2)					

Adults produced 100% target responses for control items. 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 showed a preference for the closest singleton animal (which is also the answer expected in the [CL-N] condition): they chose it 87.5% of the trials. In the experimental conditions, adults produced slightly fewer target responses as compared to control conditions. Nevertheless, accuracy was still very high, with 82.5% correct in the singular definite condition and 92.5% correct in the plural definite condition *các*. In the plural test condition with pluralizer *nhũng*, whose definiteness status was unclear, adults chose plural maximal sets 90.0% of the time. Thus it is clear from adults' performance here that both *các* and *nhũng* were treated as definite plurals. Therefore, in my analysis of this experiment, the term 'definite plural conditions' embraces not only *các* trials, but also *những* stimuli.

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

3.5.6.2. Children's results: Control sentences

Table 7 below gives the percentage and frequency of children's responses in each control condition, again grouped by number and definiteness, while Table 8 breaks them down by age group (3 years old, N = 12; 4 years old, N = 15; and 5 years old, N = 15).

Table 7. Percentage (frequency) of children's (N = 42) response types in control trials

Condition	(84 responses each):	SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các</i> -CL-N	all- những- CL-N
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)

Table 8. Percentage (frequency) of children's response types in control trials per age group

() 0 - (,,	, -,-,		
Condition	(24 responses each):	SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các</i> -CL-N	all- những- CL-N
Singular	Closest	50% (12)	12.5% (3)	16.7% (4)
Singular	Non-closest	37.5% (9)	12.5% (3)	8.3% (2)
_				
Plural	Maximal	12.5% (3)	75% (18)	75% (18)

(*i*) Age 3 (N=12; range: 2;7-3;11; M=3;3)

(*ii*) Age 4 (N=15; range: 4;0-4;10; M=4;5)

Condition	(30 responses each):	SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các-</i> CL-N	all- những- CL-N
Singular	Closest	66.7% (20)	23.3% (7)	20% (6)
Singular	Non-closest	30% (9)	6.7% (2)	6.7% (2)
Plural	Maximal	0% (0)	60% (18)	60% (18)
Plural	Non-maximal	0% (0)	10% (3)	13.3% (4)
Plural	Other	3.3% (1)	0% (0)	0% (0)

(*iii*) Age 5 (N=15; range: 5;0-5;7; M=5;4)

Condition	(30 responses each):	SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các-</i> CL-N	all- những- CL-N
Singular	Closest	83.3% (25)	0% (0)	3.3% (1)
Singular	Non-closest	10% (3)	0% (0)	0% (0)
Plural	Maximal	6.7% (2)	93.3% (28)	86.7% (26)
Plural	Non-maximal	0% (0)	6.7% (2)	10% (3)

Figure 4 illustrates the proportions of children's response types by age group reported in Table 8, collapsing across the two plural control conditions, that are [*all-các*-CL-N] and [*all-những*-CL-N] sequences, as children responses were similar between them within each age group.²² In the singular 'one' trials, children showed a slight preference for the singular unique

²² Key: Response types in Figure 4 and most figures in Experiments 1 and 2 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). For some figures in Experiment 1, the 'PL others' response type (see 3.5.5) is also included and specified in the legend as 'Others.'

response (i.e., they chose the closest animal 67.86% of the time), but not as strong as adults, especially among younger children (50% and 66.7% for 3- and 4-year-olds, respectively).



Figure 4. Proportion of children's response types, by age group, in singular control condition (*left*) and plural control conditions (*right*). See fn. 22 for key

The percentage of total target responses in each control condition per age group is summarized in Table 9. Across all three control conditions, children of all age groups provided mostly expected responses, showing that they understood the task.

Table 9. Percentage of children's target responses in control conditions by age group

Condition:	SG-indef	maximal	maximal
Age group	one-CL-N	all- <i>các-</i> CL-N	all- những- CL-N
3 years old (N=12)	87.5	75	75
4 years old (N=15)	96.67	60	60
5 years old (N=15)	93.33	93.33	86.67

3.5.6.3. Children's results: Experimental sentences

In order to address the research questions listed in (64), children's responses in experimental trials were analyzed in four steps below.

(67) Analysis steps

- (i) Overall performance. This involves the investigation of (a) whether children treated các and *những* differently, given that adults chose the plural definite response for both pluralizers as seen in Table 6, and (b) children's response types, with focus on target response rates, in three conditions: [CL-N], [các-CL-N], and [*những*-CL-N].
- (ii) *Children's knowledge of number*, addressing three following questions:
 - a. Do they know that [CL-N] is singular?
 - b. Do they know that các/ những are interpreted as NOT singular?
 - c. Do they make the number distinction between [CL-N] and [các/những-CL-N]?
- (iii) Children's knowledge of definiteness. The percentage of definite responses independent from number (i.e., counting both plural maximal and singular unique choices in any testing condition)²³ was examined as the representative of this knowledge. Munn et al. (2006) does not include this step in their analysis. They instead defined definiteness (using the term 'maximality') as singular unique responses in the singular condition, and plural maximal responses in the plural condition. They also calculated these percentages out of only responses that were correct in number, not out of total responses, for each condition. The rationale behind their approach could be that they assumed number to be acquired before definiteness an assumption might be reasonable for English and Spanish, but not necessary for Vietnamese.

In addition, I look closely at whether children treated the singular definite trials (i.e., CL-N) and the control singular *in*definite condition (i.e., *one*-CL-N) differently in terms of definiteness. This involved the comparison between the two conditions in terms of the definite response rates to check if there is a general bias across participants towards a specific item/set.

- (iv) *Children's ability of integrating the two pieces of information number and definiteness,* looking at how each feature is acquired within the constraint of the other. This can be examined from three different calculations:
 - a. A comparison of the target response rates (reflecting children's integration ability) against the percentage of responses correct in terms of number (cf. Step (ii)) and against the percentage of definite responses (cf. Step (iii)). If the rates are roughly the same, it is reasonable to suggest number and definite features were acquired together. If they are different, then the two following percentages are discussed to decide which feature is responsible for the non-target responses.
 - b. The percentage of definite responses out of trials correct in number. This is what Munn et al. (2006) use to assess children's knowledge of definiteness. They call this metric Maximality.

 $^{^{23}}$ As noted in footnote 21, the accurate term in referring to the target choice responding to definite expressions is a *unique* set (either a unique *singular* set or a unique *plural* set). However, this Chapter examines each response from three different angles, i.e., number, definiteness, and both. Therefore, for the sake of being consistent and less confusing, the term 'unique' is used to indicate a unique *singular* set and 'maximal' to mean a unique *plural* set, while 'definite' includes both set types.

c. The percentage of number-correct responses out of trials correct in definiteness.

I report the results from each of the four analysis steps respectively in the next four sections.

3.5.6.3.1. *Overall performance*

Table 10 presents the percentages and frequencies of children's responses in the three experimental conditions. I will first focus on the plural *các/ những* conditions, and then the singular definite condition [CL-N] in comparison to [*các*-CL-N] and [*những*-CL-N].

Table 10. Percentage (frequency) of children's (N = 42) response types in experimental trials

Condition (84 responses each):		Sg. Def	Pl. Def	Pl. Def (?)
Response		CL-N	<i>các-</i> CL-N	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)

Các vs. *những*. Like adults, children treated [*các*-CL-N] and [*những*-CL-N] sequences similarly, with no significant differences in the overall distribution of responses, according to Pearson's Chi-squared tests across all children (χ^2 (4) = 4.477, *p* = .354). In particular, the exhaustive interpretation for both pluralizers, although at much lower rates compared to adults, outweighed the non-exhaustive reading as clearly and as strongly (32.15% vs. 4.77% for *các* and 23.81% vs. 2.39% for *những*). Figure 5 below illustrates each individual child's target response rates in three experimental conditions, using their age (in months) as an indicator.²⁴ This visualization also confirms the similar exhaustive reading rates between [*các*-CL-N] and [*những*-CL-N] trials across children of all ages.

²⁴ Key: children's age in Figures 5 and 8 ranges between 3 (circle), 4 (triangle), and 5 years old (square).


Figure 5. Proportion of children's target responses by age in experimental conditions: singular unique [CL-N] (top), plural các (mid), and plural những (bottom). See fn. 24 for key

The division by age group is reported in Table 11. Again, Pearson's Chi-squared tests between the two pluralizers within each age group were conducted to compare their distribution of response types. All age groups showed no association between the pluralizer used and the response types (all p > .1). A two-way mixed-design ANOVA on target responses with pluralizer (*các*, *những*) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor shows no significant difference among age groups (F(2, 39) = 1.71, p = .194) nor between the two pluralizers (F(1, 39) = 3.597, p = .065). There is also no interaction between age and which pluralizer was used (F(2, 39) = 1.824, p = .175). Given these statistical results together with the overall Chi-squared test above, *các* and *những* were collapsed as plurals (PL) in all subsequent analyses henceforth.

 Table 11. Percentage (frequency) of children's response types in experimental trials per age

 group

(1) 1150 5 (1 12, runge. 2, 7 3, 1	1, 11 5,5		
Condition	(24 responses each):	Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	các-CL-N	những-CL-N
Singular	Closest	45.8% (11)	29.2% (7)	50% (12)
Singular	Non-closest	45.8% (11)	29.2% (7)	29.2% (7)
D11	Marina 1	0.20/(2)	22 20/ (9)	12 50/ (2)
Plural	Maximal	ð.3% (2)	33.3% (8)	12.5% (3)
Plural	Non-maximal	0% (0)	8.3% (2)	4.2% (1)
Plural	Other	0% (0)	0% (0)	4.2% (1)

(i) Age 3 (N=12; range; 2;7-3;11; M=3;3)

(*ii*) Age 4 (N=15; range: 4;0-4;10; M=4;5)

Condition (30 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)	
Response		CL-N	<i>các-</i> CL-N	những-CL-N	
Singular	Closest	83.3% (25)	56.7% (17)	60% (18)	
Singular	Non-closest	10% (3)	20% (6)	16.7% (5)	
Plural	Maximal	3.3% (1)	16.7% (5)	16.7% (5)	
Plural	Non-maximal	3.3% (1)	6.7% (2)	3.3% (1)	
Plural	Other	0% (0)	0% (0)	3.3% (1)	

⁽*iii*) Age 5 (N=15; range: 5;0-5;7; M=5;4)

(M) Age 5 (N=15; range: 5; 0-5; 7; M=5; 4)							
Condition	(30 responses each):	Sg. Def.	Pl. Def.	Pl. Def. (?)			
Response		CL-N	<i>các-</i> CL-N	những-CL-N			
Singular	Closest	76.7% (23)	53.3% (16)	60% (18)			
Singular	Non-closest	3.3%(1)	0% (0)	0% (0)			
-							
Plural	Maximal	20% (6)	46.7% (14)	40% (12)			

[CL-N] vs. [PL-CL-N]. Figure 6 illustrates the proportion of children's response types per age group in the [CL-N] (singular, definite) and [các/những-CL-N] (plural, definite) conditions.



Figure 6. Proportion of children's response types, by age group, in singular (left) and plural experimental conditions (right). See fn. 22 for key

Table 12 reports children's target response rate per age group in experimental conditions. In the singular definite condition (for example, *Give me* **CL** *dog next to the tree*), the overall target response rate is 70.24%. Children age 3 were split equally between the closest dog (singular definite choice) and the furthest dog (a singular indefinite choice), at the rates of 45.8% each. Children ages 4 and above produced a majority of target responses, choosing the closest dog to the tree 76.7-83.3% of the time. In the plural definite conditions (ex. *Give me* **các/những** *CL dog next to the tree*), children produced far fewer target responses compared to the singular definite condition (23.81-32.15%, as compared to 70.24%). Interestingly, while the 4-year-old children and under were evenly split between number and definiteness errors, the only other choice 5-year-olds made besides the maximal set of dogs was the singleton dog closest to the tree, which is the expected answer if they are looking for a unique set, independent of number.

Age group	Sg. Def.	Pl. Def.
	CL-N	PL-CL-N
3 years old (N=12)	45.83	22.92
4 years old (N=15)	83.33	16.67
5 years old (N=15)	76.67	43.33

 Table 12. Percentage (frequency) of target responses per age group

A two-way mixed-design ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor was conducted on the target response rates. Main effects of age group (F(2, 39) = 4.473, p = .018) and condition (F(1, 39) = 15.836, p = .0003) were found. There was no significant interaction between age group and condition (F(2, 39) = 1.543, p = .226). Pairwise *t*-tests crossing age groups and conditions without p-value adjustments revealed that the rate of target responses produced in plural conditions remained equally low across age groups (all p > .078), while in singular condition, children of age 4 and above made significantly more target choices in the singular conditions relative to the plural conditions (both p < .05). However, conservatively, under Bonferroni-adjusted alpha levels of .006 per test (alpha .05 divided by 9 comparisons), only the difference between two conditions within 4-year-olds stays statistically significant (p = 2.7e-05).

