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博 士 論 文

量化與複數性之介面研究：以越南語為例

Quantification and Plurality at the Interface:

the case of Vietnamese

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學號: 107044892

研 究 生: 高成越 (Thanh Viet Cao)

指導教授: 謝易達博士 (I-Ta Chris Hsieh)

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高成越 君（學號107044892）所提之論文

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Institute of Linguistics

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Quantification and Plurality at the Interface: the case of Vietnamese

by

Thanh Viet Cao

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Abstract

This dissertation investigates the distributions and interpretations of the four most common D-quantifiers (viz., *tất-cả, cả,, mọi,* and *mỗi*), and the two plural markers *các* and *những* in Vietnamese from the standard framework of generalized quantifiers (Barwise & Cooper 1981) enhanced with a type-flexible neo-Calsonian semantics (Chierchia 1998b; 2013).

Thus, I argue that all particular features of universal determiners (e.g. *cả/*tất-cả/*mọi/*mỗi Nam và Mi đã tới* 'Nam and Mi both arrived') in this classifier language, especially their interaction with plural markers as an overt/covert means of domain restriction, can be characterized by their different cardinality, atomicity, uniformity, and distributivity presuppositions imposing on their restrictors, along the lines of Chierchia (2010).

Meanwhile, I propose that the two plural markers *các* and *những* resemble each other more than they might look from the surface. Thus, both of them can be assumed to be syntactically modifying plurals in the sense of Wiltschko (2008), and semantically instantiations of the inclusive PL operator in the sense of Chierchia (2010) with slightly different presuppositions: *những* is encoded with atomicity and domain widening presuppositions, whereas *các* is encoded with a contextually determined assignment function instead of the domain widening presupposition, but sharing the atomicity selection in aligning with *những.* Given this presuppositional account of *các* and *những,* all of their four essential uses, including (i) the predicative use (e.g. *Nam và Mi là những/các sinh-viên* 'Nam and Mi are students'), (ii) the argumental use (e.g. *Các/những sinh-viên đó đã có-mặt* 'Those students arrived'), (iii) the generic use (e.g. *Các/những con khủng-long đã tuyệt-chủng* 'Dinosaurs were extinct'), and (iv) the wh-indefinite use (e.g. *Nam đã gặp những ai?* 'Who did Nam meet?'), can be captured in a systematic way.

摘要

本論探討越南語中四個最常 的D-量詞（即 tất-cả、cả、mọi 和 mỗi）以及 兩個複數標記 các 和 những 的分布與詮釋， 研究架構採般化量詞理論（Barwise & Cooper 1981）， 並結合具類型彈性的 neo-Carlsonian 語意學（Chierchia 1998b；2013）。

因此，我主張，在這種分類詞語中，所有全稱限定詞的特殊語法特徵（例 如 cả/*tất-cả/*mọi/*mỗi Nam và Mi đã tới「Nam 和 Mi 都來了」），特別是它們與複數標記在顯性或隱性的定義域限制上的互動，都可以透過 它們對限制語所施加的基數性、原性、逐指性與均性預設 （presupposition） 加以解釋，與 Chierchia （2010） 的理論精神相符合。

同時，我提出，複數標記 các 和 những 之間的相似性遠超過表 所。 兩者在句法上皆可視為 Wiltschko （2008） 所定義的複數修飾語，在語意上 則皆為 Chierchia （2010） 所述的包容性複數運算 (inclusive PL operator) 的反映，但其預設略有不同：những 帶有原 性與定義域擴展的預設，các 則以語境決定的賦值函數取代定義域擴展預設， 但在原性選擇上與 những 致。基於這套 các 與 những 的預設理論，兩者的四種基本法──（一）謂 語法（如 Nam và Mi là những/ các sinh-viên「Nam 和 Mi 是學」）、 （二）論元法 （如 Các/những sinh-viên đó đã có-mặt「那些學來了」）、 （三）類指法 （如 Các/những con khủng-long đã tuyệt-chủng「恐已經滅絕 了」）、（四）疑問不定法（如 Nam đã gặp những ai? 「Nam遇了哪 些？」）──皆可系統性地加以說明。

To the memory of my father,
and my mother's sacrifices all along

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To Prof. Hsiu-chuan Liao, I owe a special debt: her Historical Linguistics was the first course that I took officially at NTHU, and my first publications were all under her supervision. In my heart, she has thus always been the second 'supervisor', and I am proud to be a (lifetime) member of Liao's group for the rest of my life.

Within the circle of NTHU, I have also owed a great debt to many other professors and friends. Prof. Chinfa Lien attended both my qualifying paper exams (one in Historical Linguistics and one in Formal Semantics) and gave me a lot of insightful suggestions, shaping the frame of this thesis. He is also the one who first taught me one or two things about event semantics that I almost chose to work on for this thesis. I have also learnt a great deal about events from the two syntacticians at NTHU – Profs. Dylan Tsai and Jonah Lin – but mostly through their papers on the syntax of light verbs. I took Syntax I & II from both professors, and their immense knowledge of the field, in particular the formal linguistics of Mandarin Chinese, has inspired and changed me once and for all. While Prof. Dylan never fails to remind us we are 清大幫, it was Prof. Jonah who first welcomed me to NTHU and planted in me the first seeds of affection for this soil. I never thank him enough for his support and encouragement, intellectually and personally, all along. His spirit of 'get straight to the point' will definitely be my motto for my students in the future, no matter where I go. Beyond that, Profs. Yueh-chin Chang and Feng-fan Hsieh have also always been around the corner offering me support and advice whenever I need. So I am grateful for their teaching and caring, too.

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Lastly, I would like to dedicate this thesis to my mother, Nguyễn Thị Xuân, who is the happiest to see me graduate, and the memory of my father, Cao Sỹ Cơ, who is always felt to be with me in every step that I take.

Contents

List of Tables

List of abbreviations

1	first person
2	second person
3	third person
Q	quantifier
QP	quantifier phrase
D	determiner
DP	determiner phrase
PM	plural marker
PL	plural
SG	singular
Num	numeral
NumP	numeral/number phrase
CLF	classifier
ClP	classifier phrase
NP	noun phrase
AttrP	attributive phrase
PossP	possessive phrase
RC	relative clause
DEM	demonstrative
DemP	demonstrative phrase
PST	past tense
PERF	perfect
COP	copula
NEG	negation, negative
TOP	topic marker

Chapter 1

Introduction

1.1   Research motivation

The main goal of this dissertation is to investigate the distribution and interpretation of universal determiners[1] and plural markers in Vietnamese.

  "*All languages have some kind of quantification*" (von Fintel & Matthewson 2008:23), by itself, is an example of a universally quantificational structure by employing a lexical universal D(eterminer)-quantifier, i.e. *'all'*, in subject position and an existential D-quantifier, i.e. *'some'*, in object position. One of the truth conditions of this sentence, thus, is that for any entity/individual x, if x is a language, x has some ways to make quantificational claims. This statement is also the cross-linguistically standard position (although weak) assumed by most semanticists, at least since Barwise & Cooper's (1981) groundbreaking seminar on quantifiers in natural languages. Nevertheless, as von Fintel & Matthewson (2008:25) point out, the big question linguists have to tackle is pertinent to the following fact: "*it's just that languages employ different encoding strategies.*" As an illustration, the truth-conditional content of the sentence above can be paraphrased in at least three ways in Vietnamese as follows.[2]

(1)   a.   ***Mọi/Mỗi** (*các) ngôn-ngữ đều có   **một-số** phương-thức*
              all   PL   language DEU have some   means
              định-lượng.
              quantification

---

[1]Throughout this thesis, I will use the term *determiner(s)* as an umbrella term for many heterogeneous functional classes in pre-nominal position (e.g., quantifiers, plural markers, focus markers, numerals, etc.), but excluding classifiers. Thus, bare nouns can be identified as nominals without overt determiners or classifiers. Note that this description is more restricted than Cheng & Sybesma's (1999) characterization that a bare noun in Chinese is at least a Cl(assifier)P.

[2]Vietnamese data throughout this study are represented in the standard '*Quốc-ngữ*' orthography enhanced with the hyphen ("-") for compounds (meanwhile, words are separated from each other by spaces).

'All languages have some kind of quantification.'

b. ***Tất-cả/*Cả (các) ngôn-ngữ đều có một-số* phương-thức**
   all   PL   language DEU have some   means
định-lượng.
quantification
'All languages have some kind of quantification.'

c. *Ngôn-ngữ **nào cũng** có **một-số** phương-thức định-lượng.*
  language which CUNG have some   means   quantification
'All languages have some kind of quantification.'

How different are quantificational strategies encoded in Vietnamese? How can we account for and, more importantly, decompose such diverse 'encoding strategies' in this classifier language from a syntax-semantics perspective? Concretely, how do we account for all of the core features of syntax-semantic mappings regarding universal quantifications with the most typical D-quantifiers *tất-cả, cả, mọi/mỗi*? Besides, how does the landscape of quantification in Vietnamese look like if we take plurality into consideration? How is domain restriction realized by employing plural markers (e.g., *các* in the examples above) in Vietnamese? When are plural markers really needed in this language? These are the main themes that I will investigate and characterize in this thesis. More specifically, two central claims to be argued in what follows are (i) there is a number of quantifiers in Vietnamese showing sensitivity to number-related interpretations of their associating nominals (e.g., singulars, plurals, number-neutral expressions, etc.), and (ii) many puzzling constraints on various quantificational constructions in Vietnamese can be captured by their different presuppositions encoded in the lexical semantics of the relevant quantifiers and plural markers.

However, before proceeding to present the results of my investigation regarding the most typical D-quantifiers in Vietnamese (viz.,*tất-cả, cả, mọi,* and *mỗi*) and their interaction with plural markers (viz., *các, những*) in the main texts, I will briefly recapitulate the main puzzles pertaining to these quantifiers and markers in Section 1.2 as well as the analysis presented in this dissertation in Section 1.3.

1.2 Puzzles to be addressed

The overarching puzzle to be addressed in Chapter 3 is this: what kind of semantic/syntactic objects can or cannot surface in domain-restrictor position of the four D-quantifiers *tất-cả, cả, mọi,* and *mỗi* in Vietnamese, i.e., the four simplex quanti-

fiers[3] in **bold** as represented in (2)?

(2)   Vietnamese ∀ D-quantifiers

```
                  simplex                    complex

            tất-cả 'all'          tất-cả/toàn-bộ/hết-thảy/tất-thảy mọi
            mọi 'every'                       'every'
         mỗi 'every/each'            gần-như/hầu-như tất-cả
        cả 'all/(the) whole'                 'almost all'
       hết-thảy 'all/every'          tất-cả ngoại-trừ năm CLF
       tất-thảy 'all/every'                  'all but five'
         toàn-bộ 'all'                         etc.
```
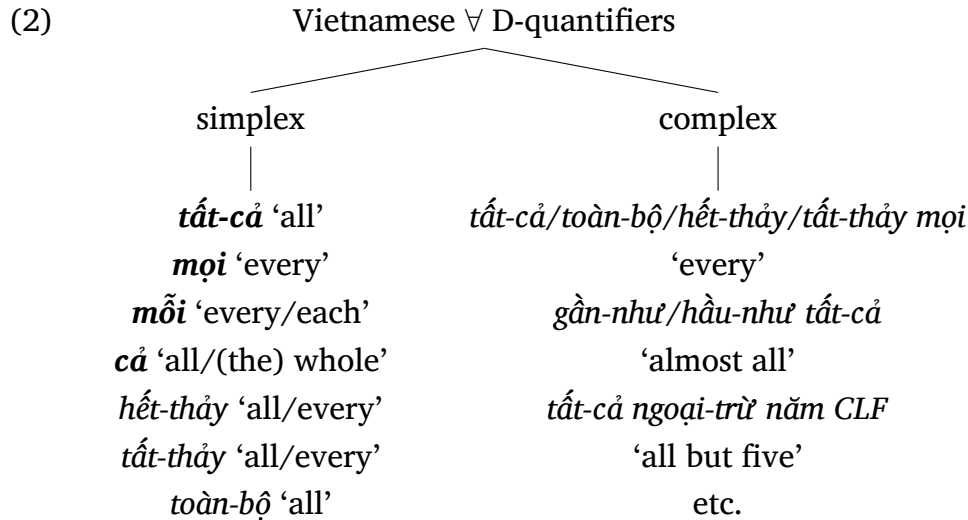
For instance, in view of observations like (3),[4] it is tempting to ask on what ground can we capture the fact that *tất-cả* cannot co-occur with DemPs like *con chó này* 'this dog' or group terms like *làng* 'village' or sum-denoting expressions like conjoined terms *Nam and Mi* 'Nam and Mi', whereas *cả*, conversely, is found to allow both group terms and conjoined terms, as evidenced in (4).

(3)   a. *Tất-cả/*cả con chó này rất ngoan.*
           all   CLF dog DEM very well-behaved
           Intended: 'All these dogs are very well-behaved.'

       b. *Tất-cả làng này đã đi bầu.*
           all   village DEM PST go vote
           Intended: 'All the villagers voted.'

       c. *Tất-cả Nam và Mi đã có-mặt.*
           all   Nam and Mi PST show.up
           Intended: 'Nam and Mi all arrived.'

(4)   a. *Cả hội-đồng đã có-mặt.*
           CẢ committee PST show.up
           'All the committee members arrived.'   (group term)

       b. *Cả Nam và Mi đã có-mặt.*
           all Nam and Mi PST show.up
           'Nam and Mi all arrived.'   (conjoined term)

In other words, how can we distinguish these four most common D-quantifiers in

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[3]Notice that 'complex' here means being a morphosyntactic cluster of two or more quantifiers/quantify words, whereas 'simplex' roughly means non-complex ones. See Section 3.2 for more details.

[4]Conventions for acceptability judgements: * = ungrammatical sentence, # = infelicitous utterance, ? = mixed judgement.

Vietnamese in terms of their s-selections and c-selections to capture the contrasts like (5) and (6) in the most cohesive way?

(5)   a.   ****Mọi*** *ba*   *con chó ăn một cái pizza.*
       every three CLF dog eat one CLF pizza
       Intended: 'Every three dogs eat a pizza.'

       b.   ***Mỗi*** *ba*   *con chó ăn một cái pizza.*
       each three CLF dog eat one CLF pizza
       'Each three dogs eats a pizza.'   (pair-list reading)

(6)   Co-occurrence with plural pronominals

       a.   ***Tất-cả/*cả/*mọi/*mỗi*** *bọn-họ đã*   *có-mặt.*
       ∀   3PL   PST show.up
       'All of them shown up.'   (distributive)

       b.   ***Tất-cả/*cả/*mọi/*mỗi*** *bọn-họ đã*   *họp-lại ở*   *căng-tin.*
       ∀   3PL   PST gather at canteen
       'All of them gathered at the canteen.'   (non-distributive)

In the meantime, Chapter 4 will be devoted to unraveling the distribution and interpretation concerning plurality and the two most common plural markers in Vietnamese, namely *các* and *những* – which has long been suggested to be plural articles of sort since Nguyễn T.C. (1996) and spelled out in Nguyen H.T. (2004:42) as in (7).

(7)   Candidates for articles/determiners in Vietnamese (Nguyen H.T. 2004:42)

       a.   *một* 'one/a'   [−Plural, − Definite]

       b.   *những* 'plural marker'   [+Plural, −Definite]

       c.   *các* 'plural marker'   [+Plural, +Definite]

(8)   a.   *Nam và Mi là*   *các/những*   *sinh-viên.*
       Nam and Mi COP CAC/NHUNG student
       = 'Nam and Mi are students.'   (predicative use)
       ≠ 'Nam and Mi are the/all students.'

       b.   *Các/Những*   *con khủng-long đã*   *tuyệt-chủng.*
       CAC/NHUNG CLF dinosaur   PST become.extinct
       'Dinosaurs have become extinct.'   (generic use)

Given the observations like (8) where *các/những* functions as a part of predicates or kind-denoting terms and the fact that bare nouns in classifier languages are number-neutral (i.e. inclusive plurals), it is tempting to ask whether *các* and *những* are true plural markers or articles or something else. Plus, do *các/những*-plurals act like exclusive plurals across all environments? Can they be interpreted inclusively in

Table 1.1: Distributional features of Vietnamese *các* vs. *những* (Le & Schmitt 2016:165)

Example	Distributional features	NHỮNG	CÁC
(63)	Co-occur with *tất-cả* 'all', *hầu-hết* 'most'	+	+
(55)	Co-occur with *mọi* 'every', *vài* 'several'	−	−
(56)	Co-occur with numerals	−	−
(57)	Require classifiers	+	+
(58)	Allow generic/kind reading	+	+
(61)	Require *D(iscourse)-linking* contexts	+	+
(60), (52)	Require restrictions on the NP in subject position	+	−
(50)	Co-occur with *wh*-elements	+	−
(46), (47)	Appear in existential constructions	+	?
(51)	Co-occur with kinship terms	−	+

downward-entailing environments on par with the plural morphology in number-marking languages? And how can we capture the many peculiar interpretations of *các/những* and their distributional divergences/convergences as summarized in **Table 1.1** above? These are the crucial questions that we will touch upon in Chapter 4.

Finally, Chapter 5 will be devoted to shedding some light on the following two puzzles.

First, if we take the plural markers *các/những* to be necessary only for compositional reasons in cases when quantifiers require non-atomic restrictors, as illustrated by (9) and (9-a), how can we account for their optionality in (9-c) and (9-d) where the plural reading of the restrictors is implied by the contextually relevant place-adverbial *khu-này* 'this area'?

(9)   Co-occurrence between *các/những* and universal quantifiers

    a.   *Tất-cả *(**các/những**) sinh-viên/gia-đình này đã bỏ phiếu.*
       all   PL   student/family   DEM PST cast vote
       'All these students/families cast the vote.'

    b.   *Tất-cả *(**các/những**) con chó này rất ngoan.*
       all   PL   CLF dog DEM very well-behaved
       'All these dogs are very well-behaved.'

    c.   *Tất-cả (**các/những**) sinh-viên/gia-đình **khu** này đã bỏ phiếu.*
       all   PL   student/family   area DEM PST cast vote
       'All of the students/families in this area cast the vote.'

  d. *Tất-cả (**các/những**) con chó **khu** này rất ngoan.*
    all PL   CLF dog area DEM very well-behaved
    'All the dogs in this area are very well-behaved.'

Second, how can we account for the vanishing of the universal force involving 'plural' wh-elements like *những ai* and the alleged universal A-quantifier *cũng* as illustrated in (10)?

(10) a. *Ai$_F$ **cũng** đã giúp Nam.*
     who CUNG PST help Nam
     = 'For those who also helped Nam, who are they?' (interrogative)
     = 'Everyone helped Nam.'   (wh-quantification)

   b. *{Những ai}$_F$ **cũng** đã giúp Nam.*
     PL   who CUNG PST help Nam
     = 'For those who also helped Nam, who are they?' (interrogative)
     ≠ 'Everyone helped Nam.'

Building on Kratzer & Shimoyama's (2002) Hamblin semantics (also known as alternative semantics) for Japanese *mo*-phrases, Tran (2009:116–118) distinguishes *cũng$_F$* from *cũng$_A$* and attributes the quantificational force in focus wh-quantification sentences like (25-b) or (26-b) to the former. However, under this approach, we run into an overgeneration problem where the quantificational force presumably encoded in *cũng* should have arisen even when the wh-indefinite co-occurring with the PM *những*, contrary to the fact observed in (10-b). How can we address this empirical problem to retain Tran's account of wh-quantification involving *cũng$_F$* in Vietnamese? This will be our focus in Section 5.5.

1.3 The proposal in a nutshell and the outline

This dissertation is organized as follows. First, Chapter 2 will cover some side themes throughout this thesis, where I will spell out the semantic and syntactic foundations that this study builds upon. As you will see, most of these pieces are popular and well-established characterizations and assumptions about nominal references in natural languages, which can be extended to a classifier language like Vietnamese.

  Given these backgrounds, Chapter 3 will briefly present an inventory of quantifiers in Vietnamese and investigate the most peculiar distributions and interpretations of universal quantification over entities involving the four D-quantifiers, i.e. *tất-cả, cả, mọi, mỗi*. Accordingly, I will show that the four D-quantifiers *tất-cả, cả, mọi,* and *mỗi* differ in their number-sensitive presuppositions pertaining to cardinal-

ity, atomicity, and uniformity, and c-selections imposing on their restrictor, given Link's (1987) ontology as presented in (11).

(11) a. $[\![\mathbf{Nam}]\!] = N$ (pure) atom
      b. $[\![\mathbf{Nam\ và\ Mi_{sum}}]\!] = N \oplus M$ sum
      c. $[\![\mathbf{Nam\ và\ Mi_{group}}]\!] = {\uparrow}(N \oplus M)$ group/impure atom

Thus, their distinctive domain-restricting strategies will be shown to be the essential factor underlying their various peculiar behaviors concerning different semantic sub-categories of nominals.

Next, Chapter 4 is devoted to discussing plurality and plural markers in Vietnamese with a focus on convergences and divergences between *các* and *những*. Thus, I will argue that these two most common plural markers in Vietnamese can be syntactically analyzed as modifying plurals in the sense of Wiltschko (2008), and semantically as instantiations of the inclusive PL operator in the sense of Chierchia (2010) which convert singulars into inclusive plurals semantically before turning to exclusive plurals pragmatically.

More importantly, their differences are suggested to be rooted in their slightly different presuppositions: *những* is encoded with atomicity and domain widening presuppositions, whereas *các* is encoded with a contextually determined assignment function instead of the domain widening presupposition, but sharing the atomicity selection in aligning with *những*. Given these presuppositional accounts of *các* and *những*, all of their distributions as summarized in **Table 1.1** involving the four essential uses, including (i) the predicative use, (ii) the argument use (i.e. the definite/anaphoric use), (iii) the generic use, and (iv) the wh-indefinite use, can be captured systematically.

In Chapter 5, the empirical optionality/obligatoriness of plural markers in various quantificational constructions will be investigated. One of the characterizations that I will put forth in this chapter is the existence of a covert counterpart of *các/những,* i.e. PL_S, underlying the interaction at issue in a few context-sensitive cases. Meanwhile, at the end of this chapter, I will show that the unnoticed gap in wh-quantification involving the alleged quantifier $c\~ung_F$ and wh-indefinites formed with plural markers, as shown in (10), can be accommodated to Tran's (2009) quantifier-account of $c\~ung_F$ on the assumption that the composition between the quantifier $c\~ung_F$ and *những* wh-items is impossible due to the presupposition encoded in $c\~ung_F$ that ruling out its access to alternative-related domains whose non-atomic, scalar propositions (i.e. logically dependent ones) like those involving *những* wh-items.

Finally, Chapter 6 will take stock and conclude the thesis.

Chapter 2

Theoretical foundations

2.1   Overview

This background chapter touches upon several aspects that theories of quantification and plurality tend to share in common. Specifically, to best facilitate our upcoming discussions, Section 2.2 will present a typology of nominals in semantic terms and take stock of the mass-count distinction reflected in natural languages, particularly classifier languages, that underlies that typology. Since Vietnamese is a classifier language, it is critical to spell out the most well-established assumptions about the syntax/semantics of numeral classifier phrases and their heads, i.e. classifiers, that I will adopt throughout this dissertation. This topic will be covered in Section 2.3. Meanwhile, the semantics of bare nouns will be discussed in Section 2.4. Next, Section 2.5 will present our theoretical toolkit for compositional stuff such as mereological and type-shifting operators. The last section in this chapter, i.e. Section 2.6, will be devoted to syntactic structures, from both linear and hierarchical aspects, of Vietnamese nominals that this study hinges upon.

2.2   The mass-count distinction and semantic categories of nominals

Many well-documented languages show a morphosyntactic distinction between mass-denoting vs. count-denoting terms, typically reflecting an ontological difference between a discrete entity/individual, like *book*, and a non-discrete substance, like *water* (Chierchia 1998a, 2010, Pelletier & Schubert 2003, Borer 2005, Rothstein 2011, Deal 2017, Grimm 2018, Doetjes 1997, 2019, Kiss et al.2021, Moltmann 2025, among many others). Their cognitive difference can be formalized in terms of a set of formal features, e.g. $[+/-\text{bounded}]$ and $[+/-\text{internal structure}]$, as sub-

mitted by Jackendoff (1991) in **Table 2.1** below (with my additional examples in Chinese and Vietnamese).

Table 2.1: Semantic categories of nominals (Jackendoff 1991)

Feature values	Categories	English	Chinese	Vietnamese
+bounded,−internal structure	individuals	*a book*	*(yi-) ben-shu*	*(một) quyển sách*
+bounded,+internal structure	groups	*a committee*	*wei-yuan-hui*	*(một) hội đồng*
−bounded,−internal structure	substances	*water*	*shui*	*nước*
−bounded,+internal structure	aggregates	*books*	*(yi- xie) shu*	*(những quyển) sách*

What is the nature of this apparent ontological-grammatical correlation? Under one of the most influential accounts, Chierchia (2010) considers the mass-count distinction as a matter of vagueness involving the means of determining the so-called 'atom'. Accordingly, he proposes three mass-related universals and cross-linguistic variations in accordance with three ways of manifesting the mass-count distinction on the nominal system as follows.[1]

(2)   Mass-related universals (Chierchia 2010:111)

       (i)The signature property: **three blood*

       (ii)The mapping property: *blood* is universally mass

       (iii)The elasticity property: some nouns are ambiguous (e.g. *furniture*), and most can be coerced into count construals.

(3)   Cross-linguistic variations of encoding the mass-count distinction (Chierchia 2010:107)

       (i)Classifier languages: no noun can directly combine with numerals without mediating items called classifiers. Hence, the mass/count distinc-

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[1]Note that noun ambiguity and coercion can be found in many languages, including English.

(1)   Noun ambiguity and coercion (Chierchia 2015:152)

     a.   Ambiguous nouns: *rope, rock, beer, chicken, ...*
       (i)   I got *three ropes/a lot of rope* at the convenience store.
       (ii)   This is good *rope/*these are good *ropes*. I wish we had more of it/them.
     b.   Coercion: mass-to-count
       (i)   At a vampire bar: They ordered *three bloods* on the rocks.
       (ii)   In a lab: We store *three bloods* here.
     c.   Coercion: count-to-mass
       (i)   There is *apple* in the salad.
       (ii)   There was *cat* all over the floor.

tion is, presumably, encoded into the syntax and semantics of classifiers (e.g., Chinese).

(ii) Number-marking languages: nouns have overt and obligatory number features (e.g., Indo-European languages).

(iii) Number-neutral languages: those lack both obligatory number marking and obligatory classifier systems (e.g., Dëne).

Specifically, he argues that the vague factor here is pertinent to the way the grammar divides up, or in his term – "apportion", a substance-denoted mass into atoms, i.e. entities that have no proper parts (but do not necessarily lack their own structure, i.e. contra Jackendoff). Given this opacity of the atomic property, there are things that the grammar can not verify whether they are atoms or not (i.e. unstable individuals). Chierchia also claims that it is the vague apportioning that prevents us from interpreting a prototypical mass noun like *water* as *water amount* or *water quantity*. Contrastingly, we don't encounter this kind of vagueness with object-denoting count nouns. In other words, *book*-atoms are countable because they are stable, whereas *water*-atoms aren't.[2]

Details aside, this mass-count distinction has been widely assumed to motivate many syntactic-semantic patterns pertaining to subclasses of singular, plural, and mass nouns in many languages. The following **Table 2.2** summarizes such patterns in English (Lasersohn 2019:209).[3]

However, manifestations of such a distinction are far from transparent in classifier languages than in number-marking languages like English because, among other things, bare nouns in these languages do not host number morphology[4]. Like Chinese, a bare common noun in Vietnamese like *chó* means 'one or more than one dog/dog(s)'[5], and also requires a mediate item called a classifier, e.g. *con*, to be

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[2]By attributing the mass/count distinction to the vagueness of atom apportioning (masses = vague-atom-based entities), Chierchia (2010) also revokes his early position, explicated in Chierchia (1998a), where he posited that the semantic-cognitive contrast dictating the mass-count distinction in grammar was the (im-)possibility of identifying atoms in the denotation of count and mass nouns (though both accounts adopt the Single Domain approach, i.e. "*masses are of the same sort as countables*" (Chierchia 2010:144-145), in contrast with the Double Domain approach like Link (1987) where mass nouns, simply put, are assumed to draw their denotation from a different quantificational domain from count nouns, i.e. "*a semi-lattice which is not atomic or not known to be atomic*".

[3]Terminology: sg = singular; pl = plural; collective singulars = group terms; heterogeneous mass nouns = Doetjes' (1997) count mass nouns = Chierchia's (2010) fake mass nouns = Moltmann's (2025) object mass nouns.

[4]In fact, as Grimm (2021) points out, cross-linguistic data has shown that grammatical countability is a much more heterogeneous domain than typically assumed, for example, many languages are found with three or more categories of grammatical number than just singular/plural-mass. However, I have very little to say regarding that controversy throughout this thesis.

[5]In other words, despite lacking number/plural morphology, bare nouns in classifier languages

Table 2.2: Syntactic-semantic patterns distinguishing subclasses of singular, plural, and mass nouns in English (Lasersohn 2019:209)

	ordinary singulars *cup*	collective singulars *government*	lexical plurals *police*	ordinary plurals *cups*	heterogeneous mass nouns *furniture*	homogeneous mass nouns *water*	plural mass nouns *dues*
agreement	sg	sg/pl	pl	pl	sg	sg	pl
many vs. *much*	*	*	*many*	*many*	*much*	*much*	*much*
numerals	*	*	?	✓	*	*	*
bare	*	*	✓	✓	✓	✓	✓
cumulative reference	no	no	yes	yes	yes	yes	yes
co-occur with "stubbornly distributive" predicates	✓	✓	✓	✓	✓	*	*

countable, i.e., being capable of co-occurring with cardinal numerals, as exemplified by (4) below.

(4)   a.   *Hai *(con) chó*
        two CLF   dog
        'two dogs'   (Vietnamese)

       b.   *Liang *(zhi) gou*
        two CLF   dog
        'two dogs'   (Mandarin Chinese)

A note, nevertheless, should be made here is, unlike Chinese where classifiers are much more strictly required for most common nouns (excluding the unit-denoting nouns), whether classifiers are required or not in Vietnamese depends on which kind of nouns they associate with (Bisang 1999, Nguyễn P.P. 2002, Simpson & Ngo 2018, Bisang & Quang 2020, among others). Descriptively, there are three essential subgroups of nouns in terms of their syntactic co-occurrence with classifiers, namely:

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are semantically number-neutral, i.e. being inclusive plurals – denoting a set consisting of both singularities and pluralities. See Chapter 4 for more details.

(5)   (i.)**Obligatory-classifier nouns**: e.g., *chó* 'dog(s)' (*hai *(con) chó* 'two dogs')

    (ii.)**Optional-classifier nouns**: e.g., *sinh-viên* 'student' (*hai (đứa) sinh-viên* 'two students')

    (iii.)**Non-classified nouns**: e.g., unit-denoting nouns like *phòng* 'room' (*hai phòng* 'two rooms'), abstract nouns[6] like *ý-kiến* 'idea' (*hai ý-kiến* 'two ideas'), etc.

More importantly, what further complicates the mass-count distinction in these languages, among other things, is the crucial fact that homogeneous mass nouns in these languages behave similarly to count nouns in that they also require such a lexical linker called measure word or unit noun in quantifying construals involving numerals/quantifiers, as illustrated by (6) in Vietnamese.

(6)   *Hai *(cốc) nước*
    two cup   water
    'two cups of water'   (Vietnamese)

This crucial observation has led many authors to believe that all nouns in classifier languages inherently are mass (Thompson 1987, Cao X.H. 1988, Chierchia 1998a, among others).[7] However, scrutiny of the syntax and semantics of measure words and classifiers reveals that they are not the same. For instance, Cheng & Sybesma (1999) observe that, unlike classifiers, measure words in Mandarin tend to have a looser syntax: the latter allow coercing modifications (e.g., adjectival modifiers, *DE*-modifier). This fact is also attested in Vietnamese as shown by the contrast in (7).[8]

(7)   a.   *Hai quyển (*to) sách vật-lý*
        two CLF   large book physics
        Intended: 'two large (natural units of) books about physics' (classifiers)

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[6]See Vietnam Council of Social Sciences's *A Grammar of Vietnamese* (1983:101)

[7]For instance, Cao X.H. (1988:46) remarks on the non-existence of mass-count distinction in Vietnamese as follows:

"... As a corollary of this, there is in Vietnamese no grammatical distinction between nouns for objects (at least in their quasi-totality) and nouns for stuff, while that between unit nouns (pure form nouns) and the two formers is rigorously clear cut; in European languages, on the other hand, the semantic difference between pure form nouns and object nouns is weakly reflected on the grammatical level, while the distinction between object nouns and stuff nouns is generally clear cut semantically and grammatically, but when used in a mass sense, object nouns become semantically similar to Vietnamese mass nouns referring to objects."

[8]Nguyen H.T. (2004:90–93) is an attempt along this line. For investigations of classifiers/measure words in Vietnamese, please refer to Nguyễn P.P. (2002), Hui (2003), Hoàng & Nguyễn (2008), Tran (2011), among others. In addition to that, from an areal perspective, see Vittrant & Allassonnière-Tang (2021) for an overview of the forms and uses of classifiers in Southeast Asian languages.

b. *Hai thùng (to) sách vật-lý*
two MW$_{box}$ large book physics
'two (large) boxes of books about physics' (measure words)

Semantically, as Matsumoto (1993:706) points out, classifiers are employed to explicate the number of entities in a naturally discrete, grammar-based unit, whereas measure words are used to measure an entity or a group of entities in terms of a world-knowledge, humanly determined unit (see also Cheng & Sybesma 1999, Krifka 1995; 2003).

Let us take an example to see how natural the grammatical bond between classifiers and count nouns is. Consider the following scenario.

(8) Scenario: Suppose both A and B raise cows. A has 2 herds of 12 cows in total (viz., 6 yellow and 6 black cows), whereas B has 3 herds of 10 cows in total (viz., 3 yellow, 3 black, and 4 spotted cows). Question:

*A hay B có nhiều **bò** hơn?*
A or B have many cow more

'Who has more cows, A or B?'

If *bò* 'cow' is mass in Vietnamese, and there are no fundamental distinctions between classifiers (i.e. *con* in this case) and measure words (i.e. *bầy* or *đàn* 'herd, flock' in this case) as Cao X.H. (1988) suggests (see Footnote 7), then a question like *A hay B có nhiều **bò** hơn?* 'Who has more cows, A or B?' as in (8) should be interpreted as ambiguous between the classifier-based and measure-word-based readings, resulting in no proper answers: either A or B can have more COW depending on the relevant measuring base. But this prediction, in fact, is not borne out because, intuitively, it does have a natural answer for any Vietnamese: A has more COW than B. This evidence indicates that *bò* 'cow' semantically is a count noun in Vietnamese, and classifiers and measure words in this language do have a fundamental distinction in cognitive-semantic terms.[9]

Additionally, measure words are observed to be more substantive than classifiers since, for instance, a classifier like *quyển* 'CLF for books' maps books to books, whereas a measure word like *thùng* 'MW$_{box}$' maps books to boxes of books. Intriguingly, this semantic difference is assumed to have some bearing on the contrast between modified nominals like *hai quyển sách to* [two CLF books large] vs. *hai thùng sách to* [two MW$_{box}$ books large] in Vietnamese. As Trinh (2019:92–93) points out, while the former can only bear the reading 'two large books', the latter is am-

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[9]I am indebted to Trinh H.T. (p.c.) for the discussion on this thought experiment.

biguous between the two following readings depending on what is parsed as the modified, i.e. either as [*hai* [[*thùng sách*] *to*]] 'two large BOXES of books' or as [*hai* [*thùng* [*sách to*]]] 'two boxes of large BOOKS' (notice that the canonical word order in Vietnamese nominals is modified + modifier).

(9) *Nam sẽ   mua hai thùng sách to.*
Nam will buy two MW_{box} book large
= 'Nam will buy two large BOXES of books.'
= 'Nam will buy two boxes of large BOOKS.'

In sum, these considerations support the conclusion that the mass-count distinction is encoded in the syntactic-semantic differences between classifiers and measure words (Cheng & Sybesma 1999, 2005, Kim 2005, Chierchia 2010, 2015, among others).[10] Accordingly, count nouns in these languages (e.g., Vietnamese *chó* 'dog'), by and large, are assumed to be semantically number-neutral (i.e., denoting cumulative reference) and roughly pattern with heterogeneous mass nouns in number-marking languages (e.g., English *furniture*) from many syntactic-semantic aspects. For instance, although neither type can directly co-occur with numerals, both are still compatible with "stubbornly distributive" predicates of shape and size like *small, big,* etc. (Lasersohn 2019:207), as exemplified in (10).

(10)   a.   *This furniture is small.* (Compare: **This water is small.*)
        b.   *Chó này nhỏ.*
              dog this small
              'This dog is small.'
        c.   **Nước này nhỏ.*
              water this small

Furthermore, some Vietnamese quantifiers and plural markers are empirically found to impose several semantic selections (i.e. s-selections), including the mass-count criterion, on their associating nominals. For instance, given the subcategories of nominals shown in **Table 2.1** & **Table 2.2**, D-quantifier *cả* 'all/whole' in this language seems to select merely [+bounded] entities, i.e. ordinary singulars (without numerals) and groups, i.e. collective singulars (with or without numerals), but not [−bounded] ones, i.e. substances/mass nouns and aggregates/plurals. In these latter cases, it is worth pointing out that *cả* can only function as a focus marker-scalar operator somewhat on a par with English *even*, as shown in (11-b).

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[10]This conclusion has been revised here and there, e.g., see Li (2013) for a syntactic approach to the distinction of Chinese count and measure classifier phrases, or Jiang (2020) for a semantic unified account of classifiers and massifiers (i.e. measure words) based on Krifka's (1995) ideas.

(11) a. *Cả*   (***một**) *quyển sách/* (*một*) *hội-đồng*
      all/whole one   CLF   book/ one   committee
      'the whole book/the whole committee'

   b. **Cả*   *nước/ (những quyển) sách ngôn-ngữ-học*
      all/whole water PL   CLF   book linguistics

On a par with *cả* but with some extra semantic constraints on its associating nouns, the determiner *mọi* 'every' can also quantify over both individuals (without numerals) and groups (presumably interpreted as atom-like entities, to be elaborated in Chapter 3) but not substances (like *nước* 'water') and aggregates, in particular, the plurals derived from obligatory-classifier nouns like *sách* 'book' or *chó* 'dog' (like *những quyển sách* 'books', *những con chó* 'dogs'), as shown in (12).

(12) a. *Mọi*   (***một**) *quyển sách/* (***một**) *hội-đồng*
      every one   CLF   book/ one   committee
      'every book/committee'

   b. **Mọi nước/ những quyển sách*
      every water/ PL   CLF   book

On the other hand, unlike the determiner *cả* 'all/whole', *mọi* 'every' can associate with an optional-classifier noun like *sinh-viên* 'student', or even with a non-classified noun like *phòng* 'room', regardless with or without the classifier to bear merely an 'ordinary' distributivity (over a contextually-determined set of certain rooms), whereas the co-occurrence between *cả* and non-classified nouns (like *phòng* 'room', *huyện* 'district', etc.) can only trigger a 'part-whole' reading, but not the 'ordinary' distributivity. This contrast can be exemplified by (13-a) and (13-b) below.

(13) a. **Mọi** (*căn*) *phòng (đều dậy mùi nước-hoa Nhật-Bản.)*
      every (CLF) room (DEU emit scent perfume Japanese)
      'Every room (is full of a Japanese-perfume scent.)'   (ordinary distributive reading)

   b. **Cả**   (*căn*) *phòng (dậy mùi nước-hoa Nhật-Bản.)*
      all/whole (CLF) room (emit scent perfume Japanese)
      'The whole (space/ambience of the) room (is full of a Japanese-perfume scent.)'   ('part-whole' reading)

Observations of this kind suggest that different quantifiers in Vietnamese may select different semantic subcategories of associates. If this hunch is on the right track, to what extent do these semantic constraints underlie the compositions of generalized quantifiers, plurals, and their interaction in Vietnamese? How can we model the variations among them in terms of formal semantics? Many issues and questions established along these lines remain open in Vietnamese linguistics.

In what follows, I will demonstrate that an investigation following this direction can help us reveal many substantial characteristics of the most commonly used quantifiers and plural markers in Vietnamese. To facilitate our upcoming discussions best, let us take stock of the semantics/syntax of the two most relevant elements in the vicinity of our research foci, i.e., classifiers and bare nouns, in the next sections.

2.3 The semantics of numeral classifiers

Presumably, classifiers are assumed to function as a lexical means to render bare nouns countable and predicative. This assumption follows from the view that bare nouns in classifier languages inherently are kind-denoting items. However, I will save the discussion of this issue in the next section. Now, I will sum up this excursus on the mass-count distinction by elaborating the semantics of classifiers in Vietnamese that I will adopt throughout this thesis.

As far as the semantics of classifiers and numerals in classifier languages are concerned, there are two main approaches in the literature, i.e. Chierchia-style vs. Krifka-style proposals, which can be summarized as follows (in the case of interpreting *hai quyển sách* [two CLF book] 'two books').[11]

(14)   Chierchia-style semantics of numerals and classifiers (simplified)

    a. $[\![\,two\,]\!] = \lambda P \in D_{<e,t>}.\ \lambda x \in D_e.\ \exists Y\ [x = \oplus Y \wedge Y \subseteq at(P) \wedge |Y| = 2]$

    b. $[\![\,hai\,]\!] = \lambda P \in D_{<e,t>} : at(P).\ \lambda x \in D_e.\ {}^*P(x) \wedge \mu_{\#}(x) = 2$

    c. $[\![\,quyển\,]\!] = {}^{\cup}$ (i.e., the pred(ication) function from kinds to sets of atoms)

(15)   Krifka-style semantics of numerals and classifiers (simplified)[12]

    a. $[\![\,two\,]\!] = \lambda P \in D_{<e,t>} : at(P).\ \lambda x \in D_e.\ {}^*P(x) \wedge \mu_{\#}(x) = 2$

---

[11]The definitions of functions/operators employed here can be found in Section 2.5. Notice the *-operator is Link's (1983) pluralization operator, which can be explicated as follows (note that I will omit reference to the world/situation w_s here and in most of the formalizations throughout this thesis for simplicity).

(i)   Link's pluralization operator (simplified)
    For any predicate P of type $\langle e,t \rangle$: ${}^*(P) = \lambda x.\ \exists Y\ [Y \subseteq at(P) \wedge x = \oplus Y]$
    In prose: the pluralization of predicate P is a set of individual x such that there is Y, Y is a subset of P-atoms and x is an element of Y closed under sum. In other words, *(P) is a cumulative predicate, i.e. a complete join semilattice (Landman 1989a:562).

[12]In fact, in Krifka's original analysis (1995), he conversely considers classifiers to be measure functions that necessitate a numeral argument, which is presumably fulfilled by an implicit 'one' when no numeral is explicitly stated.

    b. $[\![hai]\!] = \lambda P \in D_{<e,t>} : at(P). \lambda x \in D_e. *P(x) \wedge \mu(x) = 2$

    c. $[\![quyển]\!] = \mu_{\#}$ (i.e., a measure function along the cardinality dimension)

Accordingly, under Krifka-style proposals, the universal semantics of cardinal numerals are morphosyntactically realized differently in languages. Thus, English numeral *two* presumably can be decomposed into two parts corresponding to two separate morphemes in Vietnamese (and other classifier languages as well): the numeral *hai* (type $\langle et, et \rangle$), and the classifier *quyển* (also type $\langle et, et \rangle$). Put differently, classifiers are numerals' own matter: English $[\![two]\!]$ = Vietnamese $[\![hai + \text{CLF}]\!]$.

Meanwhile, Chierchia adopts slightly different denotations for numerals across languages (mainly differing in their presupposition) and takes classifiers to be a type-shifter for rendering kind-denoting nouns in classifier languages into property-denoting terms. More specifically, Chierchia and his followers presumably take classifiers to head a distinct functional projection located in the middle of number phrases and noun phrases: NumP > ClP > NP (see Section 2.6 for more details). In other words, while Krifka tears the meaning of the classifier apart from the meaning of numerals in number-marking languages, Chierchia assumes classifiers exist to accommodate a cross-linguistically lexical distinction between English-type and Chinese-type languages regarding the meaning of nouns (property-denoting vs. kind-denoting).

In Chapter 4, I will show that none of these approaches can be directly extended to Vietnamese to account for many puzzling facts pertaining to the distributions of plural markers and bare nouns. For instance, it is not transparent why plural markers cannot co-occur with (cardinal) numerals in Vietnamese, contrasting their counterparts in other classifier languages like Korean, as exemplified in (16).[13]

(16)   a.   **ba   những đứa học-sinh*
              three PL   CLF student
              Intended: 'three students'   (Vietnamese)

        b.   *sey-myeng haksayng -tul*
            three-CLF student   -PL
            'three students'   (Korean, from Kim 2005:9)

---

[13]Notice that the relevant construal in Chinese is also ungrammatical, presumably, due to either an illegitimate raising of the base NP from its base-generated position (below ClP) to the head of NumP to host the suffix *-men* (Li 1999:87) or a competing between classifiers and the plural marker *-men* for the head position of ClP (Borer 2005:96, Bošković & Hsieh 2013:194, among others).

(i)   **san ge xuesheng **-men***
      three CLF student   -PL
      Intended: 'three students'   (Chinese)

Specifically, following Trinh (2011,2019), Phan et al. (2021), I will adopt a middle ground between Krifka's and Chierchia's approaches to address the distributions and interpretations of numeral classifier construals and plural expressions (henceforth, plurals), which mainly builds on Chierchia (1998b). Accordingly, the meaning of classifiers consists of the atomize operator as the core and some extra domain restrictions encoded as lexical presuppositions (see (17) for an illustration). Applying a classifier to a predicate P will yield a set of P-atoms, provided that its domain requirement is met. However, bare nouns will be assumed to denote properties cross-linguistically (to be elaborated in the next section). Meanwhile, I submit that Vietnamese numerals, like most quantifiers, are also sensitive to the number feature of their associates, and it is this number sensitivity that can explain their incompatibility with plurals (to be elaborated in Chapter 4).

(17)   Semantics of Vietnamese classifier *quyển* (semi-formal version)
$\llbracket quyển \rrbracket = \lambda P \in D_{<e,t>} : P$ is books or the like. $\lambda x \in D_e.\ x$ is a P-atom

2.4   The semantics of bare nouns

It is widely reported that bare nouns in many numeral-classifier languages like Chinese, Japanese, etc. can function as arguments (i.e. kind/individual-denoting terms) in subject position without article's support (e.g., *the, a(n)* in English), contra Indo-European languages like Italian, French, etc. where nouns typically align with adjectives in denoting properties (Chierchia 1998a, Borer 2005, Dayal 2019, among many others). As Krifka (1995:410) points out, it is the semantic flexibility of bare nouns in Classical Chinese, a precursor of modern Chinese, that underlies the Kung-sun Lung's 'White Horse' Paradox (also see Yi 2018).

(18)   *Bai   ma   fei   ma.*
white horse NEG horse
= 'The white-horse-kind is not the horse-kind.' (kind-denoting *ma* ⇒ ⊤)[14]
= 'A white horse is not a horse.'   (property-denoting *ma* ⇒ ⊥)

Given this observation, Chierchia (1998b) put forth a cross-linguistic parameter called **Nominal Mapping Parameter** (NMP), hypothesizing that all the natural languages could be classified into three broad groups by appealing to two following syntactic-semantic features lexically encoded in their bare nouns.

(19)   **Nominal Mapping Parameter** (Chierchia 1998b)

---

[14]Notice further that this reading presupposes there are non-white horses in the context.

  a. $[+/-\text{pred(icative)}]$: whether bare nouns denote properties, i.e., type $\langle s, \langle e, t \rangle \rangle$.

  $[+/-\text{arg(umental)}]$: whether bare nouns denote kinds (and thus can function as arguments), i.e., type $\langle s, e \rangle$.

  b. Examples:

  (i) $[+\text{arg}, -\text{pred}]$: Chinese, Japanese, etc.

  (ii) $[-\text{arg}, +\text{pred}]$: Italian, French, etc.

  (iii) $[+\text{arg}, +\text{pred}]$: English, German, etc.

More importantly, Chierchia argues that these settings could account for many cross-linguistic divergences and convergences concerning both the syntax and semantics of nominals. For instance, typical $[+\text{arg}, -\text{pred}]$ languages like Mandarin Chinese and Japanese are predicted to have no obligatory morphology to express singular–plural distinction (Chierchia 1998:353), and the bare nouns in these languages require a mediating functional projection, i.e., classifiers, to be capable of combining with numerals (see the previous section).

By contrast, the nominal structures of the language group $[+\text{arg}, +\text{pred}]$, like English, and the group $[-\text{arg},+\text{pred}]$, like French and Italian, will take a different derivational route. Concretely, as for the latter, because bare nouns in these languages denote properties only, i.e. type $\langle s, \langle e, t \rangle \rangle$, they need the definite articles to help transform their denotation into argument-denoting type $\langle s, e \rangle$ to function as arguments in subject position. In other words, in these languages, bare nouns are prohibited from being used to denote arguments. Meanwhile, for the former group, given that bare nouns in these languages have the $[+\text{arg}]$ feature, it then follows that they can still function as arguments in subject position in various contexts (e.g., English: *Gold is rare, Dogs are barking,* etc.) In addition, the morphology of number marking is predicted to be obligatory in both types of language.

Where do Vietnamese bare nouns fit into this picture? On the one hand, there is evidence indicating that it also observes the NMP like other typical classifier languages (e.g., Mandarin Chinese, Japanese). On the other hand, there are some observations against the NMP that apparently make Vietnamese nominals stand out. For instance, let us consider the following contrast between Vietnamese and Mandarin, repeated from Trinh (2011:12).

(20) a. ***Chó** thích ăn thịt.*
          dog like eat meat
          'Dogs/*The dog(s) like(s) to eat meat.'

      b. ***Gou** xi-huan chi rou.*
          dog like   eat meat

'Dogs/The dog(s) like(s) to eat meat.'

Thus, comparing to Mandarin and Cantonese counterparts, the bare noun *chó* 'dog(s)' in Vietnamese can appear in subject position to bear the kind reference (given a kind denotes a (maximal) plural individual) but not allow the individual-denoting reading (i.e., definite), in contrast with Mandarin but on a par with Cantonese bare nouns, as indicated by − in **Table 2.3** below.

Table 2.3: Semantic interpretations of nominals in Vietnamese, Mandarin, and Cantonese (revised from Cheng & Sybesma (1999:528) with Vietnamese added)

Templates	Vietnamese		Mandarin		Cantonese	
	Indef	Def	Indef	Def	Indef	Def
Bare N	+	−	+	+	+	−
CLF + N	−	+	+	−	+	+
Num + CLF + N	+	−	+	−	+	−

(21) *#Chó đang nằm ngoài sân.*
      dog PROG lie outside yard
      Intended: 'The dog(s) is/are lying in the yard outside.'

In other words, in view of observations like (21), bare nouns in Vietnamese seem incapable of functioning as the subject of episodic (i.e. non-generic) predicates, i.e. contra NMP.

   These observations, in sum, allow us to cast doubt upon Chierchia's projection that bare nouns in classifier languages can bear both kind- and argument-denoting readings, at least in the case of Vietnamese. Nevertheless, I will leave open to the question of whether or not the NMP can be amended to account for Vietnamese facts and adopt, instead, Trinh's (2011) assumption that bare nouns (i.e. nouns without any overt determiners or classifiers) inherently denote properties cross-linguistically, i.e., type $\langle s, et \rangle$ or $\langle e, t \rangle$ for simplicity. Given this assumption, all the available interpretations of bare nouns in Vietnamese (e.g., kind reference, (non)specific indefinite, etc.) will be analyzed as the results of applying overt/-covert operators (i.e. type-shifters in the Neo-Calsonian framework – see the next section) to their primitive property-denoting meaning.[15]

---

[15]Notice further that many bare nouns in Vietnamese can directly co-occur with overt determiners without *classifier*-support (e.g., quantifiers, numerals, plural markers, etc.) yielding various inter-

(22) Examples of various indefinite interpretations of bare nouns in Vietnamese

    a. *Khủng-long tuyệt-chủng rồi.*
       dinosaur extinct   ROI
       'Dinosaurs are extinct.'   (kind reference)

    b. *Ngoài sân chó đang sủa.*
       outside yard dogs PROG bark
       'There are dogs barking in the yard outside.'   (nonspecific)

    c. *Pluto là   chó.*
       Pluto COP dogs
       'Pluto is a dog.'   (predicative)

    d. *Tôi chưa từng ăn thịt   chó.*
       I   NEG once eat meat dog
       'I have never eaten dog meat.'   (attributive)

(23) Definite contexts:

    a. *(Đầu   năm mẹ   mua cho Nam **một cuốn vở**.)   Vở   giờ*
       (earlier year mom buy for Nam one CLF notebook.) notebook now
       vẫn còn mới.
       still   new
       '(Mum bought for Nam a notebook earlier this year.) The notebook
       still looks new until now.'   (anaphorically definite)[16]

    b. *Đảng Cộng sản   Việt Nam [...] là   **lực-lượng** lãnh-đạo Nhà-nước*
       party communist Vietnam [...] COP force   lead   state
       và   xã-hội.
       and society
       'The Communist Party of Vietnam [...] is the leading force of the State
       and the society.' (The Constitution of Vietnam (2013), Article 4.)

2.5 Classical extensional mereology and semantic operators

The semantics of classifiers and bare nouns as represented, accordingly, need something more to facilitate us in capturing all the possible interpretations of nominals in Vietnamese, especially with respect to bare plurals (i.e. plural expressions without other determiners/modifiers). The missing pieces, presumably, are covert operators, which are proposed to be universally available as a kind of repair, along the lines of Dayal (2004, 2013, 2019); Dayal and Sağ (2020) which is developed within

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pretations, given the existence of *optional* and *non-classified* nouns in this language (Simpson & Ngo 2018).