As the results from post-hoc tests did not provide supporting statistics for the main effects of age group and condition found in the ANOVA test, generalized linear mixed-effect analyses of the relationship between target response, condition and age (lme4 package; Bates et al., 2015) was performed. In these models, age (in months, i.e., a continuous scale) and condition (singular vs. plural) were entered as fixed effects. As random effect, intercept for participants was added in order to account for individual variation. Four different models were fitted to the data, as reported in Table 13. As model 3 showed a severe multicollinearity, thus eliminated, only models 1, 2 and 3 were compared and the comparison results are detailed in Table 14.

Table 13. Generalized linear mixed-effect models fitt	ed
---	----

	ml	m2	m3	m4
age		\checkmark	\checkmark	\checkmark
condition			\checkmark	\checkmark
age x condition				\checkmark

		Model 1			Model 2			Model 3	6
Coefficient	Odds Ratios	Conf. Int (95%)	P- Value	Odds Ratios	Conf. Int (95%)	P- Value	Odds Ratios	Conf. Int (95%)	P- Value
Intercept	.69	.48-1	.049	.04	.0125	.001	.07	.0173	.027
Age				1.06	1.02-1.09	.002	1.08	1.03-1.13	.002
Number (PL)							.10	.0520	<.001
Random Effec	ts								
σ^2	3.29)		3.29			3.29		
τ_{00}	.64	child		.38 chil	d		1.00 chi	ild	
ICC	.16	child		.10 chil	d		.23 chil	d	
Deviance	335.	.198		325.12	5		274.51	5	-
AIC	339.	.198		331.12	5		282.51	5	

 Table 14. Generalized linear mixed-effects model comparison

P-values were obtained by likelihood ratio tests of the full model with the effects of age and condition (model 3) against the null model (model 1) and the model containing only the effect of age (model 2). The results suggest model 3 is the best fitted model for the data as it has the smallest AIC. Similar to the ANOVA results above, model 3 shows both age and condition have a significant effect on target response rate (p < .01 and p < .001, respectively). The age significantly affected target response rate (χ^2 (1) = 10.073, p = .002), the odd ratio for target response over the unexpected responses increases from 0.07 to 1.08 when age is taken into account. The condition significantly affected target response rate (χ^2 (1) = 50.609, p = 1.127e-12), lowering it by 10.44 ± 5% from the singular condition to the plural conditions.

The overall performance suggests the following. First, children were significantly better at understanding bare classifier phrases than noun phrases with pluralizers (as plural, definite), especially the 4- and 5-year-olds. Second, there is an age development in the singular condition: children at the age of 4 and above associated [CL-N] sequences with a singular definite reading (the target response) more often than 3-year-olds (the difference is significant for 4-year-old children). Third, children of all ages in this experiment had difficulty in interpreting [*các/những*-CL-N] trials, and the best fitting model also suggests age effect in this condition, just like the singular condition.

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

3.5.6.3.2. Number

In order to fully understand Vietnamese-speaking children's knowledge of number, this section is going to first deal with responses that are correct in terms of number regardless of their definiteness accuracy (i.e., singular responses in [CL-N] trials and plural responses for [*các/những*-CL-N] sequences) and then look at the singular-plural distinction.

Number accuracy. Table 15 reports the percentage and frequency of children choices that match the number of target responses out of total responses, grouped by age group and condition. The results show that children across all ages produced low rates of plural responses in the plural conditions (23.22-43.33%). In contrast, they were very good at associating [CL-N] with singularity

(80-91.67%). Figure 7 presents these proportions, including additional information of response types.

Age group	Sg. Def.	Pl. Def.
	CL-N	PL-CL-N
3 years old (N=12)	91.67 (22/24)	31.25 (15/48)
4 years old (N=15)	93.33 (28/30)	23.33 (14/60)
5 years old (N=15)	80 (24/30)	43.33 (26/60)
Total	88.09	32.74

Table 15. Percentage (frequency) of target-number responses, ignoring definiteness accuracy



Figure 7. Proportion of children's singular responses in singular unique condition (left) and plural responses in plural maximal conditions (right). See fn. 22 for key

A two-way mixed-design ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor reveals a main effect of condition (F (1, 39) = 28.374, p = 4.45e-06) on the rate of number-correct response, but no effect of age group (F (2, 39) = .156, p = .856). There was no interaction between condition and age group (F (2, 39) = .966, p = .39). In particular, pairwise t-tests using Bonferroni-adjusted alpha levels of 0.006 per test (alpha 0.05 divided by 9 comparisons), whose results summarizes in Table 16, show that

Vietnamese children were much more accurate in interpreting [CL-N] sequences as singular than they were in associating pluralizers with plurality and this difference was significant among 3- and 4-year-old groups. There was no age group effect either in singular or plural condition. Individual child's number-correct rate, divided by condition, is plotted in Figure 8.

Table 16. Pairwise t-tests on number-correct responses between singular and plural conditions across and within age group

	Age group	Results
	within 3-y.o.s	t = 4.802, ***p = .0002
[CL-N] vs. PL	within 4-y.o.s	t = 6.406, ***p = 3.2e-06
	within 5-y.o.s	t = 2.770, p = .01
	3-y.o.s vs. 4-y.o.s	t = -0.151, p = .91
[CL-N] condition	3-y.o.s vs. 5-y.o.s	t = 0.923, p = .433
	4-y.o.s vs. 5-y.o.s	t = 0.837, p = .342
	3-y.o.s vs. 4-y.o.s	t = 0.658, p = .594
PL condition	3-y.o.s vs. 5-y.o.s	t = -0.917, p = .417
	4-y.o.s vs. 5-y.o.s	t = -1.687, p = .156



Figure 8. Proportion of children's number-correct responses by age, in singular test condition (top) and plural test condition (bottom). See fn. 24 for key

Singular-plural distinction. To address the question of whether children distinguish singular from plural definite noun phrases, we compared the proportion of plural responses

provided in the singular test condition (CL-N) relative to the plural test conditions (*các/những*-CL-N), collapsing across definite and indefinite responses. These proportions are presented in Figure 9, with plural definite responses in light grey and plural indefinite responses in medium grey. A 2x3 ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor was run on plural response rates, showing a main effect of condition (F(1, 39) = 14.011, p = .0006). Thus it is clear that while children barely treated the pluralizers as plural, they did distinguish between singular and plural conditions in the sense that they produced significantly less plural responses in the singular condition.



Figure 9. Proportion of children's plural responses by age group in singular unique (left) and plural maximal (right) conditions. See fn. 22 for key

3.5.6.3.3. Definiteness

Turning to the second research question, this section assesses Vietnamese children's comprehension of definiteness by examining the proportion of definite responses they produced, whether plural (i.e., the maximal set) or singular (i.e., the closest animal to the landmark). For

convenience, these will be referred to as plural definite and singular definite responses, although we should be aware that, strictly speaking, such terms are our interpretation of children's behavior. The percentage of definite responses in the test conditions, collapsing across singular and plural responses, as shown in Table 17, is examined. Additionally, definite responses in the control condition 'one' (singular, indefinite) are also discussed later to see whether participants were biased toward a specific item in singular conditions.

Table 17. Percentage (frequency) of definite responses, ignoring number accuracy

Age group	Sg. Def.	Pl. Def.
	CL-N	PL-CL-N
3 years old (N=12)	54.17 (13/24)	62.5 (30/48)
4 years old (N=15)	86.67 (26/30)	75 (45/60)
5 years old (N=15)	96.67 (29/30)	100 (60/60)

[CL-N] vs. [PL-CL-N]. Figure 10 presents the proportion of children's definite responses in the experimental conditions, with plural definite responses in grey and singular definite responses in black. Children at age 3 chose definite responses a bit more than half of the time in the singular definite condition (54.17%), and even more in the plural definite conditions (62.5%). Children of 4 and above, however, produced a majority of definite responses, at least 86.67% in the singular condition and 75% in the plural conditions.



Figure 10. Proportion of children's plural responses by age group in singular unique (left) and plural maximal (right) conditions. See fn. 22 for key

To check for developmental trends in the rate of what is referred to as definite responses, another 2x3 ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5) as a between-subjects factor, was also run. Similar to the results on correct-number response rates, no significant difference between two conditions (F = .017, p > .5) and no interaction between age group and condition (F = 1.682, p > .1) were found, but there was a main effect of age (F = 7.314, p < .01). That is children produced more definite responses when they got older, in both conditions, not just the plural conditions. Table *18* reports the results of the relevant sub t-tests between age groups, using Bonferroni-adjusted alpha levels of 0.006 per test (alpha 0.05 divided by 9 comparisons). In particular, in the singular definite noun phrase, 5-year-olds were significantly better than 3-year-olds (96.67% vs. 54.17%). In the plural definite conditions, children age 5 produced definite responses significantly more than younger children.

Comparison	Age group	Results	Conclusion
Within [CL-N]	3 y.os vs. 4 y.os	t = -2.67, p = .01	Not significant difference
	3 y.os vs. 5 y.os	t =-3.89, p < .001	Significant difference
	4 y.os vs. 5 y.os	t = -1.40, p > .1	Not significant difference
Within PL	3 y.os vs. 4 y.os	t = -1.38, p > .1	Not significant difference
	3 y.os vs. 5 y.os	t = -5.31, p < .000	Significant difference
	4 y.os vs. 5 y.os	t = -4.43, p < .000	Significant difference

Table 18. T-tests comparison between age groups with respect to DEFINITENESS

[CL-N] vs. [*one*-CL-N]. Here I look at whether children responded differently between singular indefinite (*one*-CL-N) and singular definite (CL-N) trials. The proportions of definite responses are reported in Figure 11, with plural definite responses in grey and singular definite responses in black.



Figure 11. Proportion plural maximal responses (grey) and singleton responses closest to the landmark item (black) in singular indefinite (left) and singular unique (right) conditions

A 2x3 ANOVA on definite response rates, with condition (*one* vs. CL) as a within-subjects factor and age group (3, 4, and 5) as a between-subjects factor, was conducted. The results revealed that there was a significant difference among age groups (F = 10.439, p <.000) but no significant difference between the two conditions (F = 1.368, p > .1) nor an age vs condition interaction (F = 1.368, p > .1)

1.71, p > .1). Therefore, although statistically children in every age group chose definite sets at similar rates for both the singular indefinite *one* and singular definite CL-N, the growth of definite response rates as children get older suggests that bias toward a specific item (i.e., the closest animal in this experiment) cannot explain the observed data.

3.5.6.3.4. *The interactions between number and definiteness, and the error patterns*

So far children's interpretation of number and that of definiteness in this experiment have been looked at independently from each other. This section investigates these features under each other's constraints. In particular, Table 19 put together the percentage of children's responses that are correct in terms of number (i.e., singular responses for CL-N and plural responses for *các/những*, cf. Table 15), definiteness (either unique or maximal, cf. Table 17), and both features (i.e., correct responses, cf. Table 12) out of total responses in the experimental conditions, through which the error patterns could be revealed.

Table 19. Percentage of correct responses in terms of number (i), definiteness (ii), and both (iii) (out of total responses) in experimental conditions by age group

	Sg. Def. (CL-N)			Pl. Def. (PL-CL-N)		
Age group	Singular	Definite	Unique	Plural	Definite	Maximal
	(i)	(ii)	(iii)	(i)	(ii)	(iii)
3 years old (N=12)	91.67	54.17	45.83	31.25	62.50	22.92
4 years old (N=15)	93.33	86.67	83.33	23.33	75	16.67
5 years old (N=15)	80	96.67	76.67	43.33	100	43.33

Results of the singular definite trials were mixed. 3-year-olds committed more definite errors than number errors (45.83% vs. 8.33%). Older children seemed to know the interpretation of CL-N: they were correct in both number and definiteness most of the time. For 5 years old, though, if they made an error (which is 23.33% of the time), it was likely a definite set of a wrong number, i.e., they picked out a maximal set, instead of a unique one, as definite response rate was 96.67% (cf. Figure 10).

In the plural conditions, children of all ages produced definite responses for the majority of the time but committed a significant amount of number errors: they tended to associate noun phrases containing a pluralizer with singular definite interpretation. In particular, 5-year-old children scored 100% in terms of definiteness but performed around chance in terms of number, i.e., they chose a closest item 43.33% of the time and a maximal set 56.67% when hearing $c\acute{ac/nh\widetilde{u}ng}$. This is also the age group that was consistent in their errors (i.e., number errors) across singular and plural definite conditions.

We can see that in both singular and plural conditions, although children's successful rates in combining the two features were lower than the correct response rate in each feature (either number or definiteness), the underlying cause may differ between conditions. While plurality was difficult for all age groups, it was definiteness that troubled the acquisition of CL-N sequences, at least for 3-year-old children. Both number (i.e., singularity) and definiteness of CL-N were easy for children at 4 and above, as the correct rates in both features, which were high, equally echoed the overall target response rates. In other words, the feature more challenging for children in interpreting plural definite noun phrases was number, not definiteness. In the singular condition, 3-year-olds suffered from definiteness, while 4- and 5-year-olds excelled at both features.