[16]Example repeated from Phan & Chierchia's (2022). See Jenks (2018:525) for a topicality-based account of similar cases in Mandarin where a bare noun could occur in subject position in episodic contexts.

the type-flexible framework, i.e. the Neo-Calsonian approach, proposed in Partee (1986); Chierchia (1998b).[17]

(24)   Covert type-shifters (Chierchia 1998b, 2015)

     a. **iota**: $\lambda P \iota P_s$, if there exists a unique maximal entity in P, undefined otherwise.

     b. **pred**: $^{\cup}k = \lambda x.\ [x \sqsubseteq k_s]$ provided that k_s is defined, else undefined.

     c. **nom**: For any property P and world/situation s,
$^{\cap}P = \lambda s.\ \iota P_s$ is in K, undefined otherwise
where P_s is the extension of P in s and K is the set of kinds.

                                                             (Chierchia 1998:350-351)

     d. **GEN**: $[\![\text{GEN X}]\!]_s$ is defined iff $[\![\text{X}]\!]_s \in K$ (K is the set of kinds)
If defined, $[\![\text{GEN X}]\!]_s = \lambda P_{<e,t>}.\ (generally_x(x \sqsubseteq [\![\text{X}]\!]_s(s) \rightarrow x \in P))$[18]

     e. $\exists$: $\lambda P.\ \lambda Q.\ \exists x\ [P(x) \wedge Q(x)]$

Specifically, the domain-shifting operations are implemented via Partee's (1986) type-shifting operators as summarized in Figure 2.1 below and, more importantly, regulated by an economy principle like Jenks' (2018) Blocking Principle as in (25).
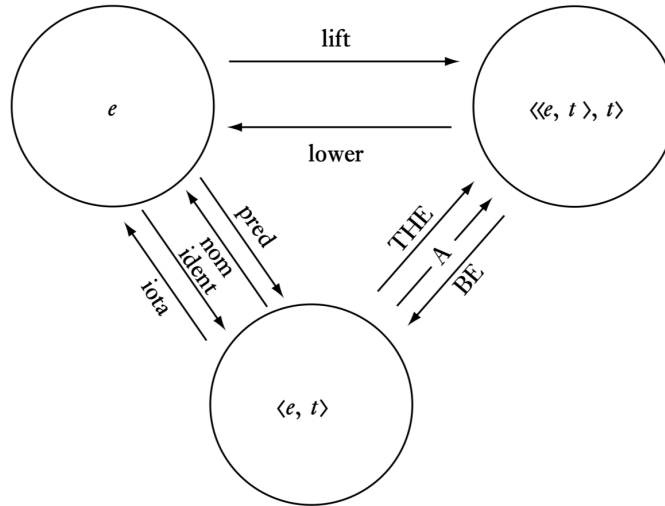
Figure 2.1: Partee's (1986) type-shifting operators

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[17]Note that all the semantic notations/representations in this thesis follow the common conventions in formal semantics well-established since Heim & Kratzer (1998).

[18]This is a modification of Trinh's (2011) version of the generic operator originally posited in Chierchia (1998),i.e. GEN, which takes a kind and a predicate and returns true iff instances of the kind generally fall under the predicate.

(25)   *Blocking Principle*
       Don't do covertly what you can do overtly!

Additionally, the definition of number-related operators employed throughout this thesis will follow the classical extensional mereology (i.e., the study of parthood), which can be formalized as follows (cf. Winter & Scha 2015, Champollion & Krifka 2016, Wagiel 2021).

(26)   Definitions of number-related operators

   a. $\oplus$ (Sum-operator): $x \oplus x = x, x \oplus y = y \oplus x, x \oplus (y \oplus z) = (x \oplus y) \oplus z$

   b. $\sqsubseteq$ ('Part'-operator): $x \sqsubseteq y \Leftrightarrow x \oplus y = y$

   c. $\sqsubset$ ('Proper Part'-operator): $x \sqsubset x \oplus y$ but $x \oplus y \not\sqsubset x \oplus y$

   d. $\sqcup$ (Join-operator): $x \sqcup y := \iota\{z : x \sqsubseteq z \wedge y \sqsubseteq z \wedge \forall z'(x \sqsubseteq z' \wedge y \sqsubseteq z' \to z \sqsubseteq z')\}$

   e. $\sqcap$ (Meet-operator): $x \sqcap y := \iota\{z : z \sqsubseteq x \wedge z \sqsubseteq y \wedge \forall z'(z' \sqsubseteq x \wedge z' \sqsubseteq y \to z' \sqsubseteq z)\}$

   f. $\oplus P$ (i.e. the closure of P under $\oplus$):[19]
        $P = \{a, b, c\} \to \oplus P = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$

Besides, our upcoming discussion will heavily rely on notions/functions pertaining to *atomicity* and *maximality*, as characterized as follows (cf. Quine 1960, Link 1983, Krifka 1989, Landman 1989a, Chierchia 1998b, Sutton & Filip 2021)[20]

(27)   The sup(P) function and the maximal element of P:

   a. $sup(P) := \{ x: sup_P(x) \}$
        where $sup_P(x) \equiv x \in sup(P) \Leftrightarrow_{def} \forall y(y \in P \leftrightarrow y \sqsubseteq x)$
        (The "supremum" of P is the smallest entity whose all the members of P as its proper parts. For instance, suppose P = {a, b, c, a$\oplus$c}, then $sup(P)$ = a$\oplus$b$\oplus$c)

   b.   Maximal element of P

---

[19]This is an informal version of the distributivity operator, i.e. the *-operator, which is assumed to be the semantics of plural morphology operating on the noun since Link (1983) (see Footnote 11).

[20]Note that the formulation of 'atomic' below is narrower than Landman's (1989a: 561) definition which characterizes the atom-formed property of sets, as we can appreciate through the qualified ones in the example.

(i)   Landman's definition of atomicity (with minor modifications)
      A is atomic iff for all $b \in$ A: there is an $a \in at$(A) such that $a \sqsubseteq b$
      Examples: A_1 = {a, b, c}; A_2 = {a, b, a$\oplus$b}; A_3 = {a, b, c, a$\oplus$b, b$\oplus$c, a$\oplus$b$\oplus$c}; etc.
      (Our atomicity criteria applies to the set A_1 only, i.e. a set of *singular individuals* in Landman's terminology)

max(P) $=$ sup(P) if sup(P) $\in$ P, undefined otherwise.

(Informally, the maximal element of P is that entity in P which has every member of P as its parts)

(28)   The at(P) function and the atomic, cumulative properties

a. at(P) := { x: $atom_P$(x) } (i.e. the atomizing function at(...), which applies to a given set P and yields the set of all *singleton subsets/atoms* x of P)

where $atom_P$(x) $\equiv$ x $\in$ at(P) $\Leftrightarrow_{def}$ x $\in$ P $\wedge$ $\neg\exists$y(y $\in$ P $\wedge$ y $\sqsubset$ x)

(Informally, x is a(n) *minimal element/atom* of P if and only if x has no proper part which is P)

b.   *Atomic predicates*

P is an atomic predicate iff $[\![P]\!]$ $=$ at($[\![P]\!]$)

(Informally, P is an atomic predicate if the (extensional) denotation of P necessarily consists of atoms of P, i.e. *P-atoms*)

c.   *Cumulative predicates*

P is a cumulative predicate iff $[\![P]\!]$ $=$ $\oplus at$($[\![P]\!]$)

(Informally, P is a cumulative predicate if and only if the denotation of P is necessarily a set closed under $\oplus$)[21]

Finally, to capture the general composition with numerals, I follow Ionin & Matushansky (2006; 2018) in assuming that only predicates denoting sets of individuals with the same number/cardinality of atomic parts, i.e. being *uniform*, can be counted, i.e. being capable of co-occurring with numerals.

(29)   *Uniform predicates*

P is uniform $\Leftrightarrow_{def}$ $\exists$n[$\forall$x[P(x) $\rightarrow$ $|x|_P$ $=$ n]]

(Informally, P is uniform iff there is a cardinal number n such that for all x, if x is P then the cardinality of x is n. For instance, {a, b, c, d} or {a$\oplus$b, c$\oplus$d} are uniform sets, whereas {a,b, c$\oplus$d} or {a, b, c, a$\oplus$b$\oplus$c} are not.)

2.6   Syntactic structures of Vietnamese nominals

Now, let me briefly sketch out the syntactic structures of Vietnamese nominals from two aspects: (i) the linear/surface structure and (ii) the hierarchical structure (i.e., the logical form).

---

[21]Given this formalization, we can see that the denotation of a cumulative P(-redicate) is the output of applying the distributivity operator to the at($[\![P]\!]$) (cf. Landman (1989a) for the idea that cumulativity and distributivity are actually two sides of the same coin.)

As for the former, the linear order of nominal constituents in Vietnamese can be represented as in (33) with illustrations as in (31) (Nguyễn T.C. 1975; 1996, Nguyen H.T. 2004, Phan & Lâm 2021, among others).[22]

(30)   The surface structure of Vietnamese nominal[23]
        Q > PM/Num > CÁI > CLF > Noun > AttrP > PossP > RC > DEM.

(31)   a. *Tất-cả những cái con mèo đen   của tôi mà   Nam đã cho đó*
            all   PL   CAI CLF cat black POSS I   COMP Nam PST give DEM
            (rất   đáng-yêu.)
            (very adorable)
            'All of those black cats of mine that Nam gave (are very adorable.)'
        b. *Tất-cả ba   cái đứa sinh-viên ngôn-ngữ-học của tôi mà   Nam đã*
            all   three CAI CLF student linguistics POSS I   COMP Nam PST
            chỉ-trích đó   (rất   ngoan.)
            criticize DEM (very well-behaved)
            'All of those three linguistics students of mine that Nam criticized (are very well-behaved.)'

Next, as far as the hierarchical structure (i.e., constituency) is concerned, nominals in classifier languages can be analyzed in different syntactic structures depending on the status of classifiers. As mentioned previously, if we adopt Krifka's idea that classifiers are integrated parts of numerals, then classifiers should be base-generated at the complement position of numerals. By contrast, if we follow Chierchia's approach to classifiers as a semantic linker between numerals and bare nouns, then they should have a distinct layer below numerals and atop NPs. As far as the syntactic structure of Vietnamese nominal is concerned, this is exactly what I will assume for the position of classifiers.

Given this assumption and the surface structure summarized in (33), following Jenks (2018) and many other authors, I assume that there are at least two distinct nominal projections within noun phrases of classifier languages: DP > ClP > NP (see Simpson, 2005; Simpson et al., 2011; Simpson and Ngo, 2018, among others).[24]

Furthermore, I concur with Nguyen H.T. (2004) in assuming a Demonstrative Phrase (DemP) and a Number Phrase mediating between DP and ClP, since, as Dayal & Jiang (2022) propose, demonstratives semantically differ from definite determiners in that they carry different presuppositions, i.e. non-uniqueness vs. uniqueness. However, diverging from Dayal & Jiang (and also Simpson 2005), I

---

[22]Notice that I will follow Liao (2020) in assuming the element *CÁI* here as an attitudinal/emphatic marker, not as a focus marker as Nguyen H.T. (2004) posited since it doesn't necessarily activate a (sub)domain of alternatives. Nevertheless, this choice doesn't affect my proposal presented below.

[23]Notice, again, that plural markers can not co-occur with cardinal numerals in Vietnamese.

[24]See Phan & Lander (2015) for an assessment of the DP/NP parameter with respect to Vietnamese.

assume demonstratives not to be base-generated in D-position (i.e. being on par with definite articles but are in complementary distribution with them), but form a separate layer of projection right below DP heading by a null D which functions as the iota operator. This assumption is mainly motivated by the different c-selections between *tất-cả* 'all' and *mọi/mỗi* 'every/each' where the former is assumed to select DP whereas the latter is assumed to select NP/ClP in their quantificational structures (see Section 3.7 for more elaborations)[25]. Notably, along the lines of Simpson (2005; 2018), Nguyen H.T. (2004, 2013), I assume there occurs a leftward movement of NumP/ClP to [Spec-DemP] in Vietnamese in linearization (indicated by the dashed line), whereas the whole DemP needs to rise to [Spec-DP] at LF presumably to check its [uD] feature (indicated by the dotted line)[26]. In sum, this proposal can be illustrated by the tree (33) below (for ease of explication, I will not represent this LF move in what follows since it doesn't affect the semantic composition between DemP and the iota operator functioning as a covert D – see more details on the semantics of Demonstratives in Vietnamese in Section 3.6.2).

---

[25]A novel piece of evidence supporting this high-DemP hypothesis is the salient singular reading of the phrase [bare N + Dem], not number-neutral as expected, suggesting its underlying LF is [$_{DemP}$ Dem [$_{ClP}$ CLF$_{null}$ [NP]]], as shown in the contrast below.

(32)   a.   *Chó này sủa   suốt ngày.*
            dog DEM bark all   day
            'This dog barks all day.' NOT 'These dogs bark all day.'
       b.   *Chó nhà   Nam sủa   suốt ngày.*
            dog house Nam bark all   day
            'Nam's dogs/Nam's dog bark(s) all day.'

[26]For an overview of the feature checking mechanism under the minimalist framework, please refer to Zeijlstra (2020).

(33) The LF of Vietnamese nominal
(*tất-cả ba đứa sinh viên này* 'all these three students')


```
                          QP
                 ┌─────────┴─────────┐
                 Q                    DP
                 │              ┌──────┴──────┐
               tất-cả        DemP_i[uD]        D′
               'all'        ┌────┴────┐    ┌────┴────┐
                          NumP      Dem′  D⁰[+D]     t_i
                                 ┌───┴───┐    │
                               Dem⁰    NumP    ι
                                │    ┌───┴───┐
                              này  Num⁰      ClP
                             'this'  │    ┌───┴───┐
                                    ba   Cl⁰     NP
                                  'three' │       │
                                        (đứa)  sinh viên
                                              'student'
```
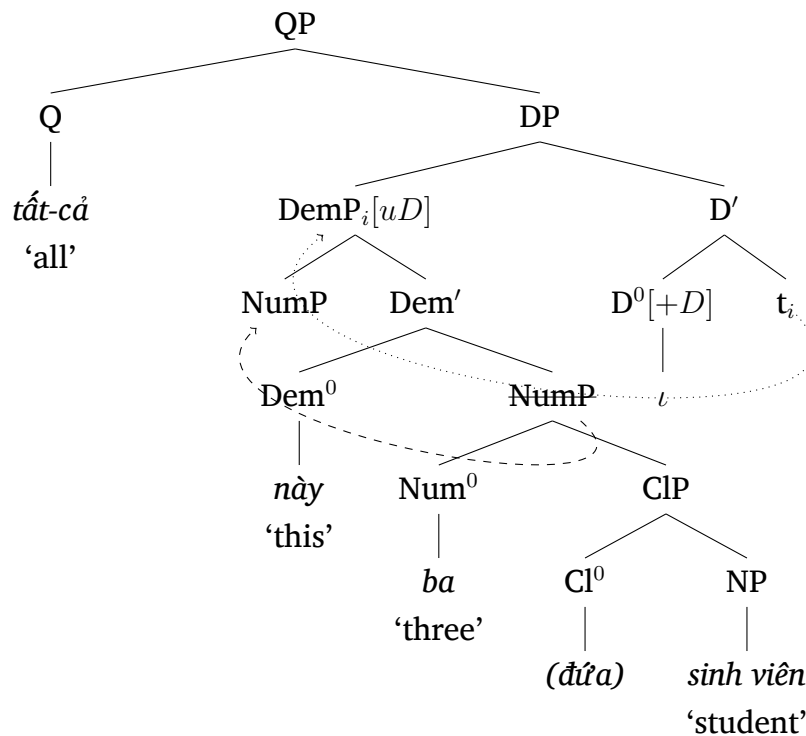
More importantly, my proposal also differs from most previous authors with respect to the position of plural markers. Accordingly, instead of treating *các/những* as either articles base-generated in D (e.g. Nguyen H.T. 2004, 2013) or heads of the Number phrases (e.g. Le & Schmitt 2016), I take them to be instantiations of the so-called modifying plural elements along the lines of Wiltschko (2008). In general, regarding the syntax of plural markers, there presumably are two ways to analyze them cross-linguistically: (i) treating them as a 'head plural' heading a quantity/measure/number phrase in the nominal spine (roughly corresponding to Li's 1999 NumP, corresponding to Abney's (1987) QP, Zamparelli's (1998) PDP, Borer's (2005) #P, and Svenonius' (2008, Solt's (2015) MeasP, among others) UnitP, among others)[27] or (ii) taking them as a 'modifying plural', i.e. an adjunct modifying some projection in the nominal spine, e.g. Root(P), *n*(P) or D(P) (Wiltschko 2008, Butler 2011, Kim and Melchin 2018, Park 2022, among others.) The two syntactic structures of modifying plural (34-a) and head plural (34-b) with their crucial differences can be summarized in **Table 2.4** below.

---

[27]Notice that under most of the proposals in the literature, such number phrases are assumed to be headed by numerals, not plural markers.

(34) a. *n*P

```
        nP
       /  \
      n    RootP
           |
          Root
         /    \
      Root   [plural]
```

b.

```
        DP
       /  \
      D    NumP
          /    \
        Num     nP
      [±plural] /  \
               n    RootP
                    |
                   Root
```
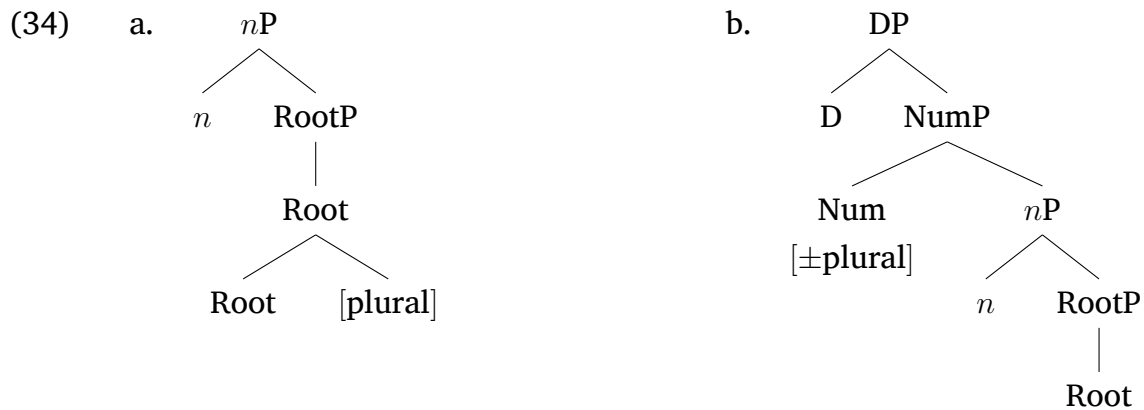
Table 2.4: Main differences between modifying plural vs. head plural

	Modifying plural	**Head plural**
(i) Status	Optional	Obligatory
(ii) Interpretation	Number-neutral vs. Plural	Singular vs. Plural
(iii) Feature value	Monovalent [plural]	Bivalent [±plural]
(iv) Position	RootP, *n*P, DP, etc.	Num

To anticipate, I will show that the modifying plural approach will fare better with respect to plural markers in Vietnamese, in particular, their general optionality in the structure of Vietnamese nominals. On the other hand, I will also argue that plural markers are merely necessary in a number of cases for compositional reasons (e.g., satisfying the plurality requirement on the domain restrictor). Chapter 5 will be devoted to presenting specific evidence supporting this claim. That being said, *các/những* in Vietnamese will be taken as adjuncts that can freely merge into any layers below DemP (viz., NumP, ClP, NP). One of these possibilities, i.e., PMs being incorporated into ClP, can be represented as in the LF (35) below.

(35)   The LF of Vietnamese nominal
(*tất-cả những đứa sinh viên này* 'all these three students')

```
                        QP
                      /    \
                   Q⁰        DP
                    |       /    \
                tất-cả    D⁰      DemP
                 'all'    |      /     \
                          ι    ClP     Dem′
                               ⌒      /    \
                            Dem⁰    ClP
                              |     /   \
                            này    ∅    Cl′
                           'this'      /    \
                                  Modifying Pl    Cl″
                                       |         /    \
                                    những      Cl⁰     NP
                                               |        |
                                             (đứa)   sinh viên
                                                     'student'
```
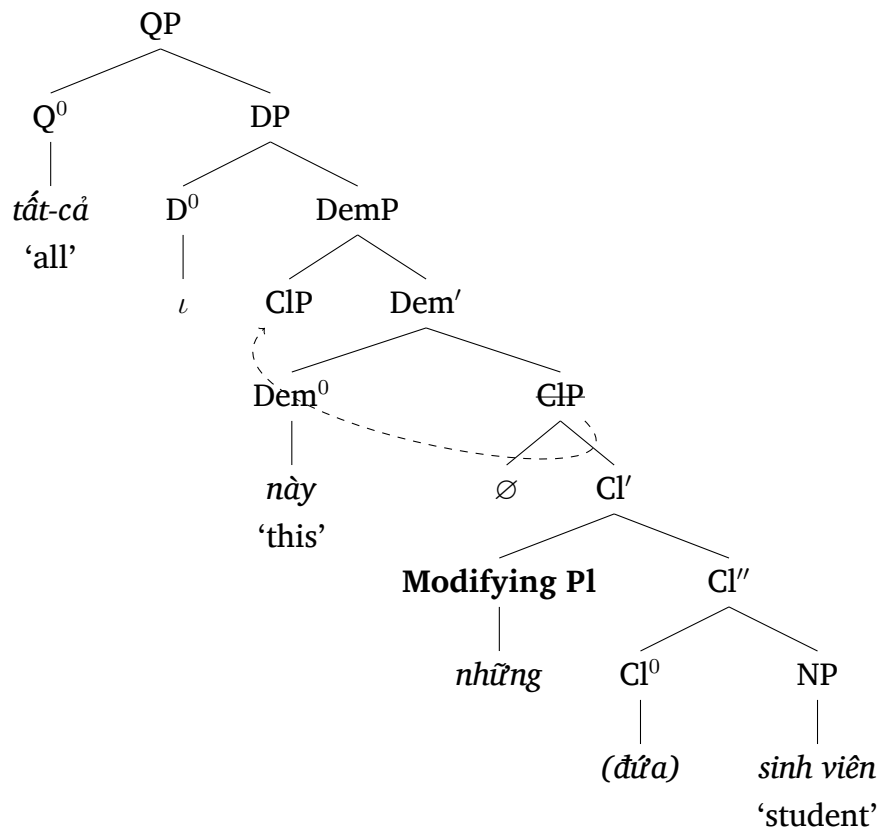
Lastly, regarding the syntax of *tất-cả*, I will follow Matthewson's (2001) revised proposal that builds on classical generalized quantifier theory (Barwise & Cooper 1981) in assuming that DPs are the complements of quantifiers below quantifier phrases (QPs, i.e. phrases headed by quantifiers). Meanwhile, as far as *mọi* and *mỗi* are concerned, I assume that their complements are ClPs/NPs on par with English *every* for the reasons that I will elaborate in Chapter 3.

Chapter 3

Universal quantification in Vietnamese

3.1 Overview

Overall, this chapter aims to characterize both s-selections and c-selections of the four most common universal D-quantifiers in Vietnamese, namely *tất-cả, cả, mọi,* and *mỗi*, as those in **bold** form in (1).

(1)   Vietnamese ∀ D-quantifiers

```
              simplex                              complex
                 |                                    |
          tất-cả 'all'            tất-cả/toàn-bộ/hết-thảy/tất-thảy mọi
          mọi 'every'                            'every'
       mỗi 'every/each'               gần-như/hầu-như tất-cả
      cả 'all/(the) whole'                    'almost all'
     hết-thảy 'all/every'          tất-cả ngoại-trừ năm CLF
     tất-thảy 'all/every'                   'all but five'
        toàn-bộ 'all'                          etc.
```
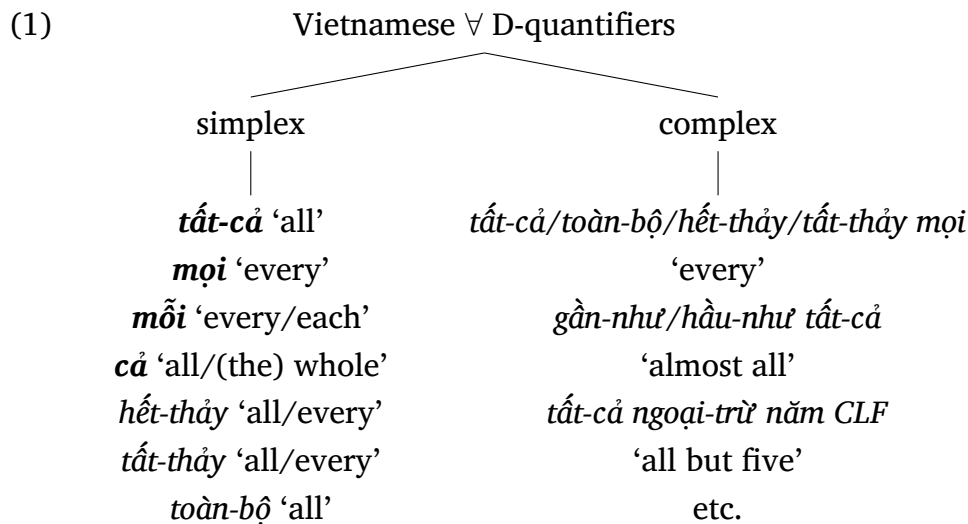
Specifically, in what follows, I will attempt to capture what kind of semantic/syntactic objects/sub-categories can or cannot surface in domain restrictor position of our four D-quantifiers in focus. Thus, in view of observations like (2), (3), it is tempting to ask why *tất-cả* cannot co-occur with DemPs like *con chó này* 'this dog' or group terms like *làng* 'village' or sum-denoting expressions like conjoined terms *Nam and Mi* 'Nam and Mi', whereas *cả* is found to allow the latter two. This kind of question has mostly been overlooked in the literature of Vietnamese linguistics.

(2)   a.   *Tất-cả/*cả con chó này   rất   ngoan.
           all   CLF dog DEM very well-behaved
           Intended: 'All these dogs are very well-behaved.'

       b.   *Tất-cả làng   này đã   đi bầu.
           all   village DEM PST go vote
           Intended: 'All the villagers voted.'

       c.   *Tất-cả Nam và   Mi đã   có-mặt.
           all   Nam and Mi PST show.up
           Intended: 'Nam and Mi all arrived.'

(3)   a.   Cả hội-đồng   đã   có-mặt.
           CẢ committee PST show.up
           'All the committee members arrived.'   (group term)

       b.   Cả Nam và   Mi đã   có-mặt.
           all Nam and Mi PST show.up
           'Nam and Mi all arrived.'   (conjoined term)

On the other hand, the contrast between *tất-cả* and *cả* seems to vanish when they quantify over nominals of the form NumPs, as illustrated by (4).

(4)   **Cả/Tất-cả** ba   con chó đằng-kia   ướt-đầm.
       all   three CLF dog over.there soaking.wet
       'All three dogs over there are soaking wet.'   (NumPs)

How can we distinguish *tất-cả* and *cả* as shown above, and also *mọi* vs *mỗi*, as illustrated in (5), (6), in terms of their semantics and syntax to capture both their diverging and converging behaviors? That is the overarching question that this Chapter is devoted to shedding some light on.

(5)   a.   ***Mọi** ba   con chó ăn   một cái   pizza.
           every three CLF dog eat one CLF pizza
           Intended: 'Every three dogs eat a pizza.'

       b.   **Mỗi** ba   con chó ăn   một cái   pizza.
           each three CLF dog eat one CLF pizza
           'Each three dogs eats a pizza.'   (pair-list reading)

(6)   Co-occurrence with plural pronominals

       a.   **Tất-cả/*cả/*mọi/*mỗi** bọn-họ đã   có-mặt.
           ∀   3PL   PST show.up
           'All of them shown up.'   (distributive)

       b.   **Tất-cả/*cả/*mọi/*mỗi** bọn-họ đã   họp-lại ở   căng-tin.
           ∀   3PL   PST gather at canteen
           'All of them gathered at the canteen.'   (non-distributive)

Thus, this Chapter will be organized as follows: Section 3.2 will present some background pertaining to the inventory of universal quantifiers in natural languages as well as their instantiations in Vietnamese. Meanwhile, Section 3.3 will summarize the basic characteristics of quantifiers in semantics terms, accompanied by a well-documented case study of English universal quantifiers recapped in Section 3.4. Given that theoretical toolkit, the distributions and interpretations of *tất-cả*, *cả*, *mọi* and *mỗi* will be investigated in Section 3.5, Section 3.6 and Section 3.7, respectively.

3.2   Universal Quantifiers in Vietnamese

In this section, I will briefly present a semantic typology of quantifiers in Vietnamese and investigate some of their most basic formal characteristics (e.g., conservativity, existentiality, monotonicity, etc.), which have a bearing on our upcoming discussion of distinctions among the most typical universal D-quantifiers in Vietnamese, i.e., *tất-cả*, *mọi*, *mỗi*, and *cả*, respectively.

As widely known in the literature of generative grammar, quantifiers tend to be syntactically subcategorized into two types: (i) D(determiner)-quantifiers which form the arguments of predicates, typically in pre-nominal position, and (ii) A(adverbial)-quantifiers which directly form predicates, typically in pre- or post-verbal position (Partee 1995, Keenan 2012; 2019, among others). Some examples of these two types of quantifiers in English are shown (in bold) below.

(7)   a.   D-quantifiers: **All / Most / Some / No/** … *birds can swim*
       b.   A-quantifiers: *Brad **always / usually / often / occasionally / rarely / never/**… works on Friday afternoons.*

In what follows, I have very little to say about A-quantifiers in Vietnamese, except for the complex distributive-universal A-quantifier of the form [*mỗi* + CLF] (which we will cover briefly in Section 3.7). Now, let us focus on the subcategories of the former in terms of semantics.

Thus, all kinds of D-quantifiers seem to fall into three main semantic types: (i) existential/cardinal quantifiers, (ii) universal/ quantifiers, and (iii) proportional quantifiers (Westerståhl 2007, Keenan & Westerståhl 2011, Keenan 2019, among others). Below are the formal definitions of each type from Keenan (2019:118) with illustrations in Vietnamese.

(8)   Existential/cardinal D-quantifiers ($\exists$)

a. <u>Definition</u>: D is *existential/cardinal* iff for all subsets A, B, X, Y of the domain E,

if $|A \cap B| = |X \cap Y|$ then $D(A)(B) = D(X)(Y)$

For instance, **BOTH** is cardinal since **BOTH**(STUDENTS′)(ARRIVED′) and **BOTH**(MATH STUDENTS′)(WEIRD′) have the same truth value given that there are exactly two students arrived, and there are exactly two math students who are weird.

b. Examples in Vietnamese: *một số* 'some', *không* 'no', *một* 'one', *(một) vài* 'several', *hơn/dưới/ít-hơn mười* 'more/less than ten', *chính-xác/đúng/nhiều-nhất/ít-nhất mười* 'exactly/at most/at least ten', *(khoảng) từ năm đến mười* 'between five and ten', *không-quá/chưa-tới năm* 'not more than five', *khoảng/gần/xấp-xỉ/trên mười* 'approximately/about/nearly/almost/over ten', *hiếm ....nào* 'hardly any' , *gần như không (một) ... nào* 'practically no', etc.

(9) Universal/non-cardinal D-quantifiers (∀)

a. <u>Definition</u>: D is *universal/non-cardinal* iff for all subsets A, B, X, Y of the domain E,

$D(A)(B) = D(X)(Y)$ whenever $|A–B| = |X–Y|$

For instance, **ALL** is co-cardinal since **ALL**(STUDENTS′)(ARRIVED′) and **ALL**(MATH STUDENTS′)(WEIRD′) have the same truth value because the number of students who didn't arrive is equal to the number of math students who aren't weird (both are equal to zero).

b. Examples in Vietnamese:[1] *tất-cả, toàn-bộ, cả, tất-thảy, hết-thảy* 'all', *mọi, {tất-cả/toàn-bộ} mọi* 'every', *mỗi (một)* 'each', *cả* 'the whole', *tất-cả ngoại trừ năm-CLF* 'all but five', *{gần-như/hầu-như} tất-cả/mọi* 'nearly/almost all', etc.

(10) Proportional D-quantifiers (Prop.Q)

a. <u>Definition</u>: D is *proportional* iff for all subsets A, B, X, Y of the domain E,

$D(A)(B) = D(X)(Y)$ whenever $\frac{|A \cap B|}{|A|} = \frac{|X \cap Y|}{|X|}$

For instance, **MOST** is proportional since **MOST**(STUDENTS′)(ARRIVED′) and **MOST**(MATH STUDENTS′)(WEIRD′) have the same truth value because, simply speaking, they have the same ratio/proportion. Suppose we have five math students (a,b,c,d,e), and three of them arrived and

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[1]For a comparative perspective, Taiwan Mandarin universal D-quantifiers exemplified in Kuo & Yu (2012:655) consist of: *quanbu, suoyou, zheng-CL* 'all', *mei-CLF* 'every/each', *ge-CLF* 'GE', *quanbu chule wu-CLF* 'all but five', *{jiangjin/jihu} quanbu* 'nearly/almost all', *bingfei {quanbu/suoyou/zheng-CL}* 'not all', *bingfei mei-CL* 'not every', *mei-CL ... {han/gen/huo} ...* 'every ... and/and/or ...', etc.
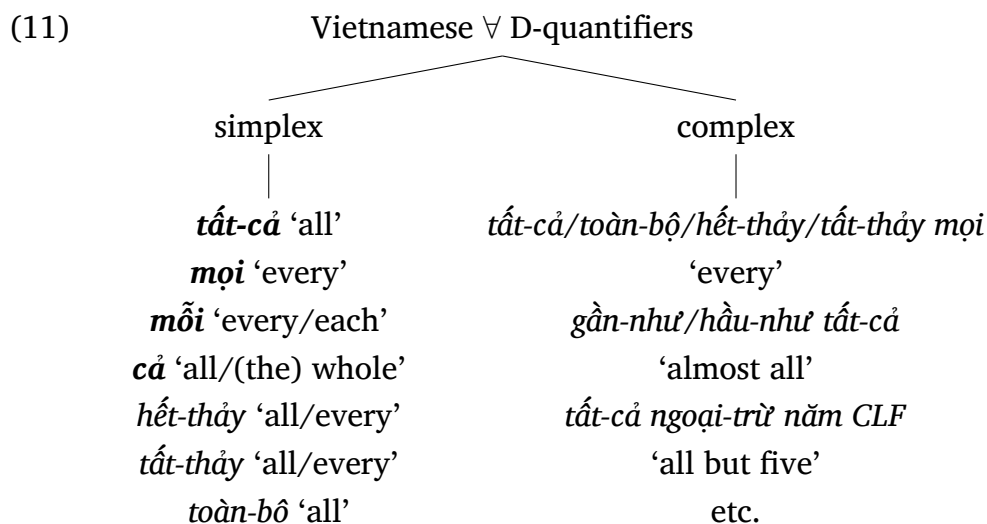
three of them are weird (though they are not necessarily the same ones). In that case, both sentences **MOST**(STUDENTS′)(ARRIVED′) and **MOST**(MATH STUDENTS′)(WEIRD′) are true, and both relevant proportions here are 3/2.

b. Examples in Vietnamese: *{hơn/ít-hơn/chưa-quá/chưa-tới} một nửa* 'more than/less than half of', *{gần/khoảng} ba-mươi phần-trăm (của)...* 'nearly/approximately thirty percent of (the)' , *{ít-nhất/nhiều-nhất/đúng} hai-phần-ba* 'at least/at most/exactly two thirds of (the)', {tất-cả trừ một-phần-mười} 'all but a tenth', *{(tuyệt đại) đa-số)/phần-lớn/phần-nhiều/ít/phần-ít/phần-nhỏ/một-thiểu-số* '(overwhelming) majority/minority of (the)', *chỉ một trong mười* 'only one in ten', etc.

It is worth noting that each type of quantifier above can be subcategorized in finer-grained terms, such as morphosyntactically 'simplex' vs 'complex' quantifiers. Thus, 'complex' quantifiers are primarily formed through the following ways, whereas 'simplex' roughly means non-complex ones:

• Modification, e.g. <u>more than</u> ten (∃) or <u>almost</u> all (∀);

• Boolean Compounding, i.e. using words like *and, or, neither...nor...,* and *not*;

• Exception Phrases, e.g. *all <u>but ten</u> students*

• Bounding Phrases, e.g. *He exercised twice a day, six days a week <u>for one year</u>*.

Additionally, as Keenan and Paperno (2012) point out, proportional quantifiers and partitive constructions (e.g., *some/all/most of the students*) are generally complex. Below are some simplex and complex universal D-quantifiers found in Vietnamese (those in **bold** will be our focus in what follows).

(11)   Vietnamese ∀ D-quantifiers

          simplex   complex

        tất-cả 'all'   *tất-cả/toàn-bộ/hết-thảy/tất-thảy mọi*
        mọi 'every'   'every'
      mỗi 'every/each'   *gần-như/hầu-như tất-cả*
      cả 'all/(the) whole'   'almost all'
     hết-thảy 'all/every'   *tất-cả ngoại-trừ năm CLF*
     tất-thảy 'all/every'   'all but five'
       toàn-bộ 'all'   etc.

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Given (11), we learn that the complex universal quantifiers in Vietnamese are essentially formed by modification (e.g., *gần-như tất-cả* 'almost all'), exception phrases (e.g., *tất-cả ngoại-trừ năm CLF* 'all but five'), or compounding two simplex quantifiers into one which inherits the syntactic-semantic characteristics of the rightmost constituent, i.e. $\left\lVert tất\text{-}cả\ mọi \right\rVert = \left\lVert mọi \right\rVert$, as evidenced in the following contrast between (12-a) vs. (12-b)/(12-c).

(12)   a.   ***Tất-cả*** *các sinh-viên* 'all the students'
       b.   *****Mọi*** *các sinh-viên* 'every students'
       c.   *****Tất-cả mọi*** *các sinh-viên* 'every students'

Now, let me conclude this section with some take on notable formal features of D-quantifiers exhibiting in natural languages to see what they may or may not share in common and, more importantly, how their semantics dictate their syntactic distributions. Specifically, there are three core semantic characteristics regarding quantifiers that demand our attention, namely *conservativity*, *existentiality*, and *monotonicity*.

First, conservativity is the notion devised for capturing the intimate bond between Q and its domain restrictor A, i.e. Q "lives on" A, in the sense that we only need to look at the members of the set A picked out by the first argument to evaluate a quantificational statement (von Fintel & Matthewson 2008:161).
Given conservativity property and the following equivalences, we learn that *every, some, no, most, few, many* all are conservative quantifiers.

(13)   *Every man smokes ≡ every man is a man who smokes.*
       Some man smokes ≡ some man is a man who smokes.
       No man smokes ≡ no man is a man who smokes.
       Most men smoke ≡ most men are men who smoke.
       Few men smoke ≡ few men are men who smoke.
       Many men smoke ≡ many men are men who smoke.

In fact, Barwise and Cooper (1981) even submits that conservativity is a common property of all the quantifiers. Regardless, conservativity has been taken to be a standard diagnosis for determining the quantifier-nature of any determiner in natural languages since then.

Next, let us turn to the property of existentiality. Keenan (1987) argues that only existential determiners are allowed in *there*-sentences on an existential reading. By contrast, non-existential determiners seem unable to show up in there-sentences or give rise to a reading other than an existential one. The definition of existentiality

is given below.

(14) Existentiality (Keenan 1987, De Hoop 1995)

    a. A basic determiner is called existential if it is always interpreted by an existential function, where

    b. A function f from properties to sets of properties is existential iff for all properties p, q

$p \in f(q)$ iff $1 \in f(q \& p)$

(where 1 is a certain trivial property shared by all individuals, e.g. 'exist')

Thus, simply speaking, a determiner D is existential if an equivalence is found between the two following patterns.

(15) a. Det N be XP
    b. Det N XP exist

Given this diagnosis, we learn that *some* is existential, whereas *all* is not, as evidenced in the equivalence attested in (16) but not in (17). More generally, Keenan argues that only existential quantifiers like *some* can feature in *there*-construction, as shown by the contrast between (18-a) and (18-b).

(16) a. *Some unicorns are white.* (17) a. *All unicorns are white.*
    b. *Some white unicorns exist.*   b. *All white unicorns exist.*

(18) *There*-sentence diagnosis

    a. *There are **some/two/no/a/many/exactly two/at most five**... unicorns in my garden.*

    b. **There are **all/every/neither/both/the/most/**... unicorns in my garden.*

The contrast between (18-a) and (18-b) illustrates the intriguing 'weak/strong' distinction of determiners established since Milsark (1977). Since then, many linguists have attempted to account for this distinction in different terms. Other than Keenan's approach as sketched above, Barwise and Cooper (1981) alternatively argue that the infelicity of (18-b) is because their LFs are tautologies,[2] whereas

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[2]Simply put, B&C submit that *there* (D(P)) = 1 iff D(P)(U) = 1 (where U is the set of everything in the universe)

(i.) B&C's logicality account

    a. *there*(**a**(*unicorn in my garden*)) = 1 iff {x: x is a unicorn in my garden} $\cap$ U $\neq \varnothing \Rightarrow$ contingent

    b. *there*(**every**(*unicorn in my garden*)) = 1 iff {x : x is a unicorn in my garden} $\subseteq$ U $\Rightarrow \top$

Zucchi (1995) attributes their deviance to the existence of presuppositions encoded in 'strong' quantifiers, etc. (Heim & Kratzer 1998:164-165, Gajewski 2002, Trinh 2024, among others).

Last but not least, the third crucial semantic property of quantifiers (and various kinds of other determiners also) that will have some bearing on our upcoming discussion is monotonicity (Keenan 2019:114).

Simply put, a generalized quantifier F is 1 iff for all properties p,q if p $\subseteq$ q then F(p) $\rightarrow$ F(q), i.e. if all p's are q's and F holds of p then F holds of q. In other words, a QP is $\uparrow$ if it licenses set-to-subset inferences (involving the subject), and is $\downarrow$ if it licenses subset-to-set inferences (involving the subject). Therefore, proper names are all $\uparrow$ because if all men die and John is a man, then John dies. Thus, *every unicorn, some unicorn, more than six doctors here*, and *most doctors* are also $\uparrow$, whereas *no doctors, neither John nor Mary, fewer than six doctors, at most five doctors*, and *less than half the nurses* are all $\downarrow$.

More importantly, quantifiers' monotonicity parallels the downward/upward-entailing properties of predicates. Thus, a downward-entailing (DE) environment will license set-to-subset inferences (involving the object) as in (19-a), whereas an upward-entailing (UE) environment will license subset-to-set inferences (involving the object) as in (19-b).

(19)   {*Americano*} $\subseteq$ {*coffee*}

    a.   *John doesn't like coffee.*
        $\rightarrow$ John doesn't like Americano (but not reverse).   (DE)

    b.   *John likes Americano.*
        $\rightarrow$ John likes coffee (but not reverse).   (UE)

(20)   Definitions of DE and UE functions/environments

    a.   A function f is DE iff for any x, y such that $x \rightarrow y$, $f(y) \rightarrow f(x)$

    b.   A function f is UE iff for any x, y such that $x \rightarrow y$, $f(x) \rightarrow f(y)$

3.3 Decomposing universal QPs: a theoretical puzzle

As commonly assumed in the literature, the standard semantics of quantifiers are uniformly (i.e. cross-linguistically) relations between two sets of individuals interpreting the subject NP and the predicate VP where the first composition with the subject NP, i.e. the domain restriction, will give us a *generalized quantifier*, of type $\langle et, t \rangle$ (Barwise and Cooper 1981, Partee et al. 1990, von Fintel 1994, Heim and Kratzer 1998, Keenan and Westerståhl 2011, Keenan 2019, among others). More concretely, the semantic denotation of a typical ∀-quantifier like English *every* could be translated into the formal language with lambda abstraction as follows (accompanied with the standard logical form as in (21-b)).

(21) a. $[\![\textbf{every}]\!] = \lambda Q_{<e,t>}.\lambda P_{<e,t>}. \forall x \in D_e [Q(x) \rightarrow P(x)]$
$[\![\textbf{every bird flied away}]\!] = [\![[\![\textbf{every}]\!] ([\![\textbf{bird}]\!])]\!] ([\![\textbf{fly-away}]\!])$
= 1 iff for all x such that x is a bird, x flies away
(in set-theoretic terms, *every bird flies* is true iff the set {x : x is a bird} is a subset of the set {y : y fly away}.)
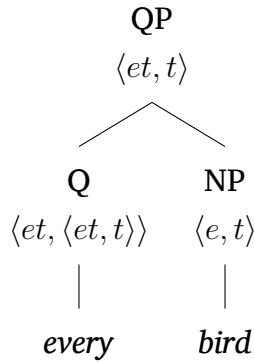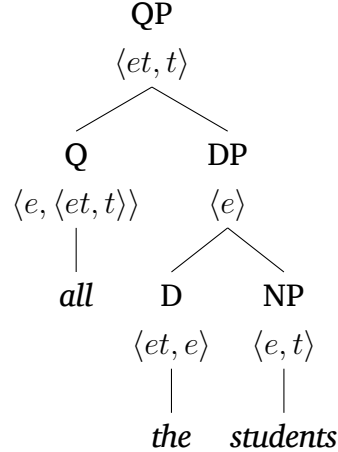
b. Standard account (GQT)   c. Matthewson's (2001) revision

However, it has been shown that this proto-typical semantics of English *every* could not be extended to many other languages, at least in a straightforward way, including Lillooet (Salish; Matthewson 2001), Mohawk (Iroquoian; Baker 1995), Newari (Tibeto-Burman; Kölver 1978), Asurini de Trocará (Tupi-Guarani; Vieira 1995), and Tohono O'odham (Uto-Aztecan; Zepeda 1983), etc. For example, by appealing to the observation that the quantifier *tákem* 'all' in Lillooet Salish requires a definite phrase (type $\langle e \rangle$) to form a generalized quantifier instead of an NP as in English *every* (but on a par with English *all*), Matthewson (2001) speculates that the

domain restriction should instead, cross-linguistically, follow the strategy found in Lillooet Salish, i.e. [$_{QP}$ Q$_{<e,<et,t>>}$ [$_{DP}$ D$_{<et,e>}$ + NP$_{<e,t>}$]]. Let us appreciate her idea as in (21-c) and sketch out the semantic derivation for English QP *all the students* based on her account of Salish counterpart as follows (I set aside references of worlds/situations for simplicity).

(22)   Semantic derivation of the QP *all the students* (of type $\langle\langle e,t\rangle, t\rangle$)

   a. $[\![\,\mathbf{all}\,]\!]$ $= \lambda X_e.\lambda P_{<e,t>}.\ \forall x \sqsubseteq X\ [\mathrm{atom}(x) \to P(x)]$

   b. $[\![\,\mathbf{the}\,]\!]$ $= \lambda P_{<e,t>}: \exists x\forall y[\mathrm{MAX}(P)(y) \leftrightarrow x = y.\ \iota x.\ \mathrm{MAX}(P)(x)$ (Heim 2019:36)

         $\mathrm{MAX}(P) := \lambda x.\ P(x) \wedge \neg\exists y\ [P(y) \wedge x \sqsubset y]$

   c. $[\![\,\mathbf{students}\,]\!]^c = \lambda y_e.\ y$ is a plurality of students in c

   d. $[\![\,\mathbf{the\ students}\,]\!]^c = [\![\,\mathbf{the}\,]\!]\,([\![\,\mathbf{students}\,]\!]^c)$
         $= \iota X.\ X$ is the maximal entity of a plurality of students in c   (by FA)

   e. $[\![\,\mathbf{QP}\,]\!] = [\![\,\mathbf{all}\,]\!]\,([\![\,\mathbf{the\ students}\,]\!]^c) = \lambda P_{<e,t>}.\ \forall x \sqsubseteq X$ s.t. X is the maximal entity of the plurality of students, if x is a student in c, then P(x)   (by FA)

Along the same lines of Matthewson's, Sauerland (2003) also decomposes German universal D-quantifier *jeder* 'every' into two parts implementing two parallel functions corresponding to English definite article *the* and D-quantifier *all*: (i) *-DER* for domain restriction and (ii) *JE-* for distributive-universal quantification, respectively.

(23)   German *jeder* = JE (quantifier) + DER (definite operator)
        $[\![\,$*JE-DER resident of these cities*$\,]\!]$ (Sauerland 2003:266-267)

   a. $[\![\,\mathbf{DER\ resident\ of\ these\ cities}\,]\!]$ = a$_1\oplus$a$_2\oplus$a$_3\oplus\cdots\oplus$b$_1\oplus$b$_2\oplus\cdots$

   b. $[\![\,\mathbf{JE}\,]\!]\,(X)(P)$ is defined iff $\forall x$: $(atom(x) \wedge x \sqsubset X) \to x \in$ domain(P)
         when defined: $[\![\,\mathbf{JE}\,]\!]\,(X)(P) = 1$ iff. $\forall x$: $(atom(x) \wedge x \sqsubset X) \to P(x)$
         (Informally, $[\![\,\mathbf{JE}\,]\!]$ presupposes for all the entities x, if x is an atom of X then x is in the domain of P and asserts that for all entities x, if x is an atom of X then x has the property P)

Thus, to illustrate, the sentence $[\![\,$*JE*$\,]\!]\,([\![\,$*DER resident-of-these-cities'*$\,]\!])([\![\,$*rich'*$\,]\!])$ is defined if and only if $[\![\,$*DER resident of these cities*$\,]\!]$ is the maximal, unique group X of x such that for all x, either x is not an atomic part of X or x is in the domain of the predicate {x: x is rich} (i.e. the domain of human individual here); where defined, $[\![\,$*JE*$\,]\!]\,([\![\,$*DER resident-of-these-cities'*$\,]\!])([\![\,$*rich'*$\,]\!]) = 1$ if and only if for all x, x is an atomic member/part of X, x is rich.

If Matthewson's and Sauerland's idea is on the right track, we have evidence to cast doubt on the generality of the so-called NP-Quantifier Universal first proposed in Barwise and Cooper (1981).

(24)   **NP-Quantifier Universal** (Barwise and Cooper 1981:177)
Every natural language has syntactic constituents (called noun-phrases) whose semantic function is to express generalized quantifiers over the domain of discourse.

On the other hand, in an attempt to defend the classical GQT, Giannakidou (2004) argues that the core facts that Matthewson found in Lillooet Salish can be reconsidered from a different perspective: it's likely that what looks like a DP-formation in this language is just a strategy of domain restriction on the nominal argument, but not an operation of individual-reference. In other words, those apparent DPs in Salish can be taken to be predicate-denoting NPs via type-shifting (DPs become predicative by means of Partee's covert operator Ident.[3]

For an article-less language like Vietnamese, it is an empirical challenge to find robust evidence to straighten out this theoretical puzzle, especially if we take into account the universal availability of covert type-shifters like Chierchia's iota operator (see Section 2.5, Chapter 2). Hence, for this current study, given the incorporations of the DP-hypothesis and neo-Calsonian semantics, I will follow Matthewson in assuming that the formation of QP in Vietnamese is similar to English's *all* and Salish's *tákem* in that the first argument of them is DP, not NP.

Details aside, a generalized quantifier expressed by a QP will finally be saturated by a predicate, creating a quantificational construction like *Every bird flies*. Generally, in Partee's (1991) terms, a quantification requires three elements: (i) a quantifier-operator, (ii) a domain restrictor (expressed by an NP or DP), and (iii) a nuclear scope (expressed by a VP predicate). This tripartite configuration, in principle, is suggested to characterize not only quantifications (over entities, situations, etc.) but also a number of information-related constructions in natural languages (Heim 1982, Rooth 1985, Partee 1991, von Fintel 1994, among others).

(25)   Tripartite configuration of quantification (Partee 1991)

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[3]Definition of **Ident** ($\langle e \rangle \rightarrow \langle e, t \rangle$): Ident(x) = λx. ∃y[[x ⊑ y] ∨ [[x = y] if x is an atomic entity]] (Giannakidou 2004:119).

```
                                    S
                 ┌──────────────────┼──────────────────┐
           Operator        (Domain) Restrictor      Nuclear Scope
               │                    │                    │
               ∀                  NP/DP              main VP
             must               "cases"            main clause
              not              if-clause            assertion
         almost every      subordinate clause         focus
            mostly               topic              consequent
          GEN(eric)         presuppositions
                               domain
                              antecedent
                               context
```
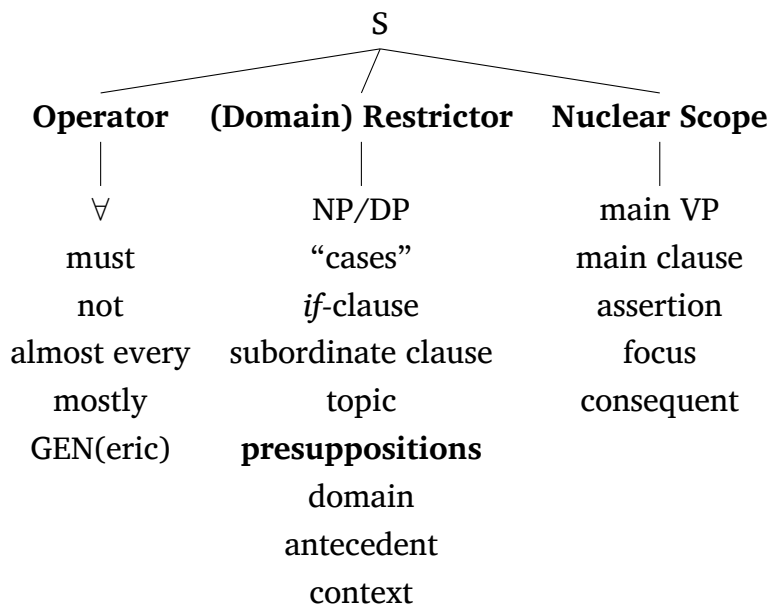
The fact we should highlight here is that, as von Fintel (1994:6) points out, domain restricting is commonly constrained by virtue of the determiner's presuppositions.[4] In other words, as far as determiners in natural languages are concerned, many of them (if not all) are found to denote a partial function in the sense that sentences containing them are not just either true or false but also can be void of truth value (Heim & Kratzer 1998:75). Typical examples of such presuppositional determiners are *both* and *each* in English: the former presupposes its first argument to have the exact cardinality of 2, whereas the latter presupposes its quantifying domain to be a non-empty set (cf. Giannakidou's (2004) (Non)veridicality property)[5], as represented below.[6]

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[4] Following common practice since Heim & Kratzer (1998:73–76), presuppositions will be introduced between the colon ":" and the period ".", whereas the material after the period corresponds to the truth-condition. Meanwhile, contextually determined information is assumed to be provided by the superscript c added to the interpretation function $[\![\ ]\!]$. Notice further that *iff = if and only if*.