To confirm this observation, let consider next the percentage of target responses out of those trials that were correct with respect to number and then the percentage of target responses out of those trials that were correct with respect to definiteness. The first calculation was to look at how often children selected answers compatible with definite responses if they knew number, while the latter examined the opposite situation – how often children chose number correctly if they knew definiteness. These proportions are given in Table 20 (a) and (b), respectively. Again,

the singular indefinite 'one' was included to examine if there was any potential bias towards a specific choice.

Table 20. Proportion of correct responses

a.	out of trials correct in number	(i.e., correct defin	niteness out of ta	rget-number respo	onses)
	Age group	one-CL-N	CL-N	PL-CL-N	
	3 years old (N=12)	57.14 (12/21)	50 (11/22)	73.33 (11/14)	
	4 years old (N=15)	68.97 (20/29)	89.29 (25/28)	71.43 (10/14)	
	5 years old (N=15)	89.29 (25/28)	95.83 (23/24)	100 (26/26)	
b.	out of trials correct in definiten	ess (i.e. correct n	umber out of tar	get-definiteness re	spons

es) DI CI M

Age group	CL-N	PL-CL-N
3 years old (N=12)	84.61 (11/13)	36.66 (11/30)
4 years old (N=15)	96.15 (25/26)	22.22 (10/45)
5 years old (N=15)	79.31 (23/29)	43.33 (26/60)

The two conditions CL-N and one are similar in number (singular) but different in terms of definiteness: the former is definite while the latter is indefinite. However, as seen in Table 20 (a), in both conditions, among trials that were treated as singular, the unique item (the closest one) was chosen at similar rates, and especially low among 3-year-olds (50% and 57.14% for singular definite and indefinite noun phrases, respectively). The rates were higher for older children, especially for CL-N sequences. As with definite responses, a two-way ANOVA on proportion of target responses out of trials correct in number with condition (indefinite, definite) as a withinsubjects factor and age group (3, 4, 5) as a between-subjects factor was conducted and showed that age has a main effect (F = 9.756, p < .01), but there was neither significant difference between two singular conditions (F = 2.391, p > .1) nor interaction between age group and condition (F = 2.808, p > .1). In particular, 4-year-olds' behavior was marginally different between the two conditions (t=-1.921, p < .1). Figure 12 illustrates the similarity between the two conditions across age groups with respect to the proportion of unique responses out of singular responses (number correct).



Figure 12. Proportion of unique responses out of singular responses by age group in singular non-unique (left) and unique (right) conditions

Maximality. The proportions of target responses for experimental trials, out of responses correct in number are presented in Figure 13. Children of all ages have target responses above chance (chance here is 33.3% and 50% for singular and plural definite conditions, respectively, given the calculations are based on the responses that are correct in number), suggesting that if a child chooses the correct number for these expressions, it is likely that they also know these are definite. Children of all ages who gave plural responses seldom associated definite pluralizers with non-maximal sets (the highest rate of this error belonged to 4-year-olds, which was only 28.57%). These results seem to pose a problem for the 'No Maximality' Hypothesis (children seldom associated definite pluralizers with non-maximal sets), and do not support the 'No Implicit Domain Restriction' Hypothesis either: Vietnamese-speaking children at 4 and above who treated CL-N as singular seemed to be good at figuring out the unique animal that this singular definite expression refers to, i.e., at 89-96% of the time, compared to only 67% of the time for children (English and Spanish combined) in Munn et al. (2006). 3-year-olds who gave correct number in the singular

condition, however, seemed to be evenly split between definite and indefinite choices. But that does not necessarily follow from the definiteness of [CL-N], since they did the same in the indefinite noun phrase trials.



Figure 13. Proportion of unique responses (black) out of singular responses in singular unique condition (left) and maximal responses (light gray) out of plural responses in plural maximal conditions (right)

Another two-way ANOVA with Condition (singular, plural) as a within-subjects factor and Age group (3, 4, 5) as a between-subjects factor revealed no significant difference between conditions (F = 0.893, p > .3), but the difference among age groups was shown as significant (F=7.383, p < .01) and there was an interaction between Age group and Condition (F = 3.388, p < .05). Follow-up t-tests indicate children from 4-year-olds and above are significantly better than 3-year-olds in the singular condition: t = 3.161, p < .01 (4 year olds), and t = 3.924, p < .001 (5 year olds). In the plural conditions, 5-year-olds who knew the plurality of *các* and *những* chose a maximal set significantly more than younger children: t = 2.256, p < .05 (3-year-olds), and t = 2.280, p < .05 (4-year-olds). Children in every age group tended to pick out the unique set for CL-

N at a rate that is not significantly different from the rate they picked out a maximal set for plural definites.

Number. While the analysis above suggests children who knew the number of CL-N and *các/nhĩng* also interpreted them as definites most of the time, the percentages of target responses out of the responses that were compatible with a definite interpretation in Table 20 (b) show a clear distinction between CL and the pluralizers among those who treated them as definites. Most children who associated CL-N with definiteness knew CL-N to be singular. However, those treating *các/nhĩng*-CL-N sequences as definite did not necessarily know their number: they also interpreted *các/nhĩng* as singular (like bare CL-N) most of the time across the board, as illustrated in Figure 14. A two-way ANOVA with Number (singular, plural) as a within-subject factor and Age group (3, 4, and 5) as a between-subject factor showed a main effect of Number (F = 72.712, p < .000) but no effect of Age group (F = .216, p > .5) and no Age group vs. Number interaction (F = 1.108, p > .1).



Figure 14. Proportion of definite responses that were singular (black) in singular unique condition (left) and that were plural (light gray) in plural maximal conditions (right) out of definite responses

Visual comparisons of Figure 13, Figure 14, and Figure 6 suggest that the percentage of responses correct in number out of definite choices in every age group (which was low) was a better predictor of the correct response rate, at least in the plural definite conditions than the percentage of definite responses out of those correct in number.

3.5.7. Discussion

This experiment shows that *những* patterned with *các* not only in the adult's responses in a sense that in both cases the participants chose the maximal plural set, but also in children's performance. Even though the nature of *những* is still a controversial theoretical issue in the literature of Vietnamese linguistics, our results offer some empirical observations that can be used to argue that *những* favors a maximal interpretation which is compatible with a definite interpretation or at least a possibility that the set described by the modified noun phrase can be the maximal set and in general that is the preferred set. My results also reveal that the pluralizers in Vietnamese present difficulties for child participants of all ages to interpret: in this experiment children succeeded only 27.98% of the time in *các/những*-CL-N trials, and until 5 years old they still can be correct only at the rate of 43.33%. On the contrary, Vietnamese-speaking children acquired the interpretation of bare classifier phrases (singular, definite) quite early, around age 4 (4- and 5- year-olds in this experiment comprehend CL-N correctly 83.33% and 76.67% of the time, respectively). Their good performance in the CL-N condition (overall correct rate is 70.24%) might suggest that the additional presence of *các/những* is responsible for their struggle.

As we have seen the protraction in child acquisition of pluralizers in other classifier languages, this is not surprising. However, there are two interesting findings from this experiment. First, as one of the first studies that attempt to isolate different features encoded in pluralizers in a classifier language like Vietnamese, my results seem to suggest Vietnamese-speaking children's struggle with the pluralizers was driven by the plurality and not the definiteness, despite the obligatoriness of *các/những* in some plural noun phrase types in Vietnamese. In particular, although they were able to distinguish plural definite noun phrases from singular ones, even at the age of 5 children interpreted the pluralizers as plural only 43.33% of the time. Meanwhile children associated the pluralizers with maximal/unique responses most of the time (at least 62.50% at age 3 and higher in older children)²⁵. Second, opposite to the definiteness challenge indicated by previous studies, Vietnamese children did not really have problem with definiteness in both plural

²⁵ Chance for definite responses (regardless of number) are about 33%, as there are 6 possible choices: the two items closer to a landmark, the two items further to a landmark, the single item furthest to a landmark, the middle item, the single item closest to a landmark, and all three items; each has 16.67% chance. The last two are considered definite responses. Theoretically, there is another option where participants give the items number 1 and 3, or number 4 and 6, i.e. a non-maximal plural response that does not contain the middle item. However, in practice, this would never happen, so I do not include this possibility while calculating chance probability.

and singular conditions: children age 4 and above were able to produce responses compatible with a definite interpretation at least 75% of the time. Overall, children (except for 3-year-olds in the singular definite condition) were able to associate definite interpretations not only to plural noun phrases but also to singular ones. These two findings together constitute the major difference between my results and those from Munn et al. (2006) in that Vietnamese children commit number errors rather than definite errors, with 3-year-old children in the singular definite condition as the only exception.

However, the fact that children (and adults alike) chose the same animal for both indefinite and definite singular conditions makes the results less convincing. In general, children participating in this experiment displayed a strong bias towards singular interpretations and, to some extent, implicit domain restriction. Singular choices were found not only in the singular condition but also in the plural condition at high rates, confirming the Vietnamese children do not know the plurality of the pluralizers until much later. In addition, recall that the rates of choosing the animal closest to the relevant landmark that both adults and children in each age group produced in the singular *in*definite and definite conditions are similar—even though multiple responses are allowed for the indefinite control condition. One might argue that this could be simply a preference, and that children were not able to distinguish between the two classifier phrases, with and without one. The default preference hypothesis, however, cannot explain why 3-year-old natives of Vietnamese did not display the bias toward the unique singleton set, or to be more exact, why the unique responses increase when they get older. In other words, the developmental trends in this experiment are the strongest counter evidence against the argument that their choices for closest animal is seemingly a default preference. Nevertheless, it is true that we cannot tell that the participants distinguish one-CL-N from CL-N in terms of definiteness.

As just mentioned, the experiment depicts a developmental trend in Vietnamese-speaking children's understanding noun phrases with and without pluralizers, i.e., their comprehension of *các/những*-CL-N and CL-N sequences was, in general, better over time. The difference between 3-year-olds and 5-year-olds was significant in both conditions. The interesting thing is the similarity between the two conditions with respect to the feature that drove this development. In the singular definite condition (CL-N), children produced singular responses at very similar (and high) rates across all age groups. However, 3-year-olds only associated CL-N with definite answers 54.17% of the time while 4- and 5-year-olds did this for most of the time, at the rate of 86.67% and 96.67%, respectively. Similarly, in the plural definite condition, children in every age group produced plural responses at similar (but low) rates while the proportion of their definite responses increases with age, from 62.5% at 3 year olds to 75% at 4 and 100% at 5 (the difference between 5-year-olds and the other two groups was significant). This was also confirmed when main effect of age was found with respect to the percentage of definite responses out of those responses that were correct in number, but disappeared in the calculation of number-correct responses out of definite responses.

Although the results do not show any development trend in children's knowledge of number, the experiment offers three findings about this feature in Vietnamese: (i) the singularity of CL-N sequences was acquired as early as age 3, (ii) children up to age 5 did not clearly associate plurality of the pluralizers, but (iii) children of all ages did distinguish between CL-N and *các/những*-CL-N in terms of number. In sum, children in all age groups in this experiment appeared to know CL-N is singular before learning it is also definite (around age 4); nevertheless, they acquired the definiteness of *các/những*-CL-N before their plurality. While children treated both conditions as singular most of the time, the fact that the proportions of plural responses in the

two conditions were significantly different and that the challenge for them in each condition seemed to be different (definiteness in the case of CL-N, at least among 3-year-olds, and number in the case of *các/những*) suggest children did not simply ignore the presence of the pluralizers and treated any noun phrase with a CL as the same.

In Experiment 2, I replicate this study once more, this time with four animals per side, to see whether the detected patterns are reliable or not. In other words, the point is whether I can replicate the results using another sample of participants and in a slightly more challenging context.²⁶ I also included older children, i.e., 6- and 7-year-old groups this time, because although Experiment 1 showed Vietnamese children at 5 and below failed to interpret the number feature of noun phrases with pluralizers, it was not able to address the question at which age Vietnamese children have fully acquired plurality, as 5-year-olds were the oldest group tested.

3.6. Experiment 2

3.6.1. Participants

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 children, 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,

²⁶ 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).

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.

3.6.2. Materials

The materials and design were identical to those of Experiment 1, except that four animals instead of three were presented next to each landmark (see Figure 15), and the training phase was added between the pretest and test phases. In this training phase, children responded to prompts using the numerals 2 through 4. Similar to Experiment 1, adults here 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).





Figure 15. Experimental setup

3.6.3. Results

Overall, the adults performed as expected, producing 100% target responses in all control and test conditions. In the singular control condition (e.g., "Give me *one CL dog* next to the tree"), where both definite and indefinite singular responses were acceptable, adults chose the closest singleton dog for all trials, which is the answer compatible with the definite singular response. In the plural test condition with pluralizer *những*, whose definiteness status was unclear, adults chose the plural definite response (maximal set of dogs) for all trials. Next I will present the children's results, for control items first and then for experimental items.