[5] This non-emptiness condition on the first argument of *each* is argued to be a common property of not only other universal quantifiers (e.g. *every/all*) but also all of quantifiers of type $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$ in natural languages by McCawley (1972), Diesing (1992) and known as the Presuppositionality Hypothesis explicated in Heim & Kratzer (1998:163).

(i.) Presuppositionality Hypothesis
In natural languages, all lexical items with denotations of type $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$ are presuppositional, in the sense of the following mathematical definition (where δ is a lexical item of the appropriate semantic type, such as a determiner): δ is presuppositional iff for all A $\subseteq$ D, B $\subseteq$ D : if A $= \varnothing$, then $<$A, B$> \notin$ dom(F$_\delta$).

[6] Notice this is the denotation of D-quantifier *each*, not A-quantifier *each* (e.g., *John and Mary each ate two bowls of noodles*) as originally sketched in Schwarzschild (1994:209). I leave open to the question of whether they are semantically the same.

(i.) The semantics of English A-quantifier *each$_A$*

(26)   a. $[\![\,\textbf{\textit{Both}} \textit{ students arrived}\,]\!]^{\,c}$ = 1 iff there are exactly two students that arrived in c.

$[\![\,\textbf{\textit{both}}\,]\!]$ = $\lambda P_{<e,t>}$: |P| = 2. $\lambda Q_{<e,t>}$. $\exists x_e$ [P(x) $\wedge$ Q(x) $\wedge$ |x| = 2]

   b. $[\![\,\textbf{\textit{Each}} \textit{ student sang a song}\,]\!]^{\,c}$ = 1 iff for all x, if x is a student, x sang a song in c.

$[\![\,\textbf{\textit{each}}_D\,]\!]$ = $\lambda P_{<e,t>}$: P $\neq \varnothing$. $\lambda Q_{<e,t>}$. $\exists X[X = \iota{*}P \wedge \forall x$ [x $\sqsubseteq$ X $\rightarrow$ Q(x)]]

(revised from Schwarzschild 1994:209)

More importantly, such presuppositional accounts of *both* and *each* allow us to account for the following infelicitous b-sentences as presupposition failure (i.e., its presupposition is not true in the relevant context) cases on the ground of Stalnaker's Bridge Principle[7].

(27)   [Context: there were more than two students in the class]

   a.   *John talked to **two** students.*

   b.   **John talked to **both** students.*

(28)   a.   ***Every** student who knows anything about the case should speak now.*

   b.   ***Each** student who knows anything about the case should speak now.*

(Giannakidou 1999:375)

In what follows, I will demonstrate that many peculiar behaviors of the most typical universal D-quantifiers in Vietnamese can also be unraveled by appealing to different presuppositions encoded in their lexical meaning. Thus, these presuppositions operate as domain-restricting strategies in the formation of generalized quantifiers in this language. However, is a presuppositional account the only way to distinguish quantifiers of the same kind in natural languages? Let us appreciate some of the non-presuppositional but influential approaches to the three most common universal D-quantifiers in English, viz. *all*, *every*, and *each*, in the next

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$[\![\,\textbf{\textit{each}}_A\,]\!]$ = $\lambda P_{<e,t>}$. λX_e. $\forall x$ [x $\sqsubset$ X $\rightarrow$ P(x)]

[7]A version of Stalnaker's Bridge Principle can be found in Trinh (2014:11), repeated as follows.

(ii.)   Bridge Principle (following Trinh 2014:11)
A sentence is felicitous in context c only if its presupposition is true in c.

Notice that its original version in Stalnaker (1978:325) is stated as follows: "Any assertive utterance should express a proposition, relative to each possible world in the context set, and that proposition should have a truth-value in each possible world in the context set." As Trinh (2014, Footnote 24) points out, one of the ideas that Stalnaker endorses by this principle is "the set of worlds in which the proposition expressed by the sentence has a truth-value is *the presupposition of the sentence*" (Stalnaker 1973; 1978, Heim 1991, Giannakidou 2004).

section.

3.4 English perspective: *All* vs. *Every* vs. *Each*

Cross-linguistically, universal quantifiers are observed to be very diverse in their selections, from both syntactic and semantic aspects. Take English for example. The most common three distributive-universal quantifiers in English undisputedly are: *all*, *every*, and *each*. These three quantifiers, though sharing the same core semantics of ∀, are observed to have different behaviors, notably with respect to the types of the predicate they combine with (collective vs. distributive), semantic subcategories of their domain restrictor, etc.

For instance, as Matthewson (2003) remarks, *all* can take on a collective meaning—something that *each* cannot do and *every* can only do to a limited extent. Example (29) demonstrates this with the inherently collective predicate *gathered in the hall*. Meanwhile, (30) shows that for a once-only predicate like *tore down the sand castle*, only quantifiers that permit collective interpretations (i.e. *all* in this case) can surface in subject position (Matthewson 2003:264).

(29)   a. ***All*** *the students gathered in the hall.*
       b. ?***Every*** *student gathered in the hall.*
       c. ****Each*** *student gathered in the hall.*

(30)   a. ***All*** *the boys tore down the sand castle.*
       b. #***Every*** *boy tore down the sand castle.*
       c. #***Each*** *boy tore down the sand castle.*

However, *all* is not inherently a collective quantifier. In other words, it can still combine with inherently distributive predicates (e.g. *smile*) just like *every* and *each*, as indicated by (31) below.

(31)   a. ***All*** *the students smiled.*
       b. ***Every*** *student smiled.*
       c. ***Each*** *student smiled.*

Furthermore, (32) indicates that unlike *every* and *each*, *all* can co-occur with a mass noun. This is just one of several morphosyntactic selectional differences between these quantifiers (which I will put aside for now.)

(32)   a. ***All*** *snow is white.*
       b. ****Every*** *snow is white.*

c. *_**Each** snow is white._

How can we account for such diverse behaviors of _all, every,_ and _each_? Many linguists believe that these differences intuitively should have something to do with their syntactic positions or, in more technical terms, their scopal dependency. Following that intuition, Beghelli and Stowell have proposed, in their classic (1997) paper, a feature-based account highlighting a crucial empirical finding: different types of quantifiers exhibit distinct scope possibilities. As a result, QR does not apply uniformly across the board and is not mandatory for each type of quantifier.

Building on Szabolcsi's (1994, 1997) insights, they categorize quantifier phrases (QPs) into five main groups: interrogative QPs (e.g., _what, which student_), negative QPs (e.g., _nobody, no student_), distributive-universal QPs (e.g., _every, each_), counting QPs (e.g., _few, fewer than five, more than five_), and group-denoting QPs (e.g., _some, several,_ bare numerals). Each category serves distinct logical functions and has specific scope-taking properties. Importantly, they suggest that members of various QP classes take scope from distinct structural positions, resulting in different c-command domains (see the tree below).

(33)
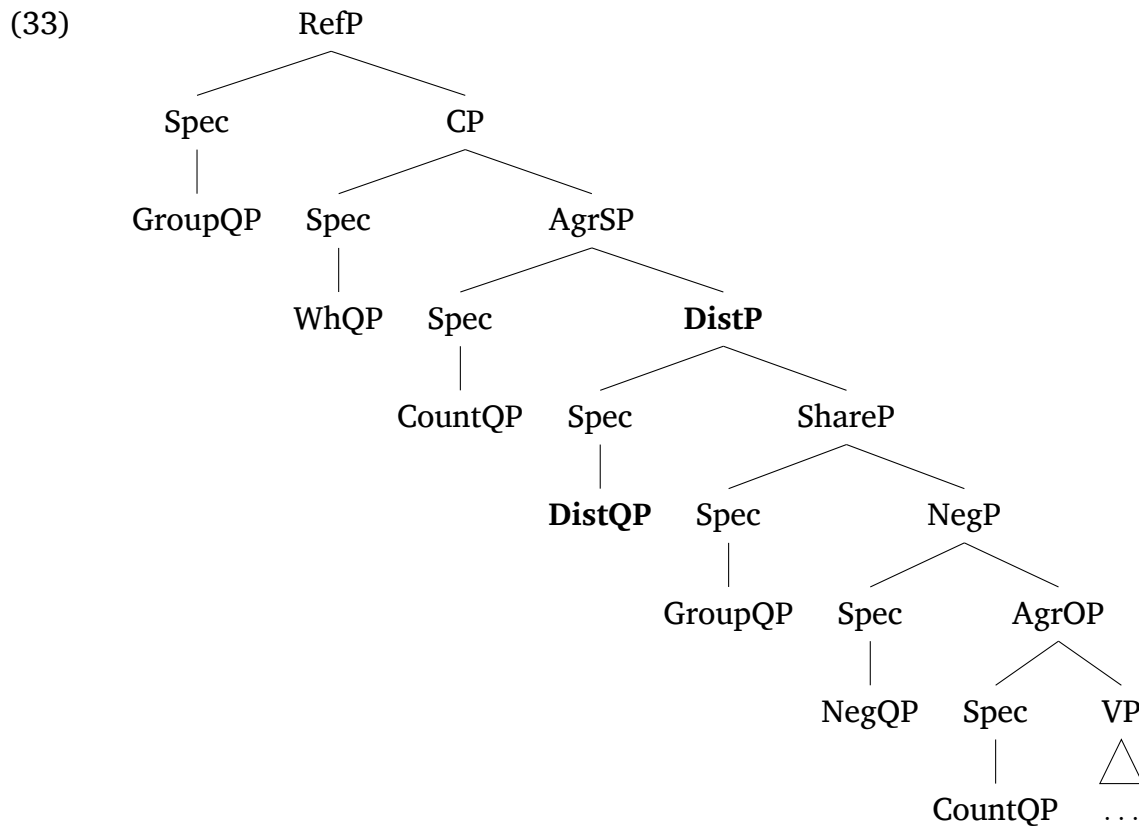
More concretely, Beghelli and Stowell argue that _each_ is an inherent distributive-universal quantifier that needs to raise to Spec-DistP (i.e. Distributive Phrase) to check its distributive feature, whereas _every_, given its underdetermined distributiv-

ity, does not need to undergo that movement. As a result, the distributivity encoded in *each* is much stronger than *every*, evidenced in *each*'s absolute incompatibility with non-distributive predicates, as shown in (29), repeated as below.[8]

(34) a. ***All** the students gathered in the hall.*
   b. ?***Every** student gathered in the hall.*
   c. ****Each** student gathered in the hall.*

All, on the other hand, is argued to be a non-distributive, universal quantifier (in his terms, "pseudo-distributivity"), given that it seems not to have any requirements on the predicates. Hence, when *all* appears in inherently distributive environments, they suggest that there is a 'silent *each*' involved in cases like (31) (Beghelli and Stowell 1997:26). However, if that silent EACH is actually responsible for distributive force in sentences like (31)-a, it is still not transparent how the semantic division of labour between *all* and the silent EACH here would be. In other words, despite all of its merits, it is not transparent how we can incorporate Beghelli and Stowell's ideas, especially with *all*, into a more coherent picture of compositionality.

  Now, let us turn to an intricate aspect of English *all*. Unlike *every* and *each*, *all* is found to have an intriguing syntactic-semantic contrast in the presence/absence of *the*. Thus, the pattern [all + bare N] tends to bear a generic reading, as shown in (35). In contrast, the pattern [all + the N] favors an episodic context, as in (36), i.e. quantifying over a contextually restricted domain, on par with *every* and *each* (Partee 1995, Gil 1995, Brisson 1998, Matthewson 2001; 2003).

(35) a. ***All** books have pages.*   (generic)
   b. ****All** pages in this book were torn.*   (non-generic)
   c. ***Every/Each** page in this book was torn.* (non-generic)

(36) a. ***All** the girls went to the gym.*
   b. ****All** girls went to the gym.*
   c. ***Every/Each** girl went to the gym.*

Matthewson (2001:169) takes these *all*'s behaviors as evidence supporting her idea that generalized quantifiers, as domain restrictions, are universally formed with a Q first combining with a DP, not NP as assumed in the classic GQT, given Chierchia's

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[8]This approach is adopted by Lin (1998a) to tackle the puzzle of *mei-dou* in Mandarin. Specifically, Lin proposes that *dou* is the head of a DistP, and universal/plural DPs such as mei-NPs carry a similar +Dist feature and thus must move to Spec of DistP to check it over. This syntactic requirement, presumably, explains the *mei-dou* co-occurrence (see Lin 2020 for an update). Also see Tunstall (1998) for a semantic elaboration on how different *every* and *each* are in terms of distributivity sub-types. Thus, *each* requires a completely distributive predicate, whereas *every* just selects a partially distributive one.

neo-Calsonian theory under which bare plurals in English can easily be shifted to kind-denoting terms via the *nom* operator (see Section 2.4). This hypothesis has forced her to treat English *every* as a definite article/sum operator, rather than a true universal quantifier. As for *each*, she remains vague, perhaps due to the fact that there are two *each* in English: D-quantifier *each* selects property-denoting NPs (as its first argument), whereas A-quantifier *each* selects entity-denoting DP (as its second argument), as I mentioned before.[9]

(37)   a.   ***Each*$_D$ *girl went to the gym.***
       b.   *John and Mary **each**$_A$ went to the gym.*
       c.   *John and Mary went to the gym **each**$_A$.*

(38)   a.   The semantics of D-quantifier *each*
            $[\![$ ***each*$_D$** $]\!]$ $= \lambda P_{<e,t>}: P \neq \varnothing.\ \lambda Q_{<e,t>}.\ \exists X[X = \iota^*P \wedge \forall x\ [\ x \sqsubseteq X \to Q(x)]]$
       b.   The semantics of A-quantifier *each*
            $[\![$ ***each*$_A$** $]\!]$ $= \lambda P_{<e,t>}.\ \lambda X_e.\ \forall x\ [x \sqsubset X \to P(x)]$ (revised from Schwarzschild 1994:209)

Contra Matthewson and following von Fintel (1994:31), Stanley & Szabó (2000), Stanley (2002), and Martí (2003), Giannakidou (2004:118) shows that *every*, as a true universal quantifier, can easily be contextually restricted, not by the definite article *the* on the nominal, but by covert domain variables which can be formalized as an atomic set C, or a complex form f(x) depending on selection functions at LF, as represented in the example below.

(39)   *In Gianna's syntax class,* ***every student*** *passed the exam.*
       a. $\forall x$ [student$_C$] x passed the exam.
       b. $\forall x$ [student$_{f(x)}$] x passed the exam.

Accordingly, the nominal associate of *every* in (39) is the set of students in Gianna's syntax class, not the set of students in the universe, resulting from the intersection between the set of students and either the set C provided by the context (in the simplex case) or the set of the free function f maps e to $<e,t>$ which is relativized to the context c (in the complex case as below).

(40) $[\![$ student$_{f(x)}$ $]\!]^{\,c,i} = \ [\![$ student $]\!]\ \cap \{x : x \in c(f)(c(i))\}$ (where i is the domain index)

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[9]Notice that $[\![$ *Two students ate a pizza **each*** $]\!]$ is truth-conditionally different from $[\![$ ***Each*** *two students ate a pizza* $]\!]$: given a situation such that there are two students respectively eating two pizzas, the former will be true, whereas the latter will be false.

(Stanley 2002)

In brief, *all*, *every*, and *each* are found to have many intriguing differences with respect to not only their morpho-syntactic requirements (e.g., number, mass/count, etc.) but also their semantic selections (e.g., distributive/collective, generic/non-generic readings, etc.) imposed upon both their arguments. Most of these distinctive features, presumably, can be represented as presuppositions encoded in their lexical entries. For example, the strong distributivity of *EACH* can be well captured if we assume that its associating predicate is presupposed to be distributive, given a definition of distributivity like (42), as follows (revised from (38)).

(41)   A presuppositional account of *EACH* (revised version)

    a.   The semantics of D-quantifier *each*

        $[\![\,\boldsymbol{each}_D\,]\!] = \lambda P_{<e,t>}$: $P \neq \varnothing$. $\lambda Q_{<e,t>}$: Q is distributive. $\exists X[X = \iota^*P \wedge \forall x\,[\,x \sqsubseteq X \rightarrow Q(x)]]$

    b.   The semantics of A-quantifier *each*

        $[\![\,\boldsymbol{each}_A\,]\!] = \lambda P_{<e,t>}$: P is distributive. λX_e. $\forall x\,[x \sqsubset X \rightarrow P(x)]$

(42)   Definition of distributivity (semi-formal version)[10]

    A predicate P is distributive iff $\forall X\,[P(X) \rightarrow \forall x\,[\,x \sqsubset X \rightarrow P(x)]]$

In the meantime, it is still not clear how we can capture the difference between *all* and *every* regarding their first argument requirements (among other things) from a presuppositional perspective. I will leave this issue and the viability of a unified entry for them along the lines of GQT open for future extensions. Now, let us turn to the primary research question of this thesis: how differently and similarly universal quantifiers in Vietnamese act.

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[10]Cf. Winter & Scha (2015:90–99).

3.5 The semantics of universal D-quantifiers *tất-cả*

This section attempts to capture the most peculiar distributions and interpretations involving the universal D-quantifier *tất-cả* by means of its presuppositions imposed on the domain restrictor. To anticipate, the following discussion regarding *tất-cả* will provide us with a helpful benchmark for the more puzzling quantifiers in the upcoming sections.

3.5.1 Crucial observations

Empirically, one of the stand-out facts regarding *tất-cả* is that universal QPs formed with it can be elided everything except *tất-cả*, as shown in (43-b), provided that the associating DP has a clear reference provided by the context.

(43)   [Context: a party held by the Association of Students for students only.]

    a.   *Tất-cả sinh-viên đã   có-mặt.*
        all   student PST show.up
        'All the students have shown up.'

    b.   ***Tất-cả**/toàn-bộ/tất-thảy/hết-thảy đã   có-mặt.*
        all   PST show.up
        'All (the students) have shown up.'

    c.   **Mọi/*mỗi/*cả đã   có-mặt.*
        all   PST show.up
        Intended: 'All (the students) have shown up.'

This behavior is sometimes known as the 'pronominal' use available for a number of D-quantifiers in Vietnamese labelled as '*đại từ chỉ lượng*' (i.e. 'quantity-denoting pronouns' or 'pronominal quantifiers') here and there in the literature of Vietnamese linguistics (Cao X.H. 2008, Hoàng D. & Nguyễn T.L.K 2008, a.o.) Accordingly, *tất-cả, toàn-bộ, hết-thảy, tất-thảy*, etc. all have this capability – as indicated in (43-b), whereas *mọi, mỗi*, and *cả* do not, as indicated in (43-c).

Intriguingly, the generalized quantifiers formed by *tất-cả*, in a few cases, typically in post-verbal position, can even be shrunk into merely *tất*, as shown in the following example.

(44)   a.   *Mất đất là   mất tất-cả.*
        lose land COP lose everything
        'To lose the land is to lose everything.'

    b.   *Mất đất là   mất tất.*
        lose land COP lose everything
        'To lose the land is to lose everything.'

Similarly, the universal QP of the form [*tất-cả* + NumP], e.g. *tất-cả ba con chó này* 'all these three dogs', can also be morphosyntactically shrunk into *cả ba con chó này* in distributive contexts, which should be clearly distinguished with the cardinal QP *cả ba con chó này* 'these (exactly) three dogs' in non-distributive contexts, as exemplified in (45).[11]

(45)   a.   *Tất-cả ba   con chó này bị   ốm rồi.*
             all   three CLF dog DEM PASS sick PERF
             'All these three dogs have got sick.'   (distributive)

        b.   *Cả ba   con chó này bị   ốm rồi.*
             all three CLF dog DEM PASS sick PERF
             'All these three dogs have got sick.'   (distributive)

        c.   *Cả ba   con chó này cứ   tranh   nhau   ăn.*
             CA three CLF dog DEM keep compete each.other eat
             'These three dogs fight each other for food all the time.'   (non-distributive)

As far as *tất-cả*'s associates are concerned, *tất-cả* is generally found to be compatible with all kinds of bare count nouns (viz., obligatory-classifier nouns, optional-classifier nouns, and non-classified nouns – see Simpson and Ngo (2018)) and mass nouns (viz., bare mass and measured mass), with a complementary distribution: the pattern [*tất-cả* + bare mass] can only feature in non-distributive, part/whole-insensitive contexts, whereas the form [*tất-cả* + measured mass] can only feature in distributive ones, as shown in (46).[12] These distributional facts can be summarized in **Table 3.1** below.[13]

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[11]We will discuss this topic in more detail in Section 3.6. Notice further that the restricting phrases here cannot be elided in any contexts: **Cả bị ốm rồi.*

[12]This restriction may have something to do with the inherent difference involving the homogeneous constraint of mass-denoting expressions.

(i.)   Homogeneous Constraint (Lønning 1987)
        Mass noun phrases combine only with homogeneous expressions to form sentences.
        a.   *Much water boiled.*   (homogeneous predicate)
        b.   **Most water weighed two grams*   (non-homogeneous predicate)

I will leave this issue open for future elaboration.

[13]Conventions: '✓' = both distributive and non-distributive/collective readings are available; '✓*' = only the non-distributive reading is available; '✓!' = only the distributive reading is available; '#' = the domain restriction is impossible.

Table 3.1: QP-patterns with *tất-cả* (#1)

∀ D-quantifiers	Nominal subcategories				
	bare nouns			mass nouns	
	obl-CLF N *chó* 'dog(s)'	**opt-CLF N** *sinh viên* 'student(s)'	**non-CLF N** *phòng* 'room(s)'	**bare mass** *nước* 'water'	**measured mass** *cốc nước* 'cup of water'
tất-cả	✓	✓	✓	✓*	✓!

* = grammatical in non-distributive, sub-atomic contexts only

! = grammatical in distributive contexts only

(46) a. *Tất-cả nước trong bể đã bị nhiễm phèn.*
      all   water in   tank PST PASS contaminated alum
      'All water in the tank has been contaminated with alum.' (non-distributive)

    b. *Tất-cả cốc nước đã bị nhiễm phèn.*
      all   cup water PST PASS contaminated alum
      'All the cups of water have been contaminated with alum.' (distributive)

By contrast, *tất-cả* is incompatible with singulars, whether they are ordinary singulars of the form [CLF + N] (e.g. *con chó* 'dog'), or collective (*làng* 'individual village') ones,[14], or individual sums (e.g. *Nam và Mi* 'Nam and Mi'), as shown below.

(47) a. **Tất-cả con chó này rất ngoan.*
      all   CLF dog DEM very well-behaved
      Intended: 'All these dogs are very well-behaved.'

    b. **Tất-cả làng này đã đi bầu.*
      all   village DEM PST go vote
      Intended: 'All the villagers here cast the vote.'

A caveat here is in order. Notice that *tất-cả* is found incompatible with definite singulars only, i.e. singularity-denoting expressions, not with singular-property-denoting expressions.[15] Accordingly, it is still capable of combining with an atomic

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[14]It should be noted that some (if not all) group terms in Vietnamese, including *làng* 'village', *gia-đình* 'family', are ambiguous between an individual-denoting, atomic reading and a bare unit-noun use, e.g. *làng* as a traditional administrative unit roughly corresponding to modern 'commune(s)' in Vietnam, or *gia-đình* as 'household(s)'. *Tất-cả*, empirically, has no trouble in combining with the bare unit-noun cases, e.g. *Tất-cả làng trong huyện này đã đi bầu* 'All the villages in this district have cast the vote.'

[15]An important point of terminology that should be made here is the term 'plurals' as plurality-denoting expressions should be distinguished from 'plurals' as cumulative reference-denoting expressions. Simply put, the former are entities of type $\langle e \rangle$, whereas the latter are properties of $\langle e, t \rangle$. Similarly, 'singulars' will also be used in a systematically ambiguous way: (i) singularity-denoting

property of the form [CLF + N] where they are interpreted as atomic predicates, e.g. ⟦*con chó*⟧ = {dog a, dog b, dog c, ...}. For example, a QP like *tất-cả con chó của Nam* 'all Nam's dogs' is still accepted by some informants. Hence, a demonstrative is added to the examples to make the definite singularity of classifier phrases (and collective nouns also) more salient. Additionally, a bare classifier phrase is also found more or less acceptable in *tất-cả*'s generic quantification,[16] which is normally found with plurals or bare nouns. This intricate observation, as shown in (48), will be elaborated on in the next section.

(48) a. *Tất-cả con chó {ở đây/của   khoa   Nhân xã}   rất*
        all   CLF dog at here/POSS department social.sciences very
        ngoan.
        well-behaved
        'All the dogs {here/at the depart of social sciences} are very well-behaved.'

    b. *Tất-cả (con) chim sẽ   bay, tất-cả (con) cá   sẽ   lội.*
        all   CLF   bird will fly all   CLF   fish will swim
        'All birds will fly, all fish will swim.'   (generic)

Other than that, *tất-cả* has no trouble with other kinds of plural-denoting expressions such as *các/những*-phrases and number phrases whose numerals are greater than 1. These behaviours are summarized in **Table 3.2** as follows.[17]

Table 3.2: QP-patterns with *tất-cả* (#2)

∀ D-quantifiers	Nominal subcategories				
	ordinary singulars	collective singulars	ordinary plurals		
	CLF + N *con chó* 'dog'	**group terms** *làng* 'village'	**sums** *Nam và Mi* 'Nam and Mi'	**PL + CLF + N** *các con chó* 'dogs'	**Num + CLF + N** *ba con chó* 'three dogs'
tất-cả	#/✓	#	#	✓	✓

It is also worth pointing out that in Vietnamese, however, the compound *tất-*

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expressions (i.e. 'atoms'), and (ii) singular property of predicates (i.e. 'atomic'). Put it together, *'singular'* and *'plural'* can mean either (i) number features involving the cardinality of entities or (ii) semantic properties involving the join-semilattice structure of the denotation of expressions. See more in Chapter 4, Section 4.2.

[16]Also see Đoàn et al. (2019) for a similar observation with respect to the generic interpretation of ClPs in Vietnamese.

[17]I use the semantically descriptive term 'plurals' here in a slightly broader sense than some authors, for example, Barker (1992) where group terms (e.g. *the committee, the group, etc.*), conjoined terms (i.e. terms forming by conjunction – *John and Mary*) are distinguished from canonical definite plurals like *the men, those people, the members of the group,* etc.

cả is ambiguous between the quantifier use and the adverbial use (on a par with *cả-thảy*), i.e. corresponding to English *altogether*. Accordingly, D-quantifier *tất-cả* cannot co-occur with conjoined terms (i.e. sums), whereas adverbial *tất-cả* can (with a looser distribution), as shown in the following contrast between a-sentences and the rest.

(49) a. **Tất-cả Nam và Mi đã có-mặt.*
         all Nam and Mi PST show.up
         Intended: 'Nam and Mi all arrived.'   (D-quantifier *tất-cả*)

     b. *Nam và Mi, tất-cả, đều đã có-mặt.*
         Nam and Mi altogether DEU PST show.up
         'Altogether, Nam and Mi arrived.'   (Adverbial *tất-cả*)

(50) a. *Tất-cả 14 đứa con của Musk đều thông-minh.*
         all 11 CLF kid POSS Musk DEU smart
         'All of Musk's 14 kids are smart.'   (D-quantifier *tất-cả*)

     b. *Musk có tất-cả 14 đứa con.*
         Musk have altogether 14 CLF kid
         'Musk has altogether 14 kids.'   (Adverbial *tất-cả*)

     c. *Tất-cả, Musk có 14 đứa con.*
         altogether Musk have 14 CLF kid
         'Altogether, Musk has 14 kids.'   (Adverbial *tất-cả*)

     d. *Musk có 14 đứa con tất-cả.*
         Musk have 14 CLF kid altogether
         Musk has 14 kids altogether.'   (Adverbial *tất-cả*)

In sum, there are three crucial puzzles involving *tất-cả* that cry for explanation. First, the co-occurrence between *tất-cả* with classifiers needs to be constrained. Specifically, it is found that not all kinds of classifiers are incompatible with *tất-cả*, for example, those modified with a PossP or a locative phrase or in generic contexts, as repeated from (48) as below.

(51) a. *Tất-cả con chó {ở đây/của khoa Nhân xã} rất*
         all CLF dog at here/POSS department social.sciences very
         ngoan.
         well-behaved
         'All the dogs {here/at the depart of social sciences} are very well-behaved.'

     b. *Tất-cả con chim sẽ bay, tất-cả con cá sẽ lội.*
         all CLF bird will fly all CLF fish will swim
         'All birds will fly, all fish will swim.'   (generic)

How can we account for this co-occurrence from a compositionality perspective,

given the assumption that ClPs universally denote atomic predicates, as evidenced in the ungrammaticality of (52-a) below?

(52)   a.   *Pluto và   Fido là   con chó.
           Pluto and Fido COP CLF dog
           Intended: 'Pluto and Fido are dogs.'
       b.   Pluto và   Fido là   những/các/hai con chó.
           Pluto and Fido COP PL/two   CLF dog
           'Pluto and Fido are dogs/two dogs.'

Second, how can we explain the incompatibility between *tất-cả* and group terms and sums, as shown in (47), (49)?

Third, from a comparative perspective, if we assume that it is basically on par with English *all*, then does *tất-cả* have any selectional restrictions on its predicates like what we have seen with *all* (e.g., generic-reference favor with NPs, distributive/non-distributive neutrality, etc.)?

In the next section, I will first review some previous accounts of *tất-cả* in the literature and then propose a presuppositional account for *tất-cả* to capture all these puzzles as well as to demonstrate that, unlike English *all*, Vietnamese *tất-cả* does not have any selectional restrictions on its second argument.

3.5.2   The proposal

Now, let us turn to my proposal for the semantics of *tất-cả* to capture what we have observed so far.

First, adopting Link's (1983) theory of plurality and Landman's (1989a; 1989b) group operator ↑, I assume the following denotations for (pure) atoms (i.e. entities), sums (i.e. sets of entities) and group/impure atoms (i.e. entities). The basic distinction between these conceptual entities is this: sums can be divided into parts, whereas atoms, pure or impure, cannot. Hence, in more technical terms, unlike sums, groups and atoms are insensitive to the part-whole relation (though unlike pure atoms, groups/impure atoms can be 'de-atomized' back to sums).

(53)   a. $[\![\textbf{Nam}]\!] = N$ (pure) atom
       b. $[\![\textbf{Nam và Mi}_{sum}]\!] = N \oplus M$ sum
       c. $[\![\textbf{Nam và Mi}_{group}]\!] = \uparrow(N \oplus M)$ group/impure atom

In other words, atoms are singularities, whereas sums are pluralities (i.e. non-atoms). How about groups, i.e. impure atoms? Simply put, groups can be characterized as entities built on sums (i.e. having a similar ontological structure with sums)

but denoted by expressions whose grammatical behaviour are on par with (pure) atom-denoting expressions. This distinction between sums and groups is assumed to capture the following contrast involving group terms and ambiguous predicates like *có một đứa con* 'have a kid' (distributive and collective/non-distributive).

(54) a. *Nam và Mi có một đứa con.*
    Nam and Mi have one CLF kid
    = 'Nam and Mi_group (as a couple) have a child together.' (collective)
    = 'Nam and Mi_sum have a child, respectively.'   (distributive)

Alternatively, we can disambiguate this sentence by assuming the distributive reading arises from a covert distributive operator, i.e. a silent EACH, along the lines of Schwarzschild (1994), Liu (2021), among others. However, a scrutiny of the selections of different Vietnamese D-quantifiers can justify the distinction in point. Thus, sums should be distinguished from groups ontologically, given that *tất-cả* "treats" groups as atoms and disallows them both, whereas *cả* can quantify over sums, but not atoms. On the other hand, if we assume the existence of a silent EACH and *Nam và Mi* inherently denotes groups, it is not clear how the semantic labour between D-quantifier *cả* and the silent EACH will be divided in the LF for the distributive reading. In other words, we will face a compositionality problem with this approach.

(55) a. **Tất-cả Nam và Mi đã có-mặt.*
    all Nam and Mi PST show.up
    Intended: 'Nam and Mi both arrived.' (D-quantifier *tất-cả*)
  b. *Cả Nam và Mi đã có-mặt.*
    all Nam and Mi PST show.up
    'Nam and Mi both arrived.'   (D-quantifier *cả*)

Thus, given this basic ontology, now let me establish the semantics of *tất-cả* to capture its facts.

Concretely, I propose that despite roughly having the same assertive components, these four $\forall$-quantifiers in Vietnamese mentioned above differ in their presuppositional contents and are subject to different constraints posed on their quantificational domain. The concrete ideas are explicated as follows.

(56) The lexical entry for D-quantifier *tất-cả*
   $\llbracket$ **tất-cả** $\rrbracket$ $= \lambda X_e$: $|X| > 1$ (i.e. X is a plurality). $\lambda Q. \forall x$ [atom(x) $\wedge$ x $\sqsubset$ X $\rightarrow Q(x)]$
   (where $atom(x)$ is defined as follows:
   For a predicate P, the set of P-atoms x, $P_{at} := \{x \in P: \neg\exists y. [y \sqsubset x \wedge P(y)]\}$)

Syntactically, I assume that *tất-cả* selects a DP (of type $\langle e \rangle$) as its first argument and imposes no requirements on its second argument, along the lines of Matthewson (2001) and Sauerland (2003). For illustration, the syntactic structure of *tất-cả ba con chó này* 'all these three dogs' can be represented as follows (notice that I assume the nominal *ba con chó này*, by the time *tất-cả* "sees" it, must be definite via the covert iota operator base-generated in D, along the lines of Dayal 2013, Jenks 2018, among others).

(57) a.


```
                        QP
                     ⟨et, t⟩
                   /          \
                  Q            DP
            ⟨e, ⟨et, t⟩⟩       ⟨e⟩
                  |          /     \
              tất-cả        D       DemP
               'all'      ⟨et, e⟩    ⟨e, t⟩
                           |          |
                           ι      ba con chó này
                              'these three dogs'
```
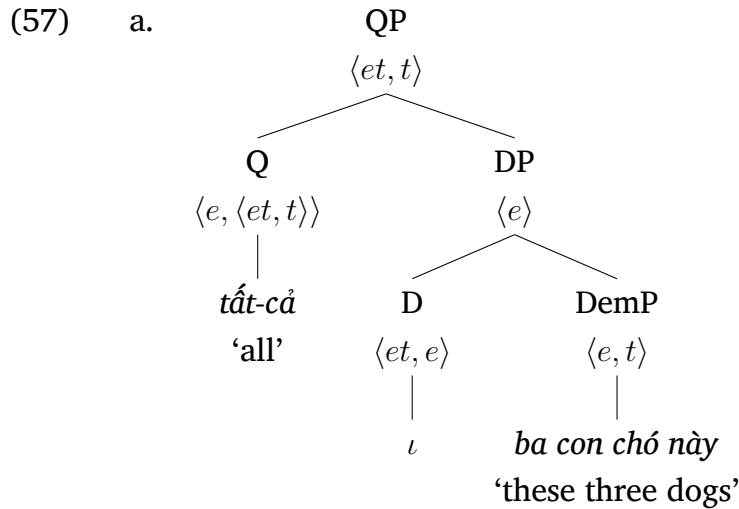
b. $⟦$ *ba con chó này* $⟧$ $= \lambda X_e.\ |X| = 3 \wedge [\forall x \sqsubseteq X \to dog'\text{-atom}(x)] \wedge X = g(1)$

(assuming that there's an assignment function g introduced by the Dem and satisfied by the index 1 provided by the context)

c. $⟦\text{DP}⟧ = \exists! X[|X| = 3 \wedge [\forall x \sqsubseteq X \to dog'\text{-atom}(x) \wedge X = g(1)]]$.

$\iota X\ [|X| = 3 \wedge [\forall x \sqsubseteq X \to dog'\text{-atom}(x)]]$

Given the assumptions above, now we can characterize *tất-cả*'s s-selections as follows. Thus, given the entry in (56), the incompatibility between *tất-cả* vs bare ClPs and group terms as well turns out to be as trivial as the ungrammaticality of the sentence **Tất cả Nam đã có-mặt* since *tất-cả* cannot quantify over an atom whose cardinality of 1 like *Nam*. This restriction, perhaps, is cross-linguistically attested with all kinds of universal quantifiers. It suggests that the non-emptiness condition on *all/every/each*'s first argument may not be tight enough: the restrictor set does not only have to be non-empty (i.e. "veridical" in Giannakidou's terms), but also non-singleton, or non-unique. In fact, this non-uniqueness presupposition (asymmetrically) entails the non-emptiness condition since there is more than more x presupposes there is x, but not vice versa.

What is less trivial is why a sum whose cardinality is greater than 1, like *Nam and Mi*, cannot be quantified over by *tất-cả*, as indicated in (49), repeated down below.

(58) a. **Tất-cả Nam và Mi đã có-mặt.*
    all   Nam and Mi PST show.up
    Intended: 'Nam and Mi both arrived.'

   b. **Tất-cả nhóm A đã có-mặt.*
    all   group A PST show.up

   c. **Tất-cả làng Vũ-Đại đã có-mặt.*
    all   village Vũ-Đại PST show.up

Given Link's ontology, this fact can be explained if we assume *Nam và Mi* here is not a sum, but a group-denoting term, i.e. an impure atom, like *nhóm A* 'group A', *làng Vũ-Đại* 'village Vũ-Đại' in the examples above. In other words, *tất-cả* 'treats' conjoined terms uniformly as group terms. Semantically, *sums* can readily be converted into groups via Link's ↑ operator (i.e. Landman's upward closure function), defined as follows.

(59) Upward closure function
    $[\![\uparrow(\alpha)]\!] = \{ [\![\alpha]\!] \}$
    (Informally, ↑ maps every set onto the singleton set containing it)

Hence, applying the ↑ operator to $[\![\textit{Nam và Mi}]\!]$ will yield a singleton set containing only N⊕M as its element. In other words, *Nam và Mi* is interpreted as an atom like *nhóm A* 'group A', i.e. bearing cardinality of 1, suppose that both Nam and Mi are sole members of this group, resulting in a case of presupposition failure. This fact suggests that conjoined terms in Vietnamese may be inherently atom-denoting group terms, and their sum-interpretation is later derivations, not the other way around as widely assumed for English counterparts. At least we have a piece of indirect evidence supporting the idea that *và* 'and' in *Nam và Mi* inherently isn't an instantiation of the sum operator (Hoeksema 1988). We will return to this implication when we deal with the quantification over group terms involving *cả*.

Now, let us turn to the intricate co-occurrence between *tất-cả* and classifier phrases. As a well-attested fact, classifier phrases are assumed to denote atomic properties cross-linguistically (Chierchia 1998b, Cheng & Sybesma 1999, Yang 2001, Trinh 2011, Jenks 2018, among others). This semantics of ClPs is a natural derivation if we take the core meaning of classifiers as the *at* function (besides other lexical restrictions on the noun,[18] represented as presuppositional materials), which we can explicate as follows (illustrated with the ClP *con chó* '(a) dog').

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[18]See Tran (2011) for an investigation of such lexical s-selections of classifiers in Vietnamese.

(60)   The at(P) function and atomic properties

a. at(P) := { x: $atom_P$(x) } (i.e. the atomizing function at(...), which
applies to a given set P and yields the set of all *singleton subsets/atoms*
x of P)
where $atom_P$(x) ≡ x ∈ at(P) ⇔$_{def}$ x ∈ P ∧ ¬∃y(y ∈ P ∧ y ⊏ x)
(Informally, x is a(n) *minimal element/atom* of P if and only if x has no
proper part which is P)

b.   *Atomic property/predicate*
P is an atomic predicate iff $⟦P⟧$ = at($⟦P⟧$)
(Informally, P is an atomic predicate if the (extensional) denotation of
P necessarily consists of atoms of P)

c. $⟦con⟧$ = = $\lambda P \in D_{<e,t>}$: P is animate. $\lambda x \in D_e$. x is a P-atom

d. $⟦con⟧$ ($⟦chó⟧$) = $\lambda x \in D_e$. x is a dog'-atom (e.g. {a, b, c, d, ...} such
that a, b, c, d, ... each is a dog)

Given this derivation, a classifier phrase can easily fall into *tất-cả*'s domain, pro-
vided that its denotation is not a singleton set, i.e., those comprising one individual
only. When are they ruled out? The answer turns out to be straightforward: ClPs
are ruled out when they or their derivations (e.g., with demonstratives or AttrPs)
denote a singleton set, which will become an atom after applying the iota operator,
as illustrated in the following cases.

(61)   [Context: there is only one dog in the building]

a.   *Tất-cả con chó (ở đây) rất ngoan.*
all   CLF dog (in here) very well-behaved

b.   *Tất-cả con chó này rất ngoan.*
all   CLF dog DEM very well-behaved

A note here regarding the semantic contribution of demonstratives is in order
to help us explain why patterns like *con chó này* [CLF + N + Dem] or even *chó này*
[N + Dem] in Vietnamese are observed to show a uniqueness effect (i.e. 'this dog',
but not 'these dogs') like the definite DP *the dog* in English. For a perspective, Jenks
(2018) suggests that demonstratives in Mandarin can be taken as a strong definite
article (instantiated in German as strong articles, i.e. non-contracted determiners)
in the sense of Schwarz (2009), i.e., carrying an assignment function g to be satisfied
by a contextually-provided index. Jenk's proposal can be recapped as in Table 3.3.

Jenks further claims that both types of definites (unique and anaphoric) carry
the presupposition of the existence of a unique individual (or a maximal plurality)
to which they refer, i.e., the uniqueness effect. However, Dayal & Jiang (2022) ar-
gue that this analysis doesn't capture all the empirical observations about Mandarin

Table 3.3: Definiteness marking in Mandarin, German, and English (revised from Jenks 2018:529)

	Mandarin	German	English
Unique definites	N	weak articles	*the*
Anaphoric definites	Dem CLF N	strong articles	*the*

anaphoric definites involving demonstratives. Instead, they propose that it is a non-uniqueness content that demonstratives presuppose, not a uniqueness one in aligning with definite articles in English or German. Under Dayal & Jiang's approach, the lexical entry for DEM can be simplified as follows (omitting the reference to situations/worlds in their original proposal).

(62)   Semantics of Demonstratives (Dayal & Jiang 2022:157–158)

$[\![\text{Dem}]\!] = \lambda P : |P| > 1. \iota x [P(x) \wedge x = y]$

(where the free variable y is the intended-referent property, corresponding to the assignment function g satisfied by an index, e.g. g(1))

Details aside (especially the syntactic position of Demonstratives), directly extending Dayal & Jiang's idea for the semantics of demonstratives in Vietnamese, the DemP *con chó này* 'this dog' can be taken to denote an individual bearing two properties: (i) being dog'-atom and (ii) carrying a contextually determined index (represented by the free variable y). Given this outcome, the semantic composition between *tất-cả* and the DemP should have been possible given that the non-uniqueness condition is met – but this is contrary to fact.

(63) $[\![\textit{con chó này}]\!] = \iota x [dog'\text{-atom}(x) \wedge x = g(1)]$

To remedy this issue, I submit that the underlying sister of Dem in Vietnamese is not ClP, but always NumP, with a covert numeral *MỘT* 'one' whenever there are no overt numerals. Hence, the LF and semantic derivation for *con chó này* 'this dog' will look like (64-a). Notice further that I take issue with both Jenks (2018) and Dayal & Jiang (2022) in that I don't assume Demonstratives to carry out the function of the iota operator, given the availability of this operator in article-less languages. Thus, the cardinality of *một con chó* rules itself out of the restricting domain of *tất-cả,* resulting in the ungrammaticalness of the pattern **tất-cả con chó này*.

(64) a. Syntactic structures

```
                    DP
                   /  \
                  D    DemP
                  ι    /  \
                   NumP   Dem'
                    ⤴    /   \
                   Dem   ~~NumP~~
                    |    /    \
                   này  Num    ClP
                  'this'  |    /  \
                      (MỘT) CLF  NP
                             |    |
                            con  chó
                                'dog'
```
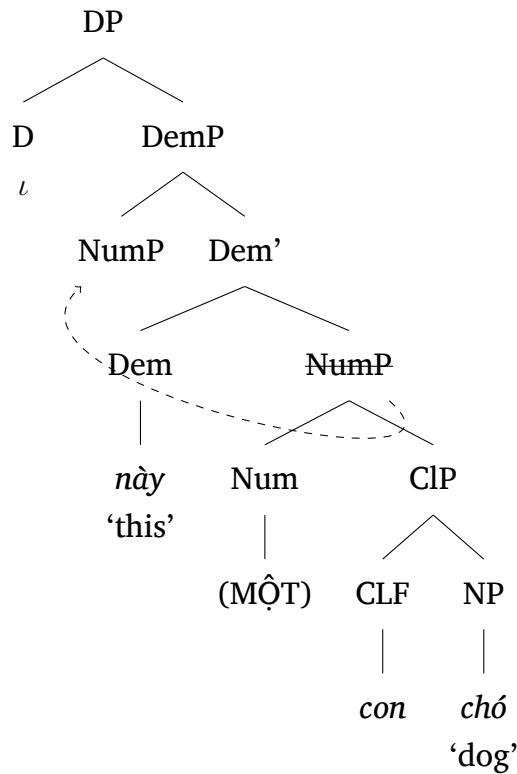
b. Semantic derivations

⟦NumP⟧ = ⟦một con chó⟧
= λx. [dog'-atom(x) ∧ |x| = 1]

⟦DemP⟧ = ⟦một con chó này⟧
= λx. dog'-atom(x) ∧ |x| = 1 ∧ x = g(1)

⟦DP⟧ = ιx [dog'-atom(x) ∧ |x| = 1 ∧ x = g(1)]

The proposal presented above, presumably, has accounted for the selectional restrictions that *tất-cả* imposed upon its associates from a semantic perspective. This is the approach that no previous accounts have tried to work out in fine-grained terms.

Accordingly, in the Vietnamese linguistics literature, given the left-outermost position of universal quantifiers in the surface structure of the nominal, many authors have noticed and attempted to account for peculiar behaviors of ∀ D-quantifiers in Vietnamese from a syntactic-semantic perspective (Nguyễn T.C. 1975, 1996, Thompson 1987, Cao X.H. 1992, Nguyen D.H. 1997, Nguyen H.T. 2004, Hoang D. & Nguyen T.L.K. 2008, among others.)

More concretely, to account for the incompatibility between ∀-quantifiers and approximate quantity-items like *vài* 'several',i.e. **tất-cả vài học sinh này*, Nguyen T.C. (1996:234) proposes that ∀-quantifiers like *tất-cả* always impose a number-specific requirement on the meaning of the associating nominal. He argues that this is the reason why D-quantifiers like *tất-cả* can only co-occur with either phrases formed by number-specific items like classifiers or overt numerals, as illustrated by (65) – his own examples, or in cases where their number specificity is contextually determined (e.g., *(nói về) học sinh trường này* '(speaking of) students of this school').

(65) a. *tất-cả cuốn sách này*
      all   CLF book DEM
      'all these book'

  b. *tất-cả ba   cô   này*
      all   three lady DEM
      'all these three ladies'

However, unlike Nguyễn T.C., I found the co-occurrence between *tất-cả* and classifier phrases more sophisticated. Thus, ClPs are sometimes found to be allowed to follow *tất-cả*, but not always so, as shown in the contrast below.[19]

(66) [Context: there is a group of dogs on the school's campus]

  a. *#Tất-cả con chó này rất ngoan.*
      all   CLF dog DEM very well-behaved
      Intended: 'All these dogs are very well-behaved.' (pointing to a building to refer to the dogs in that place)

  b. *Tất-cả con chó {ở đây/khu   này} rất   ngoan.*
      all   CLF dog at here/neighborhood DEM very well-behaved
      'All the dogs {here/in this neighborhood} are very well-behaved.'

The relevant factor here, presumably, is the number of dogs determined by the post-nominal modifier and the context: if it is a demonstrative, then the nominal should be a definite singular, i.e. a(n) singularity/atom, whereas if it is a locative phrase or a possessive phrase, then the nominal can be an *atomic predicate* denoting either a plurality of atoms like {a,b,c,d,...} or a singularity {a}. This number difference between a definite DemP vs. an indefinite DP is also attested in the contrast below involving the pattern [bare N + DEM].

(67) a. *Chó này sủa suốt ngày.*
      dog DEM bark all   day
      'This dog barks all day.' NOT 'These dogs bark all day.'

  b. *Chó nhà   Nam sủa suốt ngày.*
      dog house Nam bark all   day
      'Nam's dogs/Nam's dog bark(s) all day.'

---

[19]The nominal *quyển sách* [CLF + book] 'book' that Nguyễn T.C. used to illustrate, in my opinion, is ambiguous between an 'individual' and a 'unit' reading, as indicated by the example below.

(i.) *ba   cuốn sách của Chomsky*
      three CLF book of Chomsky
      = 'three books in the possession of Chomsky'   (individual-denoting)
      = 'three books/book-titles written by Chomsky'   (unit-denoting)

Accordingly, the former reading is our focus, whereas the latter is not individual books but individual titles/units of books. Hence, *tất-cả quyển sách này* is only acceptable on its unit reading 'all these book titles', in alignment with *tất-cả cốc nước này* 'all these cups of water'.

Similarly, when ClP is used barely in singularity-implying contexts, the interpretation of the nominal is also singular, resulting in the infelicity of sentences like (68).

(68)   *Tất-cả con chó rất   ngoan.
        all   CLF dog very well-behaved
        (Context: there is only one salient dog in the context)

In addition to Nguyen T.C.'s insights, Nguyen H.T. (2004:53) notes that there is a divergence between *tất-cả/toàn-bộ* vs. *mọi* with respect to their co-occurrence with classifiers and attributes this distinction to their different subcategorical features (i.e. c-selections). Given what we have seen with merely *tất-cả*'s patterns so far, this picture turns out to be too simplistic for this specific quantifier.

(69)   Vietnamese quantifiers (Nguyen H.T. 2004:53)

        require CLF   not require CLF (i.e. can combine with any nouns)

        mọi 'every'   ***tất-cả*** 'all'
        vài 'several'   *cả* 'all/the whole'
        mấy 'a few'   *toàn-bộ/toàn-thể* 'all'
        từng 'each'   *nhiều* 'many'
        mỗi 'each'   *ít* 'few'
        một-vài 'several'
        dăm 'five or so'
   dăm-ba 'between three and five'
  năm-ba 'between three and five'
  dăm-bảy 'between five and seven'

Besides, Nguyen H.T. also points out an interesting contrast among these ∀-quantifiers that we have mentioned in the beginning involving the so-called 'pronominal' use, i.e. unlike *cả/mọi*, *tất-cả/toàn-bộ* could stand for the whole nominal given some contexts, for instance: ***Tất-cả/toàn bộ*** *(chúng-ta) đều biết Messi muốn đá cho ai* 'We all know which club Messi wants to play for.'[20]

In sum, my proposal for *tất-cả*'s selection has bridged the gap left by all of the previous authors since they have not paid enough attention to the fact that different nominal subcategories can give rise to different patterns with *tất-cả*, such as group terms or sums, given what we have seen in (47), (49).

---

[20]Nguyen H.T. also assumes plural markers are articles (i.e., treating *các* and *những* as definite and indefinite plural articles, respectively). This controversial issue will be tackled in Chapter 4.

3.6 Group terms and the semantics of *cả*

3.6.1 On the multi-functionality of determiner *CẢ*

Unlike other universal D-quantifiers, *cả* is a multi-functional determiner in Vietnamese. In other words, there are many determiner *CẢ*s in Vietnamese, including the universal D-quantifier *cả* – our focus in this section. Specifically, there presumably are at least three unrelated functional uses of the words wearing the same phonological coat as /ka^{c1}/, namely (i) the focus marker EVEN-*cả*, (ii) the D-quantifier ∀-*cả*, and (iii) the cardinal determiner ∃-*cả*, as syntactically sketched as in (70).[21]

(70)   The multi-functionality of CẢ

EVEN-*cả*	∀-*cả*	∃-*cả*
(đến/ngay/tới) cả Nam$_F$	*Cả ba sinh-viên*	*cả-2 sinh-viên*
'even Nam'	'all the three students'	'both students'
IP	QP	QP
*ca*P$_F$ vP	Q DP	Q NP
cả *Nam$_F$* …	*cả* *ba sinh-viên*	*cả* 2 *sinh-viên*
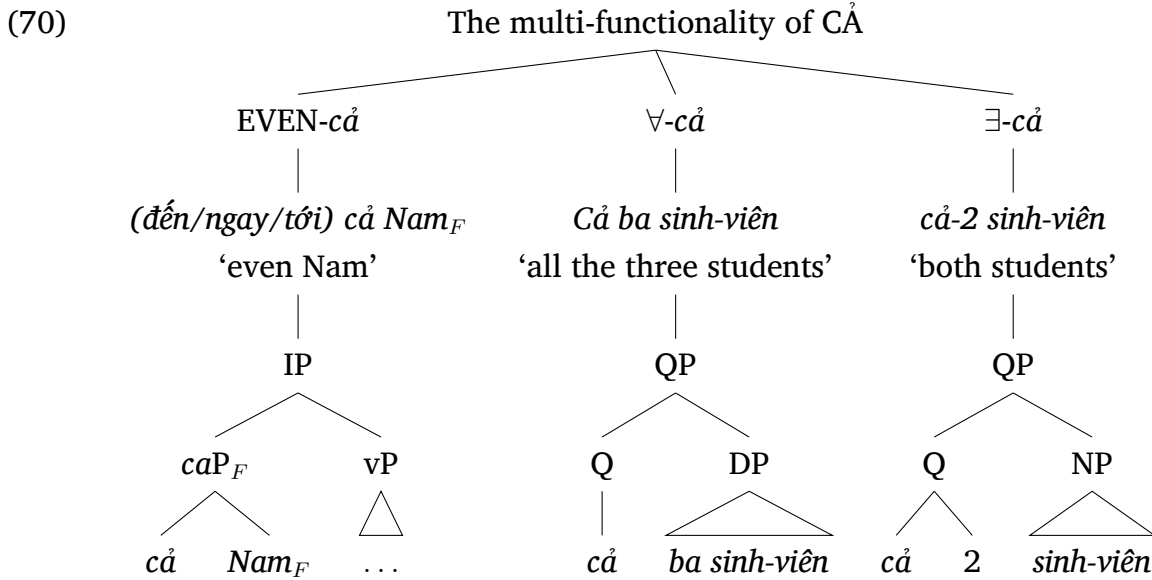
Other than these three uses that I will justify, in what follows, I also suggest that the status of *cả* in apparent quantificational patterns involving group and conjoined terms with *cả* such as *cả làng Vũ-Đại* 'the whole Vũ-Đại village', *cả lớp* 'the whole class', *cả Nam và Mi* 'both Nam and Mi', etc. may not be the source of quantificational force, but some sort of the sum operator. I refer to this idea as the hypothesis of the ⊕-*cả* and consider it as an alternative account for the ∀-*cả* analysis in group-quantification cases. In other words, *cả* can be taken as a/the definite article in Vietnamese corresponding to English *the*, which is widely assumed as a presuppositional generalized ⊕ operator (Sharvy 1980, Link 1983, Barker 1992,

---

[21]For some remarks on EVEN-*cả* (e.g. *Cả Nam cũng tới* 'Even Nam also came') as a focus particle in Vietnamese, the readers can refer to Hole (2013, 2017), Erlewine (2017), or Liao & Jheng (2025) from the Mandarin's *lian* 連 perspective. Notice in Liao & Jheng's paper, EVEN-*cả* is glossed as 'also' and treated on par with Mandarin *lian* as a domain-widening operator in tandem with another focus marker in the vicinity to trigger a scalar focus effect. I leave open the question of whether the focus function is related to quantifier-uses of *CẢ*.

Heim 2019, among others).[22]

(71) Hypothesis of the sum operator ⊕-*cả*
Cả functions as a sum operator, i.e. ⊕, in forming groups and sums in Vietnamese.
$cả(P) :=$ the α such that $\alpha = \alpha_1 \oplus \alpha_2 \oplus \alpha_3 \oplus \ldots$ for all members α_i in P.

Thus, this section will be organized as follows. Subsection 3.6.2 will briefly present group terms in Vietnamese – one of *cả*'s most favored associates, showing that they are best described as a special kind of singulars, i.e. atom-denoting expression. Next, basic facts involving quantifier-uses of *cả*, including the existential force of the cardinal determiner of the form [cả + Num], will be investigated in Subsection 3.6.3. Subsection 3.6.4 presents my proposal for both ∀-*cả* and ∃-*cả*, whereas Subsection 3.6.5 will offer an alternative account for group-quantification involving ∀-*cả*, i.e. the sum operator analysis.

3.6.2 Group terms in Vietnamese

Group terms, also known as collective nouns, are widespread in natural languages. These terms tend to be count nouns that can take a possessive phrase containing a plural complement but not a singular complement, e.g. *the committee of women/*woman, the group of linguists/*linguist*, and triggers a collective reading (Barker 1992, Landman 2000, Champollion 2017). Most semanticists subsume these terms (e.g. *that group, the committee*) under a broad category of plurality-denoting expressions, in alignment with definite plurals and conjoined terms even though they can have both plural and singular morphosyntax in many languages, including some dialects of English (Link 1991, Landman 1989a; 1989b).

(72) a. Examples of group terms, definite plurals, and conjoined terms in English (Barker 1992:71)

Plurals

Group terms	Definite plurals	Conjoined terms	...
the committee	*the men*	*Bill and John*	
that group	*those people*	*the men and the women*	
the list of reasons	*the members of the group*	*the chairman and the secretary*	
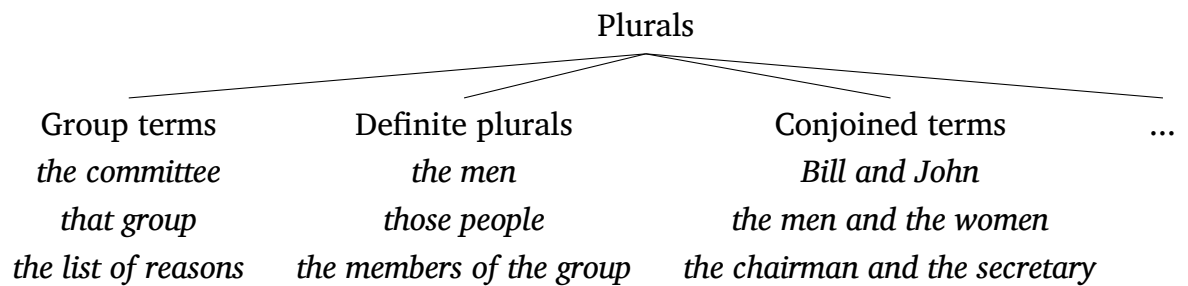
b. **Man Utd** *is/are suffering now*. (American English)[23]

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[22]The definition of *the* based on the ⊕ operator: $\llbracket$ the $\rrbracket = \lambda P: \oplus P \in P. \oplus P$

[23]In American English, sentences whose collective subjects can have both singular and plural

Group terms are controversial expressions because they denote controversial objects, i.e. groups. As a well-known fact, groups are assumed to bear the dual ontology: they resemble both individual (i.e. they cannot be characterized solely by identities/properties of their members/elements, e.g. same A, B, C can be sole members of two different groups, say *the bachelor group* and *the Neogrammarians*) and a set of individual (i.e. they can be characterized by identities/properties of their members/elements, e.g. *hội phụ nữ* 'women union'). This dual ontology of groups has led to two opposing views on their cognitive-grammatical nature, i.e. the singularism – each social group is a single thing (e.g. Barker 1992, Lasersohn 2016 – most of them are semanticists) and the pluralism – that each social group is identical to the plurality of its members (e.g. Black 1971, Horden & de Sa 2021 – most of them are metaphysicians).

Details aside, as far as the syntax-semantic characteristics of group terms are concerned, they are presumably best described as atom-denoting expressions, i.e., singulars denote entities lacking internal structure, as what Barker (1992) proposes by appealing to English data. However, group terms cannot be taken as ordinary atoms like *John, Mary, the Sun, the Moon*, etc., or else we can not capture the fact attested in many languages, including Vietnamese, that they can be employed as the restricting domains in various quantificational constructions, at least on the surface. This fact can be observed in Vietnamese quantification with *cả*.

(73)   a.   *Cả làng   Vũ-Đại ghét Chí-Phèo.*
                CẢ village Vũ-Đại hate Chí-Phèo
                'The whole Vũ Đại village hates Chí-Phèo' or 'All the villagers of Vũ-Đại hate Chí-Phèo.'

        b.   *Cả hội-đồng   đã   có-mặt.*
                CẢ committee PST show.up
                'All the committee members arrived.'

In fact, group terms exhibit many common traits with conjoined terms (e.g. *Nam và Mi* 'Nam and Mi') in Vietnamese, for example, both are incompatible with *tất-cả* but have no trouble in combining with *cả*, as evidenced in following examples.

(74)   a.   *Cả/*Tất-cả làng   Vũ-Đại ghét Chí-Phèo.*
                all   village Vũ-Đại hate Chí-Phèo
                'All the villagers of Vũ-Đại hate Chí-Phèo.'

        b.   *Cả/*Tất-cả Nam và   Mi đã   có-mặt.*
                all   Nam and Mi PST show.up
                'Nam and Mi all arrived.'

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verb agreements. By contrast, British English uniformly treats group terms as plurality-denoting expressions, thus allowing a plural verb agreement only (Trudgill & Hannah 2013:73).

These facts found in Vietnamese imply that, to some extent, it is plausible to assume group terms are different kinds of atoms. Following Link (1983), Landman (1989a; 1989b, among others), I will take group terms in Vietnamese as impure atom-denoting expressions which semantically are built on sums via the upward closure operator, repeated as below.

(75) Upward closure function

$$[\![\uparrow(\alpha)]\!] = \{\ [\![\alpha]\!]\ \}$$

(Informally, $\uparrow$ maps every set onto the singleton set containing it)

(76) Link's (1983) ontology

   a. $[\![\textbf{Nam}]\!] = \text{N}$ (pure) atom

   b. $[\![\textbf{Nam và Mi}_{\text{sum}}]\!] = \text{N} \oplus \text{M}$ sum

   c. $[\![\textbf{Nam và Mi}_{\text{group}}]\!] = \uparrow(\text{N} \oplus \text{M})$ group/impure atom

Being able to quantify over sums and groups can be taken as one of the signature features of *cả*. But that is not its whole story. In the next section, we will appreciate a more detailed description of *cả*'s quantificational patterns with other nominal subcategories to see that *cả* has both similar and different traits with respect to other $\forall$-quantifiers in Vietnamese.

3.6.3 What's so special about D-quantifier *cả*?

Other than the signature feature involving group terms and sums, *cả*[24] can also quantify over classifier phrases in non-distributive contexts, with or without post-nominal elements (e.g. Dem, AttrP, PossP, etc.), to trigger a quantification over parts of a whole dog, not over parts of a plurality of dogs.

(77)   a.   *Cả con chó đằng-kia ướt-đầm.*
            CA CLF dog over.there soaking.wet
            'The whole body of the dog over there is soaking wet.'   (predicated with a dog, not dogs)

    b.   **Cả con chó đằng-kia đang vẫy-đuôi.*
            CA CLF dog over.there CONT wag.tail
            Intended: 'All the dogs over there are wagging their tails.'

By contrast, *cả* can only combine with NumPs like *ba con chó* 'three dogs' in both distributive and non-distributive contexts, triggering ordinary quantificational

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[24] From now on, I will refer to the $\forall$ D-quantifier *cả* simply as *cả* except in comparative contexts with other uses of *cả*. The readers should bear in mind that the EVEN-*cả* basically has no trouble in combining with all types of nominal subcategories.

force over a set of atomic dogs in aligning with *tất-cả*. However, unlike *tất-cả*, *cả* is incompatible with plurals formed with plural markers.

(78)   a. *Cả ba   con chó đằng-kia   ướt-đầm.*
            CA three CLF dog over.there soaking.wet
            'All three dogs over there are soaking wet.'   (distributive)

        b. *Cả ba   con chó đằng-kia   đang vẫy-đuôi.*
            CA three CLF dog over.there CONT wag.tail
            'All the dogs over there are wagging their tails.'   (distributive)

        c. *Cả ba   con chó đằng-kia   đang sủa nhau.*
            CA three CLF dog over.there CONT bark each.other
            All the three dogs are barking at each other.'   (non-distributive)

        d. **Cả những/các con chó đằng-kia   ướt-đầm.*
            CA PL   CLF dog over.there soaking.wet
            'All the dogs over there are soaking wet.'   (distributive)

What we have seen so far regarding D-quantifer *cả* can be summarized in **Table 3.4** below.

Table 3.4: QP-patterns with *cả* in comparison with *tất-cả* (#1)

∀ D-quantifiers	Nominal subcategories				
	ordinary singulars	collective singulars	ordinary plurals		
	CLF + N *con chó* 'dog'	**group terms** *làng* 'village'	**sums** *Nam và Mi* 'Nam and Mi'	**PL + CLF + N** *các con chó* 'dogs'	**Num + CLF + N** *ba con chó* 'three dogs'
cả	✓*	✓	✓	#	✓
tất-cả	✓/#	#	#	✓	✓

* = grammatical in non-distributive, sub-atomic contexts only
! = grammatical in distributive contexts only

    Importantly, the pattern [*cả* + Num + CLF + N] is found to be ambiguous between a universal and a cardinal, existential interpretation. In other words, *cả ba con chó* can mean either *all three dogs* or *the three dogs*, depending on how much contextual information is provided. If the form is uttered in contexts providing a fixed cardinality of the entity denoted by the associating nominal, then that form involves cardinal *cả*. In the meantime, if nothing involving cardinality is available, it is the universal D-quantifier *cả* at service. For instance, in the following context where Nam has exactly three students, a-sentence with cardinal-*cả* will be void of truth value due to a presupposition failure, whereas b-sentence with ∀-*cả* will be plainly false. Overall, the difference under discussion is very similar to the

difference between *all the two students* vs. *both students* in English.[25]

(79)   [Context: Nam has exactly three students in his class.]

    a. *#Cả bốn sinh-viên của Nam rất ngoan.*
       CA four student POSS Nam very well-behaved
       'The four students of Nam are very well-behaved.'

    b. *Cả bốn sinh-viên của Nam rất ngoan.*
       all four student POSS Nam very well-behaved
       'All four students of Nam are very well-behaved.'

In addition to that, *cả* is also capable of co-occurring with non-classified nouns as in *cả phòng* 'the whole room', and measured mass nouns as in *cả cốc nước* 'the whole cup of water'. In both contexts, the only salient reading is non-distributive in aligning with the pattern [cả + CLF + N]. Other than that, *cả* is found in a near absolutely complementary distribution with *tất-cả* with respect to other types of bare count and mass nouns: where *tất-cả* can appear, *cả* cannot. **Table 3.5** below summarizes what we have just revealed.

Table 3.5: QP-patterns with *cả* in comparison with *tất-cả* (#2)

∀ D-quantifiers	Nominal subcategories				
	bare nouns			mass nouns	
	obl-CLF N *chó* 'dog(s)'	**opt-CLF N** *sinh viên* 'student(s)'	**non-CLF N** *phòng* 'room(s)'	**bare mass** *nước* 'water'	**measured mass** *cốc nước* 'cup of water'
cả	#	#	✓*	#	✓*
tất-cả	✓	✓	✓	✓	✓!

    * = grammatical in non-distributive, sub-atomic contexts only
    ! = grammatical in distributive contexts only

(80)   a. *Cả (căn) phòng đầy mùi nước-hoa Nhật-Bản.*
       CA CLF room full scent perfume Japanese
       'The whole room is full of the scent of a Japanese perfume.'

             (predicated with a singular room, not a plurality of rooms)

    b. **Cả (căn) phòng ở đây dùng chung một mạng Internet.*
       CA CLF room in here use common one network Internet
       Intended: 'All the rooms here share an Internet connection.'

In sum, *cả* is incompatible with *các/những*-plurals, obligatory-classifier nouns,

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[25]We will elaborate on this distinction between the two *CẢ* in the next section.

optional-classifier nouns, and bare mass nouns, whereas *tất-cả* have no trouble with all of these nouns. What are the common properties among these nominal subcategories that make *cả* disallow them? On the contrary, what are the common features among ClPs, measured mass, group terms, sums, and NumPs that fall under *cả*'s favor? Is there any evidence supporting the distinction between ∀-*cả* vs. cardinal-*cả* in the same surface pattern with NumPs? These are the main issues that we will shed light on in the next section.

3.6.4 The proposal

The first striking characteristic of *cả* that we can draw right away from its incompatibility with *các/những*-plurals, obligatory-classifier nouns, optional-classifier nouns, and bare mass nouns, is that it disallows associating nominals that denote cumulative references.

(81)   a.   *Atomic predicates*
         P is an atomic predicate iff $[\![P]\!] = at([\![P]\!])$
         (Informally, P is an atomic predicate if the (extensional) denotation of P necessarily consists of atoms of P)
      b.   *Cumulative predicates*
         P is a cumulative predicate iff $[\![P]\!] = \oplus at([\![P]\!])$
         (Informally, P is a cumulative predicate if and only if the denotation of P is necessarily a set closed under ⊕)[26]

Simply speaking, given an atomic set of {a,b,c}, then P_1 = {a,b,c, a⊕b,a⊕c, b⊕c, a⊕b⊕c}, P_2 = {a,b, a⊕b,a⊕c}, P_3 = {a,b,c, a⊕b,a⊕c,a⊕b⊕c}, ... all are cumulative predicates. As I submit in Chapter 2, following Trinh (2011), bare count nouns, plurals (and 'fake' mass nouns like *furniture* in English – see **Table 2.2**) in classifier languages all denote sorts of cumulative predicates. Thus, the denotations of a bare noun like *chó* 'dog(s)', plural like *các con chó* 'dogs', in contrast with atomic nouns like *con chó* 'a dog', presumably, can be represented in a simple model as below.

(82)   Denotations of Vietnamese ***chó*** (bare noun), ***con chó*** *'a/the dog'* (bare ClP) and ***những con chó*** *'dogs'* (*các/những*-phrase) (assuming there are only three dogs in the model, namely *a, b, c* in the domain, and plurals are exclusive ones for now)

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[26]Given this formalization, we can see that the denotation of a cumulative P(-redicate) is the output of applying the distributivity operator to the $at([\![P]\!])$ (cf. Landman (1989a) for the idea that cumulativity and distributivity are actually two sides of the same coin.)

a. Atomic: $[\![\textit{\textbf{con chó}}]\!]$ = {a, b, c }

b. Cumulative: $[\![\textit{\textbf{những con chó}}]\!]$ = {a⊕b, a⊕c, b⊕c, a⊕b⊕c }

c. Cumulative: $[\![\textit{\textbf{chó}}]\!]$ = {a, b, c, a⊕b, a⊕c, b⊕c, a⊕b⊕c }

Given these assumptions, I submit the following generalization regarding the D-quantifier *cả*'s selectional restrictions.

(83) Generalization on *cả*'s selectional restrictions

∀-*cả* disfavors DPs formed by cumulative predicates (i.e., non-atomic predicates).

This characterization allows us to predict that *cả* can combine with only DPs formed by atomic predicates or atoms (i.e., singleton atomic predicates). Is this prediction borne out? The answer is yes. More specifically, all the types of nouns that *cả* is compatible with, i.e., group terms, sums, NumPs, non-CLF nouns, and ClPs (even measure phrases in the cases of measured mass), are found to be formed by atomic predicates (viz., NumPs, ClPs, non-classified nouns[27]), or atom-denoting expressions (viz., sums, group terms).

However, the problem here is that *cả* gives rise to different kinds of quantification corresponding to different kinds of atomic DPs (i.e., DPs formed by atomic predicates): in particular, a distributivity over atomic entities in the cases involving NumPs like (84-a), and a distributivity over parts of a whole involving ClPs, sums, and group terms like (84-b), (84-c), and (84-d), respectively. Moreover, it is worth noting that *tất-cả* can substitute for *cả* in the former case, whereas it can not do so with the other three associates, namely: ClPs, sums, and group terms.

(84) a. *Cả/Tất-cả **ba   con chó đằng-kia**   ướt-đầm.*
      CA   three CLF dog over.there soaking.wet
      'All three dogs over there are soaking wet.'   (NumPs)

   b. *Cả/*Tất-cả **con chó đằng-kia**   ướt-đầm.*
      CA   CLF dog over.there soaking.wet
      'The whole body of the dog over there is soaking wet.'   (ClPs)

   c. *Cả/*Tất-cả **Nam và   Mi** đã   có-mặt.*
      CA   Nam and Mi PST show.up
      'Nam and Mi both arrived.'   (sums)

   d. *Cả/*Tất-cả **hội-đồng**   đã   có-mặt.*
      CA   committee PST show.up

---

[27]Notice that non-classified nouns in Vietnamese (e.g. *phòng* 'room', *màu* 'color', *nước* 'country', etc.) can be taken to be inherently atomic like ClPs on the ground that the pattern between them and DEM, e.g. *phòng này* 'this room' is strictly singular (i.e., denoting an atom), in contrast with the denotation of ordinary bare nouns like *chó* 'dog(s)' or *sinh-viên* 'student(s)' which are assumed to be number-neutral (denoting both singularities and pluralities). See more details in Chapter 4.

'All members of the committee arrived.'   (group terms)

In what follows, I will argue that (i) for cases like (84-a), the *cả*-QP, in fact, is a shrunk *tất-cả*-QP; (ii) there is a covert domain involving parts/members (denoted by silent nouns like PERSONS, PLACES, etc.) of an atom, whether pure or impure, with respect to the cases like (84-b), (84-c), and (84-d), i.e. those where *tất-cả* is impossible to appear. Finally, I will end this section by entertaining on an alternative account of ∀-*cả* in the "non-shrunk" cases, i.e. treating it as an instantiation of the sum operator. Thus, the collective reading is due to the homogeneity effect of definite plurals, whereas the distributive force, if there's any, is due to a silent A-quantifier EACH in the vicinity.

3.6.5   *Cả*-QP: cardinal QP or *tất-cả*-QP being shrunk?

The question addressed in this section is: Is *cả*-QP in the pattern [*cả* + NumP] semantically equivalent to *tất-cả*-QP, given that *tất-cả* can substitute for *cả* in such cases, or is it something else? If it's something else, then what is this "something"?

(85)   *Cả/Tất-cả ba   con chó đằng-kia   ướt-đầm.*
       CA   three CLF dog over.there soaking.wet
       'All three dogs over there are soaking wet.'

My hypothesis here is that the pattern with *cả*-QP under discussion is ambiguous between a *tất-cả*-QP being shrunk and a cardinal QP formed by a complex numeral *cả* + *Num* on a par with English *both* (corresponding to Vietnamese *cả hai*). For our reference, both denotations of Vietnamese *tất-cả* and English *both* presented in the previous sections are repeated below.

(86)   The lexical entry for D-quantifier *tất-cả*

   a. $[\![$ ***tất-cả*** $]\!]$ = λX_e: $|X| > 1$ (i.e. X is a plurality). $\lambda Q. \forall x$ [atom(x) ∧ x ⊑ X →Q(x)]

        (where $atom(x) := \{x \in P: \neg\exists y.\ [y \sqsubset x \land P(y)]\}$ (for any predicate P))

   b. $[\![$ *Tất-cả 3 sinh-viên đã có-mặt* $]\!]$ ^{c} = 1 iff for all x, if x is an atomic part of X such that X is the plurality of 3 three students, then x arrived in c.

(87)   The lexical entry for English *both*

   a. $[\![$ ***both*** $]\!]$ = $\lambda P_{<e,t>}$: $|P| = 2$. $\lambda Q_{<e,t>}$. $\exists x_e$ [P(x) ∧ Q(x) ∧ |x| = 2]

   b. $[\![$ ***Both*** *students arrived* $]\!]$ ^{c} = 1 iff there are exactly two students that arrived in c.

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What is the evidence supporting this ambiguity theory of *cả*? From the first impression, *cả*-hai 'both' behaves very similarly to the cardinal determiner *both* in English, for example, in their infelicity in existential environments as exemplified by (88).

(88)   Existential diagnosis

    a. *#**There** are **both** John's students in the meeting.*   (English *both*)

    b. *#**Có** **cả** hai sinh-viên của Nam trong cuộc-họp.*
        have CẢ two student POSS Nam in   meeting

However, this piece of evidence is not enough for us to conclude that *cả* (in complex quantifiers of the form [cả + Num]) is inherently a cardinal quantifier and different from a non-cardinal quantifier like *tất-cả* 'all', since *tất-cả* 'all' is also disallowed in existential environments (as what we expect to see with all the instantiations of 'strong' quantifiers in natural language as previously mentioned in Section 3.2). In contrast, I will show that there are observations suggesting that *cả* is ambiguous between the two readings. More specifically, in what follows, I will employ a bunch of tests involving the non-homogeneity effect of universal QP to see if *cả*-derivations of the pattern [*cả* + NumP] are really *tất-cả*-QP or not. The linking hypothesis here is that if it is ambiguous, then the acceptability judgments from native speakers for the downward-entailing tests should be mixed, whereas those for the upward-entailing test should be consistent.

In brief, (non-)homogeneity effect involves the contrast between definite plurals and universal QPs in downward-entailing environments like negative, conditional (Krifka 1996, Brisson 1997, Hirsch 2016, Križ 2016, Križ & Spector 2021, Liu 2021, among others).

(89)   **(Non-)homogeneity effect of universal QPs**

    a. *Mary didn't read <u>the books on the reading list</u>.*
        ⤳ Mary read **no or nearly no** books on the reading list. (homogeneous reading)[28]

    b. *Mary didn't read <u>all the books on the reading list</u>.*
        ⤳ Mary read **some** books on the reading list.   (non-homogeneous reading)

Thus, the negation of a statement whose universal QP will lead to 'some'-reading, whereas the negation of a statement whose a definite plural in object position will

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[28]Notice that the "nearly no"-inference here is assumed due to another peculiar semantic effect involving definite plurals called *non-maximality* (Brisson 1997). We will temporarily set it aside at this point.

lead to 'no or nearly no'-reading. A similar observation is also found in Mandarin between universal *mei*-QPs/ *suoyoude*-QPs and definite plurals like *zhe-xie NP*, as shown below.

(90)   (Non-)homogeneity involving Mandarin universal QPs

    a.   *Zhang-san ba zhe-jian-shi gao-su da-bu-fen san-nian-ji   xue-sheng, dan*
        ZS   BA this-thing tell   most   third-grade student   but
        *wo meiyou ba zhe-jian-shi gaosu {**mei-yi-ge/suoyou-de**} san-nianji*
        I   NEG   BA this-thing tell   every/all   third-grade
        xuesheng.
        student
        'Zhang-San told this to most third-grade students but I didn't tell this to every third-grade student.'
        ⤳ I did tell this to some third-grade students.

    b.   *Zhang-san ba zhe-jian-shi gao-su da-bu-fen san-nian-ji   xue-sheng, dan*
        ZS   BA this-thing tell   most   third-grade student   but
        *wo meiyou ba zhe-jian-shi gaosu **zhe-xie san-nianji   xuesheng**.*
        I   NEG   BA this-thing tell   these   third-grade student
        'Zhang-San told this to most third-grade students but I didn't tell this to these third-grade students.'
        ⤳ I didn't tell this to any of these third-grade students.

(91)   Prediction #1:
    Given the non-homogeneity reading of the universal QP *cả ba đứa nó* 'all the three of them' (= *tất-cả ba đứa nó*), it is predicted that (92-b) should be judged felicitous, whereas (92-a) should be judged infelicitous, given the scenario in (92).

(92)   [*Scenario:* Suppose Nam has three close friends (viz. A, B, and C), and his wife knows this. Three days ago, he just learnt that his wife is pregnant. Yesterday, she asked him whether he had told his wingmen the good news or not. He replied:]

    a.   *Anh mới chỉ báo   cho A biết   chứ chưa   nói cho ba   đứa nó.*
        I   just only inform to A know but not-yet tell to   three CLF 3SG
        'I have just only told A but not the three of them.'

    b.   *Anh mới chỉ báo   cho A biết   chứ chưa   nói cho cả ba   đứa*
        I   just only inform to A know but not-yet tell to   CA three CLF
        nó.
        3SG
        'I have just only told A but not all the three of them.'

(93)   Result:
    The prediction is borne out. Most of the consultants (7 out of 10, including

me) attested to the prediction #1, i.e. only a-sentence is odd, but some of them (3 out of 10) thought both sentences are infelicitous.

This mixed result in (93) implies that [cả + NumP] is readily ambiguous, suggesting that our linking hypothesis is on the right track. Thus, those who judged both the sentences to be infelicitous had, presumably, perceived a semantic conflict between the universal reading of *cả*-QP and another cardinal interpretation of it. Meanwhile, those who judged only a-sentence to be odd had uniformly interpreted *cả*-QP as identical as a universal *tất-cả*-QP. The test with Q-senstive expression *ngoại trừ* 'except' (with the same context), as exemplified by (94), has the same mixed result (indicated by a single question mark ?).

(94)   The test with the Q-sensitive expression *ngoại trừ* 'except' [given the same context as (92)]

    a. #*Ngoại-trừ A, anh vẫn chưa nói cho ba đứa nó.*
       Except   A, I   still not-yet tell to   three CLF 3SG
       Intended: 'Except A, I still haven't told the three of them yet.'

    b. *Ngoại-trừ A, anh vẫn chưa nói cho ?{cả ba đứa nó}.*
       Except   A, I   still not-yet tell to   CA   three CLF 3SG
       '#Except A, I still haven't told the three of them yet.'

       'Except A, I still haven't told all of them yet (i.e., I have told it to A but not B and C).'

Beyond that, the two following tests with upward-entailing environments show us the alignment between *cả*-QP and *tất-cả*-QP, upholding our linking hypothesis.

(95)   The test with *chỉ-mỗi* 'only'. [Context: Nam's institute has exactly 20 professors.]

a.   *Chỉ-mỗi Nam là mời tất-cả các giáo-sư... (những người khác chỉ*
    only   Nam COMP invite all   PL professor PL   people other only
    mời vài vị).
    invite some CLF
    'Only Nam invited all the professors... (others just invited one or two professors).'

b.   *Chỉ-mỗi Nam là mời cả 20 giáo-sư... (những người khác chỉ*
    only   Nam COMP invite all 20 professor PL   people other only
    mời vài vị).
    invite some CLF
    'Only Nam invited all the 20 professors...(others just invited one or two professors).'

c.   *Chỉ-mỗi Nam là   mời   các giáo-sư... (#những người khác chỉ mời*
     only   Nam COMP invite PL professor PL   people other only invite
     vài   vị).
     some CLF
     'Only Nam invited the professors...(#others just only invited one or two
     professors).'

(96)   The test with Q-sensitive expression *hầu-như* 'almost'. [Context: Nam's
       institute has exactly 20 professors.]

       a.   *Nam đã   mời   hầu-như tất-cả các giáo-sư   của viện   tới bữa*
            Nam PST invite almost   all   PL professor of institute to CLF
            tiệc.
            party
            'Nam invited almost all the professors of the institute to the party.'

       b.   *Nam đã   mời   hầu-như cả 20 giáo-sư   của viện   tới bữa tiệc.*
            Nam PST invite almost   CA 20 professor of   institute to CLF party
            'Nam invited almost all the 20 professors of the institute to the party.'

       c.   *#Nam đã   mời   hầu-như 20 giáo-sư   của viện   tới bữa tiệc.*
            Nam PST invite almost   20 professor of   institute to CLF party
            Intended: 'Nam invited almost the 20 professors of the institute to the
            party.'

Given the test results above, we can come to a conclusion that the pattern
cả-QP is ambiguous between a universal reading which is identical to *tất-cả*-QP
and a different reading which is similar to a definite plurals in specific contexts.
Therefore, I submit that *cả* in the pattern [*cả* + NumP] should be analysed as (i) a
tất-cả-QP of the form [*tất-cả* + DP] being shrunk and (ii) a cardinal QP in aligning
with English cardinal determiner *both*.[29] Specifically, the semantics of the cardinal
cả will carry a cardinal presupposition that its associating predicate must bear a
fixed cardinality as its first number argument (Champollion 2017:32), explicated
as follows.
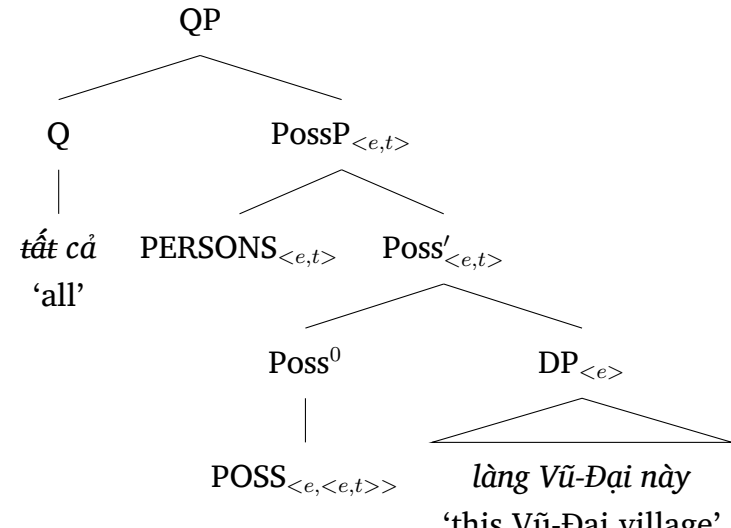
(97)   The semantics of the cardinal *cả* (of type $\langle n, \langle et, \langle et, t \rangle \rangle \rangle$)

       a. $\llbracket \boldsymbol{c\mathring{a}} \rrbracket = \lambda n. \lambda P: |P| = n. \lambda Q. \exists x [^*P(x) \wedge |x| = n \wedge Q(x)]$

       b. $\llbracket c\mathring{a} \ ba \rrbracket = \lambda P: |P| = 3. \lambda Q. \exists x [^*P(x) \wedge |x| = 3 \wedge Q(x)]$

       c. $\llbracket c\mathring{a} \ ba \ sinh\text{-}vi\hat{e}n \rrbracket^c$ is defined iff there are exactly three students in c
            where defined, $\llbracket c\mathring{a} \ ba \ sinh\text{-}vi\hat{e}n \rrbracket^c = \lambda Q. \exists x[^*student'(x) \wedge |x| = 3 \wedge$
            Q(x) in c]

       d. $\llbracket c\mathring{a} \ ba \ sinh\text{-}vi\hat{e}n \ đ\tilde{a} \ c\acute{o}\text{-}m\breve{a}t \rrbracket^c = 1$ iff there is a plurality x bearing car-

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[29]Intuitively, these two readings of *CẢ* seem to have a phonetic resolution: the cardinal *cả* tends
to induce a stress on the adjacent numeral, whereas on the universal reading of *cả*, this cue is not
observed or not so obvious as on its cardinal use.

dinality of 3, x is a student and x arrived in c.

In the cases of *cả*-QP as shrunk *tất-cả*-QPs, to account for its composition with group terms, sums, and CLPs (but not plurals), I assume that there is a covert domain denoting by silent nouns like PERSONS/THINGS, along the lines of Kayne (2005), Moltmann (2022), among others. Thus, the group terms, sums, and CLPs at issue are not true arguments of *cả* at LF. Rather, they are possessors of the true restrictor in the domain denoted by silent generic nouns like PERSONS/THINGS (i.e. a contextually determined set, e.g. *dân* 'villagers/citizens' or *gia-đình* 'households') located in SPEC-PossP as the possessum (headed by a silent morpheme POSS – corresponding to the overt *của* – in charge for the possessive relation)[30]. This account can be exemplified by the LF of *cả làng Vũ Đại này* [$_{QP}$*cả* [$_{PossP}$ PERSONS [$_{Poss'}$ POSS [$_{DP}$ *làng Vũ-Đại này*]]]] 'the people of this Vũ-Đại village' in (98-a) below.

(98)   The LF of *cả làng Vũ Đại này* 'all the people of this Vũ-Đại village'

a.

b.   ⟦ POSS ⟧ = λx_e. λy_e. y is a part of x.

c.   ⟦ PossP ⟧ = λx. *PERSON*'(x) $\wedge$ x is a part of ⟦ *làng Vũ-Đại này* ⟧   (by PM)

Furthermore, I assume that sums (e.g. *Nam và Mi* 'Nam and Mi') and CLPs engage in the same way as group terms as parsed above, whereas plurals (e.g. *(*cả) những sinh-viên* 'students') are ruled out since they cannot be the complement of

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[30]Notice that PM = Predicate Modification (Heim & Kratzer 1998:65)

(i)   Predicate Modification compositional rule (PM)
If α is a branching node, $\{\beta, \gamma\}$ is the set of a's daughters, and ⟦ β ⟧, ⟦ γ ⟧ are both in $D_{<e,t>}$ then
⟦ α ⟧ = $\lambda x \in D_e$. ⟦ β ⟧ (x) = ⟦ γ ⟧ (x) = 1

POSS due to their inherently predicative status, as evidenced by the unacceptability of the overt PossP *người của những sinh-viên (này)* below.

(99) a. *người của làng Vũ-Đại này*
person POSS village Vũ-Đại DEM
'persons of this Vũ-Đại village'

b. **người của những sinh-viên này*
person POSS PL student DEM

More importantly, the universal quantifier *cả* here can be analyzed either as *tất-cả* in disguise across the board (with the PossP type-shifted into e-expressions) or as a distinct universal quantifier whose identical semantics as *tất-cả* but differs in their c-selection: *cả* selects PossP (of type $\langle e, t \rangle$), whereas *tất-cả* selects DP (of type $\langle e \rangle$). Given the fact that *tất-cả* can only substitute *cả* in the pattern with NumPs but cannot do so with ClPs, sums, or group terms, I will opt for the latter approach that takes *cả* to be semantically the same as *tất-cả*, but c-selects a PossP (of type $\langle e, t \rangle$), whereas *tất-cả* requires an e-type restrictor. Then it follows that the NumP in the pattern [*cả* + NumP] should be parsed in the complement of the PossP (i.e., the possessor) with a silent noun PERSONS (i.e., the possessum), whereas the NumP in the corresponding surface structure [*tất-cả* + NumP] is assumed to be in Comp-DP (headed by the iota operator).

The account sketched above, however, poses a challenging question with respect to the status of silent generic nouns and their distributions in Vietnamese. One way or another, they need to be constrained and motivated by independent evidence drawn from other aspects of Vietnamese grammar. Why don't we have a generic noun like *sách* 'BOOKS' or *lớp* 'CLASS' instead of *người* 'PERSON' in QPs like (99-b)? Overall, these issues make our silent noun analysis look more like an ad-hoc solution to our compositional problem regarding *cả*. In what follows, let us contemplate an alternative view to *cả* that doesn't have anything to do with silent generic nouns, but seems capable of accounting for all of the "non-shrunk" cases. The analysis I want to entertain in the next section is to treat *cả* uniformly as an instantiation of the sum operator.

3.6.6 An alternative view: *Cả* as a sum operator

As shown in the previous section, assuming *cả*-QP as *tất-cả*-QP with a covert domain can help us solve the compositionality problem involving group terms or sums, but cannot explain why *tất-cả* cannot quantify over these expressions by itself in the same manner as what we have observed with the case of NumP-associate, where *cả* and *tất-cả* are interchangeable, as repeated in (100).

76

(100) a. *Cả/*Tất-cả Nam và Mi đã có-mặt.*
CA/all Nam and Mi PST show.up
'Nam and Mi both arrived.' (sums)

b. *Cả/*Tất-cả hội-đồng đã có-mặt.*
CA/all committee PST show.up
'All members of the committee arrived.' (group terms)

c. *Cả/Tất-cả ba sinh-viên của Nam đã có-mặt.*
CA/all three student of Nam PST show.up
'All three Nam's students arrived.' (NumPs)

Put differently, we can attribute these contrasts between *cả* and *tất-cả* to their different c-selection, as I suggested in the previous section. However, the price we have to pay for this account is that we have to admit that *cả* in the pattern [*cả* + group terms/sums] is a different quantifier from *cả* in the pattern [*cả* + NumP], which we have established to be just a morphological variation of *tất-cả*. This puzzle of *cả*, thus, cries for a more meticulous explanation than the covert domain as assumed above.[31]

From a broader perspective, there is also a piece of indirect evidence against the covert domain analysis of *cả* pertaining to the interaction between silent head nouns and quantity words in Vietnamese.

Accordingly, it is worth noting that the 'spell-out' in Vietnamese involving quantity words is more restricted than in English. More specifically, Vietnamese doesn't allow nominals whose Q-adjectives like *nhiều* 'many', *ít* 'few' to surface with silent nouns as Kayne (2005) suggests on the grounds of English counterparts. Consider the following contrast between (101) and (102), where a generic noun like *người* or *kẻ* 'person, individual' is necessary to appear.

(101) a. *Many linguists like phonology, but many don't.*

b. **Good linguists like phonology, but bad don't.*

c. **Numerous linguists like phonology, but numerous don't.*

(102) Vietnamese Q-adjectives

a. *Nhiều nhà-ngôn-ngữ-học thích âm-vị-học, nhưng không ít *(người)*
many linguists like phonology but NEG few person

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[31]Notice further that in previous sections, I also assume that the suffix *-cả* in *tất-cả* has nothing to do with the quantifier *cả*, and subsume both under the category of 'simplex' universal quantifiers in Vietnamese. If *cả* is taken as a sum operator, then it follows that *tất-cả* should no longer be regarded as a 'simplex' quantifier, and it can presumably be decomposed into two parts (along the lines of Sauerland's analysis of German *je-der*), carrying out two distinct functions: *tất-* for quantifying, and *-cả* for domain-restricting. However, given the lack of robust evidence bolstering the sum operator approach to *cả* (at least for now), I have to leave this appealing decomposition of *tất-cả* open for future elaborations.

77

không thích.
NEG   like
'Many linguists like phonology, but many don't.'

b. *Nhà-ngôn-ngữ-học tử-tế thì   thích âm-vị-học, nhưng *(người) không*
linguists   good TOP like phonology but   linguist NEG
tử-tế thì   không thích.
good TOP NEG   like
'Good linguists like phonology, but bad linguists don't.'[32]

Given these problems pertaining to the silent noun analysis, it is tempting to take a look at it from another perspective. Accordingly, I suggest that *cả* in patterns with group terms, sums, and CLPs can be alternatively considered as an instantiation of the sum operator, defined as follows.

(103)   Hypothesis of the sum operator $\oplus$-*cả*
Cả functions as a sum operator, i.e.$\oplus$, in forming groups and sums in Vietnamese.
$cả(P) := \text{the } \alpha \text{ such that } \alpha = \alpha_1 \oplus \alpha_2 \oplus \alpha_3 \oplus \ldots \text{ for all members } \alpha_i \text{ in P.}$

In other words, *cả* can be considered as a definite article in Vietnamese corresponding to English *the*, which is widely assumed as a presuppositional generalized $\oplus$ operator (Sharvy 1980, Link 1983, Barker 1992, Heim 2019, among others).[33] This immediately bring us back to Lin's (1998a) classic account of Mandarin *mei* as the maximal operator *iota* in co-occurrence with the universal distributor *dou*.

Overall, if this idea is on the right track, potentially we can even account for a minority of judgments involving the homogeneity effect with [cả + NumP]. Put differently, for these speakers, *cả ba đứa nó* has the meaning of a definite plural like *the three of them* in English, as shown in (104-b).[34]

(104)   a. *#Ngoại trừ A, anh vẫn chưa   nói cho ba   đứa nó.*
Except   A, I   still not-yet tell to   three CLF 3SG
Intended: 'Except A, I still haven't told the three of them yet.'

b. *Ngoại trừ A, anh vẫn chưa   nói cho #**cả ba   đứa nó**.*
Except   A, I   still not-yet tell to   CA   three CLF 3SG
'Except A, I still haven't told all of them yet/#the three of them yet.'

Next, how can we account for the distributive force in examples like (100)? I

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[32]Notice that unlike English and Mandarin counterparts (Hsieh 2019), adjectives take sides in Vietnamese nominals: Q-adjectives always surface on the left of the head noun, whereas (non-Q) ordinary ones tend to surface on the right.

[33]The definition of *the* based on the $\oplus$ operator: $[\![the]\!]$ $= \lambda P: \oplus P \in P. \oplus P$

[34]Also, as Sihwei Chen (p.c.) points out, if [ca + NumP] is interpreted as definites, it is expected to be infelicitous in discourse-new or non-unique contexts like existential constructions.

suggest that this interpretation can be derived by appealing to a silent A-quantifier EACH (corresponding to the overt A-quantifier expressions of the form *mỗi-CLF*) in the vicinity, defined as in (105).

(105)   The semantics of A-quantifier *EACH$_A$*
         $[\![\boldsymbol{EACH_A}]\!]$ = $\lambda P_{<e,t>}.\ \lambda X_e.\ \forall x\ [x \sqsubset X \to P(x)]$

However, this sum-operator account of *cả* apparently has some drawbacks with respect to its predictions. For instance, given the definite reading of the sum *cả Nam và Mi*, the collective reading should be more salient in sentences involving ambiguous predicates between distributive and collective readings like *ăn một cái pizza* 'eat a pizza', or *có một em-bé* 'have a baby', etc. However, as far as I can say, this prediction is not so obvious. Intuitively, the more salient readings with predicates like *ăn một cái pizza* 'eat a pizza', and *có một em-bé* 'have a baby', as shown in (106), are distributive, but not collective – something we would expect if *cả* is taken as the sum operator.

(106)   a.   *Cả Nam và Mi ăn một cái pizza.*
              CA Nam and Mi eat one CLF pizza
              = 'Nam and Mi eat a pizza each.'   (distributive)
              = 'Nam and Mi eat a pizza together.'   (collective?)
         b.   *Cả Nam và Mi đã có   một em-bé.*
              CA Nam and Mi PST have one baby
              = 'Nam and Mi already have a baby each.'   (distributive)
              = 'Nam and Mi already have a baby together.'   (collective?)

All in all, up to this point, given the lack of robust evidence supporting the sum-operator account of *cả*, this alternative approach still cries for elaboration in future extensions. Hence, I will leave open the possibility of applying this sum analysis to *cả*, and move on to the discussion of *mọi* and *mỗi* in the next section.

3.7   The semantics of distributive D-quantifiers *mọi* and *mỗi*

Now, let us turn to the last two universal D-quantifiers discussed in this Chapter, i.e. *mọi* 'every' and *mỗi* 'each'. In what follows, as suggested by the glosses, I will show that *mọi* and *mỗi* semantically behave very similarly to English *every* and *each,* respectively. In the meantime, they also exhibit many peculiar intra-linguistic characteristics with respect to *tất-cả* and *cả* in terms of their c-selections

and s-selections.[35] Specifically, *mọi* and *mỗi* both c-select ClPs, instead of DPs as with *tất-cả* and *cả*. Semantically, both of them favor distributive predicates, though the distributivity of *mọi* is weaker than that of *mỗi*, in alignment with the contrast between English *every* and *each* as we have discussed in the first sections.

3.7.1 Basic facts

Vietnamese D-quantifier *mọi* and *mỗi* are cognates in terms of etymology. Accordingly, both are assumed to be different reflexes of Chinese *mei* 每 borrowed in different times: *mọi* is posited to be a (Late) Old Chinese, whereas *mỗi* is a proper Late Middle Chinese loan (Alves 2007, 2018, Cao T.V. (to appear, among others).[36]

Synchronically, *mọi* and *mỗi* exhibit many similar patterns with each other (being incompatible with sums and *các/những*-plurals), with a salient preference for distributivity, as summarized in the **Tables 3.6** and **3.7** below.

Table 3.6: QP-patterns with *mọi* and *mỗi* (#1)

∀ D-quantifiers	Nominal subcategories				
	ordinary singulars	collective singulars	ordinary plurals		
	CLF + N *con chó* 'dog'	**group terms** *làng* 'village'	**sums** *Nam và Mi* 'Nam and Mi'	**PL + CLF + N** *các con chó* 'dogs'	**Num + CLF + N** *ba con chó* 'three dogs'
mọi	✓!	✓!	#	#	#
mỗi	✓!	✓!	#	#	✓!

* = grammatical in non-distributive, sub-atomic contexts only
! = grammatical in distributive contexts only

The most stand-out contrast between *mọi* and *mỗi* in **Table 3.6** above pertains to the pattern with NumPs. Specifically, *mọi* is found strictly incompatible with them, whereas *mỗi* can co-occur with NumP to trigger a pair-list reading, as shown in the contrast in (107).

(107)   a. ****Mọi** ba   con chó ăn một cái pizza.*
           every three CLF dog eat one CLF pizza
           Intended: 'Every three dogs eat a pizza.'

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[35]Interestingly enough, both *cả* and *mỗi* have their own homophonous focus markers, i.e. EVEN-*cả* and ONLY-*mỗi* (e.g. *Mỗi Nam có mặt* 'Only Nam showed up').

[36]If this etymology is attested, apparently we will have an upstream case to the generalization of the diachronic universal cline EVERY < EACH proposed in Haspelmath (1995).

b. **Mỗi** *ba   con chó ăn một cái pizza.*
each three CLF dog eat one CLF pizza
'Each three dogs eats a pizza.'   (pair-list reading)

In other patterns with bare count nouns and mass nouns, *mọi* and *mỗi* again show the same behavior in the sense that both disallow them. However, while *mỗi* can only give rise to the distributive reading with optional-classifier nouns and non-classified nouns (i.e. *mỗi* is incompatible with collective/non-distributive predicates), *mọi* can engage in both distributive and non-distributive interpretations, as summarized in **Table 3.7** and illustrated by (108)[37].

Table 3.7: QP-patterns with *mọi* and *mỗi* (#2)

∀ D-quantifiers	Nominal subcategories				
	bare nouns			mass nouns	
	obl-CLF N *chó* 'dog(s)'	**opt-CLF N** *sinh viên* 'student(s)'	**non-CLF N** *phòng* 'room(s)'	**bare mass** *nước* 'water'	**measured mass** *cốc nước* 'cup of water'
mọi	(#)	✓	✓	#	✓!
mỗi	#	✓!	✓!	#	✓!

* = grammatical in non-distributive, sub-atomic contexts only
! = grammatical in distributive contexts only

(108)   a. **Mọi** *sinh-viên đã hát một bài.*
every student PST sing one song
= 'Every student sang a song, respectively.'   (distributive)
= 'Every student sang a song, collectively.'   (non-distributive)

b. **Mỗi** *sinh-viên đã hát một bài.*
every student PST sing one song
= 'Each student sang a song, respectively.'   (distributive)
≠ 'Every student sang a song, collectively.'   (non-distributive)

c. **Mọi**/***Mỗi** *sinh-viên đã họp   nhau   lại   ở căng-tin.*
every/each student PST gather each.other back in canteen
'Every student gathered in the canteen.' (inherently non-distributive)

Interestingly enough, *mỗi* is found somewhat infelicitous in combining with an inherently distributive predicate like *đã có mặt* 'arrived', *đã cười* 'smiled', etc.,

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[37]Note further that the collective reading in (108-a) is found to be more salient when *mọi*-QPs combine with an ambiguous predicate like *hát một bài* 'sing a song', *ăn một cái pizza* 'eat a pizza', etc.

even with *đều*'s support. In contrast, *đều* is optional in *mọi*-quantification involving this kind of predicate, as shown in (109).

(109) a. ***Mọi*** *sinh-viên (đều) đã có-mặt.*
       every student   DEU PRT show.up
       'Every student arrived.'

   b. #***Mỗi*** *sinh-viên (đều) đã có-mặt.*
       every student   DEU PRT show.up
       Intended: 'Each student arrived.'

This peculiar behavior of *mỗi*, perhaps, has something to do with the fact that there is a homophonous *mỗi_O* functioning as a focus particle ONLY in Vietnamese (e.g. ***Mỗi*** *sinh-viên đã có mặt* 'Only the students arrived'). However, I will set the details pertaining to this peculiarity of *mỗi* aside for future elaborations, since this puzzle directly concerns the semantic contribution of *đều* (i.e., the Vietnamese counterpart of Mandarin *dou*), which is still a very controversial topic in the literature (see Chapter 5, Section 5.6). Given this caveat, let us turn to the concrete account of *mọi* and *mỗi* in the next section.

3.7.2 The proposal

Given what we have seen so far, it is tempting to characterize *mọi* as a D-quantifier selecting only atomic predicates, i.e., expressions denoting sets of pure/impure atoms, like CLPs formed with an overt or covert CLF (opt-CLF N and non-CLF N both can be treated as CLP with a null CLF).

(110)   The lexical entry for *mọi* (first version, to be revised)

   a. ⟦ ***mọi*** ⟧ = λP: P is an atomic predicate. λQ. $\forall x$ [P(x) → Q(x)]
   b. ⟦ *mọi sinh viên* ⟧ = λQ. $\forall x$ [*student'*-atom(x) → Q(x)]

However, this generalization will not be able to capture the facts involving *sums* and NumPs if we don't have a clear distinction between sums and (pure/impure) atoms. Thus, sums are made of atoms by closing under the sum operator, but they are not atoms since they can be divided (i.e. they have proper parts), whereas atoms cannot (because atoms don't have proper parts) (Champollion 2016, Champollion & Krifka 2016).[38]

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[38]Notice the *-operator is Link's (1983) pluralization operator, which can be explicated as follows.

(i)   Link's pluralization operator (simplified)
      For any predicate P of type $\langle e, t \rangle$: *(P) = λx. $\exists Y$ [Y ⊆ $at(P)$ ∧ x = ⊕Y]
      In prose: the pluralization of predicate P is a set of individual x such that there is Y, Y is a subset of P-atoms and x is an element of Y closed under sum.).

Furthermore, note that numerals (and their derivations) in many languages including English are assumed to be ambiguous between the predicative use (type $\langle e, t \rangle$), which can readily be interpreted cardinally (i.e., CardP) via the covert existential operator $\exists$ as shown in (111-c), and the cardinal-existential use (of type $\langle\langle e, t \rangle, t \rangle$), i.e. being taken as a cardinal quantifier, as illustrated by the QP *three boys* in (111-b) (notice that (111-a) is assumed to be the DP derived from the predicative use of CardP *three boys*).

(111)   Semantic derivations of cardinal expressions (Dayal 2013:62)

a. $[_{DP}$ the$_{<et,e>}$ $[_{CardP}$ three$_{<e,t>}$ $[_{NP}$ boys$_{<e,t>}$ $]]] = \iota x. [|x| = 3 \wedge \text{boys}(x)]$

b. $[_{QP}$ three$_{<et,<et,t>>}$ $[_{NP}$ boys$_{<e,t>}$ $]] = \lambda P. \exists x [|x| = 3 \wedge \text{boys}(x) \wedge P(x)]$

c. $[_{CardP}$ three$_{<e,t>}$ $[_{NP}$ boys$_{<e,t>}$ $]] = \lambda x[|x| = 3 \wedge \text{boys}(x)]$
        $= *\exists \Rightarrow \lambda P. \exists x [|x| = 3 \wedge \text{boys}(x) \wedge P(x)]$

Hence, the incompatibility between *mọi* and NumPs can be explained as the consequence of the assumption that the NumPs, by the time *mọi* "sees" them, are definite phrases (via the covert iota operator) on par with groups/sums (e.g. *(*mọi) Nam và Mi* 'Nam and Mi') or a cardinal-existential QP, i.e. being comparable to (111-a) and (111-b), as shown in (112). Either way, *mọi* ends up disallowing NumPs in its restrictor position in the way that it disallows both sums and atoms, regardless of pure or impure. This is also a piece of evidence supporting the proposal that *mọi* c-selects predicative phrases, not definite expressions.