3.6.3.1.Children's results: Control sentences

Children's responses in control conditions, grouped by number and definiteness are reported in Table 21 and then divided into different age groups in

Table 22. Overall, they produced expected responses at a very high rates across all three control conditions.

Table 21. Percentage (frequency) of children's response types in control trials

	Condition:	one-CL-N	all- <i>các</i> -CL-N	all- <i>những</i> -CL-N
Response ty	pe			
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)

Table 22. Percentage (frequency) of children's response types in control trials per age group

(i) Age 3 (N=11; range: 3;2-3;11; M=3;7)

Condition	(22 responses each):	SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các</i> -CL-N	all -những- CL - N
Singular	Closest	86.4% (19)	22.7% (5)	27.3% (6)
Singular	Non-closest	13.6% (3)	9.1% (2)	0% (0)
Plural	Maximal	0% (0)	54.6% (12)	63.6% (14)
Plural	Non-maximal	0% (0)	13.6% (3)	9.1% (2)

(ii) Age 4 (N=12; range: 4;0-4;10; M=4;5)

Condition (24 responses each):		SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các</i> -CL-N	all- những- CL-N
Singular	Closest	70.8% (17)	0% (0)	0% (0)
Singular	Non-closest	25% (6)	0% (0)	0% (0)
-				
Plural	Maximal	4.2% (1)	83.3% (20)	87.5% (21)
Plural	Non-maximal	0% (0)	16.7% (4)	12.5% (3)

Table 22 (cont'd).

(ui)Age 5 (N=15; range: 5;0-5;11; M=5;4

Condition (30 responses each):		SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các-</i> CL-N	all- những- CL-N
Singular	Closest	96.7% (29)	6.7% (2)	10% (3)
Singular	Non-closest	3.3% (1)	3.3% (1)	0% (0)
Plural	Maximal	0% (0)	83.3% (25)	83.3% (25)
Plural	Non-maximal	0% (0)	6.7% (2)	6.7% (2)

(iv)Age 6 (N=13; range: 6;0-6;11; M=6;6)

Condition (26 responses each):		SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các-</i> CL-N	all- những- CL-N
Singular	Closest	92.3% (24)	7.7% (2)	7.7% (2)
Singular	Non-closest	7.7% (2)	0% (0)	0% (0)
Plural	Maximal	0% (0)	92.3% (24)	92.3% (24)

(v) Age 7 (N=7; range: 7;0-7;7; M=7;4)

Condition (14 responses each):		SG-indef	maximal	maximal
Response		one-CL-N	all- <i>các</i> -CL-N	all- những- CL-N
Singular	Closest	92.9% (13)	0% (0)	0% (0)
Singular	Non-closest	7.1% (1)	0% (0)	0% (0)
Plural	Maximal	0% (0)	100% (14)	100% (14)

In the singular control condition, children gave almost 100% target responses (i.e., any singular item). Similarly to adults, they showed a distinct preference for the closest animal, something which should be taken into account when interpreting children's behavior in the [CL-N] experimental condition. The increase of animals in the display does seem to have boosted children's preference for the closest dog; children from 3 to 5 years old chose this response 85.53% of the time, up from 67.86% in Experiment 1. Indeed, an ANOVA with age group (3, 4, 5) and experiment (Experiment 1, Experiment 2) as between-subjects factors reveals no significant difference between two experiments regards the rate of target responses in the singular control condition while another ANOVA comparing the rate of responses compatible with a singular definite interpretation (i.e., the closest dog) provided by 3-, 4- and 5-year-olds in this condition shows a significant difference between the two experiments (F = 7.132, p < .01) and a main effect

of age group (F = 8.683, p < .005). Sub t-tests on unique response rates indicate that the difference between two experiments is significant only for the 3-year-old groups (t = -2.833, p < .01).

Within the plural control conditions, the rates of children's target responses (i.e., maximal plural sets) are considerably high as well: 82-85% of the time. An ANOVA with age group (3, 4, 5) and experiment (Experiment 1, Experiment 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 is 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 2 relative to Experiment 1 (t (104.98) = 3.10, p < 0.01), but this is the only age group within which there is a significant difference between two experiments.

Figure 16 divides children's responses by age group, collapsing across the two plural control conditions ([*all-các*-CL-N] and [*all-những*-CL-N] sequences) because children of all age treated them the same, as seen in Table 22. Even children in the youngest age group produced a majority of target responses.



Figure 16. Proportion of children's response types, by age group, in singular control condition (*left*) and plural control conditions (*right*). See fn. 22 for key

3.6.3.2. Children's results: Experimental sentences

Children's responses in the experimental conditions are shown in Table 23 and the division by age group is reported in Table 24 and Figure 17. Like adults and similar to Experiment 1, children treated *các* and *những* similarly, with no significant differences in the distribution of responses (χ -squared = 0.39, df = 3, p = 0.94). Thus, we collapse across the two plural conditions in all subsequent analyses.

	Condition:	Sg. Def.	Pl. Def.	Pl. Def (?)
Response type		CL-N	<i>các-</i> CL-N	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)

Table 23. Percentage (frequency) of children's response types in experimental trials

 Table 24. Percentage (frequency) of children's response types in experimental trials per age group

(i) Age 3 (N=11; range: 3;2-3;11; M=3;7)

Condition (22 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	<i>các-</i> CL-N	những-CL-N
Singular	Closest	68.2% (15)	40.9% (9)	36.4% (8)
Singular	Non-closest	9.1% (2)	4.5% (1)	0% (0)
Plural	Maximal	18.2% (4)	22.7% (5)	31.8% (7)
Plural	Non-maximal	4.5% (1)	31.8% (7)	31.8% (7)

Table 24 (cont'd).

(ii) Age 4 (N=12; range: 4;0-4;10; M=4;5)

Condition (24 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	<i>các-</i> CL-N	những-CL-N
Singular	Closest	62.5% (15)	20.8% (5)	16.7% (4)
Singular	Non-closest	8.3% (2)	0% (0)	0% (0)
Plural	Maximal	20.8% (5)	79.2% (19)	83.3% (20)
Plural	Non-maximal	8.3% (2)	0% (0)	0% (0)

(iii)Age 5 (N=15; range: 5;0-5;11; M=5;4)

Condition (30 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	<i>các-</i> CL-N	những-CL-N
Singular	Closest	80% (24)	46.7% (14)	43.3% (13)
Singular	Non-closest	6.7% (2)	0% (0)	0% (0)
Plural	Maximal	6.7% (2)	53.3% (16)	56.7% (17)
Plural	Non-maximal	6.7% (2)	0% (0)	0% (0)

(iv)Age 6 (N=13; range: 6;0-6;11; M=6;6)

(iv)Age 6 (N=13; range: 6;0-6;11; M=6;6)				
Condition (26 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	<i>các-</i> CL-N	những-CL-N
Singular	Closest	84.6% (22)	15.4% (4)	19.2% (5)
Singular	Non-closest	7.7% (2)	0% (0)	3.8% (1)
Plural	Maximal	7.7% (2)	76.9% (20)	73.1% (19)
Plural	Non-maximal	0% (0)	7.7% (2)	3.8% (1)

(v) Age 7 (N=7; range: 7;0-7;7; M=7;4)

(v) Age / $(N-7, 1 alige, 7, 0-7, 7, 101-7, 4)$				
Condition (14 responses each):		Sg. Def.	Pl. Def.	Pl. Def. (?)
Response		CL-N	<i>các-</i> CL-N	những-CL-N
Singular	Closest	64.3% (9)	0% (0)	0% (0)
Singular	Non-closest	7.1% (1)	0% (0)	7.1% (1)
Plural	Maximal	28.6% (4)	100% (14)	92.9% (13)



Figure 17. *Proportion of children's response types, by age group, in singular (left) and plural experimental conditions (right). See fn. 22 for key*

In the singular definite condition (for example, "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. A two-way ANOVA with age group (3, 4, 5) and experiment (Experiment 1, Experiment 2) as betweensubjects factors reveals no difference between the two experiments in the rate of closest-to-thelandmark responses provided in the singular definite condition, although there is a main effect of age (F = 3.351, p < .05). That is, despite the change in children's default preference in the singular *in*definite condition, their target rates in the singular *definite* condition remain unchanged when the number of animals in the display is higher. 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 possible, independent of number. This error pattern is also observed in Experiment 1, but only among the 5-year-olds, not the 3-year-olds, who for the singular definite condition. In other words, 3-year-old children in Experiment 1 appeared to know [CL-N] is singular (92%) but failed to associate it with being definite. On the other hand, their peers in Experiment 2, like older children in both experiments, knew to treat [CL-N] as singular, definite most of the time, so the error rate for each feature is relatively small, with number error higher than definiteness error.

Turning to the plural definite conditions with the pluralizers các and những, we find a similar pattern. Just as in the singular condition, children's most common error was a definite response of the wrong number, namely the closest single dog. Although children in Experiment 1 produced far fewer target responses compared to children from the current experiment (23.81-32.15% target responses in the two plural conditions in Experiment 1, as compared with 55.26% for the 3- to 5-year-olds here), 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), therefore, remained high: 90.13% of the 3-5-year olds' responses in the plural conditions in this experiment qualified as either definite singular or definite plural, compared to 79.79-80.95% for those in Experiment 1. Children age four and older produced a majority of target answers, that is to say, they chose the maximal set of dogs. However, the three year-olds were evenly split between number and definiteness errors.²⁷ Once again, this is the only age group displaying major differences between the two experiments. In particular, comparing Figure 17 and Figure 6, we see that 3-year-old groups are alike in both experiments, choosing a maximal set (compatible with a plural, definite interpretation, i.e., expected responses) and a

²⁷ 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 indefinite responses.

unique singleton item (compatible with a singular, unique interpretation, i.e., definite responses of the wrong number) at a rate of about one-third of the time each. But their third choices differ vastly between two experiments. Three-year-old children in Experiment 1 associated [*các/những*-CL-N] with a singular, non-maximal interpretation for almost 30% of the time (i.e., unexpected responses in terms of both number and definiteness) while in Experiment 2, they treated them as plural, nonmaximal (i.e., correct number but unexpected in terms of definiteness) at a similar rate. This, together with the error patterns found in the [CL-N], suggests that children of the 3-year-old group in Experiment 2 performed slightly better than their peers in Experiment 1, which might be due to the fact that 3-year-olds in Experiment 2 are in fact slightly older (M=3;7, range: 3;2-3;11) than those in Experiment 1 (M=3;3, range: 2;7-3;11).

Next we examine children's comprehension of number and definiteness independently from each other.

3.6.3.2.1. 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. This is illustrated in Figure 18 with plural definite responses in light grey and plural indefinite responses in medium grey. 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).



Figure 18. Proportion of children's plural responses by age group in singular unique (left) and plural maximal (right) conditions. See fn. 22 for key

Despite distinguishing between singular and plural, however, three- and five-year-olds produced 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 behavior 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 25. This is also a repetition of what their peers did in Experiment 1, where children were still below chance across age 3-5, and in line with what has been found for pluralizer comprehension in Mandarin, Japanese, and Korean (Munn et al., 2009; Nakano et al., 2009). On the other hand, Vietnamese-speaking children in both experiments knew [CL-N] is singular. Overall, they chose singular responses in the singular definite condition at similar rates that children in Munn et al. (2009) did.

Language and age group	SG-Def		PL-Def	
	Expt. 1	Expt. 2	Expt. 1	Expt. 2
English (N=15) 3;0-5;5	83.8		81.3	
Spanish (N=20) 3;2-4;11	90		95	
Vietnamese (N=12) 2;7-3;11 (Expt. 1) / (N=11) 3;2-3;11 (Expt. 2)	91.7	77	31.3	59
Vietnamese (N=15) 4;0-4;10 (Expt. 1) / (N=12) 4;0-4;10 (Expt. 2)	93.3	71	23.3	81
Vietnamese (N=15) 5;0-5;7 (Expt. 1) / (N=15) 5;0-5;11 (Expt. 2)	80	87	43.3	55
Vietnamese (N=13) 6;0-6;11		92		81
Vietnamese (N=7) 7;0-7;7		71		96

Table 25. Percentage of target number responses, ignoring definiteness accuracy. Comparison of English and Spanish children in Munn et al. (2006) with our Vietnamese children in both experiments

Figure 19 presents these proportions of children's choices in Experiment 2 that match the number of target responses out of total responses, grouped by age group and condition plus additional information of response types. A two-way mixed-design ANOVA with condition (singular, plural) as a within-subjects factor and age group (3, 4, 5, 6, 7) as a between-subjects factor reveals a main effect of age group (F = 8.253, p < .005) on the rate of number-target response and the interaction between condition and age group, but there is no significant difference between two conditions, unlike in Experiment 1 (cf. Section 3.5). In particular, pairwise t-tests using Bonferroni-adjusted alpha levels of 0.005 per test (alpha 0.05 divided by 10 comparisons) show an overall development with age in [*các/những*-CL-N] trials (except for the reverse effect between 4- and 5-year-olds) while there is no significant difference among age groups in the singular, definite condition. Only significant results are presented in Table 26.