(112)   a.   ⟦ *sinh-viên* ⟧ $= \lambda x.$ x is a *student'*-atom (e.g. {a, b, c, d, e, f, ...})

b.   ⟦ *ba* ⟧ $= \lambda P: at(P). \lambda x \in D_e. *P\text{-atom}(x) \wedge |x| = 3$
                    (following Ionin & Matushansky 2006)

c.   ⟦ *ba sinh-viên* ⟧ $= \lambda x. student'\text{-atom}(x) \wedge |x| = 3$ (by FA)
        (e.g. {{a, b, c}, {d, e, f}, ... })
        (Informally, *ba sinh-viên* is a set of pluralities such that each of them consists of three atomic students)

d. $= *\iota \Rightarrow \iota($ ⟦ *ba sinh-viên* ⟧ $)$
        $= \iota x.student'\text{-atom}(x) \wedge |x| = 3$ $(= \{a \oplus b \oplus c\})$

e. $= *\exists \Rightarrow \lambda P. \exists x. student'\text{-atom}(x) \wedge |x| = 3$

In other words, *mọi* are incompatible with sums and sum-based predicates like NumPs. Plurals formed by *các/những* are also not atomic predicates, resulting in their incompatibility with *mọi* and *mỗi*.

However, unlike *mọi*, which disallows all kinds of sums, *mỗi* still allows a special kind of them, i.e. uniform sums (viz., sums bearing the same cardinality like NumPs), to give rise to the pair-list reading.

(113)   *Mỗi (nhóm) ba   sinh-viên đọc một bài báo.*
each (group) three student   read one CLF article
'Each (group of) three students read an article.'   (pair-list reading)

(114)   *Uniform predicates* (Ionin & Matushansky 2006)
P is uniform $\Leftrightarrow_{def} \exists n(\forall x(P(x) \to |x|_P = n)$
(Informally, P is uniform iff there is a cardinal number n such that for all
x, if x is P then the cardinality of x is n. For instance, {a, b, c, d}, {a⊕b,
c⊕d}, etc. are uniform set, whereas {a,b, c⊕d}, {a, b, c, a⊕b⊕c} are not.)

In addition to that, the distributivity encoded in *mỗi* is also found to be stronger than *mọi*. This contrast is very similar to the difference between *every* and *each*. Moreover, unlike *mọi*-NP, *mỗi*-NP requires an overt numerical (open) statement of the form: mỗi-NP + V + NumP (e.g., *Mỗi sinh-viên ăn *(một) quả táo* 'Each student ate one apple'.) I submit that these distinctions between *mọi* and *mỗi* can be captured by two presuppositions imposed on the second argument encoded in *mỗi* but absent in *mọi* (besides the non-singleton condition shared with *tất-cả*): one is the distributive presupposition[39] and the other is the relational requirement, i.e. requiring it to be at least a two-argument predicate (with an overt NumP in object position). This proposal can be represented as follows.

(115)   The presuppositional account of *mọi* and *mỗi* (final version)

a.   The semantics of D-quantifier *mọi*
⟦**mọi**⟧ = λP: |P| > 1 & P is an atomic predicate. λQ. $\forall x$ [P(x) → Q(x)]
P is an atomic predicate iff ⟦P⟧ = $at($⟦P⟧$)$
(Informally, P is an atomic predicate if the (extensional) denotation of P necessarily consists of atoms of P)

b.   The semantics of D-quantifier *mỗi*
⟦**mỗi**_D⟧ = λP_{<e,t>}: |P| > 1 & P is a uniform atomic predicate. λQ_{<e,t>}: Q is distributive and relation-derived. $\forall x$ [x ⊑ ι*P → Q(x)] where Q is derived from a relation Q′ such that $\exists Y \exists n$ [$\forall y$ [y⊏Y ∧ |y| = n] → [Q′(ι*P,Y) ∧ Q′(x,y)]]
(Informally, *mỗi*-NP is defined iff its associate is distributive and derived from a relation between a proper part of a definite plural and a

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[39]Note that a predicate P is distributive iff $\forall X$ [P(X) → $\forall x$ [x ⊏ X → P(x)]].

proper part of a cardinal plural. For instance, *đã ăn một quả táo* 'ate one apple' is derived from the relational (two-place) predicate *đã ăn* 'ate'.)

Given this approach, it is straightforward to account for the incompatibility between *mỗi*-NP and intransitive (i.e., not being derived from a relation), distributive predicates like *đã có-mặt* 'arrive', in contrast with *mọi*-NP, as observed in (109), repeated as (116) below.

(116)　a.　*Mọi sinh-viên (đều) đã có-mặt.*
　　　　　every student　DEU　PST arrive
　　　　　'Every student arrived.'

　　　b.　**Mỗi sinh-viên (đều) đã có-mặt.*
　　　　　each student　DEU　PST arrive
　　　　　Intended: 'Every student arrived.'

　　Furthermore, it is worth noting that D-quantifier *mỗi* also has an A-quantifier sibling of the form [*mỗi* + CLF]. I assume this A-quantifier to have the same semantics as the English A-quantifier *each_A* and leave its complex morphosyntax for future elaborations.

(117)　The semantics of A-quantifier *mỗi-CLF*
　　　$[\![\textbf{\textit{mỗi}}_A\textbf{-\textit{CLF}}]\!]$ = $\lambda P_{\langle e,t\rangle}$: P is distributive and relational. λX_e. $\forall x [x \sqsubset X \rightarrow P(x)]$

(118)　*Nam và Mi **mỗi-người** đã ăn một cái pizza.*
　　　Nam and Mi MOI-CLF　PST eat one CLF pizza
　　　'Nam and Mi each ate a pizza.'

　　Syntactically, along the lines of Nguyen H.T. (2004), I assume that *mọi* and *mỗi* also differ from *tất-cả* and *cả* in their c-selection. Thus, the latter selects DPs, whereas the former will select lower projections, i.e. DemPs or ClPs, those denoting properties of type $\langle e,t\rangle$. This syntactic difference is borne out by the contrast between *tất-cả* and *mọi/mỗi* in patterns with plural pronouns (typically represented as DPs), as shown in (119) below.[40]

(119)　Co-occurrence with plural pronominals

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[40]*Cả* is incompatible with plural pronominals, perhaps, for the same reason as with plural definites like **cả những sinh-viên này* (notice if *cả* here is the EVEN-*cả*, it is still acceptable). I will leave this issue open for future extensions.

a. **Tất-cả/*cả/*mọi/*mỗi** bọn-họ đã có-mặt.
   ∀   3PL   PST show.up
   'All of them shown up.'   (distributive)

b. **Tất-cả/*cả/*mọi/*mỗi** bọn-họ đã họp-lại ở căng-tin.
   ∀   3PL   PST gather at canteen
   'All of them gathered at the canteen.'   (non-distributive)

(120) a. Syntactic structure of *tất-cả*-QP
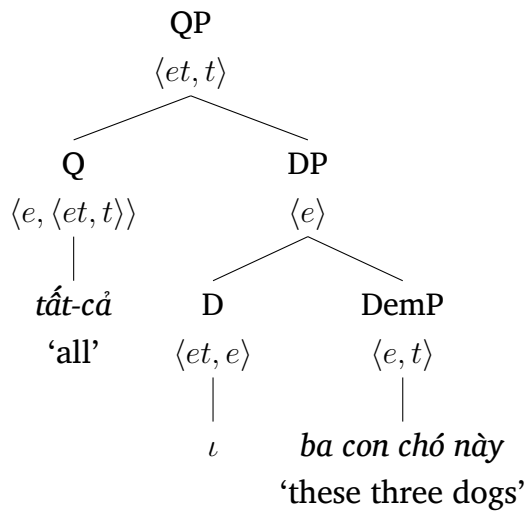
                                                       b. Syntactic   structure   of *mọi/mỗi*-QP

```
                QP                                              QP
              ⟨et, t⟩                                         ⟨et, t⟩
            /       \                                       /        \
          Q          DP                                   Q           DemP
      ⟨e, ⟨et, t⟩⟩    ⟨e⟩                             ⟨et, ⟨et, t⟩⟩     ⟨e, t⟩
          |         /    \                                 |             |
        tất-cả     D     DemP                           mọi/mỗi     con chó này
        'all'   ⟨et, e⟩  ⟨e, t⟩                    'every/each'    'these dog'
                  |        |
                  ι    ba con chó này
                       'these three dogs'
```

     Given this different c-selection between *tất-cả* and *mọi/mỗi* and the assumption that pronominals have a comparable semantics to that of definite DPs (i.e. Heim & Kratzer's (1998:290–293) D-type theory)[41], it is predicted that *mọi/mỗi* cannot directly combine with pronominals of all sorts. This prediction is borne out in view of the facts as in (119) above and (121) below where the presence of a classifier like *đứa* or *người* is obligatory.

(121) a. *Mọi/*mỗi bọn-họ đã có-mặt.
           every   they PST show.up
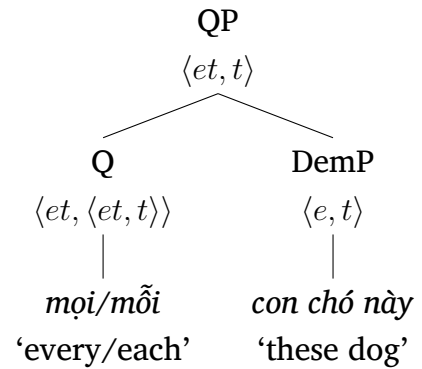   Intended: 'Everyone of them arrived.'

       b. Mọi/mỗi   *(đứa/người) bọn-họ đã có-mặt.
           every/each CLF   they   PST show.up
           'Everyone/Each of them arrived.'

     Meanwhile, the composition problem involving the QP in sentences like (121-b), presumably, can be resolved if the pronominal at issue is either converted into predicative expressions (of type ⟨e, t⟩) to feed the input requirement of classifiers (of type ⟨et, et⟩) properly, as represented in (122) – along the lines of Bošković & Hsieh

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[41] Also see Elbourne's (2005) Chapters 2 & 3 for a version of D-type theory of pronouns which treat them as definite articles with certain extra presuppositional materials for person, number, gender, and presumably θ-features.

(2013:198), or parsed as a part of an abbreviated partitive construction (as suggested by the glossing 'of them' in English) whose the full form as *mọi người (của) bọn-họ* 'every person of them', in alignment with the covert domain analysis of *cả* posited in the previous section. I leave it open to the question of which option will fare better for future extensions.

(122)   a. $⟦ bọn\text{-}họ ⟧^{g,c}$ = a unique group of individuals in c that is neither the speaker nor the addressee

       b. $\pi(⟦ bọn\text{-}họ ⟧^{g,c}) = \lambda X_e$. X includes a unique group of individuals other than the speaker and the addressee   (type-shifted meaning)

       c. $⟦ đứa/người\ bọn\text{-}họ ⟧ = ⟦ đứa/người ⟧ (\pi(⟦ bọn\text{-}họ ⟧^{g,c}))$
$= \lambda x_e$. x is an individual in X such that X includes a unique group of individuals other than the speaker and the addressee

All in all, the distributions involving Vietnamese D-quantifiers, as discussed above, show that both domain-restricting strategies assumed in the CQT and Matthewson's (2001) theory seem available in Vietnamese. In other words, we do not find conclusive evidence in Vietnamese, at least for now, to support either of the two competing domain-restricting strategies proposed for the cross-linguistic quantification structure remarked in Section 3.3.

3.8 Summary

In conclusion, this chapter has shown how many peculiar behaviors involving different domain-restricting strategies with different D-quantifiers in Vietnamese, as summarized in **Table 3.8**, can be captured on the ground of different presuppositions pertaining to cardinality, atomicity, uniformity, distributivity, and relationality as repeated below.

(123)　The lexical entry for D-quantifier *tất-cả*

  a.　$⟦$ ***tất-cả*** $⟧$ $= \lambda X_e$: $|X| > 1$ (i.e. X is a plurality). $\lambda Q. \forall x$ [atom(x) $\wedge$ x $\sqsubset$ X $\rightarrow$ Q(x)]

   (where $atom(x) := \{x \in$ P: $\neg\exists y.$ [$y \sqsubset x \wedge$ P(y)]$\}$ (for any predicate P))

  b.　$⟦$ *Tất-cả 3 sinh-viên đã có-mặt* $⟧$ $^c = 1$ iff for all x, if x is an atomic part of X such that X is the plurality of 3 three students, then x arrived in c.

(124)　The presuppositional account of *mọi* and *mỗi*

  a.　The semantics of D-quantifier *mọi*

   $⟦$ ***mọi*** $⟧$ $= \lambda P$: $|P| > 1$ & P is an atomic predicate. $\lambda Q. \forall x$ [P(x) $\rightarrow$ Q(x)]

   P is an atomic predicate iff $⟦$ P $⟧$ $= at($ $⟦$ P $⟧$ $)$

   (Informally, P is an atomic predicate if the (extensional) denotation of P necessarily consists of atoms of P)

  b.　The semantics of D-quantifier *mỗi*

   $⟦$ ***mỗi***$_D$ $⟧$ $= \lambda P_{<e,t>}$: $|P| > 1$ & P is a uniform atomic predicate. $\lambda Q_{<e,t>}$: Q is distributive and relation-derived. $\forall x$ [x $\sqsubseteq \iota^* P \rightarrow$ Q(x)] where Q is derived from a relation Q′ such that $\exists Y \exists n$ [$\forall y$ [y$\sqsubset$Y $\wedge$ |y| = n] $\rightarrow$ [Q′(ι^*P,Y) $\wedge$ Q′(x,y)]]

Meanwhile, unlike other universal D-quantifiers, *cả* has been shown to be a multi-functional determiner in Vietnamese, including at least three unrelated functional uses of the same phonological word /ka^{c1}/, namely (i) the focus marker EVEN-*cả*, (ii) the D-quantifier $\forall$-*cả*, and (iii) the cardinal determiner $\exists$-*cả*, as roughly sketched as in (125).

(125)   The multi-functionality of CẢ

```
                    The multi-functionality of CẢ
          ┌──────────────────┼──────────────────────┐
       EVEN-cả              ∀-cả                   ∃-cả
          │                   │                      │
  (đến/ngay/tới) cả Nam_F  Cả ba sinh-viên      cả-2 sinh-viên
      'even Nam'        'all the three students'  'both students'
          │                   │                      │
         IP                  QP                     QP
        ┌─┴─┐               ┌─┴─┐                  ┌─┴─┐
      caP_F  vP            Q    DP                Q    NP
      ┌─┴─┐   △            │    △               ┌┴┐   △
    cả  Nam_F ...       (tất-)cả ba sinh-viên  cả  2  sinh-viên
```
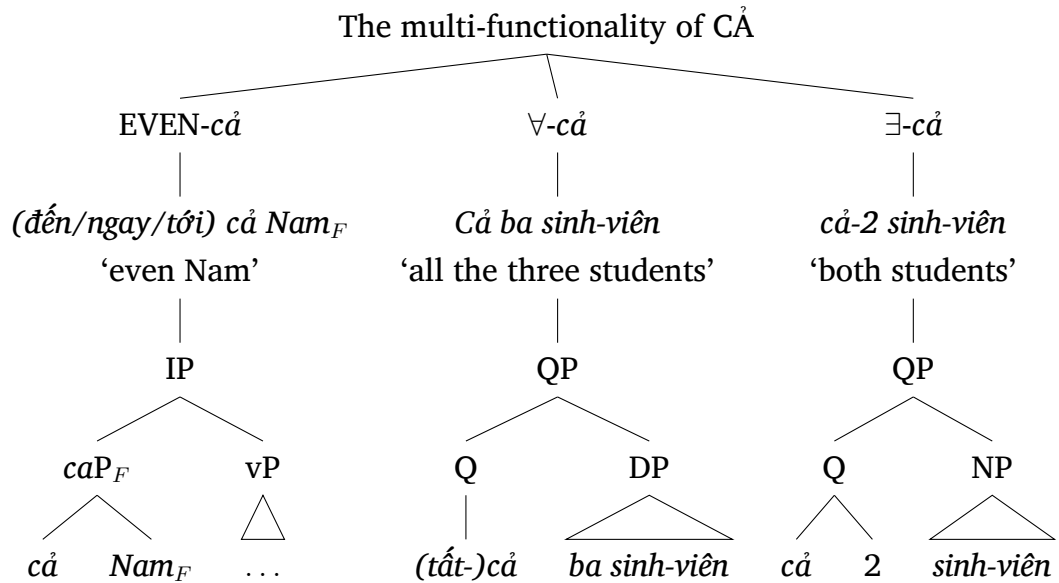
Importantly, I have also suggested that *mọi* and *mỗi* differ from *tất-cả* and *cả* in their c-selection. Thus, the latter selects DPs, whereas the former will select lower projections, i.e., DemPs or ClPs, those denoting properties of type $\langle e, t \rangle$.

Nevertheless, some intriguing distributions involving these four D-quantifiers, especially regarding *cả* 'all/whole' and *mỗi* 'each' (with its numerical requirement on the predicate), still cry for further elaborations. For instance, given our assumption that *cả* in the pattern with NumPs can be semantically equated with *tất-cả* (with different c-selections – *cả* selects PossP, whereas *tất-cả* selects DP), it seems ad-hoc for us to assume that, unlike *tất-cả*-QPs, there is always a silent generic noun like PERSONS/PLACES at the Spec-PossP for *cả* to quantify over in the following cases with sums or group terms as in (126). After all, it is this kind of problem that may cast doubt on the quantifier status of *cả*, and point us to a different direction that is worth exploring in future extensions (e.g., taking it as a sum operator).

(126) a. *Cả/*Tất-cả Nam và Mi đã có-mặt.*
           CA   Nam and Mi PST show.up
           'Nam and Mi both arrived.'   (sums)

       b. *Cả/*Tất-cả hội-đồng đã có-mặt.*
           CA   committee PST show.up
           'All members of the committee arrived.'   (group terms)

While I will leave most of these issues open for now, there are some other puzzles, in particular those pertaining to the co-occurrence between quantifiers and plural markers, that will become more transparent in the following chapters when we take into account the syntactic-semantic contribution/function of plural markers in Vietnamese quantificational statements.

Table 3.8: Summary of QP-patterns with *tất-cả, cả, mọi*, and *mỗi*

∀ quantifier	ordinary singulars	collective singulars	ordinary plurals			bare nouns			mass nouns	
	CLF + N *con chó* 'dog'	**group terms** *làng* 'village'	**sums** *Nam và Mi* 'Nam and Mi'	**PL + ClP** *các con chó* 'dogs'	**NumP** *ba con chó* 'three dogs'	**Obl.cl** *chó* 'dog(s)'	**Opt.cl** *sinh viên* 'student(s)'	**Non.cl** *phòng* 'room(s)'	**bare mass** *nước* 'water'	**measured mass** *cốc nước* 'cup of water'
tất-cả	#/✓	#	#	✓	✓	✓	✓	✓	✓*	✓!
cả	✓*	✓	✓	#	✓	#	#	✓*	#	✓*
mọi	✓!	✓!	#	#	#	(#)	✓	✓	#	✓!
mỗi	✓!	✓!	#	#	✓!	#	✓!	✓!	#	✓!

* = grammatical in non-distributive, sub-atomic contexts only

! = grammatical in distributive contexts only

Notice: **cả** + **NumP** (*cả ba con chó* 'the three dogs') can be translated cardinally in non-distributive contexts.

Chapter 4

Plurality in Vietnamese

4.1   Overview

This chapter investigates the puzzle of plurality and plural markers in Vietnamese, in particular, *các* and *những,* within the general framework of plurality (Link 1983, Landman 1989a, 1989b, 2000, Schwarzchild 1996, among others).

Vietnamese nominal plural morphemes *các* and *những* have been assumed to be both exclusive plural markers and quantifiers or articles of sorts in the literature (Nguyễn, T.C. 1996, Bùi, M.H. 2000, Nguyễn H.T. 2004, among others), given such observations as in (1)/(2) and (3), where a universal or maximal reading of *các* and an existential/indefinite reading of *những* are salient, respectively.

(1)   ***Các** phương-tiện không được phép rẽ   trái.*
       CAC vehicle   NEG   allow   turn left
       'All the vehicles are not allowed to turn left.'   (universal)
       or 'The vehicles are not allowed to turn left.'   (maximal)

(2)   *Nam có   ba   sinh-viên nhưng tôi   chưa gặp   mặt **các/những** sinh-viên*
       Nam have three student   but   1SG NEG   meet face CAC/NHUNG student
       đó.
       DEM
       'Nam has three students but I haven't met those students in person.'
       ⤳ I haven't met any of Nam's students in person.

(3)   *Có   **những**/?**các** cuốn sách trên bàn.*
       have PL   CLF book on   table
       'There are books on the table.'   (existential)

However, it is not always obvious how such a Q(uantifier)-analysis or a D(eter-miner)-analysis, as shown in (4), of *các/những* can account for their various simi-lar/different distributions and interpretations, such as the predicative and generic

uses as illustrated by (5).

(4)   Candidates for articles/determiners in Vietnamese (Nguyen H.T. 2004:42)

    a.   *một* 'one/a'   [−Plural, − Definite]

    b.   *những* 'plural marker'   [+Plural, −Definite]

    c.   *các* 'plural marker'   [+Plural, +Definite]

(5)   a.   *Nam và Mi là   các/những   sinh-viên.*
      Nam and Mi COP CAC/NHUNG student
      = 'Nam and Mi are students.'   (predicative use)
      ≠ 'Nam and Mi are the/all students.'

    b.   *Các/Những   con khủng-long đã   tuyệt-chủng.*
      CAC/NHUNG CLF dinosaur   PST become.extinct
      'Dinosaurs have become extinct.'   (generic use)

Are *các* and *những* genuine articles or quantifiers? Plus, do *các/những*-plurals act like exclusive plurals across all environments? And how can we capture the many peculiar interpretations of *các/những* and their distributional divergences/-convergences as summarized in **Table 4.1**. These are the crucial questions that this chapter is devoted to shedding some light on.

Table 4.1: Distributional features of Vietnamese *các* vs. *những* in a nutshell (revised from Le & Schmitt 2016:165)

Distributional features	NHỮNG	CÁC
Co-occur with quantifiers *tất-cả* 'all', *hầu-hết* 'most'	+	+
Co-occur with quantifiers *mọi* 'every', *vài* 'several'	−	−
Co-occur with numerals	−	−
Require classifiers	+	+
Allow generic/kind reading	+	+
Require *D(iscourse)*-linking contexts	+	+
Require restrictions on the NP in subject position	+	−
Co-occur with *wh*-elements	+	−
Appear in existential constructions	+	?
Co-occur with kinship terms (relational nouns)	−	+

This chapter, thus, will be organized as follows: Sections 4.2 and Section 4.3 will be devoted to providing the semantic foundation of number and plural denotations from cross-linguistic and intra-linguistic perspectives, respectively. As the main part of this Chapter, Section 4.4 will establish that *các/những*-plurals in

Vietnamese are best analyzed as inclusive plurals in the sense of Chierchia (2010) with slightly different presupposition., whereas Section 4.5 will elaborate on this inclusive account of *các* and *những* to capture their similarities and differences. Thus, *những* carries atomicity and domain widening presuppositions, whereas *các*, as a nominal plural marker in contrast with its pronominal counterpart, is encoded with a contextually determined assignment function instead of the domain widening presupposition, but shares the atomicity selection in aligning with *những*. Syntactically, both are to be shown as modifying plurals in the sense of Wiltschko (2008).

4.2   Number and Plurals

Many, if not all, languages are found with at least a basic distinction with respect to the number of nominals (including pronouns and common nouns) consisting of (i) 'singulars' as noun phrases typically refer to atomic individuals or to quantify over such individuals, and (ii) 'plurals' as noun phrases typically involve reference to (or quantification over) collections of individuals (Corbett 2000, Winter & Scha 2015, Champollion 2017, among others). This number distinction typically can be, optionally or obligatorily, marked not only on the morphology of nouns but also on other morpho-syntactic sub-systems of determiners, verb number agreements, etc., as can be illustrated below with German (Wiltschko 2009:28).

(6) a. *der   Mann*
        D.MASC.SG man
        'the man'

   b. *die Männ-er*
        D.PL man-PL
        'the men'

   c. *die   Frau*
        D.FEM.SG woman
        'the woman'

   d. *die Frau-en*
        D.PL woman-PL
        'the women'

   e. *das   Kind*
        D.NEUT.SG child
        'the child'

   f. *die Kind-er*
        D.PL child-PL
        'the children'

(7) a. *Das   Kind*
        D.NEUT.SG child
        spielt.
        play.PROG.SG
        'The child is playing.'

   b. *Die Kinder   spielen.*
        D.PL child-PL play.PROG.PL
        'The children are playing.'

Semantically speaking, singular count nouns are assumed to denote atomic predicates, i.e., a set of singularities such as {a, b, c, d, ...}, given that atoms are entities without proper parts. This property of atomic predicates is also known as quantized reference, as formally explicated as follows.

(8)   Quantized reference (Champollion 2017:23)

QUA(P) := $\forall x[P(x) \rightarrow \forall y[y \sqsubset x \rightarrow \neg P(y)]]$

(Informally, a predicate P is quantized iff whenever it holds of something, it does not hold of any of its proper parts.)

On the other hand, plural count nouns are commonly assumed to denote non-atomic predicates, i.e., sets of entities closed under the sum operator such as $\{a \oplus b, b \oplus c, a \oplus b \oplus c, \dots\}$. However, this is a controversial point. It is found in many languages including English that, this exclusive reading of plurals (following Farkas & de Swart's (2010) terminology) generally disappears in downward-entailing environments, as shown in the contrast in (9), giving up its place to the so-called an *inclusive* reading which encompassing both atoms and non-atomic entities (i.e. proper sums). These two views of plurals can be represented as in **Figure 4.1**.

(9)   a. *Nam read books.*

⤳ Nam read more than one book.   (exclusive reading)

b. *Nam didn't read books.*

⤳ Not a single book did Nam read.   (inclusive reading)
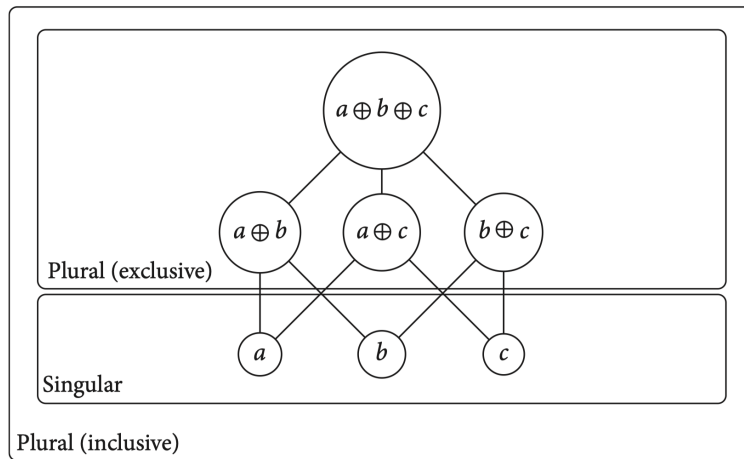
Figure 4.1: Singular vs. (inclusive/exclusive) plural denotations (Champollion 2017:44)

Overall, such observations have led many linguists to adopt the position that the inclusive reading of plurals should be more basic than the exclusive one (Krifka 1989, Sauerland 2003, Sauerland & Anderssen & Yatsushiro 2005, Spector 2007, Zweig 2009, Chierchia 2010, among others). In contrast, some others attribute this fact to the ambiguity of count nouns (Farkas & de Swart 2010, Martí 2020). Thus, under the *inclusive view*, given that the denotation of singulars is included in

that of plurals, the reason why the singular form blocks the plural form in singular reference cases is assumed to be dictated by some pragmatic factors, like the principle of Maximize Presupposition (MP) proposed by Heim (1991) stated in (12) (which accounts for various observations in natural language like (13) in English), given an assumption that both PL and SG features bear the same truth-condition, but the SG feature carries an extra presupposition of atomicity (Sauerland 2003), as explicated in (11).

(10)   *Pluto is/*are {a dog/*dogs}.*

(11)   Sauerland's (2003:260) presuppositional account of PL/SG (modified version)

    a. $[\![\text{SG}]\!] = \lambda X \in D_e: \neg\exists x[\text{atom}(x) \wedge x \sqsubset X \wedge x \neq X]. X$

    b. $[\![\text{PL}]\!] = \lambda X \in D_e. X$

(12)   Maximize Presupposition (Heim 1991)
    Make your contribution presuppose as much as possible.

(13)   Observations in English captured by Heim's MP

    a. *Mary went to the party. Bill went to the party, #(too).*

    b. *Mary went swimming yesterday. She went swimming #(again) today.*

    c. *Sam was in New York yesterday. He is #(still) there today.*

    d. *The/#A sun is shining.*

    e. *I washed both/#all of my hands.*

    f. *Sam knows/#thinks that Paris is in France.*

Beyond that, a notable property of (inclusive/exclusive) plurals is that they are assumed to denote cumulative predicates, as defined below.

(14)   Cumulative predicate (Champollion 2017:23)
    $\text{CUM}(P) := \forall x [P(x) \rightarrow \forall y[P(y) \rightarrow P(x \oplus y)]]$
    (Informally, a predicate P is cumulative iff whenever it holds of two things, it also holds of their sum. For instance, if Nam is *children*, and Mary is too, then the sum of Nam and Mary is *children*.)

    Cross-linguistically, the inclusive plurals in number-marking languages are considered to correspond to the number-neutrality (also known as 'general number' or 'transnumeral' denotation) of bare nouns in classifier languages (Corbett 2000:9–19, Rullman & You 2006, Chierchia 2010:114). In the meantime, singular count nouns in classifier languages tend to appear in the form of [CLF + bare N], where CLF can be a kind or an individual one. In fact, Krifka (1998:200) used to

suggest that "simple predicates in natural language typically are cumulative", implying that bare nouns in classifier languages and their corresponding noun roots (e.g. $\sqrt{zebra}$, $\sqrt{chair}$, $\sqrt{child}$, etc. in English) in number-marking languages both have the same denotation (Kratzer 2007:271) Thus, both can be assumed to denote either kinds (following Chierchia 1998b) or cumulative predicates (following Rullman & You 2006 – i.e. my assumption), whereas the inflectional 'singular' count nouns in number-marking languages, by the time we hear/see them, can be considered as atomic predicates derived from applying a covert kind/individual classifier to the denotation of the noun roots, as explicated by Kratzer (2007:272) as follows.

(15)   a. $[\![\,\sqrt{zebra}\,]\!]\ =\ zebra_K$
       b. $[\![\,\text{CLF}_{ind}\,]\!]\ =\ \lambda x.\ \lambda y.\ [\text{kind}(x) \wedge \text{individual}(y) \wedge y \sqsubseteq x]$
            $[\![\,\text{CLF}_{kind}\,]\!]\ =\ \lambda x.\ \lambda y.\ [\text{kind}(x) \wedge \text{kind}(y) \wedge y \sqsubseteq x]$

More importantly, as Kratzer suggests, those 'singular' atomic predicates may precisely be the cross-linguistic input for pluralization.

(16)   LF of pluralization

([plural])

classifier $\sqrt{zebra}$
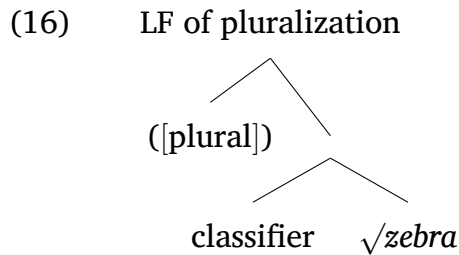
   In what follows, we will see that this schema of plural marking is precisely the pattern that Vietnamese plurals adhere to, even though a correlation between the existence of numerical classifiers and the absence of obligatory plural marking in natural languages has been pointed out by many typologists (e.g., Greenberg 1972, Sanches & Slobin 1973)[1]. However, what are the characteristics of plural markings in Vietnamese? Are plurals in Vietnamese exclusive or inclusive ones? What is the nature of plural markers in this language: are they articles, quantifiers, or something else? These are the main themes that I will attempt to shed some light on in the next sections, respectively.

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[1]In contrast, see Aikhenwald (2000:100) for numerous exceptions to this generalization in aligning with Vietnamese, including Yuki, Nootka, Tlingit, Tucano, North Arawak, etc.

4.3 Plurals in Vietnamese: plural – singular – plural

As a typical classifier and bare noun language, Vietnamese, by and large, does not show the obligatory plural marking on the noun by means of any morphological strategies (e.g., noun prefix/suffix, stem change, reduplication, etc.), and bare NPs in this language can be interpreted as number-neutral, i.e., denoting a cumulative predicate consisting of both atoms and sums, in parallel with bare NPs in Chinese, Korean, and Hungarian as illustrated by (17).

(17)   a.   *Nam đang nuôi chó.*
            Nam PROG breed dog
            'Nam is breeding one or more than one dog.'   (Vietnamese)

        b.   *Zuotian wo mai le shu.*
            yesterday I buy ASP book
            'Yesterday, I bought one or more books.' (Chinese – Rullmann & You 2006)

        c.   *sakwa-ka chayksang wui-ey issta.*
            apple-NOM desk   top-at exist
            'There is/are apple(s) on the desk.'   (Korean – Kang 1994)

        d.   *Mari verset olvas.*
            Mari poem-ACC read
            'Mari is reading a poem/poems.'   (Hungarian – Farkas & de Swart 2003)

However, the lack of obligatory means does not mean that plural can not be marked in classifier languages. Empirically, the two most common ways found in these languages for optional plural marking are (i) reduplication and (ii) adding a plural marker.

Accordingly, some classifier languages (e.g. Mandarin, Indonesian, Korean, Japanese) are reported to employ reduplication as an optional morphological number-marking way on a limited number of nouns (Li 1999, Chung 2000, Kim 2005, Tomioka 2021). Below are such examples in Japanese from Tomioka (2021), ex.(2), and Indonesian from Chung (2000:165), respectively.

(18)   Japanese reduplicative plurals
        ie-ie, house-house, 'houses', *yama-yama*, mountain-mountain, 'mountains', *hito-bito,* person-person, 'people', *kami-gami*, god-god, 'gods', *sima-zima* island-island, 'islands', *sumi-zumi*, corner-corner, '(all) corners', *ki-gi*, tree-tree, 'trees', *hi-bi* day-day, 'days', etc.

(19)   ***Pulau-pulau** Bali, Lombok dan Sumbawa terletak di sebelah timur pulau*
        island.PL   Bali Lombok and Sumbawa lie   at side   east   island

Jawa.
Java
'The islands of Bali, Lombok and Sumbawa are located east of Java.'   (Indonesian)

Vietnamese also seems to have this morphological pattern. However, it is worth noting that reduplication in Vietnamese can only be applied to a very limited set of generic nouns (e.g. *người* 'human', *nơi* 'place', *nhà* 'house', etc.) More importantly, Vietnamese data show that this morphological means is not for plural marking (e.g., Trương V.K. 1883:80) but rather for quantifying (mostly in generic contexts), i.e., turning a common noun into universally generalized quantifiers, e.g., *người-người* human-human 'everyone', *nhà-nhà* house-house 'every house', *ngày-ngày* 'every day', *đêm-đêm* 'every night', etc., as illustrated by (20).

(20)   a.   *Ở Việt Nam, **người-người** đi xe-máy, **nhà-nhà**   treo   ảnh*
            in Vietnam   human-human go scooters house-house hang picture
            Bác   Hồ.
            Uncle Ho
            'In Vietnam, everyone (generally) rides a scooter, every house (generally) hangs a picture of Uncle Ho.'

       b.   *(Cửa-hàng buôn-bán cho may,)   **Đêm-đêm** hàn-thực*
            store   sell   PRP fortunate night-night cold.food.festival
            ***ngày-ngày** nguyên-tiêu.*
            day-day   lantern.festival
            '(Praying for the business to be so thriving that) every night is a night of the Cold Food Festival, every day is a day of the Lantern Festival.'
                                                (Nguyễn Du's The Tale of Kiều, lines #941–942)

How about the second strategy? Empirically, all of the typical classifier languages are found with plural markers with different selections imposing on their associating nominals. For example, Mandarin plural morpheme *-men* can only combine with [+human] nouns (Li 1999, Yang 2005, Bošković & Hsieh 2013, Jiang 2017, among others); Japanese *-tati, -ra, -domo, -gata* or *-rentyû* can only co-occur with animate nouns (Nakanishi & Tomioka 2004, Kurafuji 2004, Tomioka 2021, among others); whereas Korean *-huy, -ney*, and *-tul* are specialized for a group or associate plural reading (with human nouns only) and individual sum reading (with no restrictions on its associates), respectively (Kang 1994, Kim 2005, Kim & Melchin 2018, Park 2022, among others). Thus, what makes Vietnamese stand out is that plurality can be marked by applying one of the plural morphemes (viz., *các, những, mấy*) to common nouns of almost any sort (Luong V.H. 1987).

(21)   A paradigm of nominals in Vietnamese

   a.   *sách*
        book
        'one or more than one book'   [bare N]

   b.   *(một)   cuốn sách*
        (one/a) CLF   book
        'a book'   [(one/a) + CLF + N]

   c.   *ba   cuốn sách*
        three CLF   book
        'three books'   [Num + CLF + N]

   d.   ***các/những/mấy** cuốn sách*
        PL   CL   book
        'the books'   [PL + CLF + N]

   e.   *tất-cả **các/những/mấy** cuốn sách đó*
        all   PL   CLF book DEM
        'all those books'   [∀ + PL + CLF + N + DEM]

In what follows, we will investigate the syntactic-semantic characteristics of *các* and *những* from a compositional perspective, whereas temporarily set *mấy* aside for future extensions.

4.4 *Các/những*-plurals: exclusive or inclusive?

Now, let us turn to the crucial question of whether Vietnamese plurals, in particular, *các/những*-phrases, are exclusive or inclusive. Thus, I will first review some crucial patterns found across languages in bolstering both inclusive and exclusive views of plurals, then respectively present comparable evidence in Vietnamese. To anticipate, it will turn out that *các/những*-phrases are best described as inclusive rather than exclusive plurals, suggesting that the inclusive view of cross-linguistic plurals is on the right track.

As previously remarked, bare plurals in number-marking languages like English are observed to bear the inclusive reading in questions or downward-entailing (DE) environments (e.g. negative, restriction of *no* or *few*, the if-clause, etc.), whereas giving rise to the exclusive reading in most upward-entailing (UE) contexts. Let us take English data in the following examples, from (22) to (25), for illustration (Martí 2020:48).

(22)   English DE contexts (negative + restriction of *few/no*)

   a.   *I don't have **children**.*

   b.   ***Dogs** are not barking at me.*

c. *Few/No **students** came to the party.*

(23)   English *if*-clauses
(Context: directed at one person) *If you spot **horses** in this picture, you will get a prize.*

(24)   English universal quantifications
*Every house with **windows** overlooking the ocean is overpriced.*

(25)   English questions

a. *Have you ever seen **horses** in this meadow?* (Farkas & de Swart 2010:3)
b. *Did you eat **apples** today?*

Accordingly, for instance, the sentence *I don't have children* should be judged true in such a scenario that the speaker doesn't have any child, whereas for the question *Did you eat apples today?*, an answer such as *Yes, I had one* is absolutely felicitous. The contrast between possible answers to questions involving *several bears* and the bare plural *bears* in English, as shown in (26) and (27) below, conveys the same idea (examples from Zweig 2009:362).

(26)   *Did you see **several bears** during your hike?*

a.   No, I saw one.
b.   #Yes, I saw one.

(27)   *Did you see **bears** during your hike?*

a.   #No, I saw one.
b.   Yes, I saw one.

All in all, these facts seem to point us to a generalization that all the plural forms at issue semantically denote both singularities and pluralities, corresponding to the number-neutral property of bare nouns in classifier languages.

However, comparable sentences to English inclusive cases above are not always found to be inclusive, at least for Turkish, Western Armenian, and Brazilian Portuguese. Thus, the bare plural counterparts in these languages are observed to bear the exclusive denotation, as shown in (28) below.

(28)   Exclusive plurals in Turkish, Western Armenian, and Brazilian Portuguese

a. *Cocuk-lar-in   var   mi?*
child-PL-GEN exist Q
'Do you have two or more children?'   (Turkish, Görgülü 2012:98-99)

b. *Bazdig-ner   unis?*
child-INDEF.PL have.2SG.PRES

'Do you have two or more children?'   (Western Armenian, Bale &
Khanjian 2014)

c. *O   João não tem   filhos.*
    DEF João NEG have.3SG.PRES child.PL
    'João does not have (two or more) children.'   (Brazilian Portuguese,
    Martí 2008:7)

More concretely, for instance, in view of the facts like the question in (29-a) can't be answered affirmatively if the addressee saw only one boy, Martí (2008:5) argues that *unos* DPs in European Spanish should be taken as exclusive plurals (also see Alonso-Ovalle & Menéndez-Benito 2013).

(29) a. *¿Viste   a unos niños   jugando en el patio?*
          you-saw A UNOS children playing in the playground
          'Did you see some children playing in the playground?'   (E.Spanish)
      b. #Yes, I saw one. / No, I saw only one.

How about Vietnamese? Empirically, Vietnamese bare plurals also give rise to the more-than-one interpretation, i.e. the exclusive reading (also known as 'genuine' plurals in Nomoto 2013:102), in most UE environments as illustrated by (30-c), in contrast with (30-a).

(30) a. *Trên bàn có   bút.*
          on   table have pen
          'There is/are a pen/pens on the table.'   (one or more than one pen)

      b. *Trên bàn có   một cây bút.*
          on   table have one CLF pen
          'There is a pen on the table.'   (one pen only)

      c. *Trên bàn có   những cây bút.*
          on   table have PL   CLF pen
          'There are pens on the table.'   (more than one pen)

Similarly, if *các/những*-phrases in Vietnamese are treated on a par with English inclusive plurals, it seems puzzling to account for the cases where plural NPs are strictly forbidden to be the predicate of a singular subject as in (31-a), or have a strict plural denotation as bare plurals in (30-a) or as definite plurals in (32-b).

(31) a. *Fido và Pluto là   chó.*
          Fido and Pluto COP dog
          'Fido and Pluto are dogs.'

      b. *Fido và Pluto là   những con chó.*
          Fido and Pluto COP PL   CLF dog
          'Fido and Pluto are dogs.'

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    c.   *Fido là   (một)/(*những) con chó.*
         Fido COP one/PL   CLF dog
         'Fido is a dog.'

In fact, when bare plurals become no longer bare, i.e. turning into definite plurals in patterns with DEM or PossP, the exclusive reading is even more salient.

(32)   a.   *Nam đã mua sách này làm   quà cho Mi.*
          Nam PST buy book DEM make gift for Mi
          'Nam bought this book as a gift for Mi.'   (one book only)
    b.   *Nam đã mua **những/các** cuốn sách này làm   quà cho Mi.*
          Nam PST buy PL   CLF   book DEM make gift for Mi
          'Nam bought these books as a gift for Mi.'   (more than one book)

However, things become more puzzling when it comes to DE environments like (33). At first, we seemingly have evidence against the inclusive view of plurals in Vietnamese, given the following infelicitous DE-sentences whose *các/những*-phrases.

(33)   a.   *Tôi không có   (*các/*những đứa) con.*
          1SG NEG have PL   CLF child
          'I don't have children.'
    b.   *Không/Ít (*các/*những) sinh-viên *(nào) tới   dự   lễ.*
          no/few PL   student which come participate ceremony
          'No/Few students came to the ceremony.'
    c.   *Bác   có   (*các/*những đứa) con   không ạ?*
          2sg.uncle have PL   CLF   child(s) not   PRT
          'Do you have children, Uncle?'
    d.   *Bạn   đã bao-giờ nhìn-thấy (?những/?các con) **ngựa** trên*
          2SG.friend PST ever   see   PL   CLF horse on
          triền-đồi này chưa?
          hillside DEM yet
          'Have you ever seen horses on this hillside?'[2]

A similar contrast can also be seen with bare plurals in the restriction of the quantifier *no*. Thus, if the denotation of English *cats* in (34) does not include atomic cats, i.e., bearing the exclusive meaning, this sentence would be judged true if there is just one cat on the mat, contrary to our intuition. Therefore, the denotation of plurals like *cats* in (34) must encompass both atomic cats and groups of cats in its domain. However, Vietnamese plural counterparts are found not to be so coherent in comparable contexts as (34). Instead, as shown in (35), an indefinite negative-

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    [2]Note that these sentences are still acceptable to some extent if we interpret *những/các con ngựa* 'horses' as *Equus ferus caballus*, i.e. the horse-kind.

polarity item (NPI) of the form *con mèo nào* 'whichever cat' is more favored.

(34) *There are no **cats** on the mat.*   (Chierchia 2010:114)

(35) a. *Trên tấm thảm chẳng có   con mèo #(nào).*
          on   CLF mat NEG   have CLF cat   which
          'There are not any cats on the mat.'

     b. *#Trên tấm thảm chẳng có   **những/các** con mèo.*
          on   CLF mat NEG   have PL   CLF cat
          Intended: 'There are not any cats on the mat.'

All of the observations mentioned above seem to suggest that, unless we have other evidence in favor of the inclusive position, it would be safer to assume the exclusive (i.e. more than one) interpretation for Vietnamese *các/những*-plurals while maintaining that bare nouns in this language include both singular and plural entities, i.e. bearing the inclusive (i.e. one or more-than-one) denotation in aligning with English counterparts. This is also the position taken for granted in the majority of previous accounts of *các/những* in the literature (e.g. Nguyễn T.C. 1975, Nguyen H.T. 2004, Le & Schmitt 2016, among others)[3]. But, is it our final conclusion? The answer is no. Hence, a closer examination of them suggests that we still have substantial evidence in favor of inclusive denotation for both bare nouns and *các/những*-plurals in Vietnamese. I will provide two pieces of them in what follows: (i) behaviors of *các/những*-plurals in a few DE environments, and (ii) behaviors of *những*-plurals in questions.

First, notice that unlike typical exclusive plurals in Turkish, Western Armenian, and Brazilian Portuguese – as shown in (28), Vietnamese counterparts do not bear the exclusive denotation but generally are not allowed in such inclusive-favored environments. In other words, sentences like (33) or (35) are not direct counter-examples for the inclusive analysis of *các/những*-plurals in Vietnamese, but rather imply that some interfering factor is at issue. Presumably, it is this unknown factor that has blocked *các/những*-phrases but licensed bare nouns or NPIs in such DE environments.

What kind of this factor can it be? Is it the case that *các/những*-phrases are completely banned in DE environments or questions? Let us address the latter first and then return to the former in what follows. Simply speaking, the answer to the second question is no: *các/những*-phrases can still be found in *if*-clauses in definite contexts like (36-a), or negative imperatives like (36-b) below.

(36)   [Context: Mi met Nam in an orientation event for linguistics freshmen. Mi

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[3]The only exception, to my knowledge, is Phan (2023) where she suggests that the inclusive view can be extended to *các/những*-plurals.

said to Nam:]

   a. *Cậu sẽ mất ngủ nếu đọc **những/các** cuốn sách của Chomsky đấy.*
     2SG will lose sleep if   read PL   CLF book of Chomsky PRT
     'If you read (any of) books written by Chomsky, you will be insomniac
     (I warn you).'

   b. *Đừng đọc **những/các** cuốn sách của Chomsky!*
     don't read PL   CLF book of Chomsky
     'Don't you read (any of) books written by Chomsky!'

The fact we should highlight here is *các/những*-phrases are not only able to appear in such definite DE environments above but also pattern with English counterparts in bearing the inclusive reading. Accordingly, in (36-a), Mi implied that Nam would lose his sleep if he read any books written by Chomsky, whereas, in (36-b), she advised Nam not to read any books that Chomsky wrote.
Similarly, in some dialogues involving *các/những*-plurals, an affirmative answer whose singular denotation is still accepted, whereas the negative answer is only felicitous if the focus particle *mỗi* 'only' is present, as shown in (37).

(37) a. *Cậu có   thấy những/các cái ghim tớ vừa để đây không?*
       2SG have see PL   CLF pin 1SG just put here not
       'Do you see the pins that I just put here?'

    b. *#Không, tớ   có   thấy một cái.*
       no   1SG have see   only one CLF
       'No, I saw one.'

    c. *Có, tớ có   thấy một cái.*
       yes 1SG have see   one CLF
       'Yes, I saw one.'

Meanwhile, in the following dialogue, it is worth noting that an answer with singular denotation like (38-c) is still accepted even if it is against the inquirer's expectation with a plural wh-word forming with *những* as in (38-a).

(38) [Context: A asked about B's trip to Taipei yesterday with an expectation that B had visited at least two places there.]

   a. *Hôm-qua Đài Bắc trời đẹp,   cậu đi chơi được **những-đâu** thế?*
     yesterday Taipei sky beautiful 2SG go play DUOC PL-where   PRT
     'Yesterday was such a beautiful day in Taipei, where have you visited?'

   b. *Tớ đi được Cố Cung   và Đạm Thủy.*
     1SG go DUOC Palace Museum and Tamsui
     'I visited the National Palace Museum and Tamsui.'   (an expected answer)

    c.   *Tớ đi được Cố Cung.*
         1SG go DUOC Palace Musem
         'I visited the National Palace Museum.'   (unexpected answer)

Notably, the observation that the unexpected answer is still accepted indicates that answers whose singular denotations are still in the set of possible answers to the question at issue. Since it has been widely assumed that the semantics of a question is the set of possible answers to it (aka Hamblin's (1973) postulate) that can be represented as a set of alternatives introduced by the focus at the comparable position of the wh-element (Rooth 1992, Krifka 2006). Therefore, given that the 'singular' answer is still accepted, it is suggested that the semantics of *những-đâu* should include both singularities and pluralities, i.e. aligning with English inclusive plurals. Meanwhile, the 'plural' expectation accompanied by the question can be considered as an implicature of sorts, given that the 'singular' unexpected answer can cancel it. In fact, an implicature-based mechanism (Sauerland 2003, Sauerland et al. 2005, Spector 2007, Zweig 2009, Mayr 2015, among others) has been widely adopted to explain the conversion from the inclusive to the exclusive readings of plurals, besides the homogeneity effect and the ambiguity account (Renans et al. 2020:319).

    Accordingly, since Grice (1989), it has been well-established that conversation participants are assumed to adhere to a Cooperative Principle (CP) that roughly says the speaker should convey the strongest piece of information (Quantity Maxim) that he/she believes to be true (Quality Maxim) (and in the simplest way, i.e. Manner Maxim)[4]. Hence, upon hearing a positive sentence like (39-a), the hearer will reason that (39-a) must be the strongest proposition that the speaker believes to be true among a set of propositions, including stronger alternatives like (92-b). Moreover, assuming the speaker is opinionated with respect to (92-b), then he/she must have believed it to be false (or else he/she would have said so). Consequently, the conjunction of both the inclusive reading of (39-a) and the scalar implicature that (92-b) to be false is the ultimate exclusive reading that we observe upon hearing sentences like (39-a).

(39)   a.   *Nam read books.*   (assertion)
           = Nam read one or more than one book   (inclusive reading)
      b.   *Nam read exactly one book.*   (stronger alternative)
           ⤳ Nam read one or more than one book and it is not the case that Nam read exactly one book   (assertion + implicature, given CP)

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[4]I set aside various issues involving the characteristics of the alternatives-set in Neo-Gricean implicature theories discussed in Magri (2009), Fox & Katzir (2011), Trinh & Haida (2015), Fox & Spector (2018), Breheny et al. (2018), Gotzner & Romoli (2022), among others.

≈ Nam read more than one book.   (exclusive reading)

Adopting the implicature-based approach, we can readily account for the exclusive reading in UE environments like (30), (31-c) and (32) by the same reasoning as (39). In the meantime, in negative sentences or if-clauses (i.e. typical DE environments) like (95-b) or (36-a), given the strength of the assertion and the alternatives are reversed, the stronger inclusive reading is predicted to be derived via the cooperative principle (in particular, Maxim of Quantity).

Now, let us return to the former issue: what is the interfering factor blocking the use of *các/những*-plurals in DE environments like (33) and (35), repeated as (40) below?

(40)   a.   *Trên tấm thảm chẳng có   (*các/*những) con mèo nào.*
              on CLF mat NEG have PL   CLF cat which
              'There are not any cats on the mat.'   (negative existential)

        b.   *Tôi không có   (*các/*những đứa) con.*
              1SG NEG   have PL   CLF   child
              'I don't have children.'   (ordinary negative)

        c.   *Không/Ít (*các/*những) sinh-viên nào   tới   dự   lễ.*
              no/few PL   student which come participate ceremony
              'No/Few students came to the ceremony.'   (negative quantification)

If we assume the inclusive reading for *các/những*-plurals above, then their semantic contribution to the sentences in object position at issue is roughly equal to the contribution of the corresponding bare noun forms, e.g. ⟦ *các/những đứa con$_{incl}$* ⟧ = ⟦ *con* ⟧ in (40-b). I assume, given this equal semantic denotation and pragmatic effect, in association with an economy principle like Patel-Grosz & Grosz's (2017) *Minimize DP!* below, inclusive *các/những*-plurals have been blocked by the bare noun forms.[5]

(41)   *Minimize DP!* (Patel-Grosz & Grosz 2017:279–280)
        An extended NP projection α is deviant if α contains redundant structure, that is, if

        a.   there is an extended NP projection β that contains fewer syntactic nodes than α,

        b. β is grammatical and has the same denotation as α (= Referential Irrelevance), and

        c.   using α instead of β does not serve another purpose (= Pragmatic

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[5]*Minimize DP!* is a generalized version of Schlenker's (2005:391) *Minimize Restrictor!*, Chomsky's (1981:65) *Avoid Pronoun*, and Cardinaletti & Starke's (1999:198) *Minimise Structure*. I leave open to the question of whether this principle is an instantiation of Gricean Maxim of Manner or not.

Irrelevance).

To illustrate, the deviance of (42-c) below is explained by the facts that the modifier *small* at issue doesn't have any impact on the denotation of the DP (i.e. Referential Irrelevance) or serve any pragmatic purpose (i.e. Pragmatic Irrelevance) in the case there is only one American President in the context. By contrast, since *stupid* in (42-d) conveys the speaker's attitude of sorts to the referred President, i.e. it bears some pragmatic effect, the sentence at issue is felicitous.

(42)   (Schlenker's (2005:388) examples)

    a.   *The President made important mistakes.*

    b.   *The American President made important mistakes.*
        (accepted in contrastive contexts, i.e. contrasting with other Presidents in the discourse)

    c.   #*The **small** American President made important mistakes.*

    d.   *The stupid American President made important mistakes.*

Accordingly, in (40-b), *Minimize DP* has ruled out the form of *các/những*-plurals since the bare noun form *con* in this case is syntactically simpler and has the same semantic denotation and pragmatic effect. Meanwhile, the two cases (40-a) and (40-c) are more complicated to account for due to the extra involvement of NPIs besides plural and bare noun forms, i.e. *(con) mèo nào* 'any cats' and *sinh-viên nào* 'any students'. My assumption here is this: in addition to *Minimize DP!* that blocks the plural forms, there's another preference principle in Vietnamese (and potentially in other classifier languages) that favors NPIs over bare noun forms in DE environments. I will refer to this principle as 'NPIs Preference', as in (43), and leave it open to further qualifications in the future.

(43)   NPIs Preference
    Prefer NPIs to bare noun forms in downward-entailing environments.

In sum, I submit that *các/những*-phrases in Vietnamese are best analyzed as inherently inclusive plurals. As inclusive plurals (i.e. bearing the one-or-more-than-one interpretation), they can naturally appear in DE environments and be strengthened into exclusive plurals (i.e. bearing the more-than-one interpretation) in UE environments via implicature derivation. Meanwhile, a number of cases across polarity where inclusive *các/những*-plurals are ruled out in favor of bare noun forms or NPIs are assumed to be dictated by appealing to the two principles, namely *Minimize DP!* and NPIs Preference. On the other hand, in cases where *các/những*-plurals

are equally as acceptable as the bare noun forms, like (44) below, it is predicted that the plural forms should convey something different from the bare noun forms in terms of semantic or pragmatic aspects. For instance, both the forms are accepted in (44) since *các/những sinh-viên* receives the exclusive reading, whereas *sinh-viên* only receives the inclusive reading.

(44) *Nam và Mi là   (các/những) sinh-viên.*
      Nam and Mi COP PL   student
      'Nam and Mi are students.'

Now, let us turn to an elaboration of *các*-plurals and *những*-plurals from a compositionality perspective to fully appreciate the differences and similarities between these two peculiar plural markers in Vietnamese.

4.5   Distinguishing *các* and *những*

4.5.1   Overview

Having established that *các/những*-phrases are semantically inclusive plurals that can become exclusive pragmatically, this section will dig deeper into the issues pertaining to the inherent syntactic-semantic characteristics of *các* and *những* as reflected in Subsection 4.5.2. Thus, I will show that *các* and *những* resemble each other more than they might look on the surface, in particular when they are interpreted as definite plurals and triggering the homogeneity effect (Subsection 4.5.4). More specifically, in Subsection 4.5.6, I will argue that both of them are best analyzed as instantiations of the exclusive PL operator in the sense of Chierchia (2010), not articles or quantifiers of sort as previously assumed (see Subsection 4.5.3) with slightly different presuppositions: *những* is encoded with atomicity and domain widening presuppositions, whereas *các* is encoded with a contextually determined free variable instead of the domain widening presupposition, but sharing the atomicity selection in aligning with *những*. Syntactically, both are assumed to be modifying adjuncts in the sense of Wiltschko (2008).

4.5.2   Syntactic distributions revisited

How different/similar are *các* and *những* in terms of their distributions? As shown in **Table 4.2** below (summarized from Nguyễn (1975); Luong (1987); Nguyễn (1997); Bùi (2000); Le and Schmitt (2016); Nguyễn (2021); Phan and Chierchia (2022), among others), *các* and *những* converge with respect to most distributional features

but diverge from each other in a few environments pertaining to wh-elements and kinship terms.

Table 4.2: Syntactic features of Vietnamese *các* vs. *những* (revised from Le & Schmitt 2016:165)

Example	Distributional features	NHỮNG	CÁC
(63)	Co-occur with quantifiers *tất-cả* 'all', *hầu-hết* 'most'	+	+
(55)	Co-occur with quantifiers *mọi* 'every', *vài* 'several'	−	−
(56)	Co-occur with numerals	−	−
(57)	Require classifiers	+	+
(58)	Allow generic/kind reading	+	+
(61)	Require *D(iscourse)*-linking contexts	+	+
(60), (52)	Require restrictions on the NP in subject position	+	−
(50)	Co-occur with *wh*-elements	+	−
(46), (47)	Appear in existential constructions	+	?
(51)	Co-occur with kinship terms (relational nouns)	−	+

Among the observations above, there are five peculiar features regarding *các/những* that have ignited a lot of debates in the literature, namely:

(45)   (i.)(in)compatibility with existential constructions;

   (ii.)(in)compatibility with wh-elements;

   (iii.)requirement of restrictions on the *những*'s associates in subject position;

   (iv.)incompatibility with numerals and 'low' quantifiers;

   (v.)capability of bearing generic readings.

Thus, it is often reported that *những*-phrases and *các*-phrases contrast each other concerning their ability to appear in existential constructions. Accordingly, unlike bare *những*-phrases (i.e. those without any modifications/restrictions), *các*-phrases (regardless of being bare or not) are rarely found in existential contexts (e.g. *có*-constructions in Vietnamese – see Diệp Q.B. 1998), as shown in (46). Such divergence immediately reminds us of the well-known distinction between 'weak' vs. 'strong' determiners in English as first established by Milsark (1977).[6]

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[6]The weak/strong distinction here follows the traditional, empirical one first proposed by Milsark (1977) to capture different behaviors of quantified NPs in existential constructions. Thus, those

(46)   **Existential *có* constructions**

    a. *Có   những/một/ba/nhiều   cuốn sách trên bàn.*
        have NHỮNG/one/three/many CLF book on table
        'There is/are books/ a book/ three books/ many books on the table.'

    b. ?*Có   các/tất-cả các/mọi/đa-số các   cuốn sách trên bàn.*
        have CÁC/all-CÁC/every/most-CÁC CLF book on table
        'There is/are *the books/*all the books/*every book/*most books on the table.'

Nevertheless, it should be noted that the acceptability judgements from native speakers regarding *các* in existential environments are mixed. In fact, some tokens of it are still found here and there in corpora, as evidenced in (47) below.

(47)   a. *Ở dưới gốc cây có   các cụ già, các bà mẹ*
        beneath trunk tree have CÁC elder CÁC mother
        (đã nuôi cách mạng...)
        who nourished the revolution
        'At the tree trunks, there were elders and mothers who nourished the revolution.' (extracted from the poem *Đồng-chí của tôi* 'My comrades' by Văn Cao)

    b. *Nơi-đây xưa-kia thường   có   các cuộc hát ghẹo trong những*
        here   long.ago commonly have CÁC event sing tease in   NHỮNG
        ngày-lễ.
        holiday
        'Long time ago, there commonly were sing-to-tease events in the holidays here.'[7]

Furthermore, both *những* and *các* are found to behave similarly with bare numeral subjects in modalized contexts in bearing the i(ndividual)-denoting reading, presumably via the existential operator (a similar phenomenon found with bare numeral subjects in Mandarin, see Li 1998, Tsai 2001, Liao 2018).

(48)   *(Có) các/những/ba   học-sinh không được tham-gia   cuộc-thi*
        have CÁC/NHỮNG/three student cannot   participate contest
        (...là   Nam, Hùng, Dũng.)
        (...namely Nam Hùng Dũng)
        'There are students/three students who cannot participate in the contest (...namely Nam, Hùng, Dũng.)

---

determiners can follow '*There is/are* ...' are termed 'weak' whereas those that can not are 'strong'. A semantic-syntactic elaboration of this distinction along this line of thought can be found in De Hoop (1995).

    [7]Data retrieved from the corpus of Vietlex.

Another parallel behavior between the two is also found with NPs involving both plural markers and bare numerals in postverbal position. Thus, the actuality of the event is observed to imply an existential force of the nominal (Bhatt 2006), as exemplified below.

(49) *Tối qua, giáo-sư đã chữa lại các/những/ba   sai-sót trong bài-báo*
      last night professor PST revise   CÁC/NHỮNG/three errors in   paper
      của Nam. (#Có điều, bài-báo đó   chẳng có   sai-sót nào cả.)
      POSS Nam (but   paper DEM NEG have errors any at.all)
      'Last night, Nam's professor revised errors/three errors in his paper. (#But there weren't any errors in his paper.')

These observations suggest that the notorious contrast between *các* and *những* in existential contexts might just be an illusion given the fact that *các*, like *những* and bare numerals, still can be bound by a(n) overt/covert existential operator in either preverbal or postverbal position. At least, we can speculate that the degradation of *các*-phrases in such environments is not encoded in the semantics/syntax of *các* as previously assumed but pertained to some unknown pragmatic factors. Hence, for now, I will simplify this matter by assuming that both the plural markers behave similarly to some extent in existential environments and leave open to further elaboration on *các*'s behavior in this kind of context.

Next, let us consider a much more transparent contrast between *các* and *những*, which pertains to the co-occurrence with *wh*-elements. Thus, *wh*-elements such as *ai* 'who', *gì* 'what', *đâu* 'where', etc., can follow *những* but not *các*, as illustrated below.

(50) **Co-occurrence with wh-elements**

   a. *Cô-ấy đã nói **những/*các** gì?*
       3SG.F PST say PL   what
       'What did she say?'   (implied: she said more than one thing)

   b. *Cô-ấy đã đi **những/*các** đâu?*
       3SG.F PST go PL   where
       'Where did she visit?'   (implied: she visited more than one place)

By contrast, only *các* is found to be compatible with all kinship terms (e.g. *cô* 'auntie') and some non-kinship terms (e.g. *thầy* 'teacher') to form first or second person pronouns. However, I assume this behavior involves the pronominal plural marker *các* on par with *mấy, bọn, tụi,* etc. (see Appendix A), not the nominal counterpart which is our focus.

(51) **Co-occurrence with pronominals**

   a.   ***Những/các** cô   vừa nói gì   thế?*
       PL   lady.2SG just say what PRT
       'What did you say, girls?' (addressing to a group of female students)

   b.   ***Những/các** thầy   đang đi thăm thầy   Nam.*
       PL   teacher.1SG CONT go visit teacher Nam
       'We are on our way to visit Teacher Nam.'   (addressing to some
       students)

Notably, *các/những*-plurals, especially *những*-phrases, in subject (or restrictor) position, by and large, tend to require some kinds of modifying expressions, as shown in (52), though these requirements are assumed to be looser with *các*.[8]

(52)   a.   ***Những** cuốn sách *(này) rất   thú-vị.*
          NHỮNG CLF book DEM   very interesting
          'These books are very interesting.'   (demonstrative)

      b.   *Tất-cả **những** cuốn sách *(ngôn-ngữ-học) rất thú-vị.*
          all   NHỮNG CLF book linguistics   very interesting
          'All the linguistic books are very interesting.'   (attributive phrase)

      c.   ***Những** cuốn sách *(mà mẹ   đã mua hôm-qua) rất thú-vị.*
          NHỮNG CLF book COMP mom PST buy yesterday very interesting
          'All the books that Mom bought yesterday are very interesting.' (relative clause)

Intriguingly, the last two constructions of such 'rescuing' strategies (i.e., employing attributive phrases and relative clauses) are commonly referred to a cross-linguistic phenomenon called "*licensing by modification*" in the literature (see Nomoto 2013; Kayne 2017, among others). Notably, this phenomenon is only found with *những*-phrases in subject/restrictor position but not with *các*-phrases. Note further that in the presence of those modifiers, such contrast between *những*-phrases and *các*-phrases seems to be neutralized, i.e., they barely differ from each other. This neutralization between them can also be found in object position, regardless of whether there are any kind of modifiers or not, as evidenced in (53) below.

(53)   a.   *Nam và Mi là   **những/các** sinh-viên.*
          Nam and Mi COP PL   student
          'Nam and Mi are students.'

       b.   *Nam và Mi là   **những/các** sinh-viên của   tôi.*
          Nam and Mi COP PL   student POSS 1SG
          'Nam and Mi are my students.'

---

[8]Interestingly enough, this contrast between *những* and *các* is found to be not so obvious in the XVII–XIX Catholic records (i.e., in Middle Vietnamese) as it is today in modern Vietnamese (Võ T.M.H. 2014).

c. *Nam và Mi là **những/các** sinh-viên rất xuất-sắc.*
Nam and Mi COP PL   student very talented
'Nam and Mi are very talented students.'

The only exception to this restriction requirement, perhaps, is when *các/những* combines with potential kind-denoting terms in subject position. Thus, aligning with English bare plurals in (59), they can receive an existential reading in an episodic context as in (54).

(54)   ***Những/các** con mối   đã gặm sạch hai cuốn sách của Nam.*
      PL   CLF termite PST gnaw clear two CLF book POSS Nam
      'Termites have gnawed completely two books of Nam.'

As far as their convergences are concerned, both *các* and *những* are also found not to co-occur with numerals (unlike Korean *-tul* as shown in (56)-đ) and some quantifiers such as *mọi* 'every', *vài* 'several', etc.[9] The examples of these incompatibilities are provided below.

(55)   **Incompatibility with 'low' quantifiers**

a. **Mọi* *các/những chiếc thuyền gỗ*
   every PL   CLF boat wooden
   Intended: 'every wooden boats'

b. **Vài* *các/những chiếc thuyền gỗ*
   several PL   CLF boat wooden
   Intended: 'several wooden boats'

(56)   **Incompatibility with numerals**

a. **Hai* *các/những chiếc thuyền gỗ*
   two PL   CLF boat wooden
   Intended: 'two wooden boats'

b. **Hai* *chiếc các/những thuyền gỗ*
   two CLF PL   boat wooden
   Intended: 'two wooden boats'

c. **Mười-mấy* *các/những chiếc thuyền gỗ*
   over ten PL   CLF boat wooden
   Intended: 'over ten wooden boats'

---

[9]Le & Schmitt (2016) refer to *mọi* 'every', *vài* 'several' as 'low' quantifiers in contrast with 'high' canonical quantifiers like *tất-cả* 'all'. Details aside, these sloppy terms are used here for purely descriptive purposes. Note further that I also diverge from Le & Schmitt in considering *mấy* not to be a 'low' quantifier on a par with *mọi* 'every' and *vài* 'several' but as the third nominal plural markers, in particular – a paucal plural marker, along with *các* and *những* (see Section 4.5 and **Appendix A** for more distributive evidence supporting this claim).

d. *salam(-tul) ney myeng*
human(-PL) four CLF
'four people'   (Korean, from Kim & Melchin 2018:23)

Besides, it is well known that *các/những* tend to precede classifiers in Vietnamese. However, it is worth pointing out that this co-occurrence is not compulsory in any circumstance but depends on the characteristics of the nouns they combine with. Concretely, given the three subtypes of nouns in Vietnamese in terms of their correlation with classifiers (viz., *obligatory-classifier* nouns; *optional-classifier* nouns; and *non-classified* nouns), the co-occurrence between plural markers and classifiers is only obligatory when their NP-associates belong to the first group, i.e. *obligatory-classifier* nouns, as indicated in (57-a).

(57)   **Co-occurrence with classifiers**

a. ***các/những*** **(con) chó đó*
PL   CLF   dog DEM
'those dogs'   (obligatory)

b. ***các/những*** *(đứa) sinh-viên trong lớp   này*
PL   CLF   student in   class DEM
'the students in this class'   (optional)

c. ***các/những*** *(căn) phòng trong ngôi-nhà này*
PL   CLF   room in   house   DEM
'the rooms in this house'   (optional)

Similarly, both *các* vs. *những* are found to be compatible with generic environments, i.e. direct kind references and generic generalizations (Farkas and de Swart, 2007; Dayal, 2011), contra what Lê & Schmitt (2016) assume. Concretely, while Lê & Schmitt (2016) rule out the ability of *các* to appear in such environments without modifications, my consultants and I still find it possible for both markers to surface as bare plurals in generic/kind environments.[10]

(58)   **Capability of bearing the generic/kind reading**

a. *Các/những con khủng-long đã   bị   tuyệt-chủng.*
PL   CLF dinosaur   PST PASS extinct
'Dinosaurs were extinct.'   (kind reference)

b. *Các/những con chó thường   rất   hung-dữ khi   chúng bị*
PL   CLF dog generally very dangerous when they   PASS
đói.
hungry

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[10]Intuitively, the two plural markers (especially *những*) seem to be more felicitous with the generic generalizations than the direct kind references. As for the latter, it is widely accepted that bare nouns seem to be favored over the pattern with plural markers (Trinh 2011).

'Generally, dogs are dangerous when they are hungry.'   (generic generalization)

Importantly, this capability of bare *các/những*-plurals is aligned with bare plurals (i.e. plurals without any kind of overt determiners) cross-linguistically, including English where bare plurals in subject position can either have a kind or existential references, contingent on the predicate they combine with (Carlson 1977, Diesing 1992:16, Dayal 2019, among others).

(59)   a.   ***Brussels sprouts*** *are unsuitable for eating.*   (generic)
     b.   ***Carpenter ants*** *destroyed my viola da gamba.*   (existential)

Additionally, both *các*-phrases and *những*-phrases can surface as the subject or the domain restrictor of quantifier *tất-cả* 'all' with the support from anaphoric elements like demonstratives or a contrastive/D-linking context of sorts (Pesetsky 2000, Shields 2008, among others).

(60)   [**Anaphoric context**: *Đầu năm mẹ mua cho Nam một đống sách…* 'Early this year, Mom bought for Nam many books (of many kinds)']

     a.   *Tất-cả **các** cuốn sách *(đó) rất   thú-vị.*
        all   CÁC CLF book DEM very interesting
        'All the books are very interesting.'

     b.   *Tất-cả **những** cuốn sách *(đó) rất   thú-vị.*
        all   NHỮNG CLF book DEM very interesting
        'All those books are very interesting.'

Notice further that this requirement is not necessary for contrastive contexts (or D-linking contexts) when *các/những*-phrases play the role of contrastive topics like (61) and (62) below.

(61)   [**Contrastive contexts:** *Nhà tôi nuôi 2 con chó$_i$ và 3 con mèo$_j$…* 'my house has 2 dogs and 3 cats']

     a.   ***…Những/các*** *con chó$_i$ thì   rất   ngoan.*
        PL   CLF dog TOP very well-behaved
        'The dogs are very well-behaved.'

     b.   ***…Những/các*** *con mèo$_j$ thì   rất   hư.*
        PL   CLF cat TOP very badly-behaved
        'The cats are very badly behaved.'

(62)   *[**Các** em   nàng]$_i$!   **Những** đứa em$_i$*
     CÁC younger.sibling 3SG.maiden NHỮNG CLF younger.sibling
     thông-minh và   ngoan-ngoãn quá!
     clever   and well-behaved so

'Her younger siblings! They are so clever and well-behaved!'
(in contrast with others' younger siblings in the context – Nguyễn T.C.'s (1975) example)

Last but not least, both *các* and *những* are found to be obligatory elements in certain contexts pertaining to quantification (Bùi M.H. 2000, Le & Schmitt 2016, Phan & Chierchia 2022, among others). Thus, this obligatoriness could be seen in the following quantificational structures with (monosyllabic) unit-denoting nouns like *huyện* 'district' or group terms like *gia-đình* 'family', omitting *các/những* will lead to a distributive reading involving the internal domain of a specific, singular entity denoted by the relevant group term, but not a quantification over a set of each group (which I refer to as the 'externally distributive' reading).

(63) a. *Tất-cả/Hầu-hết *(các/những) gia-đình này   đã có-mặt.*
          all/most   PL   family   DEM PST show.up
          'All/most these families arrived.'   (externally distributive)
      b. *Tất-cả/Hầu-hết gia-đình này   đã có-mặt.*
          all/most   family   DEM PST show.up
          'All/Most the members of this family arrived.' (internally distributive)

However, note that even in the latter cases, *các/những* still seems not strictly obligatory elements in such quantifications. Empirically, if we replace the demonstrative *này* 'this' with a location modifier *xóm-này* 'this village', *các/những* somehow turn out to be optional elements, as shown in (64). This issue will be elaborated on in Chapter 5.

(64) *Tất-cả/Hầu-hết (các/những) gia-đình xóm   này đã có-mặt.*
      all/most   PL   family   village DEM PST show.up
      'All/most of these families in this village arrived.'

4.5.3   Articles or quantifiers or what?

As remarked in Section 4.2, what makes Vietnamese plurals stand out is the fact that plural markers in this language are capable of co-occurring with classifiers, following precisely what Kratzer's (2007) assumes for the cross-linguistic pluralization. However, this is a surprising fact since, though being optional, plural markers generally are expected to be in complementary distribution with classifiers in most classifier languages[11]. Notably, it is also this behavior that set *các/những* apart

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[11]This observation has often referred to the Sanches-Greenberg-Slobin generalization that Borer (2005) builds upon in assuming a single head for both classifiers and plural markers in classifier languages (Greenberg 1972, Sanches & Slobin 1973, Chierchia 2010, Allassonnière-Tang & Her 2019)

from the so-called "plural classifiers" in the sense of Cheng & Sybesma's (1999; 2005) account of number-related elements like Mandarin *xie*, Wenzhou *lie*[7] or Cantonese *di*[12]. Therefore, a unified analysis of classifiers and plural markers as the locus of quantity-number phrase (e.g. Borer 2005, Nomoto 2013, among others) cannot be extended to the case of Vietnamese.

(65) a. *Wo xiang mai **xie** shu.*
          I   want buy CLF^{volume} book
          'I would like to buy some books.'   (Mandarin, Cheng & Sybesma 2005:275)

    b. *Tôi muốn mua **các/những** cuốn sách.*
          I   want buy PL   CLF book
          'I would like to buy books.'   (Vietnamese)

This peculiar co-occurrence between classifiers and *các/những* has also led some authors to refute their status as true plural markers and instead, assume them as quantifiers (Trương V.K. 1924:40, Thompson 1987:180, Her & Chen 2013:40). For instance, regarding the distinctive characters of these plural morphemes, Thompson (1987:180) claims that "***các** implies that all of a given set of entities are involved, while **những** suggests that only certain of the total possible number are referred to*" with the sentences as in (66) and interpretations for illustration without further elaborations on the issue.

(66) a. ***Những** cái đèn trong nhà này tối quá.*
          NHỮNG CLF light in   house DEM dim too
          = '[**Some of the**] lights in this house are too dim.'
    b. ***Các** cái đèn trong nhà này tối quá.*
          CÁC CLF light in   house DEM dim too
          = 'The lights in this house are too dim [**all of them**].'

Besides, the quantifier-nature of *các* seems to be a natural consequence of the fact that *các* is a Sino-Vietnamese reflex of the distributive-universal quantifier *ge* 各 'every/each' in Chinese.[13] In fact, the morpheme *các* is sometimes found in complex

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[12]Besides, *các/những* also differs from these 'classifiers' in terms of their (in-)compatibility with quantifiers: while Sinitic elements can not co-occur with quantifiers, *các/những* can. On the other hand, unlike typical/canonical classifiers, all these quantity words are not compatible with cardinals (greater than 1) to some extent. See Borer's (2005) Chapter 6, Section 6.4, for an extended discussion of *xie* and *di*.

[13]Also, historical linguistics tells us that the grammaticalization route from ALL to PLURAL is quite common in the history of many languages (Heine & Kuteva 2002:36)

quantifiers[14] like *hết các mọi* 'every' in the following line from the classic The Tale of Kiều (Nguyễn Du) in the late 18th-early 19th century.

(67) *Dặn dò hết **các** mọi đường*
     'carefully left directions on every aspect'
     Thuận phong một lá, vượt sang bến Tề
     '(they) sailed to the pier of Tề on a small boat with the wind'
                                                    (The Tale of Kiều, lines #1625–1626)

However, if *những* is an existential quantifier on par with English *some*, and *các* is a universal quantifier in alignment with English *all/every*, it is not obvious how we can capture their co-occurrence with both universal and existential quantifiers in Vietnamese, as well as their predicative use in object position, as evidenced below, respectively.

(68) a. *Một-số **các** cái đèn trong nhà này tối quá.*
         some   CÁC CLF light in   house DEM dim too
         'Some the lights in this house are too dim.'
      b. *Tất-cả **những** cái đèn trong nhà này tối quá.*
         all   NHỮNG CLF light in   house DEM dim too
         'All the lights in this house are too dim.'

(69) *Nam và Mi là **các/những** sinh-viên.*
     Nam and Mi COP CÁC/NHỮNG student
     = 'Nam and Mi are students.'
     ≠ 'Nam and Mi are some/all the students.'

In addition to that, *các* is also found not compatible with Q-sensitive expressions like *hầu-như/gần-như* 'almost' and *ngoại-trừ* 'except', which are standard diagnoses for canonical universal quantifiers (Carlson 1981, Kadmon & Landman 1993, Liu 2021). Thus, the contrast between a-sentences and b-sentences below indicates that *các* is not on par with canonical universal quantifiers like *tất-cả* 'all' or *mọi* 'every'.

(70) Diagnosis with Q-sensitive *hầu-như* 'almost'[15]

      a. ***Hầu-như** tất-cả/mọi sinh-viên đã có-mặt.*
         almost   all/every   student PST show.up
         'Almost all the students arrived.'   (canonical ∀)

---

[14]By analogy to the complex quantifier *tất cả-mọi* 'every', all the syntactic-semantic features of *hết các mọi*, including its quantificational force, is assumed to be inherited from the rightmost morpheme, which is *mọi* 'every' in this case (see Chapter 3, Section 3.2).

[15]Note that the Q-sensitive expression *hầu-như* 'almost' should not be confused with the proportional quantifier *hầu-hết* 'most'.

b. #***Hầu-như các*** sinh-viên đã có-mặt.
almost   CAC student PST show.up
Intended: 'Almost all the students arrived.'

(71)   Diagnosis with Q-sensitive *ngoại-trừ* 'except'
[Context: I have five students, including Nam.]

a. ***Ngoại-trừ*** Nam, tôi vẫn chưa   nói chuyện này cho ***tất-cả/mọi***
Except   Nam, I   still not-yet tell affair   DEM to   all/every
sinh-viên.
student
'Except Nam, I still haven't told this affair to all the (five) students.'
(canonical ∀)

b. #***Ngoại-trừ*** Nam, tôi vẫn chưa   nói chuyện này cho ***các*** sinh-viên.
Except   Nam, I   still not-yet tell affair   DEM to   CAC student
Intended: 'Except A, I still haven't told this affair to all the (five) students.'

Alternatively, if we take Thompson's proposal on the meaning of *các* as the maximal reading in aligning with English definite article *the* or more relevant, German plural definite determiner *die* (see (6)), we immediately follow the lines of treating *các* as a plural, definite article adopted by many Vietnamese authors, established since Nguyễn T.C. (1975:232–233) (also see Bùi M.H. 2000, Đinh, V.Đ. 2001, Nguyễn H.T. (2004, Nguyễn Đ.D 2021, among others). Accordingly, the observation that the plural markers *các* and *những* involve some kind of (in)definiteness or specificity, i.e. the invididual-denoting reading, has led to the well-known DP-hypothesis of Vietnamese nominal, first suggested in Nguyễn T.C. (1975) then spelled out by Nguyễn H.T. (2004), namely: *các* and *những* are plural definite and indefinite articles in Vietnamese, respectively.

(72)   Candidates for articles/determiners in Vietnamese (Nguyen T.H. 2004: 42)

a.   ***một*** 'one/a'   [−Plural, − Definite]
b.   ***những*** 'plural marker'   [+Plural, −Definite]
c.   ***các*** 'plural marker'   [+Plural, +Definite]

This D-analysis of *các/những*, in fact, has found its way into their definitions recorded in Vietnam Institute of Linguistics's Dictionary of Vietnamese (Hoàng Phê et al. 2003) as follows (notice their article-status are undetermined in these entries).

(73)   Entries of *các* and *những* in Dictionary of Vietnamese

a.   **các**$_2$...: Từ dùng để chỉ số lượng nhiều được xác định, gồm tất cả sự vật muốn nói đến. *Các nước Đông Dương. Các thầy giáo trong trường*

(Hoàng Phê et al. 2003:101).

(**các₂**...: used for indicating a definite plurality, comprising all the things mentioned. *các nước Đông Dương* 'Indochina countries'. *Các thầy giáo trong trường* 'school's teachers'.)

b. **những**...: Từ dùng để chỉ một số lượng nhiều, không xác định. *Bầu trời chi chít những vì sao. Những trang giấy dày đặc những con số.* (Hoàng Phê et al. 2003:729)

(**những**...: used for indicating an indefinite plurality. *Bầu trời chi chít những vì sao* 'sky full of stars'. *Những trang giấy dày đặc những con số* 'pages full of numbers'.)

However, if we analyze *các* as the plural definite article on par with German *die,* it is not transparent how we can capture the predicative and the generic uses of *các,*[16] in addition to numerous distributional divergences between *các* and a typical definite article like English *the* as Phan & Chierchia (2022) point out (also see Phan & Lander 2015:393–395).

(74) a. *Nam và Mi là các sinh-viên.*
          Nam and Mi COP CAC student
          = 'Nam and Mi are students.'   (predicative use)
          ≠ 'Nam and Mi are the students.'

      b. *Các con khủng-long đã tuyệt-chủng.*
          CAC CLF dinosaur PST become.extinct
          'Dinosaurs have become extinct.'   (generic use)

(75) Phan & Chierchia's (2022) example (6)

      a. *the three books*   (English)

      b. *các ba cuốn sách
          CAC three CLF book
          Intended: 'the three books'   (Vietnamese)

(76) Co-occurrence with demonstratives

      a. *(*the) those (*the) books*   (English)

      b. *Những/các cuốn sách ấy*
          PL CLF book DEM
          'those books'   (Vietnamese)

The example in (76-b) is also a crucial piece of evidence showing that *những* can have the parallel definiteness effect just like *các*. This evidence suggests that the distinction between *các* and *những* does not align with the dichotomy between definite

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[16]Notice that definite plurals in English are rarely found in kind-reference contexts (Carlson 1977).

vs. indefinite in a strict sense (like English *the* vs. *a/an*).

Given the counter-examples above, it is tempting to ask on what grounds should we consider *các/những* as some kind of determiner-article? Put it differently, are *các* and *những* true articles, or are they canonical plural markers? In what follows, I will show that the definiteness involved *các* is also attested with *những* and, more importantly, this definiteness effect is not encoded in the semantics of *các/những* but arising from definite contexts. Thus, when *các/những*-plurals become definite plurals in definite contexts, they are assumed to trigger the so-called homogeneity effect in aligning with cross-linguistic definite plurals. This effect, I submit, is the factor underlying the definiteness flavor involving both *các* and *những* in various definite contexts (contrastive, anaphoric, etc.) as reported in what precedes. In other words, I suggest that *các* and *những* inherently are neither articles nor quantifiers as assumed in previous accounts.

4.5.4   'All or nothing' effect

Let us consider the following traffic instruction involving *các*-phrases accompanied by the 'no turn left' sign, which can be easily found on many urban streets in Vietnam. Intriguingly, the superficial interpretation of this sentence in this context is a universal quantification on par with *all* or a maximal reading involving *the*, i.e., not a single vehicle is allowed to turn left, as paraphrased in (77) below.

(77)   ***Các** phương-tiện không được phép rẽ   trái.*
        CAC vehicle   NEG   allow   turn left
        'All the vehicles are not allowed to turn left.'   (universal)
        or 'The vehicles are not allowed to turn left.'   (maximal)

Similarly, *những* can also give rise to this kind of universal/maximal reading in definite contexts like anaphoric ones as exemplified by (78).

(78)   *Nam có   ba   sinh-viên. Chiều nay,   tôi đã gặp **những** sinh-viên*
        Nam have three student   this.afternoon 1SG PST meet NHUNG student
        đó   ở   thư-viện.
        DEM at library
        'Nam has three students. This afternoon, I met those students at the library.'
        ⤳ I met all of Nam's three students at the library this afternoon.

Given these observations, can we assume that *các* and *những* are instantiations of universal quantifiers like *all*? The following negative version of (78) below indicates that the answer is NO since the negation of *all* must be *some*, not *nothing*.

(79) *Nam có   ba   sinh-viên nhưng tôi   chưa gặp   mặt **các/những***
      Nam have three student   but   1SG NEG   meet face CAC/NHUNG
      sinh-viên đó.
      student   DEM
      'Nam has three students but I haven't met those students in person.'
      ⤳ I haven't met any of Nam's students in person.

What we have seen so far, in fact, is not unique to Vietnamese *các/những*-phrases, but has been known as the 'homogeneity effect' involving definite plurals attested cross-linguistically. More specifically, this effect refers to the ∀-like behavior in upward-entailing environments and the ∃-like behavior in downward-entailing environments of definite plurals. In other words, a definite plural is predicted to be interpreted universally in an upward-entailing context (e.g., affirmative) and existentially in a downward-entailing one (e.g., negative, *if*-clause, etc.). (Krifka 1996, Brisson 1997, Hirsch 2016, Križ 2016, Križ & Spector 2021, Liu 2021, among others).

(80) Homogeneity effect in English

   a. Mary read the books on the reading list.
       ⤳ Mary read all or almost all of the books on the reading list.
   b. Mary didn't read the books on the reading list.
       ⤳ Mary read no or nearly no books on the reading list.
   c. Mary didn't read all the books on the reading list.
       ⤳ Mary read some books on the reading list.

(81) Krifka's (1996) account of homogeneity (P is a non-collective predicate)

   a. $\text{HOM}(P) \Leftrightarrow \forall x [P(x) \rightarrow \forall y[\ y \sqsubseteq x \rightarrow P(y)\ ]]$
   b. A plural definite is underspecified between an existential and a universal interpretation, and the strongest denotation for the sentence is preferred as long as it is consistent with general background assumptions.[17]

Given the assumption that Vietnamese is an article-less language, it is tempting to ask what is the semantic contribution of *các* in definite plurals like *các phương tiện* 'vehicles' in (77) (in the absence of the demonstrative). Is it a definite plural article on par with German *die* whose both number and definiteness features encoded in the same lexical entry? If *các* and *những* are not either universal quantifiers or definite articles in (78) and (79) (in the presence of demonstratives), then how does

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[17]This principle is known as the Strongest Meaning Hypothesis (SMH), a term coined by Dalrymple et al. (1994).

the homogeneity effect involving definite plurals come to arise? Before I proceed to address these questions, let us pinpoint all the puzzles regarding *các/những* we have perceived so far in the next section.

4.5.5 Puzzles to be addressed

Thus, on what grounds should we treat *các* and *những* as articles in Vietnamese? If not, how do we analyze them to address their five peculiar syntactic features, namely: *(i)* (in)compatibility with existential/predicative constructions; *(ii)* (in)compatibility with wh-elements; *(iii)* requirement of restrictions on the NP for *những* in subject position; *(iv)* incompatibility with numerals and *mọi/mỗi* 'every/each' or *vài* 'several'; *(v)* ability of bearing generic/kind readings?

Semantically, both *các* and *những* are found to have (at least) four semantic uses that we need to capture in what follows, consisting of (i) the predicative use, (ii) the definite/anaphoric (individual-denoting) use, (iii) the generic use, and (iv) the wh-element use. These four uses are not homogeneously implemented with *các* and *những* but require some extra conditions in particular with *những*. This landscape of *các/những* can be summarized in **Table 4.3** below.

Table 4.3: Interpretations of *các/những*-plurals

Use	*các*	*những*	Notes
(i) Predicative use	+	+	*có*-sentences, Obj position, Sub of potential kind terms
(ii) Definite/anaphoric use	+	+	*những* requires restrictions in Sub/Restrictor position
(iii) Generic use	+	+	Sub/Obj in generic contexts
(iv) Wh-element use	−	+	only *những*

These are the problems that I will address in the next section, respectively.

4.5.6 The proposal

Along the lines of Chierchia's (2010) analysis of English plurals, I assume that bare nouns in classifier languages, aligning with bare inclusive plurals, denote cumulative predicates, that is, clusters of both singular entities and pluralities, whereas bare classifier phrases of the form [CLF + NP] denote a set of singular entities. As an illustration, if a, b, and c are the only dogs in a specific world w, then the classifier phrase '*con chó*' 'a dog' in world w represents the set of singular dogs, i.e. {a, b, c}. In the meantime, the bare noun '*chó*' and the bare plural '*các/những con chó*', both correspond to English bare plural '*dogs*', in the same world w, would denote

the set including both singularities and pluralities of a, b, c, i.e. denotes the set {a, b, c, a⊕b, a⊕c, b⊕c, a⊕b⊕c}, where a⊕b represents the sum/plurality of a and b.

(82) Denotations of Vietnamese *chó* (general number), *con chó* 'a/the dog' (singular) and *những con chó* 'dogs' (incl.plural) (assuming there are only three dogs, namely *a, b, c* in the model)

    a. Singular: ⟦ ***con chó*** ⟧ = {a, b, c }

    b. (Inclusive) Plural: ⟦ ***những con chó*** ⟧ = {a,b,c,a⊕b,a⊕c,b⊕c,a⊕b⊕c}

    c. General number: ⟦ ***chó*** ⟧ = {a,b,c,a⊕b,a⊕c,b⊕c,a⊕b⊕c}

Given the inclusive denotation of plurals above, the ungrammaticality of cases like (83-b), repeated below, turns out not to be a number-sensitive mismatch between a singular subject versus an inclusive plural predicate but a pragmatic anomaly: it violates the Maxim of Quantity (i.e. choosing the strongest piece of information) since *Fido là những con chó* is less informative than *Fido là một con chó*, given that *một con chó* 'a dog' asymmetrically entails *những con chó* 'dogs'. Alternatively, we can assume that *những con chó* in this case is ruled out by *Minimize DP!* in the presence of a simpler phrase, i.e. the bare noun form *chó* 'dogs', whose the same semantic denotation and pragmatic effect.

(83)   a. *Fido và Pluto là những con chó.*
        Fido and Pluto COP PL   CLF dog
        'Fido and Pluto are dogs.'

    b. *Fido là một/#những con chó.*
        Fido COP one/PL   CLF dog
        'Fido is a dog.'

    c. *Fido là chó.*
        Fido COP dog(s)
        'Fido is a dog.'

(84) *Minimize DP!* (Patel-Grosz & Grosz 2017:279–280)
An extended NP projection α is deviant if α contains redundant structure, that is, if

    a. there is an extended NP projection β that contains fewer syntactic nodes than α,

    b. β is grammatical and has the same denotation as α (= Referential Irrelevance), and

    c. using α instead of β does not serve another purpose (= Pragmatic Irrelevance).

Next, to account for the common uses of *các* and *những*, I propose that both

of them are instantiations of the inclusive PL operator in the sense of Chierchia (2010:114), with the atomicity presupposition to capture their s-selection for classifier phrases, as explicated below.

(85) Lexical entry of *các/những* (to be revised)
⟦ ***các/những*** ⟧ = λP: P is an atomic predicate. λx. ∃Q [Q⊆ P ∧ x = ⊕Q] (for any P)
In prose, for any atomic predicate P, the pluralization of P is a set of x such that x is the sum of Q, such that Q is a subset of P (note that Q⊕Q = Q).

Syntactically, there are two ways to analyze plural markers cross-linguistically: (i) treating them as a 'head plural' heading a quantity/measure/number phrase in the nominal spine (Li 1999, Borer 2005, a.o.) or (ii) taking them as a 'modifying plural', i.e. an adjunct modifying some projection in the nominal spine, e.g. Root(P), *n*(P) or D(P) (Wiltschko 2008, Butler 2011, Kim and Melchin 2018, Park 2022, among others) The two syntactic structures of modifying plural (86-a) and head plural (86-b) with their crucial differences can be summarized in **Table 4.4** as follows.
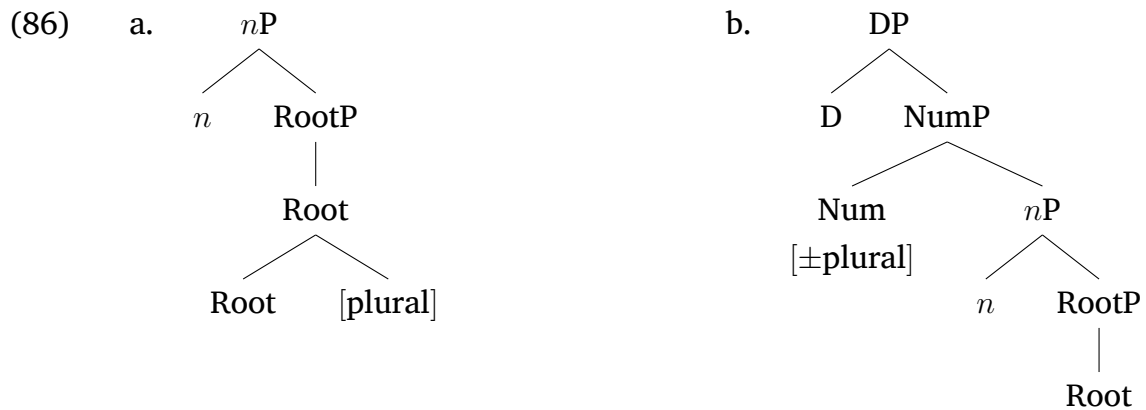
(86)   a.

```
        nP
       /  \
      n   RootP
            |
           Root
          /    \
       Root   [plural]
```

b.

```
          DP
         /  \
        D   NumP
           /    \
         Num     nP
       [±plural] /  \
                n  RootP
                     |
                    Root
```

Table 4.4: Main differences between modifying plural vs. head plural

	Modifying plural	**Head plural**
(i) Status	Optional	Obligatory
(ii) Interpretation	Number-neutral vs. Plural	Singular vs. Plural
(iii) Feature value	Monovalent [plural]	Bivalent [±plural]
(iv) Position	RootP, *n*P, DP, etc.	Num

Given their general optionality in nominal structures of Vietnamese and their number-

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neutral property, I take *các/những* to be instantiations of modifying plural elements whose flexible positions down the spine below DemP (i.e. ClP, NP).

Furthermore, I assume that *các* originally is a pronominal plural marker[18] (e.g. those having the form [*các* + kinship terms (relational nouns)] as in *các bác* 'uncles', *các dì* 'aunts', etc. – see **Appendix A**) but have undergone a reanalysis in the period of Middle Vietnamese to become a genuine plural marker for nominals, i.e. *các_{nom}*. Therefore, the uses of *các_{pro}* and *các_{nom}*, in aligning with *những*, should be clearly distinguised, as in the examples (87) below.

(87)   Difference between *các_{pro}* and *các_{nom}*

    a. ***Các/*những** chị   đi đâu   vậy?*
        CAC_{pro}   sister go where Q
        'Where are you going, my sisters?'   (pronominal *các*)

    b. ***Các/những** người chị   của Nam đều đã lập   gia-đình.*
        PL_{nom}   CLF   sister POSS Nam DEU PST establish family
        'Nam's sisters all got married.'   (nominal *các*)

Given the definition in (85), we also learn that *các/những* are inherently plural modifiers of the type $\langle et, et \rangle$. Thus, applying a singular predicate to *các/những* will yield a plural predicate denoting the cumulative denotation. This semantic output of *các-những*-phrases make them completely comfortable in object position or the restrictor of covert/overt existential operators like (88) and (89). In other words, the predicative use of *các/những* can be captured straightforwardly under this account. The representation in (91) demonstrates the semantic derivation of a *những*-phrase in existential *có*-constructions (note that I assume *các* has the same behavior).

(88) ***Những/các** con mối   đã gặm sạch hai cuốn sách của Nam.*
      PL   CLF termite PST gnaw clear two CLF   book POSS Nam
      'Termites have gnawed completely two books of Nam.'   (predicative use)
      $= \exists x$ [*termites*'(x) $\wedge$ x have gnawed completely Nam's two books].

(89) *Có   **những/các** cuốn sách trên bàn.*
      have PL   CLF book on   table
      'There are books on the table.'   (predicative use)

(90)   Lexical entries of (89):
    $[\![\textit{trên-bàn}]\!]^{\,c} = \lambda x_e.$ x is on the table[19]
    $[\![\textit{sách}]\!]^{\,c} = \lambda x_e.$ x is a book or a group of books in c

---

[18]Presumably, Vietnamese pronominal plural marker *các* is reanalyzed from the Sinitic loan *ge* 各 'every/each'.

[19]Assuming the PP *trên bàn* 'on the table' is a predicative chunk for simplicity.

$\llbracket \textit{cuốn} \rrbracket = \lambda P_{<e,t>}$: P is book or the like. $\lambda y_e. [P(y) \wedge at_{book}(y)]$

$\llbracket \textit{những} \rrbracket = \lambda P_{<e,t>}$: P is an atomic predicate. $\lambda x. \exists Q [Q \subseteq P \wedge x = \oplus Q]$

$\llbracket \textit{có} \rrbracket = \lambda P_{<e,t>}. \exists x [P(x)]$

(91)   a.
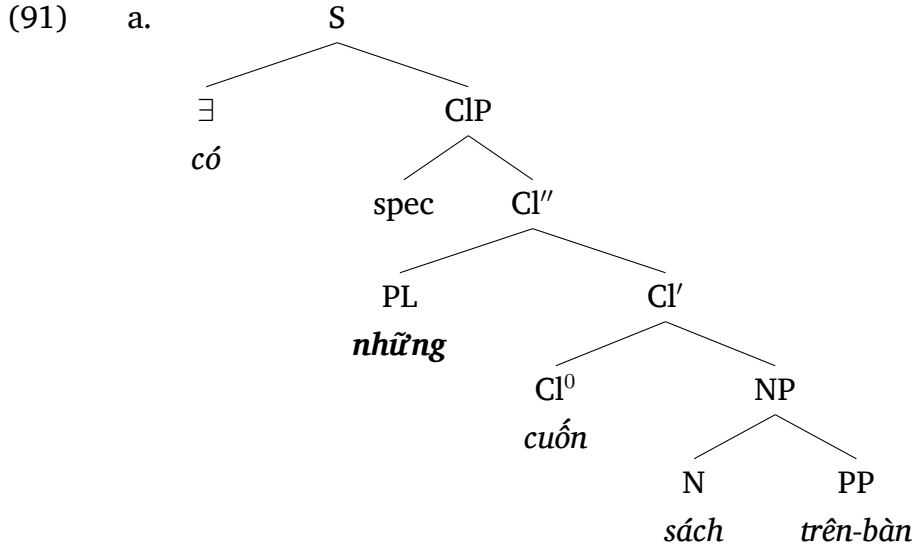
b.   Semantic derivation of (89):

$\llbracket NP \rrbracket^c = \lambda x_e. \llbracket \textit{sách} \rrbracket^c(x) \wedge \llbracket \textit{trên-bàn} \rrbracket^c(x)$

$= \lambda x_e.$ x is a book or a group of books and x is on the table in c   (by PM)

$\llbracket Cl' \rrbracket = \llbracket Cl \rrbracket (\llbracket NP \rrbracket) = \llbracket \textit{cuốn} \rrbracket (\llbracket \textit{sách trên-bàn} \rrbracket)$

$= \lambda y_e. [\textit{books-on-table}'(y) \wedge at_{book}(y)]$ (by FA)

$\llbracket ClP \rrbracket = \llbracket CL'' \rrbracket = \llbracket \textit{những} \rrbracket (\llbracket Cl' \rrbracket)$

$= \lambda x_e. \exists Q [Q \subseteq \{y:$ y is a book on the table in c$\} \wedge x = \oplus Q]$ (by FA)

$\llbracket S \rrbracket = \llbracket \textit{có} \rrbracket (\llbracket ClP \rrbracket) = 1$ iff

$\exists x [\exists Q [Q \subseteq \{y:$ y is a book on the table in c$\} \wedge x = \oplus Q]]$ (by FA)

($\approx$ 'There is one or more than one book on the table')

Notice the truth condition in (91-b) is just the semantic input for a pragmatic implicature reasoning as shown in (92) that helps us derive the salient exclusive reading we observed with (89) empirically involving *các/những-plurals* in UE environments.

(92)   Implicature reasoning involving (89)

   a.   *Có những/các cuốn sách trên bàn.*   (assertion)
        = There is one or more than one book on the table (inclusive reading)

   b.   *Có một cuốn sách trên bàn.*   (stronger alternative)
        ⤳ There is one or more than one book on the table and it is not the
        case that there is exactly one book on the table   (assertion +

implicature, given CP)

≈ There is more than one book on the table.   (exclusive reading)

Now, let us turn to the definite use of *những* and *các*. Notice that I assume when attached to a nominal (i.e., a classifier phrase or a common unclassified noun), *các/những* functions as a modifying plural, not a head plural. This assumption, in conjunction with the unified denotation between *các/những*-plurals and bare noun forms, explains its optionality in most contexts from a syntactic-semantic perspective. Having established *các/những* as plural modifiers, not articles of sort, it is tempting to ask how can we capture the definiteness of *các/những*-plurals in cases like (93) and (94) below.

(93)   a. ***Những*** *cuốn sách *(này) rất   thú-vị.*
            NHỮNG CLF book DEM   very interesting
            'These books are very interesting.'   (demonstrative)

        b. ***Những*** *cuốn sách *(ngôn-ngữ-học) rất   thú-vị.*
            NHỮNG CLF book linguistics   very interesting
            'The linguistics books are very interesting.'   (attributive phrase)

        c. ***Những*** *cuốn sách *(mà mẹ   đã   mua hôm-qua) rất   thú-vị.*
            NHỮNG CLF book COMP mom PST buy yesterday very interesting
            'The books that Mom bought yesterday are very interesting.' (relative clause)

(94)   ***Các*** *phương-tiện không được phép rẽ   trái.*
        CAC vehicle   NEG allow   turn left
        'The vehicles are not allowed to turn left.'   (maximal)

In other words, the crucial question we need to answer here is how the homogeneity effect involving definite plurals, as in (95-b), comes to arise.

(95)   [Context: there are three unrelated books on Nam's table. Having read them all by chance, Mi said to Nam:]

        a. *Cậu sẽ   mất ngủ   nếu đọc* ***những/các*** *cuốn sách này đấy.*
            2SG will lose sleep if   read PL   CLF book DEM PRT
            'If you read (any of) these books, you will be insomniac (I warn you).'

        b. *Đừng đọc* ***những/các*** *cuốn sách này!*
            don't read PL   CLF book DEM
            'Don't you read (any of) these books!'

Given the modifier nature of plural markers, we have to assume their definiteness does not come from themselves but from a different source, i.e. the definite contexts such as anaphoric or contrastive ones. As we all know, demonstratives are commonly analyzed as a kind of anaphoric definite determiner in complemen-

tary distribution with canonical definite determiner (Schwarz 2009, Dayal & Jiang 2022). Formally, both demonstratives and definite articles are assumed to be instantiations of the maximal operator iota (Partee 1986).

(96)   Semantics of Demonstratives (Dayal & Jiang 2022:157–158)

$[\![\,\text{Dem}\,]\!] = \lambda P : |P| > 1.\ \iota x\ [P(x) \wedge x = y]$

(where the free variable y is the intended-referent property, corresponding to the assignment function g satisfied by an index, e.g. g(1))

However, in this study, I will assume a weaker version of demonstratives to be consistent with the account of universal quantifiers as presented in the previous chapter[20]. Specifically, I submit that demonstratives in Vietnamese differ from their English/German counterparts in lacking the maximal force encoded in the iota operator.
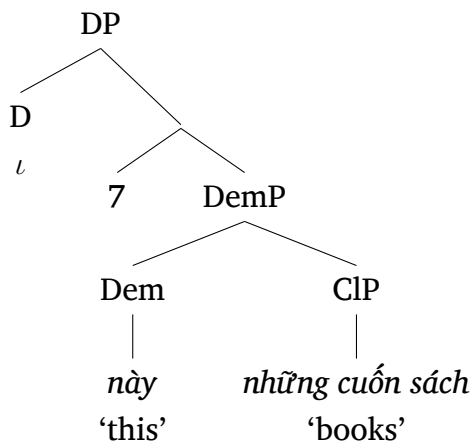
(97)   Semantics of demonstratives in Vietnamese

$[\![\,\text{Dem}_{weak}\,]\!] = \lambda P : |P| > 1.\ \lambda x\ [P(x) \wedge x = y]$

(where the free variable y is the intended-referent property, corresponding to the assignment function g satisfied by an index, e.g. g(1))

That being said, I submit that all the definiteness effects come from the same source, i.e., definite contexts – which can formalized by the presence of the covert operator iota ("ι") to implement the *e*-composition at the DP node when necessary, along the lines of Trinh (2011).