Figure 19. Proportion of children's singular responses in singular unique condition (left) and plural responses in plural maximal conditions (right). See fn. 22 for key

Table 26. Significant results from pairwise t-tests on number-correct responses between singular and plural conditions across and within age group

	Age group	Results
	3-y.o.s vs. 7-y.o.s	t = -4.4958, p = 3.24e-05
PL condition	4-y.o.s vs. 5-y.o.s	t = 3.044, p = .003
	5-y.o.s vs. 6-y.o.s	t = -3.0284, p = .003
	5-y.o.s vs. 7-y.o.s	t = -5.601, p = 2.663e-07

As mentioned, the results from the ANOVA run on number-target responses indicate some differences between the two experiments. Therefore, two two-way ANOVAs with age group (3, 4, 5) and experiment (Experiment 1, Experiment 2) as between-subject factors in terms of number-target responses were conducted; one for the singular, definite condition and the other one for the plural experimental conditions. For the singular [CL-N] condition, the ANOVA results show a main effect of age group (F = 3.383, p < .05) and an interaction between age group and experiment (F = 3.313, p < .05), but no main effect of experiment. To address which age groups in which experiment differed from each other, see Table 16 and the discussion of Figure 18. For the plural

[*các/những*-CL-N] conditions, however, the conducted ANOVA indicates there is a significant difference between two experiments (F = 49.527, p < .001), and also an interaction between age group and experiment (F = 4.891, p < .05), although there is no effect of age group. The relevant sub t-tests between the two experiments using Bonferroni-adjusted alpha levels of 0.008 per test (alpha 0.05 divided by 6 comparisons) show that 3- and 4-year-olds in Experiment 2 were significantly better at associating *các/những* with plurality than their peers in Experiment 1 (t = 3.735, p < .001 and t = 8.6339, p < .000, respectively) while 5-year-olds performed similarly in both experiments.

3.6.3.2.2. *Definiteness*

Now we turn to responses compatible with definiteness, regardless of number. Figure 20 presents the proportion of children's plural maximal responses in grey and singular unique 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 20. Proportion plural maximal responses (grey) and singleton responses closest to the landmark item (black) in experimental conditions: CL-N (singular, unique; left) and PL-CL-N (plural, right). See fn. 22 for key

As with Experiment 1, I used 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 to test for developmental trends in the overall rate of definite responses, regardless of number. Similar to the previous experiment, there was a significant effect of age group (F = 8.049, p <.001), reflecting an overall increase in definite responses over time, but this time, a significant interaction between condition and age group was found (F = 4.219, p < .01). Sub-*t*-tests between age groups, with Bonferroni-adjusted alpha levels of 0.005 per test (alpha 0.05 divided by 10 comparisons) reveals that the rate of definite responses produced in singular conditions 3-year-olds produced fewer 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 condition, 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.

Similar to what was done for number feature, two two-way ANOVAs with age group (3, 4, 5) and experiment (Experiment 1, Experiment 2) as between-subject factors were run for definite response rates. According to these results, within the singular [CL-N] condition, there are again a main effect of age group (F = 5.085, p < .01) and an interaction between age group and experiment (F = 4.973, p < .01) while the two experiments do not significant differ from each other. For details on which age groups in which experiment that differ from each other, see Table **18** and the discussion of Figure 20 above. In the plural [*các/những*-CL-N] conditions, the ANOVA results reveal a significant difference between two experiments (F = 6.757, p < .01), a main effect of age group (F = 32.578, p < .000), and also an interaction between age group and experiment (F = 4.830, p < .01). The relevant sub t-tests between two experiments in the plural conditions using Bonferroni-adjusted alpha levels of 0.008 per test (alpha 0.05 divided by 6 comparisons) show that the only age group significantly different between the two experiments is 4-year-olds (t = 4.4347, p < .000).

3.6.4. Discussion

Vietnamese children in Experiment 2 again appear to interpret singular and plural noun phrases as definite—even when the number of animals increases. 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 in the sense that unlike their Spanish- and English-acquiring counterparts as shown in Munn et al. (2006), Vietnamese children (except for 3-year-

olds) frequently committed number errors, despite producing an overwhelming proportion of definite responses. In the singular definite experimental condition, they continued to choose the singular definite response, even at higher rates compared to Experiment 1. 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 cross-linguistic peers in Munn et al. (2006).

In sum, the major difference between my results and those of Munn et al. (2006) is the error patterns. Spanish- and English-acquiring children from Munn et al. (2006) produced numbertarget responses across singular and plural conditions and failed to produce definite responses in the singular definite condition. In contrast, the children in both of my experiments 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. In particular, Vietnamese-speaking children across all age groups knew the singularity but struggled with plurality until the age of 6. They, on the other hand, were able to produce majority of definite responses (either unique singleton or maximal plural sets) as early as 4 years old.

However, one might argue that the reason that the Vietnamese children in Experiment 2 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, 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? Also, if this is indeed a preference, why do Vietnamese children's preference patterns in the singular indefinite control condition differ between two experiments? In Experiment 2, children showed a much stronger preference for the animal closest to a landmark compared to Experiment 1 in the singular *in*definite trials where multiple responses are allowed. One might suspect that our decision to use four animals per landmark rather than three made a difference. A restriction had to be imposed for the singular and the item closest to the child was too far to also satisfy close to the landmark. 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. Yet, as seen in Experiment 1, where the number of animals was identical with that of Munn et al. (2006), Vietnamese-speaking children as early as 4 were able to choose the unique singleton set in the singular definite trials most of the time, and more importantly, at a rate significantly higher than 3-year-olds, i.e., there was an age development, which a preference should not be subject to.

3.7. 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. One might suggest this difference

originates from the difference in the acquisition order of these morphemes themselves. Under this assumption, 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 pluralizers 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. (2009), Park (2010). The literature also points out a number of different reasons why plural morphemes in classifier languages are difficult for children to acquire as such, including their portmanteaumorpheme-like nature, their optionality and the variability that this entails; see Li et al. (2009), Munn et al. (2009), Nakano et al. (2009), M. Kim (2011), Kim, O'Grady and Deen (2014). Meanwhile, cross-linguistically animate classifiers are reported to be acquired earliest in terms of both production and comprehension; see Gandour, et al. (1984), Uchida & Imai (1996), Tse, Li & Leung (2007), Tran (2012), among others. I will come back to this point later in Section 4.7 to explain why this is not the case for Vietnamese pluralizers.

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 behavior 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?

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One possibility is that the semantics of the noun phrase locative modifier might differ in Vietnamese. Maybe the phrase *dirng kế cái cây*, which we have translated as "next to the tree," really means something more like "adjacent to the tree." However, I reject this explanation based on truth value judgments from native speakers, who answer *yes* to sentences like (68), even in the scenario where the dog with the bow is not the one adjacent to the tree.

(68) 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 21. 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 I 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 behavior 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, my findings highlight the importance of crosslinguistic research in contributing to our understanding of how children acquire semantic concepts. Specifically, what my results suggest is that when languages encode the same semantic primitives in different ways, this has consequences for how children interpret those semantic primitives.

Chapter 4. THE ACQUISITION OF VIETNAMESE PLURAL NOUN PHRASES: CÁC VERSUS NHŨNG

4.1. Introduction

Unlike what was claimed in the Vietnamese literature, we learned from the two comprehension studies in Chapter 3 that both children and adults treated *các* and *những* alike and as maximal and plural. This chapter presents the results from another experiment (henceforth, 'Experiment 3'), a picture-selection task focusing on any possible difference in the interpretation between the two pluralizers. In particular, this study is designed to serve two goals. First, I investigate one more time, in a context differing from the context in the two previous experiments, whether *các/những* are interpreted as referring to the maximal set in the discourse or they accept a proper set of the set available in the discourse. To put it more simply, the goal is to determine whether in a different context *các* and *những* are also acceptable with a "some of the" set in the discourse and do not require a maximal interpretation. Second, I am interested in finding out if children's (and adults') comprehension of the pluralizers is task dependent. In particular, do participants distinguish between *các* and *những* in another context or do they still consistently treat the two pluralizers interchangeably, like what we have seen in the act-out tasks above?

4.2. Experimental set up

Experiment 3 is a modified picture-selection task in which participants listen to a sentence and have to pick the picture that matches the description. This is a modification of the coveredbox method used by Huang et al. (2013) to test scalar implicatures with numbers and *some* vs. *all* paradigm. Participants have three pictures to choose from, but one of the pictures is partially covered by a gigantic (but friendly) worm. The covered picture can be chosen in case participants find none of the other two options provided to be good enough to match their interpretation of the linguistic expression they hear.

Each trial includes an introductory story where all items are on display in a kitchen setting. There are 8 identical items of the same type (e.g., bananas, cups), which are divided in two groups of two different colors (e.g., green or yellow), so each color has 4 items, as illustrated in Figure 22(a). The color distinction is added to satisfy the modification requirement on *những*. Then participants will receive three pictures which appear together and hear a prompt about one of the characters. In each picture, there are two characters carrying some of the objects. The character about which a statement will be made is carrying one item (singular - 'one' picture), two items (subset - 'some' picture) or four items (maximal - 'all' picture) of the same color respectively, as illustrated in Figure 22(b). The worm randomly covers one of the three pictures, in this case the singular picture. Participant's task is to choose the picture that matches the prompt they heard, which varies among a singular expression (i.e., *one*-CL-N) or noun phrases with *các* or *những*, or the picture covered partially by the worm if none of the pictures fits the description.



(a) *Introductory picture*: Bo and Hoa have to bring yellow bananas to their guest



(b) *Picture selection*

Figure 22. Experimental setup

4.3. Hypotheses and predictions

The experiment is designed on the premise of how scalar implicature works. In general, scale terms such as *sometimes* are stored in our memory in association with alternative terms like *always*, *often*, and *rarely* due to habitual generation of the implicatures for *sometimes* (i.e., 'not always') in everyday communications (Gazdar, 1979; Levinson, 1983, 2000). The idea is that if the two pluralizers *các* and *những* are indeed different in a way that *các* is definite while *những*, as claimed in the literature, refers to a subset (i.e., similar to English *some*), then participants should accept the picture in which a character is carrying just some items of the entities restricted by the discourse when they hear an NP with *những* but reject it if they hear [*các*-CL-N], as *những* would be a better alternative. My task also has a third option which allows participants to show their different preferences for *các* and *những*, if any. If *các* is definite and strictly demands the maximal reading while *những* merely prefers it, then they should also be interpreted differently. In particular, adults are expected to pick the maximal pictures for *các* consistently while allowing the

subset pictures for *những*, especially in the condition where the maximal option is covered and therefore less readily accessible. However, if what I found in Experiment 1 and 2 holds, adults and children will treat them the same and as definites, i.e., they mostly choose 'all' pictures regardless of which pluralizer is used.

Interestingly, though, previous studies show even adults allow non-maximal interpretations of the definites in certain contexts. The first experiment in Munn, Zhang, & Schmitt (2009) uses a Truth Value Judgement Task with pictures to investigate whether Mandarin-speaking children and adults interpret noun phrases with the pluralizer *-men* as plural definites or not, in comparison to bare noun phrases. The results show that children learned the properties of *-men* separately with comprehension of plurality proceeding maximality and that for adults, *-men* is not necessarily treated as maximal (even though maximal interpretation is preferred). In the plural condition, when asked a question like (69) and given a picture in which two out of three ladies were eating a banana, Mandarin adult speakers said yes 24% of the time. And their acceptance rate of non-maximal readings is even higher when bare noun phrases like what in (69) are used: they said yes 68% of the time.

(69) a. Ayi-men zai chi xiangjiao, dui-bu-dui? Aunt-MEN ZAI eat banana right-not-right 'The ladies are eating a banana, is that right?'
b. Ayi zai chi xiangjiao, dui-bu-dui? Aunt ZAI eat banana right-not-right 'The lady/ladies is/are eating a banana, is that right?'

As Mandarin-speaking adults' unexpected interpretation of the bare NPs poses the question whether the domain restriction was changed by the context of the task, Munn, Zhang, & Schmitt (2009) replicated the experiment with 20 English-speaking adults, comparing the singular and plural definite noun phrases. Interestingly enough, they report the participants rejected a non-maximal plural picture for a question like "*Are the girls eating a banana*?" only 45% of the time.

The authors then suggest that in this context, the domain restriction assigned to *the girls* is the set "the girls who are eating a banana" (Munn, Zhang, & Schmitt, 2009, p. 321).

Simon-Pearson & Syrett (2018) provides another instance in which both English-speaking adults and preschoolers are likely to accept the non-maximal interpretations of the definites. In their study, participants saw a scene in which a set of red dinosaurs all went to a bookstore and a set of green dinosaurs were split: some green dinosaurs went to the library, while some went to the bookstore. Puppet then uttered the sentence like "*The red dinosaurs went to the bookstore, and the green dinosaurs went to the bookstore, too.*" Both children and adults frequently accepted such utterances even if not all of the green dinosaurs went to a single location (about 48% and 57%, respectively).

Under the modification constraint of *những*, having a contrastive set in this experiment comes as an unavoidable design feature. In that sense, the set up in Experiment 3 is very close to the contexts used in Munn, Zhang, & Schmitt (2009) and Simon-Pearson & Syrett (2018), which allow English and Mandarin adult speakers to accept the non-maximal readings of the definites, something we should keep in mind when discussing the results later. It is also similar but not identical to the context of the two previous experiments where I contrasted two sets with respect to their locations.

4.4. Participants

Ninety-one children were recruited from three kindergartens and two elementary schools in Ho Chi Minh city. Thirty-four of these children were later excluded from the analysis for failure during the pretest, showing they did not understand the task, or for failure to provide at least two correct responses for the eight control trials. The data reported here come from 57 children (M=5;11, range: 3;8-7;10), including sixteen four-year-olds (M=4;5, range: 3;8-4;11), fourteen five-year-olds (M=5;2, range: 5;0-5;11) nine six-year-olds (M=6;6, range: 6;3-6;11), and eighteen seven-year-olds (M=7;5, range: 7;0-7;10). Seventeen native Vietnamese-speaking adults in the same city also participated as controls. All child and adult participants did not receive any compensation.

4.5. Materials and Procedure

The task included three phases: training, pretest, and test. All phases used the same design as described in Section 4.2 with different complexity levels and contents. They were conducted in a single session. Each session lasted approximately 30 minutes, including a 1-minute break after the pretest. The series of stories and trials were narrated by the experimenter along with pictures displayed on a laptop or projection screen. Children were tested individually and videotaped (as parents consented). Adults were tested, either individually or in a group, using an answer sheet on which they circled their picture choices.

The procedure and materials used for each phase will be described in detail below.

4.5.1. Training

The purpose of the training phase is to make sure participants understand the design of the task. Participants were told that they were participating in a game and the point of the task was to match the sentence they heard with only one picture. Then the experimenter introduced the worm using the script whose English equivalent version is in (70).

(70) This is the worm! He is tricky and likes to cover up parts of the pictures you will see. Because of this, sometimes he can cover up crucial parts of the correct picture. Let's see how this works. The experimenter continued introducing two characters and walking the participant through three training trials around this character. These training trials were reproduced from Latack & Hirzel (2015) with their permission. In each training trial, three pictures were shown together with one character holding an object which is different in each picture. The pictures were randomized in such a way that the worm covered the correct picture in two out of three trials. After the participant chose a picture that they thought matched with the prompt, the worm moved to show what was covered and the experimenter explicitly gave the participant feedback on which picture was the correct one. An example trial (translated to English) is given in (71).

(71) a. Prompt: *Can you show me the picture where Misa has an orange basketball?*b. Pictures:



c. Feedback: Look! That was easy since the worm was not covering the basketball, he was covering a tennis ball. Let's try again.

4.5.2. Pretest

After the training phase, participants entered a pretest. The design of this phase is identical to the training phase, except that the worm did not move, i.e., what was covered underneath it was not revealed, and that the experimenter did not give any feedback on which picture might be the

right one. Three target objects were *cây đàn ghi-ta* 'guitar', *tam giác màu xanh dương* 'blue triangle' and *trái tim màu xanh lá cây* 'green heart.' Participants who failed in any of the three trials in the pretest were not included in the analysis.

4.5.3. Test

Participants were first given the context of a new story, as in (72), together with the picture

of the two new characters.

(72) Now do you think you know how everything works? (*wait for confirmation*) Let's start the game! As you noticed some pictures are not to scale, please disregard that. Some pictures were enlarged to show details. Please keep in mind that there is only one picture that matches the description. Also, if the two pictures visible to you are not the perfect answer, the covered picture would be the perfect one. This story is about new characters, Bo (*point to the male character on the screen*) and Hoa (*point to the female character on the screen*). They are brother and sister. They are having a party at their house with lots of guests. They both are competitive and want to help their parents out more than the other one. Because of this, sometimes one does more work than the other, but sometimes they do the same amount of work. Pay very close attention the pictures and the sentences that you hear! And remember that the worm is tricky and the correct picture can sometimes be hidden behind him! I will only say the sentence one time, so listen carefully²⁸. Are you ready? Let's see what Bo and Hoa are doing now!

Under this general context, the experimenter told participants a series of short stories

together with illustrated pictures. In each trial, a script as exemplified in (73) was used along with pictures presented on a screen as illustrated in Figure 22. The experimenter started by introducing the two sets of objects of interest in a kitchen setting (e.g., yellow bananas and green bananas), following by specifying which color of the objects the guest would want (e.g., yellow bananas). At the end of each story, three pictures were presented and the participant was instructed to choose which picture they thought best fit the prompt they heard, using one of the target nominal

²⁸ Adults were instructed to leave it blank on their answer sheet.

constructions in (73). The types of three pictures are 'one' picture, 'some' picture, and 'all' picture,

where the character who participants were asked about had one item, two, or all four items of the

set of interest, respectively.

- (73) a. Preamble: Hey look in the kitchen. Do you see yellow and green bananas? (*context picture presented*) John and Sally have to bring yellow bananas to their guests. They both want to do more work than the other person. Look they are coming back now!
 - b. Prompt: Can you show me the picture where Hoa is carrying...?

Test trials:							
(i)	các	trái	chuối	vàng			
	PL	CL	banan	a yellov	N		
(ii)	những	trái	chuối	vàng			
	PL	CL	banan	a yellov	N		
Con	trol tria	ls:					
(i)	một tr	·ái chi	ıối	vàng			
	one C	L bar	nana	yellov	N		
(ii)	tất cả	các	trái	chuối	vàng		
	all	PL	CL	banana	yellow		
(iii)	tất cả	những	trái	chuối	vàng		
	all	PL	CL	banana	yellow		

Participants were tested for four linguistic expressions. The two test conditions are noun phrases with *các* (henceforth as *các* condition) and *những* (henceforth as *những* condition). The two control conditions used noun phrases which either lexically specified a singleton set using the numeral *one* (henceforth as *one* condition) or lexically specified the maximal set with the quantifier *all*, accompanied by a pluralizer *các* or *những* (henceforth as *all* condition). Expected pictures to be chosen are shown in Table 27.

Tab	le 27.	Noun p	hrase	types	used	in	Experiment 3	3
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	Condition	Noun phrase type	Expected picture
Experimental	PL-def	các-CL-N	'all' picture
	PL-def (?)	những-CL-N	'all' or 'some' picture
Control	SG-indef 'one'	<i>một</i> CL-N	'one' picture
	all + $c\acute{a}c$	tất cả các-CL-N	'all' picture
	all + <i>những</i>	tất cả những-CL-N	'all' picture

The full set of prompts was generated by crossing these five noun phrase types with sixteen types of object to produce 80 items. Each participant was tested on 16 items (four of each noun phrase type, except that *all-các* and *all-những*; each of them was tested only twice per participant) plus four simple question fillers from another experiment of mine.

Participants were randomly assigned to one of five different versions of the 16-item test, each with a different order. Similar to Experiment 1 and 2, in all versions, the control *all*-items were presented *after* experimental items to prevent children from developing a contrast strategy for interpreting the experimental items. In four of the five versions, experimental items were presented in blocks, with either the [*những*-CL-N] block first (version 1 and 2) and the [*các*-CL-N] block first (version 3 and 4); items were ordered randomly within each block. In version 2 and 4, the [*one*-CL-N] block was inserted between *những*- and *các*-blocks. In other versions, the *one*- and *all*-trials were randomized after the two experimental conditions. In version 5, each block contained a [*những*-CL-N] item, a [*các*-CL-N] item, and a [*one*-CL-N] item, presented in a random order. One filler item followed after every four tested items. No significant differences were found between versions; therefore, I collapsed them when reporting the results. I also randomize which picture type was covered by the worm for each type of object (e.g., in the yellow banana trials, the covered picture was randomly assigned for a 'one', 'some', or 'all' picture).

4.6. Results

4.6.1. Adults

Adults performed very well in both control conditions: their target responses were 99% and 93% for *one* and *all* phrases, respectively, showing that they understood the task. Next we will look at their behavior in the experimental trials. Table 28 presents the percentages and frequencies

of adults' response types in *các* and *những* conditions, grouped by picture types chosen ('one' picture on the left, 'some' picture in the middle, and 'all' picture on the right). The pictures partially covered by the worm are in shaded cells, e.g., 'one,' 'some,' 'all' pictures are covered in Trial 1, Trial 2, and Trial 3, respectively.

 Table 28. Percentage (frequency) of adults' response types in các and những conditions (pictures covered by the worm are in shaded cells)

		(i) CÁC		(ii) NHỮNG		
Picture Type	*	まま	kkkk	\$	また	kkkk
Trial 1	0	18.52% (5/27)	81.48% (22/27)	0	13.79% (4/29)	86.21% (25/29)
Trial 2	0	5.26% (1/19)	94.74% (18/19)	0	17.65% (3/17)	82.35% (14/17)
Trial 3	4.55% (1/22)	40.91% (9/22)	54.55% (12/22)	4.55% (1/22)	59.09% (13/22)	36.36% (8/22)
Total	1.47%	22.06%	76.47%	1.47%	29.41%	69.12%

The proportion of times adults chose the singular picture (the first column in Table 28 (i) and (ii)) in trials using *các* and *những* noun phrases clearly shows that adults know these two morphemes are plurals. They rejected the singular picture most of the time even when it was uncovered.

In terms of maximality, when the 'all' picture was not covered, adults associated the pluralizers with it at high rates, with *các* has a bit higher rate of the 'all' picture than *những* (81-95% vs. 82-86%). Four two-proportion z-tests reveals that the difference in adults' maximal choice between *các* and *những* is not significant and that there is also no significant difference in the rates adults interpreted them as maximal between the two trial types where the 'all' picture was not covered (Trial 1 in which 'one' picture was covered vs. Trial 2 in which 'some' picture was covered).

In trials where the maximal option was covered, however, adults seemed to split between 'some' and 'all' pictures for their interpretation of the pluralizers. Adults associated *các* with 'some' picture about 41% and 'all' pictures about 55%, while accepting subset and maximal readings of *những* about 59% and 36%, respectively. The difference between 'some' choice and 'all' choice is not statistically significant for both pluralizers. Nevertheless, two-proportion z-tests comparing the proportion of 'all' choice in trials where it was visible shows versus in trials where the 'all' picture was covered that adults significantly reduced the rate of their maximality interpretation of *các* and *những* in the latter case ($\chi^2(1) = 6.981$, *p* = .008 and $\chi^2(1) = 14.156$, *p* = .0002, respectively). In other words, whether the maximal picture was covered or not has a main effect on the frequency that adults associate the pluralizers with maximality. Figure 23 presents the proportions of adults' maximal (in light grey) and non-maximal (in dark grey) responses when they heard *các* and *những* noun phrases, both when the maximal picture was covered or visible.



Figure 23. Proportion of adults' plural responses by response types in các and những conditions when the maximal picture was covered (left) and uncovered (right)

The interpretation of *các* and *những* thus is not even clear from the adults' results. If we define definiteness as a requirement of maximality then neither of these pluralizers is definite due to the fact they allowed a subset reading when the maximal picture was hidden underneath the worm. If we define indefiniteness as a preference for subset reading like *some* in English, then it appears neither of them is indefinite either, because they did not prefer the subset reading when both maximal and subset pictures are available.

In the next section we investigate how Vietnamese-speaking children performed in the same task, first in the control conditions and then in the test conditions.

4.6.2. Children

4.6.2.1.Control sentences

Table 29 presents the percentages and frequencies of children's picture selections for the control trials. Like adults, children did well, producing the target responses in 'one,' 'all-*các*' and 'all-*những*' conditions regardless of which picture was covered. Therefore we can say they understood the task.

Table 29. Percentage (frequency) of children's response types in control conditions (pictures covered by the worm are in shaded cells)

	(i) ONE-CL-N			(ii) A	(ii) ALL-CÁC-CL-N			(ii) ALL-NHŨNG-CL-N		
Pic. Type	\$	**	66 66	*	**	k k k	*	また	kkkk	
Trial 1	82.46% (94/114)	9% (10/114)	9% (10/114)	10.34% (6/58)	5.17% (3/58)	84.48% (49/58)	2.38% (1/42)	2.38% (1/42)	95.24% (40/42)	
Trial 2	92.98% (53/57)	0	7.01% (4/57)	13.33% (2/15)	0	86.67% (13/15)	4.65% (2/43)	4.65% (2/43)	90.7% (39/43)	
Trial 3	85.96% (49/57)	1.75% (1/57)	12.28% (7/57)	7.32% (3/41)	19.51% (8/41)	73.17% (30/41)	3.45% (1/29)	10.34% (3/29)	86.21% (25/29)	
Total	85.96%	4.82%	9.21%	9.65%	9.65%	80.7%	3.5%	5.26%	91.23%	

Although the number of times a child pick the maximal picture look different between [allcác-CL-N] and [all- *những*-CL-N], two-proportion z-tests confirm that these differences are not statistically significant, i.e., children interpreted them as same.