(98)   Semantic derivation of the definite plural *những cuốn sách này* 'these books'

```
            DP
           /  \
         D      \
         ι       \
              7    DemP
                  /    \
               Dem      ClP
                |        |
              này   những cuốn sách
             'this'      'books'
```

a. $[\![\,\text{iota}\,]\!] := \lambda P: \oplus P \in P.\ \oplus P$ (the unique maximal entity in P)

b. $[\![\,\textit{những cuốn sách này}\,]\!]^{\,g} = [\![\,\text{Dem}_{weak}\,]\!]^{\,g}([\![\,\textit{những cuốn sách}\,]\!])$

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[20]In particular, this solution is motivated by the different c-selections assumed for *tất-cả* and *mọi/mỗi*, i.e. the former selects DP (of type $\langle e \rangle$), whereas the latter selects ClP/DemP (type $\langle e, t \rangle$).

$$= \lambda x\ [\ \exists Q\ [Q \subseteq \{y: y\ \text{is a book}\} \land x = \oplus Q] \land x = g(i)] \qquad \text{(by FA)}$$

c. $\iota(\ \|\ \textit{những cuốn sách này}\ \|\ ^g)(7)$

$$= \oplus(\lambda x\ [\ \exists Q\ [Q \subseteq \{y: y\ \text{is a book}\} \land x = \oplus Q] \land x = g(7)])$$

$= $ the unique maximal entity of books in $g(7)$ $\qquad$ (by FA)

(For instance, if $\|\ \textit{những cuốn sách này}\ \| = \{a,b,c,a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$, the output of $\iota(\ \|\ \textit{những cuốn sách này}\ \|\ )$ will be the singleton set $\{a \oplus b \oplus c\}$)

Accordingly, there presumably are at least three kinds of definite contexts that license the definiteness of *các/những*-plurals via the iota operator, namely: (i) anaphoric contexts as in (95-b), and (ii) contrastive contexts as in (99) and ones requiring restriction like (93-b) or (93-c), and (iii) what I refer to as 'immediate situation' ones like (94) in a sense that a traffic instruction implying a traffic rule should immediately apply to all the 'immediate' vehicles within its area, along the lines of Hawkins (1991)[21].

(99)   [**Contrastive contexts:** *Nhà tôi nuôi 2 con chó$_i$ và 3 con mèo$_j$...* 'my house has 2 dogs and 3 cats']

    a.   ***Những/các*** *con chó$_i$ thì rất ngoan.*
        PL   CLF dog TOP very well-behaved
        'The dogs are very well-behaved.'

    b.   ***Những/các*** *con mèo$_j$ thì rất hư.*
        PL   CLF cat TOP very badly-behaved
        'The cats are very badly behaved.'

Now, to account for the subtle difference between *các* and *những* with respect to restriction requirements in subject position, along the lines of Nguyễn T.C. (1975; 1996)[22], I propose that, unlike *các*, *những* has an extra presupposition other than ClP-selection, i.e. the domain of its ClP-associate must be a subset of a larger domain determined by the context. The idea here is *những* is employed for partitioning or grouping a set of entities into contrastive sub-partitions or sub-groups, and restriction/modification is a natural way for implementing that process. Let us refer to these two presuppositional contents as atomicity and partitivity or the domain widening presuppositions, respectively.

---

[21]Immediate situation uses, as defined by Hawkins, refer to individuals or entities that are physically present in the context of the utterance and uniquely fit the description provided by the definite expression (Schwarz 2013:535).

[22]Nguyễn T.C. (1996:233) basically claims that *những* "puts its reference in a contrastive status with other references in the discourse", whereas *các* puts its reference outside of a contrastive condition.

(100)   The lexical entry of *những* (final version)

⟦**những**⟧ = $\lambda P_{<e,t>}$: P is an atomic property $\land\ \exists P'$ such that $P \subset P'$.
$\lambda x_e.\ [\exists Q\ [Q \subseteq P \land x=\oplus Q]]$

Informally, *những* presupposes its associate is an atomic predicate P whose domain is a subset of a domain P'. When defined, ⟦**những**⟧ (P) will yield a set of entity x such that x is singularities or pluralities of P.

However, given this partitivity requirement and Heim's (1991) Maximize Presupposition, *những* is predicted to block *các* in contrastive contexts because they carry the same truth-condition but *những* bear a stronger presupposition, contrary to fact in (99). Therefore, to remedy this unexpected consequence, I assume *các* also has an assignment function g that is presupposed to be satisfied by an index provided by the context. Simply speaking, this function can be a tacit/previously mentioned property shared by all the entities denoted by the *các*-plural at issue.

(101)   The lexical entry of *các* (final version)

⟦**các**⟧ ^{g} = $\lambda P_{<e,t>}$: P is an atomic property $\land\ \forall x[P(x) \to g(x)]$.
$\lambda x_e.\ [\exists Q\ [Q \subseteq P \land x=\oplus Q]]$

Informally, *các* presupposes its associate is an atomic predicate P whose domain is the same as the domain of an assignment function g. When defined, ⟦**các**⟧ (P) will yield a set of entity x such that x is singularities or pluralities of P.

Now, given the lexical entries of *các* and *những* above, let us turn to their generic uses, i.e. kind reference (D-generic) and generic generalization (I-generic). Thus, to derive the D-generic reading, I follow Chierchia (1998b:349–350) and Trinh (2011:8) in assuming the existence of a covert K(ind) operator which combines with a cumulative predicate P (expressed by the plural) and yields an individual concept, i.e. a "kind" (of type $\langle s, e\rangle$). In other words, K is a function from each possible world w to the maximal P-individual in w (viz., $\iota P(w)$). This individual concept then will saturate the G-generic predicate at issue by FA to give rise to a kind reference, as in (102).

(102)   The **K**(ind) operator and G-generic readings

a.   ⟦**K**⟧ ^{w} = $\lambda P_{<e,t>}$: **K**(P) $\in$ G. $\lambda w.\ max($ ⟦P⟧ $^w)$ (where G is the domain of individual kind-concepts)

b.   Maximal element of P (i.e. ιP)
$max(P) = sup(P)$ if $sup(P) \in P$, undefined otherwise.
(Informally, the maximal element of P is that individual in P which

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has every individual in P as its parts)

$sup(\text{P}) := \{ \text{x}: sup_P(\text{x}) \}$ (where $sup_P(\text{x}) \equiv \text{x} \in sup(\text{P}) \Leftrightarrow_{def} \forall \text{y}[\text{y} \in \text{P} \leftrightarrow \text{y} \sqsubseteq \text{x}])$

c. ***Các/những*** *con khủng-long đã bị tuyệt-chủng.*
   PL   CLF dinosaur PST PASS extinct
   'Dinosaurs were extinct.'   (kind reference)
   $= 1$ iff $\mathbf{K}([\![\textit{các/những con khủng-long}]\!]^{\,w}) \in [\![\textit{extinct}]\!]$
   $= 1$ iff $\textit{dinosaur}'_K \in [\![\textit{extinct}']\!]$ in w

Meanwhile, following Wilkinson (1986), Krifka (1987), Chierchia (1998b), Trinh (2011), among others, I assume that there is an abstract generic operator **GEN** that works like a universal quantifier (quantifying over tokens/instantiations of a kind) to give rise to generic generalizations (i.e. I-generic readings), as illustrated by (103). These generic compositions are quite straightforward since the semantic contribution of bare nouns and bare *các/những*-plurals as cumulative predicates are the same. Notice further that the reason why bare nouns do not block the use of bare plurals here, in accordance with the principle *Minimize DP!*, is assumed to be pragmatics-related (e.g., in contrastive contexts, topicalized contexts, etc.).

(103)   The **GEN**(erally) operator and I-generic readings

a. $[\![\mathbf{GEN}\ \text{X}]\!]^{\,w}$ is defined iff $[\![\text{X}]\!]^{\,w} \in \text{G}$ (G is the set of kind-concepts)
     when defined, $[\![\mathbf{GEN}\ \text{X}]\!]^{\,w} = \lambda \text{P}_{<e,t>}.[\mathbf{GEN}_x(\text{x} \sqsubseteq [\![\text{X}_K]\!]^{\,w}(\text{w}) \to \text{x} \in \text{P})]$

b.   ***Các/những*** *con chó thì thích ăn thịt.*
     PL   CLF dog TOP like eat meat
     'Dogs like meat.'   (generic generalization)
     $= 1$ iff $\mathbf{GEN}_x[\textit{dog}'_K(\text{x})(\text{w}) \to \textit{like-meat}'(\text{x})(\text{w})]$
     (where $\textit{dog}'_K = \mathbf{K}([\![\textit{những/các con chó}]\!]^{\,w}) = $ CANIS in w)

Next, as far as the wh-element use of *những* but not *các* is concerned, I assume that this contrast between them is a labour division of grammar (or in some sense – a lexical idiosyncrasy) in order to avoid a potential conflict between the nominal plural marker *các* and its pronominal counterpart. Thus, the pronominal cac_{pro} has salient definiteness flavor of an associate plural marker[23] since, simply speaking, cac_{pro}-expressions are pronouns whose definite references. Meanwhile, given that wh-elements are canonical indefinites, cac_{nom} naturally falls out of its favor to create a plural wh-word. By contrast, *những* inherently is a plural modifier of type $\langle e, t \rangle$, hence it can be readily accepted to combine with other $\langle e, t \rangle$ expressions like wh-indefinites *ai* 'who/person', *đâu* 'where/place', etc., which can be morphologically

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[23]This property, presumably, is on par with Chinese *-men*, Korean *-tul* or Japanese *-tachi*. I will set this comparison aside for future extensions.

decomposed as [person/place/... + *nào*] 'person/place/... + which'. Note that this account is completely compatible with the alternative semantics assumed for wh-indefinites by Kratzer & Shimoyama (2002) that Tran (2009) hinges upon to analyze Vietnamese wh-indefinites as variables (which are presumably bound by some quantifiers in the vicinity – this account will be discussed in more details in the next chapter).[24]

(104) a. $[\![ai]\!]^{w,g} = [\![người-nào]\!]^{w,g} = \lambda x_e. \lambda w_s.$ x is a person in w

   b. $[\![những \ ai]\!]^c = \lambda x_e. [\exists Q [Q \subseteq \{x : x \text{ is a person in w}\} \wedge x = \oplus Q \text{ in } c]]$

The incompatibility induced by the existence of *các*$_{pro}$ between *các*$_{nom}$ and wh-elements is also comparable to another lexical idiosyncrasy found with *các*$_{nom}$ and the generic noun *người* 'person(s)', as illustrated by (105-a), given the existence of the pronominal expression *các người* 'you (pl)', presumably formed with *các*$_{pro}$, as illustrated by (105-b).

(105) a. *Tôi không thích **những/*các** người này.*
       1SG NEG like PL   person DEM
       'I don't like these people.'

   b. ***Các** người lui   ra đi!*
       CAC$_{pro}$ person move.back out PRT
       'Back away, you all!'

Last but not least, the facts that *những/các* can not co-occur with universal quantifiers *mọi/mỗi* 'every/each', and/or existential ones like *vài* 'several' fall out to be natural consequences of their similar atomicity presupposition, i.e. they all require their inputs to be atomic predicates/properties, as illustrated in (106) below.

(106) The incompatibility between *mọi* and *các/những*-phrases

   a. $[\![mọi]\!] = \lambda P_{<e,t>}: |P| > 1 \ \& \ P \text{ is atomic. } \lambda Q. \forall x [\text{P-atom}(x) \rightarrow Q(x)]$

   b. $[\![sinh-viên]\!]^c = \lambda x_e.$ x is a student in c $\qquad$ P = {a,b,c,...}

   c. $[\![các \ sinh-viên]\!]^c = \lambda x_e. [\exists Q [Q \subseteq \{x : x \text{ is a student in c}\} \wedge x = \oplus Q \text{ in } c]]$

       $\qquad\qquad\qquad\qquad\qquad\qquad$ Q = {a,b,c,a$\oplus$b,a$\oplus$c,b$\oplus$c,a$\oplus$b$\oplus$c, ...}

   d. $[\![mọi]\!]$ ($[\![các \ sinh-viên]\!]$) is undefined since $[\![các \ sinh-viên]\!]$ isn't atomic.

In other words, these incompatibilities are assumed to be instantiations of presup-

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[24]Notice that in this case, the bare noun form *ai* should be interpreted as a singular entity (i.e. a pure or impure atom) in a domain consisting of different groups to satisfy the presuppositions imposed by *những*.

positional failure: since *mọi/mỗi, vài* 'several' all require their associate to be atomic property-denoting expressions, plural predicates of the form [*các/những* + ClP] are ruled out from the composition by presupposition.

The incompatibility between cardinal numerals (e.g., *ba* 'three', *bốn* 'four', etc.) and PMs *các/những*, similarly, is assumed to be due to this common atomicity presupposition, resulting in parallel presuppositional failures, as represented in (107) (note that the plural operator *, roughly corresponding to ⟦*các/những*⟧, is presumably built-in the semantics of numerals, along the lines of Chierchia 2010; 2013, Dayal 2013, among others).

(107)   The incompatibility between numerals and *các/những*-phrases

     a. ⟦*ba*⟧ $= \lambda P_{<e,t>}$: P is atomic. $\lambda x \in D_e.\ {}^*P(x) \wedge |x| = 3$

     b. ⟦*ba*⟧ (⟦*các sinh-viên*⟧) is undefined since ⟦*các sinh-viên*⟧ isn't atomic.

To anticipate, in what follows, I will show that the apparent obligatoriness of *những/các* in some quantificational structures is also motivated by the number-sensitive requirements of their associating quantifiers, although, syntactically speaking, *các/những* is assumed to be an optional modifying plural marker, i.e. being adjunct of sort.

4.5.7   Comparing with previous accounts

The primary difference between my proposal as presented with previous accounts, perhaps, lies in the tools and assumptions made available by the general framework of formal semantics, in particular, the Neo-Carlsonian approach whose a bunch of presumably universal covert operators.

From a different perspective, Le & Schmitt (2016,2019) adopt the head plural approach and attribute the divergences between *các* and *những* to their different c-selectional features. Under their account, despite heading the same Quantity Phrase, *các* selects for ClPs whereas *những* selects relative clauses (or PredPs in their (2019) terms) as its complement. Thus, their distributional properties are accounted for by appealing to the competition of heads (i.e. *những/các* compete with Nums and most Qs on the Quantity head, which is higher than the Cl head) and by their c-selection (i.e. *những* requires a restriction on the noun phrase and thus selects for a CP (i.e. a relative clause), while *các*, like Nums and other Qs, takes a ClP as its complement).

Nevertheless, there are at least three crucial problems with this syntactic account, namely:

(i.) Syntactic-semantic mapping problem: It is not obvious how we can derive all the semantic mappings based on the relevant syntactic structures of *các/những* phrases.

(ii.) Uniformity problem: Given their c-selectional differences, it is not transparent how to account for various common features between these two plural markers, including the incompatibility with numerals, the requirement of classifier phrases, and especially, predicative use in object position where modification is unnecessary.

(iii.) The optionality problem: given the head status of *các/những*, how do we account for their general optionality in most cases?

Additionally, my account also differs from Le & Schmitt (2016) in a number of empirical observations involving *các*, such as its compatibility in existential and generic environments. I assume these divergences might be relevant to dialectal variations (I speak Northern and Central Vietnamese, whereas Le speaks Southern Vietnamese.)

As far as the compositionality involving *các/những* is concerned, I myself (Cao 2022) have argued that if we adopt Dayal's (2013) suggestion that cardinal expressions are *universally* ambiguous between predicative and ∃ generalized quantifier readings, we can assume that pluralized phrases in Vietnamese are also ambiguous between predicative and ∃ generalized quantifier readings. Concretely, *các*-phrases, regardless of their 'bareness', are inherently quantified, strong NPs of type $\langle\langle e,t\rangle,t\rangle$, whereas bare *những*-phrases are inherently predictive, weak NPs of type $\langle e,t\rangle$. Consequently, plural markers *các* and *những* can be considered as a plural quantifier (type $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$) and a (non-restrictive) plural modifier (type $\langle\langle e,t\rangle,\langle e,t\rangle\rangle$), respectively.

Thus, within the type-flexible framework suggested in Partee (1986); Chierchia (1998a); Dayal (2004, 2013); Dayal and Sağ (2020), we can account for all the peculiar distributions and interpretations of these two plural markers by appealing to universal covert type-shifters, e.g. *nom*, *iota* and ∃. Syntactically, following Le & Schmitt (2016) and (Phan and Lam, 2021), Cao argues against Nguyễn's (2004) proposal and puts forth a unified analysis for *các* and *những* as heads of Measure Phrase (MeasP) along the lines of Solt (2015). Furthermore, under this proposal, the "licensing by modification" phenomenon attached to *những* is analyzed as a side effect of the function of *những*-phrases as contrastive topics.

(108) Semantic derivations of cardinal expressions (Dayal 2013:62)

    a. [$_{DP}$ the$_{<et,e>}$ [$_{CardP}$ three$_{<e,t>}$ [$_{NP}$ boys$_{<e,t>}$]]] = ιx. [3(x) $\wedge$ boys(x)]

b. $[_{DP} \text{three}_{<et,<et,t>>} [_{NP} \text{boys}_{<e,t>}]] = \lambda P. \exists x [3(x) \wedge \text{boys}(x) \wedge P(x)]$

c. $[_{CardP} \text{three}_{<e,t>} [_{NP} \text{boys}_{<e,t>}]] = \lambda x.[3(x) \wedge \text{boys}(x)]$
$= *\exists \Rightarrow \lambda P. \exists x [3(x) \wedge \text{boys}(x) \wedge P(x)]$

However, Cao's analysis leaves behind many unsolved puzzles, including (i) why plural markers are incompatible with numerals, (ii) how to account for the convergences between *các* and *những,* given their different status (plural quantifier vs. plural modifier), and (iii) how to account for the general optionality of these plural markers while retaining the head plural approach. Especially, my account in that paper was essentially motivated by the difference between *các* and *những* in existential environments. This distinction, as we have seen, turns out to be not semantic but pragmatic of sorts. Of course, the degradation involving *các* in *có*-sentences cries for more elaborated qualification. I will leave this issue open for future extensions.

4.6 Summary

To sum up, in this chapter, I have distinguished two kinds of plural markers in Vietnamese, namely: (i) nominal plural markers, including *các*$_{nom}$, *những, mấy*; and (ii) pronominal plural markers, including *các*$_{pro}$, etc. (see Appendix A). Then, the syntactic-semantic characteristics of the two most common nominal plural markers, i.e. *các* and *những,* have been investigated along the lines of the general theory of plurality accumulated in Sauerland (2003), Spector (2007), Chierchia (2010), among others. The semantics of these two plural markers in Vietnamese, thus, are modeled as follows.

(109) The lexical entries of *những* and *các* (final version)

a. $[\![\mathbf{những}]\!] = \lambda P_{<e,t>} : P$ is an atomic property $\wedge \exists P'$ such that $P \subset P'. \lambda x_e. [\exists Q [Q \subseteq P \wedge x=\oplus Q]]$
Informally, *những* presupposes its associate is an atomic predicate P whose domain is a subset of a domain P'. When defined, $[\![\mathbf{những}]\!]$ (P) will yield a set of entity x such that x is singularities or pluralities of P.

b. $[\![\mathbf{các}]\!]^{g} = \lambda P_{<e,t>} : P$ is an atomic property $\wedge \forall x[P(x) \rightarrow g(x)]. \lambda x_e. [\exists Q [Q \subseteq P \wedge x=\oplus Q]]$
Informally, *các* presupposes its associate is an atomic predicate P whose domain is the same as the domain of an assignment function g. When defined, $[\![\mathbf{các}]\!]$ (P) will yield a set of entity x such that x is

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singularities or pluralities of P.

Accordingly, unlike previous accounts of *them* as quantifiers or articles, I have demonstrated that *các* and *những* are best analyzed semantically as proper plural markers, not quantifiers or articles, in aligning with the inclusive plural affix in number-marking languages, and syntactically as modifying plurals in the sense of Wiltschko (2008). I have also shown that *các* and *những* resemble each other more than they might look on the surface. Specifically, both of them can be assumed to be instantiations of the inclusive PL operator in the sense of Chierchia (2010) with slightly different presuppositions: *những* is encoded with atomicity and domain widening presuppositions, whereas *các* is encoded with a contextually determined assignment function instead of the domain widening presupposition, but sharing the atomicity selection in aligning with *những*. Given these presuppositional accounts of *các* and *những*, all of their four essential uses, as summarized in **Table 4.5**, can be captured more consistently.

Table 4.5: Summary of interpretations of *các/những*-plurals

Use	*các*	*những*	Notes
(i) Predicative use	+	+	*có*-sentences, Obj position, Sub of potential kind terms
(ii) Definite/anaphoric use	+	+	*những* requires restrictions in Sub/Restrictor position
(iii) Generic use	+	+	Sub/Obj in generic contexts
(iv) Wh-element use	−	+	only *những*

In what precedes, however, we have only investigated the syntactic-semantic characteristics of *các* and *những* from a compositional perspective, whereas temporarily set the third plural marker *mấy* aside for future extensions. Regarding this third nominal plural marker, as my first estimation, *mấy* is very likely to be an instantiation of the paucal plural marker in the sense of Corbett (2000:22–26)[25], i.e.

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[25]A prototypical example of paucal plural markers can be found in Bayso, a Cushitic language spoken in Ethiopia, as shown in the b-sentence with the nominal *lubanjaa* 'lion.PAU' below.

(i)   Bayso (Corbett 2012:230)

    a.   *Lubán-titi hudure.*
        lion-SG   sleep.MASC.SG.PST
        'A single/particular lion slept.'

    b.   *Luban-**jaa** hudureene.*
        lion-PAU   sleep.PL.PST
        'A few lions slept.' (about two to six lions involved)

    c.   *Luban-jool hudure.*
        lion-PL   sleep.MASC.SG.PST
        'Lions slept.'

a marker for referring to a plural denotation involving a small number of individuals, approximately from two to about ten (though the upper bound seems not to be as specific as the lower bound). Interestingly enough, unlike *các/những*, only *mấy* can be employed to create the so-called associative plurals with proper nouns[26], as shown in (110).

(110) *mấy/*các/*những *(đứa) Nam*
MAY/CAC/NHUNG CLF   Nam
'a group of people who Nam is included'

In brief, the lexical entry of *mấy* can be roughly established as in (111), along the lines of the exclusive, but not inclusive, PL operator in Chierchia (1998b).[27]

(111) The lexical entry for *mấy* (paucal plural marker)
$\llbracket \textbf{\textit{mấy}} \rrbracket = \lambda P \in D_{<e,t>}$: P is atomic $\land$ $2 \leq |P| \leq 10$. $\lambda x \in D_e$.
$\neg P(x) \land \forall y[y \sqsubset x \land atom(y) \rightarrow P(y)]$

I will leave open to the syntactic-semantic details pertaining to *mấy* for future research.

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[26]For a comparative perspective, see Jiang (2017) for an analysis of Mandarin *-men* as an associative plural marker.

[27]One of the most puzzling behaviors of *mấy* is that, unlike *các/những*, it cannot co-occur with existential quantifiers like *một-số* 'some', e.g. *Nam có một-số *mấy/các/những quyển sách rất hay* 'Nam has some very well-reading books'.
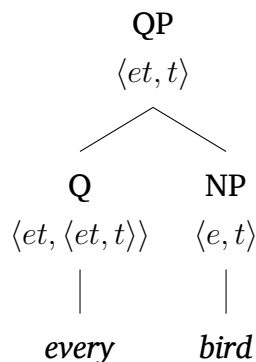
Chapter 5

The quantification–plurality interface: when *các/những* is a must
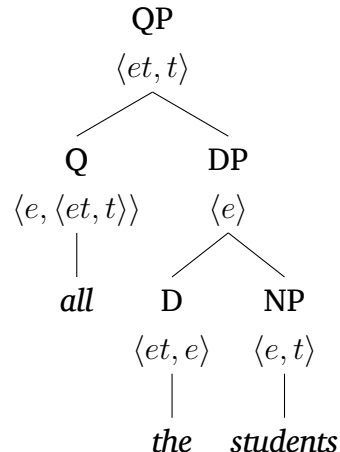
5.1 Overview

The aim of this chapter is twofold. First, I will investigate the remaining unsolved puzzles pertaining to the interaction between plural markers (henceforth PMs) and quantifiers in various quantificational constructions in Vietnamese, given the newly established assumption that the denotation of plurals and bare nouns in this language encompasses both singularities and pluralities and *các/những* are syntactically merely modifying elements. More specifically, I will revisit Matthewson's (2001; 2013) puzzle regarding the quantificational structure of QPs mentioned in Chapter 3 (Section 3.3), i.e. whether the restrictor of quantifiers like *every, all, most,* etc. is DP or NP (as GPT assumed), from the Vietnamese perspective, in particular *các/những*'s contributions to various patterns of quantification.

(1)　　a.　Standard account (GQT)　　　　b.　Matthewson's account

$$
\begin{array}{cc}
\text{QP} & \text{QP} \\
\langle et, t\rangle & \langle et, t\rangle
\end{array}
$$

Tree (a):
- QP ⟨et, t⟩
  - Q ⟨et, ⟨et, t⟩⟩ — *every*
  - NP ⟨e, t⟩ — *bird*

Tree (b):
- QP ⟨et, t⟩
  - Q ⟨e, ⟨et, t⟩⟩ — *all*
  - DP ⟨e⟩
    - D ⟨et, e⟩ — *the*
    - NP ⟨e, t⟩ — *students*

Thus, in consistency with the claims established in Chapter 4 regarding the non-article status of *các/những,* in Section 5.3, I will show that the plural markers *các/những* are only necessary for compositional reasons in cases when quantifiers require non-atomic restrictors, as illustrated by (89-a) and (2-b), in contrast with (2-c) and (2-d) where the plural reading of the restrictors is implied by the contextually relevant place-adverbial *khu-này* 'this area'. The implications that we can draw from these facts in Vietnamese for the cross-linguistic quantification structure will be discussed in Section 5.4.

(2) Co-occurrence between *các/những* and universal quantifiers

  a. *Tất-cả *(**các/những**) sinh-viên/gia-đình này đã bỏ phiếu.*
      all   PL   student/family   DEM PST cast vote
      'All these students/families cast the vote.'

  b. *Tất-cả *(**các/những**) con chó này rất ngoan.*
      all   PL   CLF dog DEM very well-behaved
      'All these dogs are very well-behaved.'

  c. *Tất-cả (**các/những**) sinh-viên/gia-đình khu này đã bỏ phiếu.*
      all   PL   student/family   area DEM PST cast vote
      'All of the students/families in this area cast the vote.'

  d. *Tất-cả (**các/những**) con chó khu này rất ngoan.*
      all   PL   CLF dog area DEM very well-behaved
      'All the dogs in this area are very well-behaved.'

Second, the final part of this chapter, including Section 5.5 and Section 5.6, will be devoted to discussing an unnoticed disappearance of the quantificational force involving 'plural' wh-elements like *những ai* and the alleged universal A-quantifier *cũng* as illustrated in (3).

(3) a. *Ai$_F$ **cũng** đã giúp Nam.*
        who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?'   (interrogative)
        = 'Everyone helped Nam.'   (wh-quantification)

  b. *{Những ai}$_F$ **cũng** đã giúp Nam.*
      PL   who CUNG PST help Nam
      = 'For those who also helped Nam, who are they?'   (interrogative)
      ≠ 'Everyone helped Nam.'

Accordingly, if we follow Tran (2009) in (i) treating the wh-element *ai* as a variable introducing a set of individuals, and (ii) attributing the quantificational force to *cũng,* it is not transparent how we can account for the fact that sentences whose wh-items combine with the plural marker *những* like (90-b) lack that reading. To anticipate, I will show that this quantificational disappearance, as shown in

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(90-b), is a consequence of the fact that there are no such things as plural wh-indefinites in Vietnamese. Hence, it is predicted that there are also no such things as plural NPIs in Vietnamese at all (unlike English *any* counterparts where plural NPIs are only disallowed in existential modalized contexts as in (4-a) due to violating the *Any* Condition[1]) since NPIs are nominals formed with/by non-interrogative wh-items in Vietnamese. In what follows, I will show that this prediction is empirically borne out, as illustrated by (4-b) and (4-c).

(4) a. *Gal is allowed to read **any book/*books**.*

    b. *Nam không gặp (****những) ai.***
       Nam NEG meet PL   who
       'Nam didn't meet anyone.'   (DE)

    c. *Nam được đọc bất-kỳ (****những) quyển sách nào.***
       Nam may read BAT-KY PL   CLF   book which
       'Nam is allowed to read any book.'   ($\Diamond$)

Besides, it is also worth noting that *cũng* in wh-quantification acts somewhat similarly to *đều* in various distributive constructions without wh-elements. In fact, *cũng* and *đều* seem to have a complementary syntactic distribution with comparable semantics to Mandarin *dou* (Lin 2014), as shown in (5) below. As far as I can tell, both these facts have been mostly neglected in Tran's (2009) account.

(5) a. *Họ/Mọi-người/Các-bạn **đều/*cũng** đã giúp Nam.*
       they/everyone/friends DEU/CUNG PST help Nam
       'They/The friends/Everyone all helped Nam.'   (Vietnamese *đều*)

    b. *Ai$_F$ **cũng/*đều** đã giúp Nam.*
       who CUNG/DEU PST help Nam
       'Everyone helped Nam.'   (Vietnamese *cũng*)

    c. *Tamen/Xuesheng-men/Mei-ge-ren/Shei **dou** renshi ta.*
       they/friends/everyone/who   DOU know him
       'They/The students/Everyone all know him.'   (Mandarin *dou*)

Thus, what common characteristics do both *cũng* and *đều* share? How do they co-relate with wh-elements and other sub-categories of nominals, including plurals and especially universal QPs? Are they true distributive-universal A-quantifiers or something else? These are the crucial questions that Section 5.5 and Section 5.6 attempt to shed some light on.

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[1]The *Any* Condition: A DP headed by *any* is acceptable only if its domain is dominated by a constituent that is Strawson downward-entailing with respect to it (Crnič 2022:3).

5.2 Puzzling observations

As far as quantificational constructions in Vietnamese are concerned, nominal PMs like *các/những,* by and large, are observed to be optional elements across the board, as illustrated by (6).

(6)   a. *Tất-cả (các/những) sinh-viên của Nam đã có-mặt.*
        all   PL   student POSS Nam PST show.up
        'All the students of Nam arrived.'   (universal)

    b. *Hầu-hết (các/những) con chó khu này đều rất ngoan.*
        most   PL   CLF dog area DEM DEU very well-behaved
        'Most of the dogs in this area are very well-behaved.'   (proportional)

    c. *Một-số (các/những) gia-đình xóm này đã mua ô-tô.*
        some PL   family village DEM PST buy car
        'Some families in this village have cars.'   (existential)

      On the other hand, in a number of quantificational structures, they are found to be obligatory particles, as shown in (7-a) and (7-b) where PMs are in restrictor position of universal quantifiers like *tất-cả* 'all' or proportional quantifiers like *ba-phần-tư* '3/4', especially when they combine with definite group terms like *gia-đình này* 'this family'. Meanwhile, as shown and explained in Chapter 3, PMs are incompatible with quantifiers selecting atomic predicates like *mọi* or involving covert domains (i.e. PossPs) forming with group terms like *cả*, as shown in (7-c). Notably, *các/những* are generally optional with *một-số* 'some'. These facts can be summarized in **Table 5.1** below.

(7)   Co-occurrence between plural markers and various kinds of quantifiers

    a. *Tất-cả *(**các/những**) gia-đình này đã có-mặt.*
        all   PL   family DEM PST arrive
        'All these families arrived.'   (universal)

    b. *Hầu-hết/Ba-phần-tư *(**các/những**) gia-đình này đã có-mặt.*
        most/three-quarters PL   family DEM PST show.up
        'Most/three-quarters of these families arrived.'   (proportional)

    c. *Cả/mọi (***các**/***những**) gia-đình này đã có-mặt.*
        all/every PL   family DEM PST show.up
        = 'This whole family arrived.' (with *cả*)   (collective)
        = 'All these families arrived.' (with *mọi*)   (distributive-universal)

Note further that in the cases with *tất-cả* 'all' and *ba-phần-tư* '3/4', PMs are necessary for the distributive reading involving atomic predicates only. Thus, lacking *các/những* won't make the sentence ungrammatical but give rise to a different reading, i.e. *tất-cả* 'all' and *ba-phần-tư* '3/4' will quantify over a domain of integral parts

Table 5.1: Co-occurrences between plural markers and quantifiers in Vietnamese

Quantificational patterns	*tất-cả* 'all'	*mọi* 'every'	*một-số* 'some'	*ba-phần-tư* '3/4'
a. [(CLF)-N] *sinh viên* 'student(s)'	✓!	✓!	✓!	✓!
b. [CLF-N] *cây bút* 'a pen'	✓!	✓!	✓!	✓*
c. [Collective Ns] *gia-đình* 'family'	✓!	✓!	✓!	✓*
d. [PL-(CLF)-N] *những sinh viên* 'students'	✓!	#	✓!	✓!
e. [PL-CLF-N] *những cây bút* 'pens'	✓!	#	✓!	✓!
f. [PL-Collective Ns] *những gia-đình* 'families'	✓!	#	✓!	✓!

* = grammatical in non-distributive, sub-atomic contexts only
! = grammatical in distributive contexts only

of a(n) group/entity, not a set of non-overlapping "natural units" (in the sense of Krifka 1989, Kennedy 2015, among others) denoted by the nouns, as shown in (8-b).

More importantly, *các/những* are found to have an intimate bond with demonstratives. Thus, they are found to be obligatory elements whenever there is a modifying demonstrative like *này* 'this' or *kia* 'that' to give rise to a distributive reading, as shown in (8-a) and (8-b). On the contrary, *các/những* turn to be optional when we replace demonstrative with a location-adverbial like *xóm này* 'this village', as indicated in (8-c), or a location PP-modifier like *trong hộp này* 'in this box/case', as shown in (8-d).

(8) a. *Tất-cả *(**các/những**) gia-đình này đã có-mặt.*
         all   PL   family   DEM PST show.up
         'All of these families arrived.'

     b. *Tất-cả *(**các/những**) cây bút này rất   đắt-tiền.*
         all   PL   CLF pen DEM very expensive
         'All these pens are very expensive.'

     c. *Tất-cả (**các/những**) gia-đình xóm   này đã có-mặt.*
         all   PL   family   village DEM PST show.up
         'All of these families in this village arrived.'

     d. *Tất-cả (**các/những**) cây bút trong hộp này rất   đắt-tiền.*
         all   PL   CLF pen in   box DEM very expensive
         'All of the pens in this box are very expensive.'

Notably, unlike universal or proportional quantifiers, plural markers are completely

optical elements when co-occurring with existential quantifiers like *một-số* 'some' across the board, even when the NP-associates are (mono-syllabic) unit-denoting nouns like *huyện* 'county', *quận* 'district', *nước* 'nation' etc. – cases where *tất-cả* strictly requires the presence of *các/những*, as illustrated by (9).

(9) a. *Một-số (các/những) gia-đình xóm   này đã có-mặt.*
          some PL   family village DEM PST show.up
          'Some of these families in this village arrived.'

     b. *Một-số (các/những) cây bút trong hộp này rất   đắt-tiền.*
          some PL   CLF pen in   box DEM very expensive
          'Some of the pens in this box are very expensive.'

     c. *Một-số (các/những) nước   Đông-Dương không thích dự-án*
          some PL   country Indochina NEG   like project
          Một Vành đai, Một Con đường.
          One Belt, One Road
          'Some Indochina countries don't like the The Belt and Road Initiative.'

     d. *Tất-cả *(các/những) nước   Đông-Dương không thích dự-án*
          some PL   country Indochina NEG   like project
          Một Vành đai, Một Con đường.
          One Belt, One Road
          'All Indochina countries don't like the The Belt and Road Initiative.'

Meanwhile, *mọi* and *cả* are incompatible with PMs for different reasons. In particular, while the former is assumed to be a presupposition failure due to the atomicity presupposition imposed on the restrictor by *mọi* (see Chapter 3, Section 3.7), in the latter case, PMs are ruled out presumably since they cannot participate in the PossP structure (viz., plurals cannot be the complement of the head POSS) denoting a covert quantifying domain for the input of *cả* (i.e. *tất-cả* being shrunk). The only reading accepted for the co-occurrence between *cả* and plurals is a focus-related one involving EVEN-*cả*, as illustrated by (10) (see Chapter 3, Section 3.6).

(10) *Cả những sinh-viên của Nam đã có-mặt.*
       CA PL   student POSS Nam PST show.up
       = 'Even Nam's students arrived.'
       ≠ 'All Nam's students arrived.'

Given what we have observed, it is tempting to ask when *các/những* is, or isn't, a must in various quantificational constructions in Vietnamese. How do we account for the intimate bond between *các/những* and demonstratives in quantificational constructions? In what follows, I will show that the presence of the PM is subject to the presuppositional requirements of the quantifiers involved. In other words, PMs are predicted to be totally optional in quantification if the relevant quantifier

imposes no number-related presuppositions on its restrictor. As you will see, this prediction is borne out empirically and the existential quantifier *một-số* 'some' is one of such quantifiers in Vietnamese.

5.3 The proposal

Essentially, I submit that the obligatoriness of *các/những* in quantificational constructions as in (11) is a natural consequence of the semantic requirements that the quantifiers impose on their domain restrictors which roughly demand a cumulative predicate denoting a non-singleton set, i.e. the non-uniqueness presupposition.

(11)   a.   *Tất-cả/Hầu-hết *(những/các) gia-đình này đã có-mặt.*
            all/most   PL   family   DEM PAST arrive
            'All/most these families arrived.'
       b.   *Tất-cả *(các/những) cây bút này rất đắt-tiền.*
            all   PL   CLF pen DEM very expensive
            'All these pens are very expensive.'

Thus, in the previous chapters, I have shown that PMs *các/những* are best analyzed as instantiations of the inclusive PL operator in the sense of Chierchia (2010) with slightly different presuppositions. Thus, while *những* imposes two presuppositions, i.e. atomicity and partitivity (i.e. the existence of a super-domain), on its associating predicate, *các* imposes the atomicity, and a contextually determined property shared by all the entities in the denotation of its associating predicate, as repeated in (12).

(12)   The lexical entries of *những* and *các*

       a. $[\![\textbf{những}]\!] = \lambda P_{<e,t>}$: P is an atomic property $\land \exists P'$ such that $P \subset P'$. $\lambda x_e. [\exists Q [Q \subseteq P \land x = \oplus Q]]$
            Informally, *những* presupposes its associate is an atomic predicate P whose domain is a subset of a domain P'. When defined, $[\![\textbf{những}]\!]$ (P) will yield a set of entity x such that x is singularities or pluralities of P.

       b. $[\![\textbf{các}]\!]^g = \lambda P_{<e,t>}$: P is an atomic property $\land \forall x[P(x) \rightarrow g(x)]$. $\lambda x_e. [\exists Q [Q \subseteq P \land x = \oplus Q]]$
            Informally, *các* presupposes its associate is an atomic predicate P whose domain is the same as the domain of an assignment function g. When defined, $[\![\textbf{các}]\!]$ (P) will yield a set of entity x such that x is singularities or pluralities of P.

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Meanwhile, the universal quantifier *tất-cả*, as repeated in (13), is assumed to presuppose its restrictor to be a non-singularity, i.e. a plurality: when defined, $[\![$ *tất-cả* $]\!]$ (X)(Q) is true iff for all x, if x is an atomic part of X, then Q(x) is true.

(13)   The lexical entry for D-quantifier *tất-cả*
$[\![$ **tất-cả** $]\!]$ = λX_e: $|X| > 1$. λQ. $\forall x$ [atom(x) $\land$ x $\sqsubset$ X $\rightarrow$Q(x)]
(where $atom(x)$ is defined as follows:
For a predicate P, the set of P-atoms x, $P_{at} := \{x \in P: \neg\exists y. [y \sqsubset x \land P(y)]\}$)

In other words, given that non-uniqueness presupposition of *tất-cả* (and presumably *hầu-hết*), it is predicted that all the singularity-denoting expressions in Vietnamese as shown in (14), whether inherently singular like proper nouns or derived singular via the covert iota like patterns with DEM, will be disallowed in restrictor position (note that the pattern [CLF + N] is singular, i.e. consisting of atoms, but not a singularity, i.e. denoting an atom).

(14)   Singularity-denoting patterns in Vietnamese

   a.   [(CLF) + N + DEM]: *(con) chó này* 'this dog'
   b.   [*một* + CLF + N]: *một con chó* 'one dog'
   c.   [Proper nouns]: *Nam* 'Nam'
   d.   [Singular pronouns]: *nó* 'he/she/it'
   e.   [Group terms]: *(nhóm) Nam và Mi* 'the group of Nam and Mi'

Moreover, since *tất-cả*'s first argument is assumed to be a definite phrase (DP), it is also predicted that all the atomic predicates (typically denoted by ClPs, e.g. *con chó của Nam* 'Nam's dog') can not directly combine with *tất-cả* because the maximal entity in the denotation of an atomic predicate like {a,b,c,...} is undefined, resulting in an impossible composition between an atomic predicate and the maximal iota operator (note that the maximal entity of a singleton set {a} is still defined, i.e. being itself)[2]. Consequently, *các/những* is a must in these cases, as illustrated in (16) below.

(16)   a. $[\![$ iota $]\!]$ = λP: $\oplus P \in P$. $\oplus P$ (the unique maximal entity in P)

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[2]This is also known as the uniqueness presupposition encoded in the semantics of definite articles like English *the*, i.e. *the* presupposes that there exists only one entity or group of entities in its domain (Frege 1892, Heim 1982, Heim & Kratzer 1998, Elbourne 2005, among others).

(15)   The lexical entry for English definite article *the*
$[\![$ *the* $]\!]$ = λP: $\exists x\forall y[P(y) \leftrightarrow x = y].\iota x.P(x)$

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b.	⟦iota⟧ (⟦*con chó của Nam*⟧) is undefined in the case Nam has three dogs, i.e. {a,b,c}.

c.	⟦*những/các*⟧ (⟦*con chó của Nam*⟧) = {a,b,c,a⊕b,a⊕c,b⊕c,a⊕b⊕c}

d.	⟦iota⟧ (⟦*những/các con chó của Nam*⟧) = {a⊕b⊕c}

Putting all together, the intimate bond between PMs and demonstratives in *tất-cả/hầu-hết*-quantifications as shown in (11) now turns out to be straightforward. By assuming that the pattern [CLF + N + DEM] always denotes a singularity (i.e. bearing the cardinality of 1), given the non-uniqueness requirement of *tất-cả*, the nominal at issue needs to be converted into a plurality via PM first to make itself compatible with the quantifier *tất-cả*.

Now, let us turn to cases where overt means to satisfy the non-uniqueness requirement of *tất-cả* seem to be unnecessary, as indicated by (17-a) and (17-b). Crucially, the common characteristic of these sentences is that the multiplicity/plurality of the restrictor, somehow, can be contextually determined or implied. Thus, (17-a) is accepted without *các/những* due to a world knowledge that a village tends to have more than one family, whereas (17-b) is fine since we all know that there is more than one pen in a pen case in normal situations.

(17)	a.	*Tất-cả (các/những) gia-đình xóm này đã có-mặt.*
		all	PL	family	village DEM PST show.up
		'All of these families in this village arrived.'

	b.	*Tất-cả (các/những) cây bút trong hộp này rất đắt-tiền.*
		all	PL	CLF pen in	box DEM very expensive
		'All of the pens in this box are very expensive.'

There are seemingly two ways to account for these facts. The first hypothesis is to assume that *tất-cả* there isn't our canonical *tất-cả* but a variation of it whose the same c-selection with *mọi* 'every', i.e., selecting an NP, not a DP. In other words, there are two D-quantifiers *TẤT-CẢ* in Vietnamese, differing in their c-selection. Thus, the variant *tất-cả* is assumed to allow both atomic and non-atomic predicates in its restrictor position, resulting in the optionality of *các/những* in (17). However, this account might risk the distinction between *tất-cả* vs. *mọi* that we have established so far and raise many questions pertaining to the labor division between the canonical *tất-cả* vs. the variant *tất-cả*.

Instead, I would like to adopt a second account saying that there is a silent, context-sensitive *những* in cases like (17-a) and (17-b), namely PL_S, whose identical meaning as its overt counterpart *những* and playing the same role of converting the associating nominal to a plurality to satisfy the requirement of *tất-cả* on its domain restrictor.

(18)   The lexical entry for the silent PL_S

$[\![\mathbf{PL}_S]\!]$ $= \lambda P_{<e,t>}$: P is an atomic property $\wedge \exists P'$ such that $P \subset P'$. λx_e. $[\exists Q [Q \subseteq P \wedge x = \oplus Q]]$

Given the existence of PL_S, the optionality of *các/những* in (17-a) and (17-b) should be taken as a phonetic optionality, not a syntactic-semantic one.[3]

Under my proposal, thus, it is predicted that the true syntactic-semantic optionality of *các/những* seems to be realized only in co-occurrence with quantifiers like *một-số* 'some' since such quantifiers, presumably, have no number-related presuppositions in the sense that both atomic and cumulative predicates are possible to surface as their restrictor, as illustrated by (19) and analyzed in (20) below.

(19)   a. *Một-số (các/những) nước   Đông-Dương*
             some PL   country Indochina
             'some Indochina countries'

         b. *Tất-cả *(các/những) nước   Đông-Dương*
             some PL   country Indochina
             'all Indochina countries'

(20)   The lexical entry for *một-số* 'some'[4]

         a. $[\![\boldsymbol{một\text{-}số}]\!]$ $= \lambda P_{<e,t>}$: $|P| > 1. \lambda Q_{<e,t>}$. $\exists x_e [P(x) \wedge Q(x)]$

         b. $[\![một\text{-}số]\!]$ ($[\![nước\ Đông\text{-}Dương]\!]$)
             $= \lambda Q_{<e,t>}$. $\exists x_e [$ x is an Indochina country $\wedge Q(x)]$ (by FA)

         c. $[\![một\text{-}số]\!]$ ($[\![các\ nước\ Đông\text{-}Dương]\!]$)
             $= \lambda Q_{<e,t>}$. $\exists x_e [$ x is an Indochina country or a plurality of Indochina countries $\wedge Q(x)]$ (by FA)

Note further that despite bearing no number-related presuppositions, *một-số* is still assumed to impose a cardinality-related presupposition on its restrictor on par with *tất-cả* 'all' or *mọi* 'every' to capture their incompatibility with singularity-denoting expressions like (14), e.g. *một-số #{con chó này/Nam/Nam và Mi}*.

In sum, PMs in Vietnamese are generally optional since they are assumed to be modifying adjuncts. On the other hand, they are necessary in a number of quantificational cases due to quantifiers' number-related requirements. What can we draw from this general optionality of PMs in Vietnamese for the cross-linguistic grammar of quantification? This is the issue that the next section aims to shed some light on.

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[3]I leave open to the questions regarding the distribution of the covert PL_S and the correlation between it and other overt PMs for future elaborations.

[4]I adopt the standard meaning of *một-số* in alignment with the semantics of the existential quantifier *some* assumed in the literature (Heim & Kratzer 1998, Sauerland et al. 2005, Haida & Trinh 2021, among others).
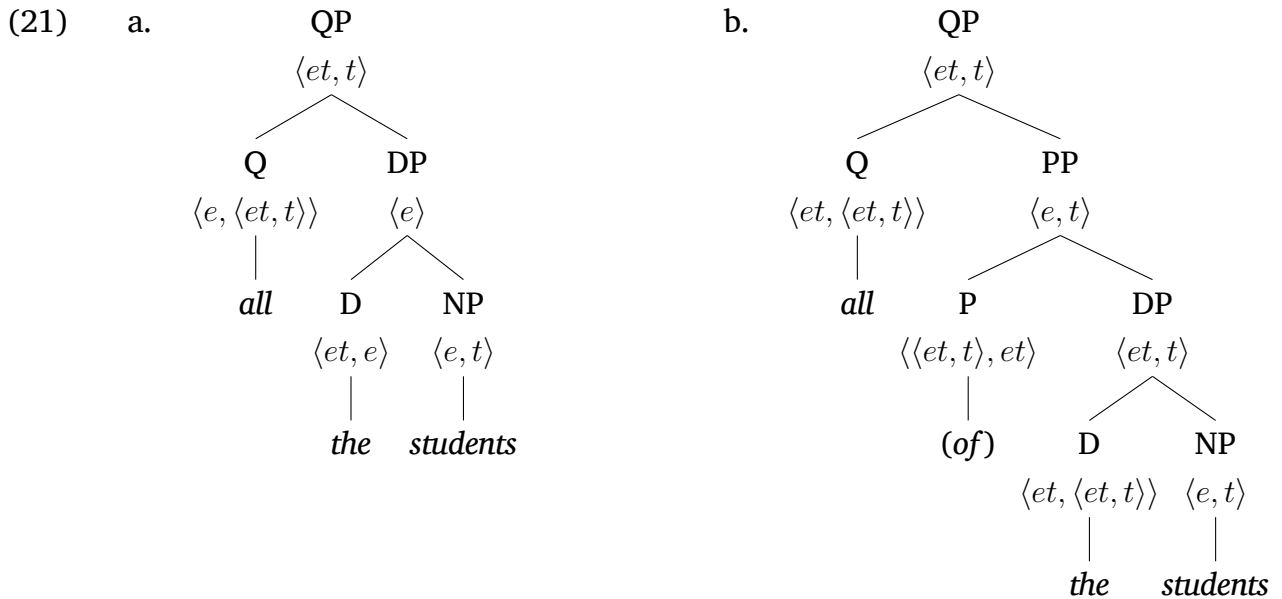
5.4   Revisiting Matthewson's theory of quantification

As mentioned in Chapter 3, the interaction between quantifiers and other elements in the nominal spine, including plural markers, reflects many cross-linguistic variations with respect to domain-restricting strategies. It is well-known that quantifying domains do not range over all individuals in the world, but they are always restricted to some extent by overt or covert means (von Fintel 1994). Accordingly, as previously mentioned in Chapter 3 (Section 3.3), under the classic generalized quantifiers theory (GQT), quantifiers like '*all*' and '*some*' are assumed to combine with noun phrases to create generalized quantifiers of sorts (Montague 1974, Barwise & Cooper 1981, Keenan and Stavi 1986, Partee at al. 1990, among others).

While this formal analysis is widely assumed, many authors have argued that this template can not capture various quantificational structures/strategies found in natural language with respect to domain restriction. In particular, there are mainly two lines of thought from a cross-linguistic perspective focusing on (i) whether there is an overt restricting means (like a distinctive lexical item) in a certain language or it employs a covert, contextual restricting strategy as found with English *every* (Matthewson 2001, Giannakidou 2004, Etxeberria 2005, among others); and (ii) if there is an overt one, where and how that means takes place, i.e. whether it is directly realized in the quantifier or in other locations (Martí 2008, 2009, Stanley & Szabó 2000, Etxeberria 2005, 2009, Etxeberria & Giannakidou 2010, among others).

Most notably, Matthewson (2001, 2013) argues that in some languages like St'át'imcets, the restriction of quantifier domain uniformly follow a two-step strategy. Thus, the noun phrase will first combine with a definite determiner to create a DP, then, the it is the DP, but not NP, that is the input for the quantifier to create a generalized quantifier, corresponding to a quantifier phrase. For instance, in St'át'imcets, the counterpart of *students* is assumed to first combine with a determiner counterpart of English *the* to create the maximal group/plural entity of students. Then, the counterpart of *all* would apply to that outcome-entity to create the generalized quantifier *all the students* (see the structure (21-a) below).
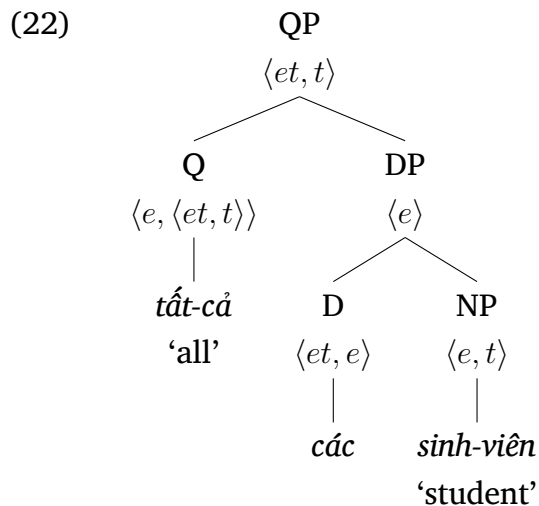
(21)   a.

$$
\begin{array}{c}
\text{QP} \\
\langle et, t\rangle
\end{array}
$$

Tree (21a):
- QP $\langle et,t\rangle$
  - Q $\langle e,\langle et,t\rangle\rangle$
    - *all*
  - DP $\langle e\rangle$
    - D $\langle et,e\rangle$
      - *the*
    - NP $\langle e,t\rangle$
      - *students*

b.

Tree (21b):
- QP $\langle et,t\rangle$
  - Q $\langle et,\langle et,t\rangle\rangle$
    - *all*
  - PP $\langle e,t\rangle$
    - P $\langle\langle et,t\rangle,et\rangle$
      - (*of*)
    - DP $\langle et,t\rangle$
      - D $\langle et,\langle et,t\rangle\rangle$
        - *the*
      - NP $\langle e,t\rangle$
        - *students*

However, as Giannakidou (2004) points out, Matthewson's hypothesis leads to various empirical problems (e.g., how do we account for cases found in Greek or Basque where the quantifier Q appears under D, i.e. [D [Q NP]]) and that the standard one-step analysis still can be accommodated to account for cross-linguistic divergences in how quantifying domains are restricted, given the two following assumptions: (i) the Q(uantifier) item is a nominal domain restrictor, and (ii) languages differ concerning whether they overtly or covertly restrict their quantificational domain.

Along this line, Etxeberria (2004, 2005, 2009) argues that Basque quantification data provide clear evidence for the need for both strategies: by appealing to a standard quantifier-determiner of type $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$ (Westerståhl 1985, Fintel 1994, Martí 2003, among others) as well as nominal domain restriction (Stanley & Szabó 2000, Stanley 2002). Thus, under his proposal, the variation of domain restriction is boiled down to the distinction between two different types of quantifiers, i.e., lexically strong quantifiers (e.g., Basque *guzti* 'all') vs. strongly-interpreted but lexically-weak quantifiers (e.g. Basque *batzuk* 'some' in partitives). Given this approach, the structure of QP *all of the students* in English might be reparsed as in (21-b)[5].

Can we adopt Matthewson's theory of quantification to account for the interaction between PMs and quantifiers in Vietnamese as sketched out in (22)?

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[5]Note that Etxeberria treats the partitive particle *of* as an instantiation of BE operator which shifts expressions of type $\langle et,t\rangle$ to those of type $\langle e,t\rangle$:
$[\![\,\text{BE}\,]\!] = \lambda P_{<et,t>}.\lambda x_e.\ P(\lambda y_e.\ y = x])$ (Partee 1986).