4.6.2.2.Experimental sentences

The percentage and frequency of children's response types ('one,' 'some,' or 'all' picture) for *các* and *những* noun phrases, grouped by which picture types being covered, are reported in Table 30.

 Table 30. Percentage (frequency) of children's response types in các and những conditions (pictures covered by the worm are in shaded cells)

		(i) CÁC		(ii) NHỮNG		
Picture Type	*	**	kkkk	k	です	kkk
Trial 1	8.05%	4.6%	87.36%	9.99%	9.99%	80.2%
	(7/87)	(4/87)	(76/87)	(10/101)	(10/101)	(81/101)
Trial 2	11.27%	8.45%	80.28%	10.53	10.53%	78.95%
	(8/71)	(6/71)	(57/71)	(6/57)	(6/57)	(45/57)
Trial 3	14.29%	35.71%	50%	7.14%	35.71%	57.14%
	(10/70)	(25/70)	(35/70)	(5/70)	(25/70)	(40/70)
Total	10.96%	15.35%	73.68%	9.21%	17.98%	72.81%

First, look at the singular picture choice (first columns in Table 30 (i) and (ii)), we can see that children know both *các* and *những* are plurals. Like adults, children found pictures where the character under question was carrying one item incompatible with *các* and *những* expressions most of the time even when the picture was uncovered.

While the singular-plural distinction is very clear as such, children's behavior in terms of maximality of these two pluralizers is more complex. Children, in fact, behaved almost exactly like adults. When both maximal and subset pictures were available, children much preferred the maximal reading for both *các* and *những*. And when the maximal choice was covered, children treat *các* like adults, namely they preferred the maximal reading but also allowed a subset interpretation. However, different from adults, children still preferred the maximal reading for *những* where adults preferred a subset reading (even though for adults, the differences between two readings in both pluralizer cases were not significant). Two-proportion z-tests show that children's maximal 'all' and non-maximal 'some' choices in *những* conditions when the maximal choice is covered (57.81% vs. 35.71%) significantly differ from each other ($\chi^2(1) = 5.629$, p =

.0177). I went further and broke down the differences in children's plural response types between trials whose maximal picture was covered and those in which it was uncovered by age groups in Figure 24, with maximal choice in light grey and subset choice in medium grey. Singular choice was not considered.



Type of MAXIMAL picture

Figure 24. Proportion of children's plural responses by response types in các and những conditions when the maximal picture was covered (left) and uncovered (right)

Multiple two-proportion z-tests were conducted, revealing the covering of the maximal pictures has significant effect on the ability to associate a pluralizer with maximality among 4- and 7-year-olds for both of the pluralizers (all p < .008) and among 6-year-olds in the case of *các* (χ^2 (1) = 4.608, *p* = .0318). Children age 5 treated both *các* and *những* as maximal and did not behave differently between trials that maximal choice was visible and trials that it was not. A three-way

ANOVA with condition (*các*, *những*) and maximal picture type (covered, uncovered) as a withinsubjects factor and age group (4, 5, 6, 7) as a between-subjects factor to test for developmental trends in the overall rate of *maximal* responses (out of plural responses) was also conducted. The results suggest there is the main effect of age group (F = 63.478, p < .000) and setup (i.e., maximal picture type; F = 5.942, p < .05), but no interaction. This means, even though the setup (covered vs. uncovered maximal picture) affected the rates that children of each age group interpreted the pluralizers as maximal, there is a consistent development over age in maximality: the older children get, the more they prefer the maximal reading for both *các and những* regardless whether that reading is visually available or not.

4.6.3. Discussion

Both adults and children successfully interpreted both *các* and *những* as plural in this picture selection task. The maximality issue is less clearer. According to the literature of Vietnamese linguistics, the target pictures are the maximal 'all' picture for *các* and the subset 'some' picture for *những*. Adults in this experiment seemed to behave differently from the predictions, at least in trials where the 'all' picture was covered. When the maximal option was covered, they suddenly allowed a subset reading for the pluralizers much more often, especially for *những*. Although the overall differences between 'some' choice and 'all' choice were not statistically significant for both of the pluralizers, this difference became significant in the trials where the picture compatible with maximality was covered by the worm.

Children behaved similarly to adults in terms of the maximality of *các*. For *những*, they still significantly preferred the maximal interpretation over the subset readings in the trials with the 'all' picture covered. However, like adults, children of most age groups chose the maximal

reading for both pluralizers significantly more in trials where the picture compatible with that interpretation was visually available, compared to when it was not. Regardless of the covered/uncovered difference, children preference to associate the pluralizers with maximality in this experiment develops with age.

Even though the results suggest that in this particular context, maximality of the $c\dot{a}c$ and *những* seems to be a preference, we cannot conclude that they are not definites, given the literature on the non-maximal uses of definites, as discussed in 4.3. Indeed, in general, the violation of uniqueness/maximality presupposition of the definites is not that uncommon in daily use of English, as seen in (74).

- (74) a. He poked her in the eye.
 - b. He hit her on the arm.
 - c. The geese flew away. (In the context one on the ground and 20 flew away)
 - d. Pick up the kids from school! (It doesn't mean picking up all the kids in that school)

What is interesting here is that my experiment seems to align with Munn et al. (2009) and Simon-Pearson & Syrett (2018) in the sense that contexts containing contrastive sets might play a role in facilitating the non-maximal interpretations of plural definites, In addition, the covereduncovered picture contrast paradigm is helpful in showing how these readings could be stimulated. Vietnamese children in this experiment were successfully associated the pluralizers with maximal sets and only accommodated the subset interpretations in the same context that adults did. Therefore, the results here, together with the two previous experiments, provide evidence against the 'No Maximality Hypothesis': Vietnamese children as young as 4 do have the maximality presupposition of the definites.

4.7. General discussion

Chapter 3 and 4 presented my experimental work on the comprehension of Vietnamese noun phrase with and without a pluralizer *các* or *những*. Experiment 1 and 2 are an act-out task focusing on the distinction between [CL-N] (mostly interpreted as singular, unique) and [*các/những*-CL-N] while Experiment 3 is a picture selection task investigating whether there is a difference between *các* and *những* in terms of interpretation. Let's return to the research questions from the beginning of Chapter 3 and see how the experimental results help address them.

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?

Vietnamese children in Experiment 1 and 2 of all ages treated [CL-N] as singular as expected while showing difficulty with the plurality that $c\dot{a}c/nh\tilde{u}ng$ entail. In particular, they did not get to the same level of accurately treating these pluralizers as plural, compared to their English- and Spanish-speaking peers until the age of 6-7. However, Vietnamese-speaking children did show the development with age in their ability to associate $c\dot{a}c/nh\tilde{u}ng$ with plural interpretations. They also produced significantly more plural responses for noun phrases with $c\dot{a}c/nh\tilde{u}ng$ than for CL-N phrases, suggesting they knew the number distinction between CL-phrases with and without a pluralizer.

Interestingly, though, children acquiring Vietnamese in Experiment 3 were able to constantly reject singular picture when they heard *các/những* nominal constructions (even when this singular choice was not covered by the worm and thus easily accessible), giving an opposite strong signal that Vietnamese-speaking children know the plural interpretation of *các* and *những* as early as 4 years old.

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 *nhũng*-CL-N sequences?

In the singular test condition, children of all ages, like adults, treated CL-N as unique, except for 3-year-olds in Experiment 1 who split evenly between unique and non-unique readings. As mentioned previously, this could be due to the fact that they are younger than the 3-year-old group in Experiment 2. Another noticeable point is that children showed the same preference towards that specific item in the singular, indefinite [*one*-CL-N]. Although it is not an unusual behavior, and adults did that as well, that makes it impossible to conclude that children know that CL-N has a uniqueness presupposition. However, it is worth to point out that, except for 3-year-olds in Experiment 1, all other children when not producing a target response (i.e., singular, unique) for [CL-N], mostly committed to responses that were compatible with definite interpretation of the wrong number (i.e., plural maximal) and that pattern differed from [*one*-CL-N]. Second, there is a development with age with respect to children's ability to associate [CL-N] with uniqueness, a trend which a generic bias is likely not to have; all ages being equal.

Both adults and children in the first two experiments treated *các* and *những* as the same. Adults interpreted them as plural, maximal. Child participants at the age of 4 and above also associated these two pluralizers with either unique or maximal readings most of the time (regardless of the different numbers of items in the setups). In other words, except for number accuracy, they behaved like adults in terms of definiteness of these morphemes. 3-year-olds' behavior in the plural conditions, on the other hand, was a bit of a puzzle. Even though in both experiments, they still produced responses that were compatible with definite interpretation majority of the time, they made quite a bit of errors associated with indefinite readings, non-unique singleton in Experiment 1 or non-maximal plural sets in Experiment 2. We will come back to this point later when addressing Q3 for a possible explanation.

In Experiment 3, both pluralizers showed a strong preference for a maximal plural set overall for both adults and children, but this does not seem to be obligatory. This not only counters the traditional descriptions of the pluralizers in terms of definiteness, but also seem to be contrary to what was found in the previous two experiments where both adults and children interpreted them as maximal (or unique for some children). Here they all allowed the subset interpretation of the pluralizers at least in the trials where a maximal set was covered. To maintain the idea that they both pick the maximal set it must be case that the two characters provide another way to restrict the set. The green bananas that the boy has vs. the bananas that the girl has, maybe a way to provide yet another implicit restriction. Only further research on the processes involved in implicit restrictions and accommodation in different languages will be able to teach the differences between the experiments.

Q3: Can Vietnamese-acquiring children integrate these two features in interpreting noun phrases with pluralizers?

Contra results from English and Spanish in the same task, Vietnamese children in Experiment 1 and 2 made few definiteness errors, instead struggling with number (plurality, to be exact), casting doubt on a universal difficulty with definiteness shown in previous research. In contrast, Experiment 3 using a picture selection task shows that Vietnamese-speaking children do have number knowledge, specifically the ability to associate $c\acute{ac}/nh\widetilde{trng}$ with plural sets. Let's start teasing apart this puzzle.

First, the fact that Vietnamese-speaking children exhibited a behavior that is compatible with both the knowledge of maximality/uniqueness and number at young ages, although in separate experiments, supports my suggestion in 3.7 that crosslinguistic differences in the acquisition of number and definiteness between Vietnamese and languages with definite determiners and grammatical number (English, Spanish) arise from how children integrate information from number and definiteness.

Second, we saw that Vietnamese children performed poorly in terms of plurality and excelled at interpretations compatible with maximality/uniqueness in the first two experiments, but behaved in an opposite way in the third experiment where they always knew pluralizers are plural but allowed non-maximal readings in certain contexts. This adds another layer to the nature of the interaction between number and definiteness: It is not only language specific but also task dependent. In other words, which feature children choose to prioritize over the other might be different when the task or the context changes. Under this hypothesis, messy behavior from 3-year-olds in Experiment 1 could be explained as a 'give-up' attitude, since they were really young while these tasks were quite demanding.

This gives rise to the reinterpretation of two previous findings. First, the fact that Vietnamese-acquiring children struggled with the plurality of pluralizers in Experiment 1 and 2 could be easily assumed as a challenge for pluralizers in classifier languages widely accepted in the literature, as mentioned in Section 3.7. However, as Experiment 3 clearly show children of the same age ranges had no issue interpreting $c\dot{a}c/nh\tilde{u}ng$ as plural, multiple information integration issue seems to be a more feasible explanation. Second, assuming that Spanish-and English-speaking children prioritize number over definiteness in the act-out task, I suggested in Section 3.7 that their adult-like behavior in the plural conditions might be accounted for by a default interpretation of plural as maximal. In addition, the marked location (e.g., the tree or the house)

and the other contrastive set (e.g., the other plural sets next to the other landmark) in that certain context could also boost that default maximal interpretation of the plural.

Chapter 5. DISCUSSION AND FURTHER RESEARCH

5.1. The questions

The linguistic phenomenon this dissertation is interested in is the two pluralizers in Vietnamese – $c\dot{a}c$ and $nh\tilde{u}ng$. In particular, it aims at investigating their properties and their effects on the structural composition as well as the comprehension of Vietnamese noun phrases. I pursued these goals by addressing the two sub-questions as in (75).

(75) Research questions:

Q1. What is the basic structure of Vietnamese noun phrases and in which way can it account for the differences between *các* and *những*?

Q2. What are the interpretations of noun phrases with and without a pluralizer in Vietnamese?

I approached the first question by providing a detailed description of the semantic properties and syntactic behavior of *các* and *những*, based on which a unified structure of Vietnamese noun phrases was proposed to account for these differences between the two pluralizers. The second question was addressed from both a theoretical (as included in the syntax structure proposed) and an acquisition perspective, focusing on how Vietnamese-acquiring children ages 3 to 7 and adults comprehend [CL-N] and [*các/những*-CL-N] in certain contexts.

I will first provide a summary of the findings and draw some conclusions in responding to the research questions in (75) (Section 5.2) and then pinpoint some relevant aspects that have not been covered by the scope of this dissertation and how further research can help address them and/or advance the current findings (Section 5.3).

5.2. The summary of findings

Q1. What is the basic structure of Vietnamese noun phrases and in which way can it account for the differences between *các* and *những*?

Bare nouns are allowed in Vietnamese, and much like bare nouns in many other classifier languages, they are underspecified for definiteness and number. Hence, depending on the contexts and the predicates, a Vietnamese bare noun like chó 'dog' may mean either "a dog," or "the dog," "the dogs," or just "dogs." Bare classifier phrases (76) are interpreted as singular and definite. 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 $m \hat{\rho}t$ 'one' to the [CL-N] sequence forces a singular indefinite interpretation (76); conversely, adding the pluralizer cáctriggers a plural, definite interpretation, as in (76).

(76)	a.	con chó		
		CL dog		
		'the dog	.,	
	b.	một	con	chó
		a/one	CL	dog
		ʻa dog'		
	c.	các con	chó	
		PL CL	dog	
		'the dog	s'	

In Chapter 2, my analysis suggests that the underlying syntactic structure of phrases (76) is as in (77), 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 the singular indefinite ($m \hat{\rho}t$ -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.

(77) a. Structure of a Vietnamese noun phrase containing [CL-N] (singular, definite)



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



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



Vietnamese also has a second pluralizer element *nhũng*, which triggers a plural interpretation but whose definiteness status remains debatable in the literature. One of the most striking properties of *nhũng* is that it imposes the additional requirement that the noun phrase be further modified; for example, (78) would be grammatically unacceptable if it lacked the attributive adjective *mực* 'black'. I argue that noun phrases with *nhũng* are compatible with a definite interpretation, but are not inherently definite; its reading is of a modified subset of the larger unmodified set, but the actual size of the subset rather varies with the context, being able to appear also in indefinite contexts such as existential sentences or question phrases, as illustrated in (78) and (78).

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

I then propose the simplified structure in (79) to account for the properties of the pluralizer *những*. Crucial point sto observe are that (i) the pluralizer 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 I have labelled as PredP. This is a syntactic reflection of a semantic function of the pluralizer *những* in which it signal a partitive relation between the set it picks out and the whole set in the discourse.

(79) Structure of a Vietnamese noun phrase containing [*những*-CL-N-Modifier]



Q2. What are the interpretations of noun phrases with and without a pluralizer in Vietnamese? As discussed in Chapter 2, the pluralizers are obligatory for the plural interpretation of CL-phrases (which are always singular). In terms of definiteness, [CL-N] is consistently associated with a definite reading. The literature of Vietnamese linguistics has been unanimously consensus that noun phrases with *các* refer to an entire set of entities under discussion, while divisive in regard to the interpretations of *những* with the majority assuming it denotes a subset, i.e., *in*definite. I argued for a wide variety of the interpretations of *những*, using linguistic instances in which *những* was compatible with definite readings and also indefinite constructions that *những* can occur with. I also proposed the distinction between *các* (which is always definite) and *những* regarding their interpretation stems from the feature of the D in their structure: the former requires a true definite D that is determinate (i.e., having an existential presupposition on top of the uniqueness presupposition) while the later looks for an empty D and thus its interpretation depends also on the modified NP it takes as a complement.

With this descriptive onset, I then asked whether adults and children can associate noun phrases with and without pluralizers to sets with the correct number and definiteness properties. Findings from each experiment are reviewed below, with adults' performance presented first followed by children's behavior.

In Experiment 1 and 2, participants were asked to pick out a set of animal(s) that were compatible with the prompts they heard as in (80).

- (80) Sample test item:
 - a. *Đưa cho cô* {*ø* /*các* /*những*} *con chó đứng kế cái cây.* give for aunt {*ø* /CAC-PL /NHUNG-PL} CL dog 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} con chó đứng kế cái cây.* give for aunt {one /all PL /all PL } CL dog stand next CL tree 'Give me one/all the dogs next to the tree.'

Adults in both experiments were consistent. They did well as expected in all control items.

They successfully picked out the closest animal to the asked landmark for [CL-N], treating this expression as singular, unique like said in the literature. *Các* and *những* patterned together in adults' interpretation as plural, maximal, suggesting that clear definite-*in*definite distinction held argued for in the literature needs to be somewhat refined.

Vietnamese-speaking children in the same experiments also performed well in the control conditions, demonstrating they understood the task. Childern of age 4 and above were also consistent in three aspects. First, they had the adult-like interpretation of bare CL phrases, i.e., they associated them with unique singleton item. Second, they had dificulty in interpreting the plurality of *các/những* while producing responses that were compatible with definite readings: they picked out either a singular unique or a plural maximal set most of the time. Third, there was an overall development with age in children's ability to treat *các/những* as plural.
However, 3-year-old children did not display the same clear and consistent patterns in their interpretations. In the singular, definite condition, they split evenly between unique and non-unique, singular responses in Experiment 1, while their peers in Experiment 2 joined older children in succeeding at this [CL-N] condition. In the plural conditions, 3-year-old group in Experiment 2 also matched their older peers' behaviors, producing a majority of definite responses while committing number errors. They made quite a bit of non-maximal, plural choices, though. In contrast, 3-year-olds's errors in Experiment 1 split equally between unique, which is definite response of the wrong number, and non-unique, singular item, which is unexpected with regard to both number and definiteness features. They were younger than children in the same age group in Experiment 2, however, which might contribute to their poorer performance.

In the picture selection task in Experiment 3, both adults and children were able to associate $[m \hat{\rho} t \text{ 'one'-CL-N}]$ with the pictures in which the character under discussion was carrying one single item, and [all- $c \dot{a} c / n h \tilde{t} ng$ -CL-N] with the pictures in which the character under discussion was carrying the maximal, plural set of items of interest, regardless whether those target pictures were partially covered by the worm or not. This shows they understood the setup and requirements of the task. For the experimental trials, all participants, both adults and children, successfully chose the maximal 'all' picture when they heard prompts with [$c \dot{a} c / n h \tilde{t} ng$ -CL-N] when this target picture was not covered most of the time. When it was covered, though, children, and adults alike, accepted the subset 'some' picture (where the character under discussion was carrying only two out of the four items of interest) roughly at the same rate as the maximal 'all'picture²⁹. Nevertheless, it is clear that children knew the plurality of $c \dot{a} c / n h \tilde{t} ng$ and their interpretation of

²⁹ Except for children in [*nhũng*-CL-N], who still preferred the maximal reading over the subset interpretation.

các/những in terms of definiteness in this Experiment was adult-like, including the accommodation in a certain context to allow a non-maximal reading of a definite.

Putting the results from the three experiments together, and also comparing Vietnamese children's behavior in Experiment 1 to English- and Spanish-acquiring children's performance in the same task in Munn et al. (2006), I argue that children do have knowledge of number and definiteness but have difficulty in integrating the information from both features as required by these tasks. Cross-linguistic differences stem from the possibility that children learning different languages prioritize different features, which may be affected by how these features are encoded in their native language. At the same time, different task designs can make a specific feature more prominent than the other. In case of Vietnamese, it was the definiteness in the act-out task and number in the picture selection task.

5.3. Further research

There are many interesting lines of research that were unable to be fully developed within the scope of this thesis. However, as they stand, the current findings provide solid foundation for future work in at least two directions.

First, a formal semantic analysis of *các* and *những* may be developed from the description of their interpretation and syntactic behavior provided in Chapter 2, alongside the syntactic analysis of the projection that hosts them. One potential line of research could focus on better understanding which kinds of modifiers, in particular, are able to satisfy the restrictions that *những* imposes on the noun, especially which properties characterize adjectival modifiers of *những*phrases. This is likely to be a fruitful line of inquiry thanks to the rich literature on adjective types and the variety of ways in which adjectives and nouns can combine in order to create different readings (cf. Morzycki, 2015). Expanding the investigation of *những* to account for the adjectives and other modifiers that it accepts would offer a deeper understandings of the properties of this pluralizer in particular and of Vietnamese noun phrases more generally.

The second extension of this research that I believe holds the most promise would be to extend Experiment 3 to the acquisition of both inflectional languages (ex. English, Spanish) and other classifier languages (ex. Korean, Chinese). In addition to adding new data, cross-linguistic comparisons provide a valuable check of the validity and generalizability of findings in any one language. To provide one specific example, expanding Experiment 3 to English and Mandarin may help contextualize some of the adult findings reported in Munn et al. (2009). Recall that in Munn et al.'s (2009) task, English- and Mandarin-speaking adults tended to treat the supposedly definite noun phrases as non-maximal – a rather surprising result. It would be interesting to test whether this tendency diminishes in contexts like that of my third experiment, in which the introductory story, the context picture, and the presence of a contrastive set seem to boost the prominence of a particular discourse set (e.g., the entire set of yellow bananas).

The discussion on the differences in behavior and interpretation between the two pluralizers *các* and *những* in Chapter 2 addresses the controversial issue in the literature of Vietnamese linguistics with respect to the status of *những*. The results from three experiments in Chapter 3 and 4 while answering the research question on children's and adults' interpretation of Vietnamese noun phrases can offer empirical evidence for the theoretical analyses.

APPENDIX

Experimental items

Experiments 1 & 2

- Đưa cho cô {Ø / một} con {chó / mèo / gà / cá} đứng kế cái nhà. Give me {the / a} {dog / cat / rooster / fish} next to the house.
- Dura cho cô {các / những} con {chó / mèo / gà / cá} đứng kế cái nhà.
 Give me {the / (some of) the} {dogs / cats / roosters / fishes} next to the house.
- 3. *Đưa cho cô tất cả* {*các / những*} *con* {*chó / mèo / gà / cá*} *đứng kế cái nhà*. Give me all the {dogs / cats / roosters / fishes} next to the house.

Experiment 3

Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng một trái {chuối / dâu / cam / táo} {vàng / xanh / đỏ}.

Can you show me the picture where {Hoa / Bo} is carrying a {yellow / green / red} {banana / strawberry / orange / apple}?

- 2. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng {các / những} trái {chuối / dâu / cam / táo} {vàng / xanh / đỏ}.
 Can you show me the picture where {Hoa / Bo} is carrying {the / (some of) the} {yellow / green / red} {bananas / strawberries / oranges / apples}?
- 3. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng tất cả {các / những} trái {chuối / dâu / cam / táo} {vàng / xanh / đỏ}.
 Can you show me the picture where {Hoa / Bo} is carrying all of the {yellow / green / red} {bananas / strawberries / oranges / apples}?
- 4. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng một cái {ly / dĩa / bát / chai / khăn} {trắng /vàng / xanh}.
 Can you show me the picture where {Hoa / Bo} is carrying a {white / yellow / blue} {cup / plate / bowl / bottle / handkerchief}?
- 5. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng {các / những} cái {ly / dĩa / bát / chai / khăn} {trắng /vàng / xanh}.
 Can you show me the picture where {Hoa / Bo} is carrying {the / (some of) the} {white / yellow / blue} {cups / plates / bowls / bottles / handkerchieves}?
- 6. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang bưng tất cả {các / những} cái {ly / dĩa / bát / chai / khăn} {trắng /vàng / xanh}.
 Can you show me the picture where {Hoa / Bo} is carrying all of the {white / yellow / blue} {cups / plates / bowls / bottles / handkerchieves}?
- Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang cầm một {trái bong bóng / ngôi sao} {trắng / xanh}.

Can you show me the picture where {Hoa / Bo} is holding a {white / blue} {balloon / star}?

8. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang cầm {các / những} {trái bong bóng / ngôi sao} {trắng / xanh}.

Can you show me the picture where {Hoa / Bo} is holding {the / (some of) the} {white / blue} {balloons / stars}?

- 9. Chỉ cho cô xem trong bức tranh nào {Hoa / Bo} đang cầm tất cả {các / những} {trái bong bóng / ngôi sao} {trắng / xanh}.
 Can you show me the picture where {Hoa / Bo} is holding all of the {white / blue} {balloons / stars}?
- 10. *Chỉ cho cô xem trong bức tranh nào Hoa đang bưng một con cá màu trắng.* Can you show me the picture where Hoa is carrying a white fish?
- 11. *Chỉ cho cô xem trong bức tranh nào Hoa đang bưng {các / những} con cá màu trắng.* Can you show me the picture where Hoa is carrying {the / (some of) the} white fishes?
- 12. *Chỉ cho cô xem trong bức tranh nào Hoa đang bưng tất cả {các / những} con cá màu trắng.* Can you show me the picture where Hoa is carrying all of the white fishes?

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