(22)

```
                    QP
                  ⟨et, t⟩
                 /        \
               Q            DP
          ⟨e, ⟨et, t⟩⟩       ⟨e⟩
               |            /    \
            tất-cả         D      NP
             'all'       ⟨et, e⟩  ⟨e, t⟩
                           |        |
                          các    sinh-viên
                                 'student'
```

Given what I have presented in the previous section, the answer seems to be negative in the sense that *các* and *những* should not be taken as means of creating DP, i.e. acting on par with definite/indefinite articles in other languages as what Nguyen H.T. (2004) suggests along the lines of Nguyễn T.C. (1996). In other words, if we treat *các/những* as definite/indefinite determiners restricting the quantifier domain of *tất-cả* along the lines of Nguyen H.T. (2004) to support Matthewson's proposal, then it is not transparent how to account for their empirical optionality in many cases as shown in the last section. The discussion in the last sections, thus, has supplemented another piece of evidence in rejecting the article approach to PMs *các/những* adopted by many authors since Nguyễn T.C. (1996), and favoring the proposal treating them as canonical PMs in Vietnamese, on a par with plurality morphology in number-marking languages, which are number modifiers necessary for satisfying number-related presuppositions of quantifiers imposing on their domain restrictor only.

5.5 Explaining a gap in wh-quantification involving *cũng*

5.5.1 Overview

The aim of this section is to investigate an unnoticed disappearance of the universal force pertaining to 'plural' wh-elements like *những ai* and the alleged universal A-quantifier *cũng* as illustrated in (90).

(23)   a.   *Ai$_F$ **cũng** đã giúp Nam.*
          who CUNG PST help Nam
          = 'For those who also helped Nam, who are they?'   (interrogative)
          = 'Everyone helped Nam.'   (wh-quantification)

    b.   *{Những ai}$_F$ **cũng** đã giúp Nam.*
          PL   who CUNG PST help Nam
          = 'For those who also helped Nam, who are they?'   (interrogative)
          ≠ 'Everyone helped Nam.'   (#wh-quantification)

The main research question here is this: what factor(s) underlies the quantificational disappearance above, given Tran's (2009) assumptions that *cũng* is assumed to be a universal A-quantifier and *ai* introduces a set of individual. Thus, this section will be organized as follows: Tran's (2009) quantifier account of *cũng* to capture the universal reading observed in (90) and the gap in his analysis involving the pattern of [*những* + wh-indefinite] will be covered in Subsection 5.5.1; next, a lexical account of wh-items like *những-ai* based on Chierchia & Liao's (2015) typology of wh-indefinites will be proposed and challenged. Finally, Subsection 5.5.3 will present a remedy for the gap along the lines of a presuppositional account of D-quantifiers established in previous chapters so that Tran's basic ideas can still be maintained.

5.5.2 The gap in Tran (2009): quantification–plurality in conflict

All the languages have some kinds of wh-elements like *what, who, where, how, why* to form interrogatives. However, unlike English wh-elements, these counterparts in classifier languages like Vietnamese can also surface in various constructions with non-interrogative interpretations (Tran 2009, Tsai 2009, Nguyễn H.C. 2015, among others). These non-interrogative uses of wh-elements/wh-items make them also known as wh-indefinites in these languages (or 'indeterminate pronouns' – 'đại

từ phiếm định' in Vietnamese), i.e., indefinites in wh-disguise (Huang 1982, Lin 1998b, Kratzer & Shimoyama 2002, Kratzer 2005, among others). This distinction can be illustrated by the contrast between the interrogative *ai* 'who' in (24-a) versus a paradigm of various environments licensing the non-interrogative uses of *ai* 'someone/ anyone/everyone' in Vietnamese as in (24)-b to -f.

(24)   a.   *Nam muốn gặp   ai?*
              Nam want meet who
              'Who does Nam want to meet?'   (interrogative *ai*)

        b.   *Nam chẳng muốn gặp   ai.*
              Nam NEG   want meet who
              'Nam doesn't want to meet anyone'

              or 'It's not the case that Nam wants to meet someone.'   (negation)

        c.   *Nam muốn gặp   ai   rồi   à?*
              Nam want meet who already Q_{yes-no}
              'Has Nam wanted to meet someone already?'   (yes-no question)

        d.   *Nếu ai   hỏi gặp   Nam thì   nói anh-ấy bận.*
              if   who ask meet Nam then say 3SG.M busy
              'If someone asks to meet Nam, please say that he's busy.'   (if-clause)

        e.   *Ai   Nam cũng   muốn gặp.*
              who Nam CUNG want meet
              'Nam wants to meet anyone/everyone.'   ($\forall$ wh-quantification)

        f.   *Hình-như có   ai   muốn gặp   Nam.*
              seemingly have who want meet Nam
              'It seems that someone wants to meet Nam.'   (epistemic modal)

As far as the universal reading of wh-indefinite is concerned, it is worth emphasizing that the salient interpretation involving the additive *cũng$_A$* 'also', as illustrated by (25-a), is a universal quantification reading when a wh-indefinite like *ai* 'who' is found in the focused subject/topic position, not an additive one.

(25)   [Context: Nam is a hard-working student, but his family is very poor. His mother is now in the hospital, preparing for surgery. So, the university's Youth Union has initiated a campaign to help him and his family. Some students have donated to help Nam.]

        a.   *Hùng/Tất-cả giáo-sư   cũng   đã   giúp Nam.*
              Hùng/all   professor CUNG PST help Nam
              'Hùng/All the professors also helped Nam.'   (additive *cũng$_A$*)

        b.   *Ai$_F$ (trong-lớp) (thì) cũng đã   giúp Nam.*
              who (in-class) TOP CUNG PST help Nam
              'Everyone (in the class) helped Nam.'   (quantificational *cũng$_F$*)

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From a cross-linguistic perspective, this kind of universal reading involving wh-indefinites is commonly found in many classifier languages, including Japanese and Mandarin Chinese. Below are comparable examples between Japanese *-mo*, Vietnamese *-cũng*, and Mandarin Chinese *dou*[6].

(26)   a.   *Dare-**mo**-ga   hohoen-da.*
           who-MO-NOM smile-PST
           'Everyone smiled.'   (Japanese *-mo*)

           b.   *Ai$_F$ **cũng** đã mỉm-cười.*
           who CUNG PST smile
           'Everyone smiled.'   (Vietnamese *cũng*)

           c.   *Zhè gè wèntí$_F$, shéi **dōu** huì   huídá.*
           this CLF question who DOU be.able answer
           'Everyone can answer this question.'   (Mandarin *dou*)

In principle, the role of *cũng$_F$* in wh-quantification can be linked to the additive use of *cũng$_A$* 'also' in view of the fact *cũng$_F$* can only be found in focus-related constructions, as shown in (28), which are assumed to exclude, include or make reference to contextually relevant alternatives by means of focus particles like ONLY, ALSO, or/and EVEN cross-linguistically (Horn 1969, Rooth 1992, König 2002, Ippolito 2007, Beaver & Clark 2009, Büring 2016, Liao & Jheng 2025, among others)[7].

(27)   a. $[\![\textbf{\textit{cũng}}_A]\!] = \lambda p.\lambda w: \underbrace{\exists q[q \in \mathrm{ALT}(p, C_{Foc}) \wedge q(w) = 1]}_{\text{additive presupposition}}.\ p(w)$

           where $\mathrm{ALT}(p, C_{Foc}) = \{\ q : p \nsubseteq q \wedge q \nsubseteq p \wedge q \in C_{Foc}\ \}$

           b.   Nam *cũng$_A$* arrived.
           $\rightarrow$ Nam arrived.   (assertion)
           $\gg$ There's someone other than Nam who arrived.   (presupposition)

(28)   a.   *Ai$_F$ **cũng$_F$** đã mỉm-cười.*
           who CUNG PST smile
           'Everyone smiled.'   (focus wh-quantification)

           b.   *Ngay-cả Nam$_F$ **cũng$_F$** đã tới.*
           even   Nam CUNG PST come
           'Even Nam (also) came.'   (focus EVEN-sentence)

However, building on Kratzer & Shimoyama's (2002) Hamblin semantics (also

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[6]Notice that the presence of the modal verb *hui* is found to be obligatory in Mandarin. In other words, unlike Japanese *-mo* and Vietnamese *cũng*, universal wh-quantification in Mandarin can only be allowed in modalized environments.

[7]Note that in contrast with ONLY – an exclusive focus particle, both ALSO and EVEN are considered as inclusive focus particles, i.e. bringing up certain backgrounded alternatives that cannot be negated/excluded without causing contradiction.

known as alternative semantics) for Japanese *mo*-phrases, Tran (2009:116–118) distinguishes *cũng_F* from *cũng_A* by attributing the quantificational force in focus wh-quantification sentences like (25-b) or (26-b) to the former. Thus, under his account, *cũng_F* functions as a universal quantifier quantifying over a set of alternatives, not a focus marker on par with *cũng_A* 'also' as shown in (27).

(29)   Tran's (2009:117) account of universal wh-quantification involving *cũng_F*

    a.   *Ai_i [_{TopP} Tân [_{FocP}t_i **cũng** đã   giúp]]*
        who   Tân   CUNG PST help
        'Tân helped everyone.'

    b.   LF: [**cũng**$_F$ [$_{FocP}$ ai$_i$ [$_{Foc'}$ 1 [$_{TP}$ *Tân đã giúp* t$_i$]]]]

    c. $[\![ai]\!]^{w,g} = \lambda w'. \lambda x.$ x is human in w'

    d. $[\![FocP]\!]^{w,g} = \{p : \exists x [\text{human}(x) \wedge \text{helped}(\text{Tân})(x)(w')]\}$

    e. $[\![\textbf{cũng}_F]\!]^{w,g} = \lambda\alpha_{<st,t>}.\lambda w'_s. \forall p \in D_{<s,t>}. \alpha(p) = 1 \rightarrow p(w') = 1$

                                                  (slightly revised)

Details aside, if A, B, C are three individuals in the domain denoted by the wh-indefinite $[\![ai]\!]$, given Tran's account, the denotation of (29-a) is assumed to be the set consisting of three true alternatives: {that Tân helped A, that Tân helped B, that Tân helped C}. Overall, this analysis successfully captures the universal reading involving *cũng_F* in sentences like (29-a) or (26-b). However, his analysis runs into an overgeneralization in cases where a plural marker like *những* is adjoined to the wh-indefinite, such as *những ai* as shown in (32-b). Thus, the problem is this: under his analysis, in particular, the meaning of *ai* as defined in (41-c), the universal reading should have arisen like the bare *ai* counterpart in (32-a), contrary to fact. For instance, if *những ai* introduces a set of both three individuals A,B,C and their sums, i.e. {A,B,C,A⊕B,A⊕C,B⊕C,A⊕B⊕C}, the corresponding set of alternatives involving (32-b) can be represented as in (31-b). Given this alternative set, the universal reading should have arisen as it does with (29-a) or (32-a), contrary to fact[8].

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[8]Note further that *những wh*-items can only surface in wh-questions (i.e. constituent questions).

(30)   a.   *{Những ai}_F **cũng** đã   giúp Nam?*
           PL   who also PST help Nam
           'For those who also helped Nam, who are they?'   (*who*-question)

    b.   *(Có) *những-ai/ai đã   giúp Nam phải không?*
          have PL-who/who PST help Nam yes   no
           'There is someone who helped Nam, right?'   (yes-no question)

    c.   *Vấn-đề này thì   *những-ai/ai quan-tâm chứ?*
           issue DEM TOP PL-who/who care   PRT
           'Who cares about this issue?'   (rhetorical question)

(31) a. $[\![\textit{nh\~ung ai}]\!]^{w,g} = \lambda \text{w}'.\ \lambda \text{x. x is a human or a group of human in w}'$

     b. Set of alternatives of (29-a):
        {that A helped Nam, that B helped Nam, that C helped Nam, that A and B helped Nam, that A and C helped Nam, that B and C helped Nam, that A and B and C helped Nam}

(32) a. *Ai$_F$* **cũng** *đã giúp Nam.*
        who CUNG PST help Nam
        = 'Everyone helped Nam.'   (✓universal)

     b. *{Những ai}$_F$* **cũng** *đã giúp Nam.*
        PL   who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?' (✓interrogative)
        $\neq$ 'Everyone helped Nam.'   (#universal)

In sum, under Tran's (2009) approach, we run into an overgeneration problem where the quantificational force presumably encoded in *cũng* is somehow nullified when it gains access to the set of alternatives introduced by the 'plural' wh-indefinite PM *những-ai* in (31-b). How can we accommodate this quantificational disappearance in (32-b) to Tran's (2009)? Can we attribute the contrast between (32-a) and (36-b) to a lexical idiosyncrasy of items like *những ai* that favors the interrogative use, semantically corresponding to existential quantifiers, given Chierchia & Liao's (2015) typology of indefinites? To look ahead briefly, I will argue that the composition in (43-b) cannot have any non-interrogative uses, including the universal use involving the bare form *ai*, i.e. introducing a set of alternatives, not due to a lexical idiosyncrasy of the item *những ai* that rooted in the locality conditions along the lines of Kratzer & Shimoyama (2002) but presumably arises from a formal constraint encoded in the semantics of *cũng$_F$*.

5.5.3 First attempt: a lexical account of *những wh*-items

Building on Karttunen's (1977) classic assumption that wh-words inherently are indefinites (e.g., *who = some person*), Chierchia & Liao (2015) compare indefinite uses involving Mandarin wh-items like *shenme* with counterparts in other languages (e.g. English *who*) and propose that the semantic characteristics of cross-linguistic wh-items can be captured via a feature system consisting of two parameters, i.e. [wh] feature referring to their interrogative use and [Σ] referring for their various indefinite uses in various polar environments.

Thus, indefinites that disallow the interrogative use can be formalized as disallowing '+' on their wh-feature (e.g., *some/a/ein* or PSIs like *any/irgendein*), i.e. [$-wh$]-only items, in which PSIs like *any/irgendein* can be further determined as

obligatorily [$+\Sigma$] in contrast to the plain indefinites *some/a/ein*. Importantly, wh-words are only compatible with the interrogative use like English *who* can be conceptualized as [$+wh$]-only items.

(33)   Mandarin *shenme*: [$+\Sigma$, U-wh] (U = unconstrained)

Given the features of *shenme* as in (33), Chierchia & Liao (2015:53) suggest that there are only three kinds of environments (i.e. a - interrogatives, b - DE environments, and c - modalized environments) that can license such wh-items in Mandarin, as shown below (with English as a metalanguage)[9].

(34)   a.   Which boy(s) did you see?   (interrogative)
            (i) C_{INT} [you saw *shenme* boy[$+\Sigma,+wh$]]
            (ii)   Interpretation: $\lambda p \exists x$ [boy$_{wo}$ (x) $\wedge$ p $= \lambda w.$ you saw$_w$ x]
        b.   Zhangsan didn't eat anything.   (DE)
            (i) $O_{SA \cup DA}$ [Zhangsan not eat *shenme* thing[$+\Sigma,-wh$]]
            (ii)   Interpretation: $\neg \exists x$[thing(x) $\wedge$ Z ate x]
        c.   Zhangsan might have eaten something.   (modalized environments)
            (i) $O_{SA \cup DA}$ [Zhangsan seem eat-PERF *shenme*[$+\Sigma,-wh$]]
            (ii)   Interpretation: $\Diamond$Z ate a $\wedge$ $\Diamond$Z ate b $\wedge \ldots$, for all things in D
        d.   Ungrammatical structures
            (i)   [I saw *shenme* boy[$-\Sigma,-wh$]]   (Ill-formed)
            (ii) $O_{SA \cup DA}$ [I saw *shenme* boy[$+\Sigma,-wh$]]   (Contradictory)

Details aside, Chierchia & Liao (2015:55) posit that all indefinites in natural languages should fall into six following subcategories based on their feature parameters as shown in **Table 5.2** with a temporary empirical gap indicated by the asterisk[10] (*m'aax* 'someone/who' is a regular indefinite in Yucatec Maya that can turn into a wh-word when focused).

    Now, where do Vietnamese wh-items formed with PMs like *những ai* fit in this typology? Given the fact that these items can only surface in interrogatives, it seems plausible for us to take them in alignment with English wh-words like *who*, i.e. [$+\Sigma,+wh$-only] items, whereas the bare wh-items like *ai* will parallel Chinese

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[9]Abbreviations: C_{INT} = the interrogative operator C; $O_{SA \cup DA}$ = exhaustification over the conjunction of Scalar Alternatives (SA) and Sub-Domain Alternatives (DA) via the covert O operator (= the Exh operator); $\Diamond$ = the existential modal operator. Besides, for a challenge to the exhaustivity thesis (i.e., NPIs and FCIs are licensed by a clausal covert Exh operator) assumed in Chierchia & Liao (2015), see Giannakidou (2018) and the references therein for the relevant discussion.

[10]Note that there are presumably no [$-\Sigma$]-only items because if Σ is obligatorily '$-$', the wh-component must be available (i.e. bearing '+'), resulting in $+\Sigma$ since the interrogative operator C is assumed to always trigger $+\Sigma$.

Table 5.2: A typology of indefinites (Chierchia & Liao 2015:55)

	U-wh	[$-wh$]-only	[$+wh$]-only
U-Σ	*m'aax*	*a/some*	*
[$+\Sigma$]-only	*shenme*	*any*	*who*

wh-forms like *shenme* as [U-wh, $+\Sigma$-only] items, as represented in **Table 5.3**.

(35)   The conjecture: two kinds of (argument) wh-items in Vietnamese

    a.   *ai* 'who'/*gì* 'what'/*đâu* 'where' /X-*nào*: [$+\Sigma$, U-wh]

    b.   *những + ai/gì/đâu/X-nào*: [$+\Sigma$,$+wh$-only] (on par with English *who*)

Table 5.3: A typology of indefinites (with **Vietnamese** items added)

	U-wh	[$-wh$]-only	[$+wh$]-only
U-Σ	*m'aax*	*a/some*	*
[$+\Sigma$]-only	*shenme/**ai***	*any*	*who/**những ai***

Given the assumption (35), it is predicted that *những ai* can only allow the interrogative use (interpreted as an indefinite like *some people*), whereas *ai* can give rise to various readings contingent on its environments (interrogatives, DE, or modalized environments), on a par with Mandarin counterpart *shei*. Besides, given that *cũng*$_F$ can only appear in quantificational statements, this characterization of wh-items formed with *những* doesn't only account for our puzzle with episodic environments as shown in (36-b), but also captures their incompatibility in DE and modalized environments, as attested in (37-a) and (37-b) (i.e. the only reading they can have is interrogative).

(36)   a.   *Ai$_F$ **cũng** đã   giúp Nam.*
          who CUNG PAST help Nam
          = 'Everyone helped Nam.'   (✓universal)

    b.   *{Những ai}$_F$ **cũng** đã   giúp Nam.*
          PL   who CUNG PAST help Nam
          = 'Who also helped Nam?'   (*những ai*: [$+wh$,$+\Sigma$])
          ≠ 'Everyone helped Nam' or 'Whoever helped Nam.'   (#universal)

(37)   a.   *Nam không gặp   những ai.*
             Nam NEG   meet PL   who
             $\neq$ 'Nam didn't meet anyone.'   (DE)
             $=$ 'Who Nam didn't meet?'

       b.   *Nam được đọc   bất-kỳ   những quyển sách   nào.*
             Nam may   read BAT-KY PL   CLF   book which
             $\neq$ 'Nam is allowed to read any book.'   ($\Diamond$)
             $=$ 'Which books is Nam allowed to read at will?'

In other words, there presumably are no such things as plural NPIs in Vietnamese since all the NPI uses (including the free choice reading) are assumed to arise only in DE and modalized environments.[11]

More importantly, given this typology, Tran's (2009) quantifier-account of *cũng$_F$* seemingly can be maintained on the two following assumptions which jointly rule out the access between the universal quantifier *cũng$_F$* to *những wh*-items due to the intervention of an existential quantifier inherently binding $[+\Sigma,+wh\text{-only}]$ items, as shown in (38):

(i) *cũng$_F$* can only associate with the closest unbound wh-indefinites (i.e. the locality conditions involving indeterminate phrases and propositional quantifiers along the lines of Kratzer & Shimoyama 2002, Shimoyama 2006), and

(ii) *những wh*-items can only function as wh-words, semantically corresponding to existential quantifiers, in interrogative sentences.

(38)   *CŨNG [$\exists$ [*những ai* [*c̶ũ̶n̶g̶$_F$* ...]]]

Thus, the disappearance of the universal reading involving *cũng$_F$* and *những wh*-items in Vietnamese is comparable to the only salient additive, but not universal, reading observed with the second *-mo* in sentences like (40) in Japanese in the sense that both are natural consequences of the locality conditions involving the interaction between quantifiers and wh-indefinites.

(39)   The comparable locality conditions involving Japanese *-ka/mo* (Shimoyama 2006:148)

    a. *[[... [... **ind** ...]-**ka/mo**] ......] -**ka/mo**

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[11]I leave open to the question whether the semantics of wh-indefinites in episodic environments like (36-a) (corresponding to English *wh-ever*) can be reduced to their NPI uses in DE and modalized environments like (37), in parallel with English *any*, for future research.

b.   [. . . [. . . **ind**. . .]_{CNP/Adjunct} . . . . . .] **-ka/mo**

(40)   *[[[[Taro-ga nan-nen-ni   nani-nituite kaita] ronbun]-**mo** yonda]*
Taro-NOM   what-year-in what-about wrote paper-MO   read
*sensei]-**mo**   totemo tukareta.*
teacher-MO very   got.tired
= 'The teacher who read, for every topic x, every year y, the paper that
Taro wrote on x in y ALSO got very tired.'
≠ 'For every year y, the teacher who read, for every topic x, the paper that
Taro wrote on x in y got very tired.'
≠ 'For every topic x, the teacher who read, for every year y, the paper that
Taro wrote on x in y got very tired.'

     However, a problem of this lexical, locality-based account is, as Chris Hsieh
(p.c.) points out, that it is rooted in the speculation that *những-ai* (as a chunk)
and *ai* are different entries in the Vietnamese lexicon, something in contrary to the
compositional picture that we have drawn so far with respect to the plural markers
like *những* and their associating nominals in previous chapters. On the other hand,
if *những-ai* can be decomposed into *những* 'PL' + *ai* 'who', it is still not transparent
why the output of this composition is not allowed to participate in all kinds of non-
interrogative uses involving wh-indefinites like the bare form *ai*. In other words,
the puzzle still remains open.
Besides, under Tran's (2009) analysis, given that *cũng* is a propositional quantifier,
it cannot directly bind/quantify over the variable introduced by the wh-indefinite
in the same way as Kratzer & Shimoyama's account of Japanese *-ka/mo* (as cross-
categorical quantifiers) unless the semantics of *cũng_F* is revised in such a way that
aligns it with canonical universal quantifiers like *mọi* 'every'.
     Given these two drawbacks, it is necessary for us to develop an alternative
account for wh-quantification involving *cũng*. To anticipate, in the next section, I
will show that the contrast at issue between wh-indefinites *những-ai* and *ai*, at least
in the case of wh-quantification with *cũng_F*, might be explained away under a formal
constraint over the set of alternatives introduced by the wh-indefinite encoded in
the semantics of the quantifiers in the vicinity, i.e., that of *cũng_F* in the case of
universal wh-quantifications.

5.5.4   Second attempt: a presuppositional account of *cũng_F*

Now recall that under Tran's (2009) analysis, as repeated in (41), the set of alter-
natives introduced by the node FocP in (41-b) is the output of the wh-indefinite *ai*

in combination with the Foc′ is assumed to be a set of singular subjects/objects like (assuming there are three individuals A, B, C in the domain): {that Tân helped A, that Tân helped B, that Tân helped C}.

(41)   Tran's (2009:117) account of universal wh-quantification involving *cũng*

    a.   *Ai$_i$ [$_{TopP}$ Tân [$_{FocP}$t$_i$ cũng đã giúp]]*
        who   Tân   CUNG PST help
        'Tân helped everyone.'

    b.   LF: [***cũng*** [$_{FocP}$ *ai$_i$* [$_{Foc′}$ 1 [$_{TP}$ *Tân đã giúp* t$_i$]]]]

    c. $[\![ai]\!]^{w,g} = \lambda w'. \lambda x.$ x is human in w'

    d. $[\![\textbf{\textit{cũng}}]\!]^{w,g} = \lambda\alpha_{<st,t>}.\lambda w'_s. \forall p \in D_{<s,t>}. \alpha(p) = 1 \rightarrow p(w') = 1$
                                               (slightly revised)

The singularity property of the set of alternatives involving *ai*, as shown in (41-c) is something implicitly assumed in Tran (2009). However, as we have pointed out in the previous section, nothing in Tran's account, at least in the current form, can prevent us from having a composition between *những-ai* and a corresponding Foc′ to yield a set of alternatives with plural subjects/objects as in (43-d), not (43-c), for wh-quantifications like (42) (assuming the same domain with three individuals A, B, and C).

(42)   *{Những ai}$_F$ **cũng**$_F$ đã giúp Nam.*
       PL   who CUNG PST help Nam
      = 'For those who also helped Nam, who are they?'   (✓interrogative)
      ≠ 'Everyone helped Nam.'   (#universal)

(43)   a. $[\![\textbf{những}]\!] = \lambda P_{<e,t>}$: P is an atomic property $\wedge \exists P'$ such that $P \subset P'$. $\lambda x_e. [\exists Q [Q \subseteq P \wedge x=\oplus Q]]$

    b. $[\![\textit{những ai}]\!]^{w,g} = \lambda w'. \lambda x.$ x is a human or a group of human in w'

    c.   Set of alternatives involving *ai*:
        {that A helped Nam, that B helped Nam, that C helped Nam}

    d.   Set of alternatives involving *những-ai*:
        {that A helped Nam, that B helped Nam, that C helped Nam, that A and B helped Nam, that A and C helped Nam, that B and C helped Nam, that A and B and C helped Nam}

I submit that the puzzle under discussion pertains to the structure of the set of alternatives that the quantifiers can access. In other words, the problem here can be reduced to the question of how we can constrain the set of alternatives to rule out sets like (43-d) and only rule in sets like (43-c). Along the spirit of the presuppositional account of D-quantifiers established in previous chapters, I suggest that this

constraint can be presupposed in the semantics of the quantifier in the vicinity, i.e., the entry of *cũng_F* in universal wh-quantification cases.

How can we implement this idea? Notice what we observe in cases like (42) suggests that the assumed universal quantifier *cũng_F* is on par with entity-related ∀-quantifiers *mọi/mỗi* in the sense that they all require singular associating nominals in restrictor position. However, unlike *mọi/mỗi*, given that *cũng_F* is a propositional quantifier, it cannot impose a parallel number-related presupposition upon its domain restrictor in the same way as *mọi/mỗi* does since the restrictor of *cũng_F* is a set of propositions, not a set of entities, as repeated in (44).

(44)　　$[\![\boldsymbol{cũng}]\!]^{w,g} = \lambda\alpha_{<st,t>}.\lambda w'_s.\ \forall p \in D_{<s,t>}.\ \alpha(p) = 1 \rightarrow p(w') = 1$

$\hfill$(Tran's (2009) version)

On the assumption that the universal reading can only be obtained whenever *cũng_F* gains access to the set of alternatives in aligning with (43-c) but not (43-d), I posit that the semantics of *cũng_F* should be revised so as to rule out its access to domains whose alternatives with 'cumulative' subjects/objects like (43-d). More concretely, the following revised version of *cũng_F* presumably can help us accomplish this end by assuming that *cũng_F* presupposes the set of alternatives α to consist of only atomic, non-scalar propositions (i.e., they are logically independent of each other).

(45)　　The proposal: a revised entry of *cũng_F* (compare (44))

　　a.　$[\![\boldsymbol{cũng}]\!]^{w,g} = \lambda\alpha_{<st,t>}.\lambda w'_s\text{: } \exists p',p'' \in \alpha\ [p'(w') \not\subseteq p''(w') \wedge p''(w') \not\subseteq p'(w')].\ \forall p \in D_{<s,t>}.\ \alpha(p) = 1 \rightarrow p(w') = 1$

$\hfill$(revised version)

　　Informally, *cũng_F* presupposes the set of alternatives α to consist of only atomic, non-scalar propositions (i.e., they are logically independent of each other).

　　b.　Set of alternatives involving *ai*, i.e. $[\![\textit{ai đã giúp Nam}]\!]$:
　　{that A helped Nam, that B helped Nam, that C helped Nam}

　　c.　Set of alternatives involving *những-ai*, i.e. $[\![\textit{những-ai đã giúp Nam}]\!]$:
　　{that A helped Nam, that B helped Nam, that C helped Nam, that A and B helped Nam, that A and C helped Nam, that B and C helped Nam, that A and B and C helped Nam}

Given this revised account of *cũng_F*, since [that A and B helped Nam], [that B and C helped Nam], [that A and C helped Nam], and [that A and B and C helped Nam]

all entail [A helped Nam] or [B helped Nam], any domain consisting of such alternatives with 'cumulative' subjects doesn't meet the requirement of *cũng* imposing on α. In other words, $[\![\text{cũng}]\!]$ (α) isn't defined with domains like (45-c).

regarding domains like (45-b), since [A helped Nam], [B helped Nam], and [C helped Nam] are logically independent of each other, i.e. none is logically stronger/weaker than the other (viz., 'non-scalarity'), such domains are compatible with *cũng$_F$*. Hence, *cũng$_F$* is assumed to s-select only the propositional domain involving *ai* 'who' or *vị nào* 'which one' while undefined with domains involving *những wh*-items like *những-ai* since the structure of these alternative set formed by *những-ai* has non-atomic, scalar propositions in addition to atomic, non-scalar ones[12].

In fact, this atomicity, non-scalarity of the set of alternatives involving *ai* (something implicitly assumed in Tran 2009), does have supporting evidence from the facts that sentences like (41-a) can have the following paraphrase with the wh-indefinite of the form [CLF + (NP) + *nào*] in the place of *ai* 'who' (recall that ClPs are singular-atomic expressions, e.g. *vị giáo-sư (này)* '(this) professor'). Note that (46-d) will be deviant since the set of alternatives of *cũng$_F$* in this case cannot be formed by a composition between a (purely) atomic subject (i.e. *vị nào*) and a collective predicate (i.e. *đã họp nhau lại* 'gathered up for a meeting').

(46)   a. *(Giáo-sư viện   này), ai$_F$ Tân cũng$_F$ đã giúp.*
               professor institute DEM who Tân CUNG PST help
               'Tân helped every professor in this institute.'

        b. *(Giáo-sư viện   này), {vị nào}$_F$ Tân cũng$_F$ đã giúp.*
               professor institute DEM CLF which Tân CUNG PST help
               'Tân helped every professor in this institute.'

        c. *(Giáo-sư viện   này), {những vị nào}$_F$ Tân cũng$_F$ đã giúp.*
               professor institute DEM PL   CLF which Tân CUNG PST help
               $\neq$ 'Tân helped every professor in this institute.'
               $=$ 'Which professors in this institute did Tân also help?'

        d. **(Giáo-sư viện   này), {vị nào}$_F$ cũng$_F$ đã họp nhau lại.*
               professor institute DEM CLF which CUNG PST gather each.other back
               Intended: 'Every professor gathered up for a meeting.'

If this account is on the right track, similar to the deviance in (46-d), *cũng$_F$* should strongly prefer distributive over collective predicates (which require collective, group-denoting subjects). This prediction is borne out in view of the facts in (47): sentences with an inherently collective predicate like (47-b) or (47-c) are found to

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[12]Notice that these 'cumulative' sets of alternatives involving *những wh*-items like *những ai* can be reduced to the 'atomic' one (i.e. they are equally informative) involving bare wh-items like *ai* given the cumulativity of predicates like 'helped Nam', i.e. from 'A helped Nam' and 'B helped Nam', it can be inferred that 'A$\oplus$B helped Nam' (Krifka 1989,1992,1998).

be deviant with *cũng_F*. Empirically, the only available reading for such sentences is the interrogative one involving the additive *cũng*, as exemplified in (47-d).

(47) a. *(Nhóm này), ai   cũng_F đã ăn một chiếc pizza.*
          group DEM who CUNG PST eat one CLF   pizza
          'Everyone (in this group) ate a pizza.'   (distributive only)

      b. *#(Nhóm này), ai   cũng_F đã họp   nhau   lại   ở căng-tin.*
          group DEM who CUNG PST gather each.other back at canteen
          Intended: 'Everyone (in this group) gathered up in the canteen.'

      c. *#(Nhóm này), ai   cũng_F đã ăn một chiếc pizza cùng-nhau.*
          group DEM who CUNG PST eat one CLF   pizza together
          Intended: 'Everyone (in this group) ate a pizza together.'

      d. *(Nhóm này), ai   cũng_A đã ăn một chiếc pizza cùng-nhau?*
          group DEM who also   PST eat one CLF   pizza together
          'Who are the members of this group who also ate pizza together?'

Additionally, this account is also compatible with the semantically inclusive semantics of the plural marker *những* that we have arrived at in Chapter 4. Another welcome implication under this revised semantics of the quantifier *cũng_F* is that the set of alternatives involved now should have at least two propositions. Besides, by incorporating the non-scalarity presupposition into the focus *cũng_F*, now we can see the link between the focus *cũng_F* and the semantics of the additive *cũng_A* 'also', which also refers to a domain of non-scalar alternatives (see (27)) in the background. Finally, since *những wh*-items cannot have any non-interrogative uses like the bare wh-items, I assume that the atomicity, non-scalarity presupposition encoded in *cũng_F* can also be extended to account for other cases like (37) involving different quantifiers. However, given the scope of this study, I have to leave the relevant details regarding various non-interrogative uses of wh-indefinites for future studies.

5.6 Toward a unified account of Vietnamese *cũng/đều* (in comparison with Mandarin *dou*)

5.6.1 Overview

Beyond the puzzle of *những wh*-items, another aspect that Tran's (2009) analysis also mostly neglects is the interplay between *cũng_F*-quantification and *đều*-quantification, both obviously correspond to Chinese *dou*-quantification, as attested in (48) below.

(48) a. *Họ/Mọi-người/Các-bạn **đều/*cũng** đã giúp Nam.*
          they/everyone/friends DEU/CUNG PST help Nam
          'They/The friends/Everyone all helped Nam.'   (Vietnamese *đều*)

      b. *Ai_F **cũng/*đều** đã giúp Nam.*
          who CUNG/DEU PST help Nam
          'Everyone helped Nam.'   (Vietnamese *cũng*)

      c. *Tamen/Xuesheng-men/Mei-ge-ren/Shei **dou** renshi ta.*
          they/students/everyone/who DOU know him
          'They/The students/Everyone all know him.'   (Mandarin *dou*)

Thus, (48) shows that while there is a division of labour between *cũng_F* and *đều* in Vietnamese[13], *dou* can co-occur with all kinds of plural nominals in Mandarin on its left (i.e. the Leftness Condition). More specifically, whereas *cũng_F* can only combine with wh-indefinites to give rise to the universal reading, *đều* basically can co-occur with any kind of plural nominals but wh-indefinites, adjoined to its left, including plural pronouns (e.g., *họ* 'they'), sums (e.g., *Nam và Mi* 'Nam and Mi'), universal QPs (e.g., *mọi người* 'everyone' – as established in Chapter 3), and *các/những*-plurals, etc (i.e. the plurality condition) to bear a quantificational force. In other words, *cũng_F* and *đều* can be taken as two distinct particles in complementary distributions but play the same role as Mandarin *dou* as a distributor in (48).

Given that approximation, can we extend Tran's account of *cũng_F*-sentences to *đều* counterparts? The answer seems to still float in the air. In particular, it is not transparent how we can account for the doubling problem with both ∀-*mọi* or ∀-*tất-cả* or ∀-*cả* co-occurring with *đều*, given the assumption that *đều* is semantically identical to *cũng_F*, i.e. a universal quantifier of sorts, as illustrated in (49) (note that *đều* is optional in both sentences below).

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[13]In terms of etymology, *cũng* is posited to be the earliest reflex of (Late Old) Chinese 共 'common' beside *cùng, cộng* in Vietnamese (Alves 2018), whereas *đều* is most likely a native word, grammaticalized from the adjective/adverb *đều* 'equal/equally'. However, the possibility that *đều* is cognate to Chinese *dou* 都 (> Sino-Vietnamese *đô*) shouldn't be ruled out completely.

(49) a. *Mọi/Tất-cả sinh-viên (đều) đã tới.*
  every/all student DEU PST arrive
  'Every student arrived.'

b. *Cả Nam và Mi (đều) đã tới.*
  all Nam and Mi DEU PST arrive
  'Nam and Mi all arrived.'

This is exactly the Vietnamese version of the infamous puzzle of *mei-dou* co-occurrence in Mandarin. Note further that other than this quantifier-distributor use, Mandarin *dou* has been assumed to have at least two other uses, namely as free choice item(FCI)-licenser (e.g. *Shei **dou** keyi jiao jichu Hanyu* 'Anyone can teach Intro Chinese'), and as scalar operator (e.g. *(Lian) duizhang **dou** chi dao le* 'Even the team leader arrived late'). The comparable function we focus on here is the quantifier-distributor use of *dou* only.

In what follows, I will sketch out an approach to uniformly capture the distributions and the quantificational force involving *cũng$_F$* and *đều* along the lines of non-quantifier, focus-related accounts of Mandarin *dou* first proposed in Liao (2011), then developed in different directions in Xiang (2020) and Liu (2016; 2017; 2021). The provisional approach I would like to give a try here is to sever the quantificational force from Vietnamese *cũng$_F$* and *đều* and trace it, if there's any, from a different source via a focus-related mechanism.[14]

Now, before I present my account of *cũng$_F$* and *đều*, let us turn to the syntactic-semantic characteristics of *dou*, in particular the puzzle of *mei-dou*, as recapitulated in Luo (2011), Tsai (2015), and Liu (2021) to best facilitate our upcoming discussion.

5.6.2 Mandarin perspective: two accounts of *mei-dou*

Overall, there are two prominent accounts of *dou* proposed in the literature to capture the co-occurrence of *mei-dou* as illustrated by (50-a), in view of the fact that one universal D-quantifier typically cannot co-occur with another universal A-quantifier cross-linguistically (let us term it as "the doubling problem"), as illustrated with English in (50-b).

(50) a. ***Mei**-ge ren *(**dou**) lai le.*
  MEI-CLF person DOU   come PERF
  'Every man came.'   (Chinese)

b. ***Every** man (*each/*all) came.*   (English)

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[14]Note further that, up to this point, I still leave open to the question of whether there is only one *cũng* in the lexicon, i.e. whether the role of *cũng$_F$* in focus-related constructions like (48) can be reduced to the presumably primitive additive *cũng$_A$*.

- **The distributivity operator approach** takes *dou* to be a distributivity operator similar to English each (Lin 1998a, Yang 2001, Chen 2008, among many others)[15]

- **The maximality operator approach** takes *dou* to be ι (or the σ operator in the sense of Sharvy 1980; Link 1983) that encodes maximality/uniqueness, similar to English definite article *the* (Giannakidou & Cheng 2006, Xiang 2008, Cheng 2009, among others)[16]

As the most widely-assumed theory of *dou* and *mei*, Lin (1998a) assumes *dou* to be a distributive-universal quantifier on par with English *each*, and attributes the semantics of a maximal operator on par with *the* to *mei*.

(51)   Lin's Proposal: Definite article *mei* (type $\langle\langle e,t\rangle, e\rangle$)
       $[\![\text{MEI-(CL)}]\!]$ = that function f such that for all P$\in$D$_{<e,t>}$, f(P) = $\bigcup [\![\text{P}]\!]$ [17]

More concretely, adopting Schwarzschild's (1996) ideas on plurality cover (i.e. ways of grouping/partitioning elements in a set) and especially the generalized D(-istributive) operator working on those cover sets, Lin takes *dou* to be an instantiation of this kind of operator.[18]

(52)   a.   C is a plurality cover of A iff C covers A and no proper subset of C covers A.
       b.   C covers A if:
            (i)   C is a set of subsets of A.
            (ii)   Every member of A belongs to some set in C.
            (iii) $\varnothing$ is not in C.

(53)   X $\in [\![\text{D(Cov)}(\alpha)]\!]$ iff $\forall$y[(y $\in [\![\text{Cov}]\!]$ & y $\subseteq$ X) $\rightarrow$ y $\in [\![\alpha]\!]$] (Schwarzschild 1996:70-71)

(54)   Lin's proposal: Distributive-universal Quantifier ***dou*** (type $\langle\langle e,t\rangle, \langle e,t\rangle\rangle$)
       $[\![\text{DOU}]\!]$ = λP$_{<e,t>}.\lambda$X$_e$. $\forall$y[y$\subseteq$X $\wedge$ y $\in [\![\text{cov}]\!]$ $\rightarrow$ P(y)], where P$\in$D$_{<e,t>}$
       (Lin 1998a:238)

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[15]For variations of the distributivity operator approach to *dou* within the framework of event structures/semantics, see Huang (1996,2005), Lin T.H. (2005), among others.

[16]I temporarily set this account aside in what follows and leave open to its feasibility with respect to Vietnamese counterparts for future elaborations.

[17]The result is the union of all individuals that are in the extension of the common noun. For example, *mei-(yi)-ge ren* 'every-one-Cl-man' would denote the same entity as *the men*.

[18]Regarding the syntax, Lin adopts Beghelli & Stowell's (1997) scope-based theory of English DQPs *every/each* in which *dou* heads DistP and forces its plural DP associate (denoting **Cov**) to move to [Spec-Dist.P] position for feature-checking.

The following derivation illustrates Lin's account of *dou*-quantification by appealing to "cover set".[19]

(56) a. *Naxie ren   **dou** shi fuqi.*
those people all   be husband-and-wife
'Those people are all husbands and wives (couples).'

b. Suppose ⟦*na-xie ren*⟧ = {a,b,c,d}; then ⟦cov_R⟧ = {{a,c}, {b,d}}

c. ⟦dou⟧ (⟦**husbands-and-wives'**⟧)(⟦*na-xie ren*⟧) = 1 iff

$\forall y[(y \subseteq$ ⟦*na-xie ren*⟧ $\land y \in$ ⟦cov_R⟧ $) \rightarrow$ ⟦**husbands-and-wives'**⟧ $(y)]$

Diverging from both the distributivity and maximality operators approaches, Liu (2016; 2017; 2021) develops a non-quantificational, EVEN-based approach to *dou* (and the *mei-dou* co-occurrence) that put forth the following claims.

- *Mei*-NPs are universal-distributive quantifier phrases per se, triggering domain alternatives.

- *Dou* is truth-conditionally vacuous but carries a presupposition that its prejacent is the strongest alternative in terms of (un)likelihood and logical strength among its alternatives.

- Heim's (1991) **Maximize Presupposition** dictates the presence of *dou* in the sense that *dou*-sentences will block their counterparts without *dou* whenever their truth-conditional content are identical to each other.

(57) *Mei-ge xuesheng *(dou) lai-le.*
every student DOU   come
'Every student came.'   (obligatory-*dou*)

As the first argument, Liu convincingly proves that *Mei*-NPs are not plural definites but universal QPs per se, as attested in most reliable diagnoses involving the homogeneity effect, Q-sensitive expressions, partitive constructions, etc. For instance, Liu shows that even without *dou*, *mei*-NPs still lack homogeneity and non-maximality (Brisson 1998), i.e. the two distinctive properties exhibited by plu-

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[19]Note that the requirement of a "cover set" imposed by *dou* under Lin's proposal might also be captured by Ionin & Matushansky's (2006) uniformity condition presumably encoded as a presupposition in the semantics of *dou* imposed on its first argument to rule in such plural predicates like '*shi fuqi*'.

(55)   Uniformity (Ionin & Matushansky 2006,2018):
P is uniform $\Leftrightarrow_{def} \exists n(\forall x(P(x) \rightarrow |x|_P = n)$
(Informally, only individuals with the same number of atomic parts can be counted or distributively predicated.)

ral definites without *dou*, and retain their maximal universal force in both positive and negative contexts, in parallel with English *every*-NPs.[20]

(58)   Non-homogeneity effect involving *mei*-NPs (revised from Liu's example (6))

    a.   *Zhang-san ba zhe-jian-shi gao-su da-bu-fen san-nian-ji xue-sheng, dan*
         ZS   BA this-thing tell   most   third-grade student   but
         *wo meiyou ba zhe-jian-shi gaosu {**mei-yi-ge/suoyou-de**} san-nianji*
         I NEG   BA this-thing tell   every/all   third-grade
         xuesheng.
         student
         'Zhang-San told this to most third-grade students but I didn't tell this to every third-grade student.'
         ⤳ I did tell this to some third-grade students.

    b.   *Zhang-san ba zhe-jian-shi gao-su da-bu-fen san-nian-ji xue-sheng, dan*
         ZS   BA this-thing tell   most   third-grade student   but
         *wo meiyou ba zhe-jian-shi gaosu **zhe-xie san-nianji xuesheng**.*
         I NEG   BA this-thing tell   these   third-grade student
         'Zhang-San told this to most third-grade students but I didn't tell this to these third-grade students.'
         ⤳ I didn't tell this to any of these third-grade students.

Diagnosing with Quantifier-sensitive expressions below also confirms this QP-status of *mei*-NPs.

(59)   (= Liu's example (12), note that *suo-you* 'all' behaves similarly)

    a.   *Chule Lisi, wo qing-le   mei-ge san-nianji xuesheng.*
         Except Lisi, I   invite-ASP every third-grade student
         'I invited every third-grade student but Lisi.'

    b.   *Lisi jihu   qing-le   mei-ge san-nianji xuesheng.*
         Lisi almost invite-ASP every third-grade student
         'Lisi invited almost every third-grade student.'

(60)   (= Liu's example (13))

    a. *#Chule Lisi, wo qing-le   zhe-xie san-nianji xuesheng.*
       Except Lisi, I   invite-ASP these   third-grade student
       Intended: 'I invited these third-grade students but Lisi.'

    b. *#Lisi jihu   qing-le   zhe-xie san-nianji xuesheng.*
       Lisi almost invite-ASP these   third-grade student
       Intended: 'Lisi invited almost these third-grade students.'

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[20]Homogeneity effect of plural definites: a definite plural is interpreted universally in an upward-entailing context (e.g. affirmative) and existentially in a downward-entailing one (e.g. negative, conditional).

Additionally, Liu (2017) points out that it is the surface position of the *mei*-NP – rather than *dou* – that determines the scope of the underlying semantic ∀, and hence, it must be the *mei*-NP that contributes the ∀, as illustrated with (61) below.

(61) (= Liu's example (20), note that the negation needs to appear before the mei-NP, not just before *dou*)

    a. *Bu-shi mei-ge xuesheng dou xihuan Jin Yong.*
       not-be every student DOU like Jin Yong
       'Not every student likes Jin Yong.'   (¬ > mei > dou)

    b. **Mei-ge xuesheng bu(-shi) dou xihuan Jin Yong.*
       every student not(-be) DOU like Jin Yong
       Intended: 'Not every student likes Jin Yong.'   (mei > ¬ > dou)

This behavior is converse with plural definites, as shown (62).

(62) a. ?*Bu-shi zhe-xie xuesheng /tamen dou xihuan Jin Yong.*
       not-be these student /they DOU like Jin Yong
       'It is not the case that these students/they all like Jin Yong.' (¬ > plural DP > dou)

    b. *Zhe-xie xuesheng /tamen bu(-shi) dou xihuan Jin Yong.*
       these student /they not(-be) DOU like Jin Yong
       'These students/they don't all like Jin Yong.' (plural DP > ¬ > dou)

Thus, in (61-b), the *mei*-NP is topicalized across negation and needs to reconstruct to Spec-*dou* for interpretation; this, however, violates Huang's (1982) Condition on Scope Interpretation, since at SS the mei-NP c-commands negation while at LF it is the other way around. Meanwhile, since this condition doesn't dictate plural definites, (62-b) is well-formed.

(63) The General Condition on Scope Interpretation (Huang 1982:220)
Suppose A and B are both QPs or both Q-NPs or Q-expressions, then if A c-commands B at SS, A also c-commands B at LF.

    Having established that *mei*-NPs are universal QPs, it is plausible for us to reconsider the quantifier status of *dou* to avoid the doubling problem in composition, i.e. having two universal quantifiers (one D- and one A-quantifier) in a sentence. Given this motivation, Liu (2016; 2017; 2021) moves on with a crucial observation that, phenomenologically, quantificational statements can be linked to EVEN-sentences.

(64) a. **Even** Chomsky didn't solve this problem adequately.
       ⤳ **Every** linguist has not solved this problem adequately.

(= **No** linguists have solved this problem adequately.)

b. *(Lian) Ta-men$_F$ dou mai-le fangzi.*
LIAN they DOU mai-PERF house
'Even they bought houses.'

Flipping the coin over, he submits that the contribution of *dou* to the meaning of the whole sentence might parallel that of focus particles, i.e. making reference to alternatives of sorts via imposing some kind of presupposition (also see Xiang (2020) for a similar approach)[21]. More concretely, he takes *dou* semantically as a clausal EVEN particle that presupposes its prejacent to be the strongest alternative with respect to (un)likelihood or logical strength, as illustrated in (66-a) and (66-b), respectively. The semantics of *dou*, thus, is explicated as follows.

(65) Liu's (2021) proposal: The lexical entry for *dou* (= Liu's (35)/(52))
$[\![\boldsymbol{dou}_C\ S]\!]$ is defined iff $\forall q \in \{[\![S']\!] : S' \in \text{ALT}(S)\} \cap C\ [\ [\![S]\!] \neq q \to [\![S]\!] \prec q]$
when defined, $[\![\boldsymbol{dou}_C\ S]\!] = [\![S]\!]$ (where $\prec$ is either $\prec_{likely}$ or $\subset$)
ALT(S) = {S': S' is derived from S by a finite series of deletions, contractions, and replacements of constituents in S with constituents of the same category taken from the lexicon.}
(Katzir's (2007), Fox & Katzir's (2011) "Formal Alternatives")
C = {S': S' is contextually relevant to S} (Rooth 1992)

(66) a. *Lisi$_F$ dou mai-le wu-ben shu.*
Lisi DOU buy-ASP five-CLF book
'Even Lisi$_F$ bought five books.' Even-*dou*← Likelihood
⤳ The probability that Lisi bought five books is smallest w.r.t. other alternatives (e.g. *Zhangsan bought five books*).

b. *{Zhangsan he Lisi}$_F$ dou mai-le wu-ben shu.*
Zhangsan and Lisi DOU buy-ASP five-CLF book
'Zhangsan and Lisi$_F$ each bought five books.' Distributive-*dou*←
Entailment
⤳ The information that Zhangsan and Lisi bought five books is strongest w.r.t. other alternatives concerning other people, i.e. [ZS ∧ LS] $\models$ [ZS]/[LS]/[ZS ∨ LS].

Syntactically, *dou* is assumed to head a functional projection (higher than IP), re-

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[21]However, note that unlike a typical focus-sensitive expression (e.g. EVEN, ONLY, ALSO) whose interpretation varies according to the placement of focus (comparing *Even NAM$_F$ read Chomsky* vs. *Nam even read CHOMSKY$_F$*), Chinese *dou* has a relatively fixed preverbal position and focus effect (if there's any) only on its left associate (i.e. the Leftness Condition). Different placements of stress-bearing focus are found to have no impact on the interpretation of *dou*-sentences.

quiring its lower associate to raise to its specifier position. Further dislocation between *dou* and its associating nominal can be achieved via topicalization of the latter.

(67)　　(= Liu's example (37))

　　a.　*Tamen mei dou kao yi-bai   fen.*
　　　　they   NEG DOU get one-hundred point
　　　　'It is not that all of them got 100 points on the test.'　　　　¬ > ∀

　　b.　*Tamen dou   mei kao yi-bai   fen.*
　　　　they   DOU NEG get one-hundred point
　　　　'All of them didn't get 100 points on the test.'　　　　∀ > ¬

Given that syntax, Liu assumes that the contrast between (67-a) and (67-b) is due to different scopes between the covert distributivity operator Dist (whose semantics as in (69)) and the negator in their LFs (i.e. different prejacents of *dou*), as parsed in (68).

(68)　　a.　(67-a)'s LF: [*dou* [**NEG** [Tamen [**Dist** [VP]]]]]
　　　　　　→ the prejacent of *dou*: [**NEG** [Tamen [**Dist** [VP]]]]
　　　　b.　(67-b)'s LF: [*dou* [Tamen [**Dist** [**NEG** [VP]]]]]
　　　　　　→ the prejacent of *dou*: [Tamen [**Dist** [**NEG** [VP]]]]

(69)　　⟦ Dist ⟧　= $\lambda P_{<e,t>}.\lambda X_e. \forall y[y \leq_{atom} X \to P(y)]$　　　　(cf. Link's (1987) D operator)

In other words, Liu severs the distributivity from *dou* concerning sentences like (70) as established since Lin (1998a) and characterizes it as a side effect, in addition to a maximality/definiteness effect, when the presupposition of *dou* is satisfied.

(70)　　*San-ge   xuesheng **dou** mai-le   wu-ben shu.*
　　　　three-CLF student   DOU buy-ASP five-CLF book
　　　　'The three students each bought five books.'
　　　　⤳ Distributivity effect: *3 students each bought five books* ⊂ 2/1 students each bought five books
　　　　⤳ Maximality/Definiteness effect: given that the prejacent of *dou* in (70) is predicted to be strongest among its alternatives, i.e. there are exactly three students in this context.

　　　　Regarding the role of *mei*-NPs, Liu assumes their function is to trigger domain alternatives, something on par with existential quantifiers, as represented in (71).

(71)   a. $[\![\text{mei}_D]\!] = \lambda P.\lambda Q.\forall x[[x \in D \wedge P(x)] \rightarrow Q(x)]$

      b.   Domain alternatives of $[\![\text{mei}_D]\!]$

            $= \{ \lambda P.\lambda Q.\forall x[[x \in D' \wedge P(x)] \rightarrow Q(x)] : D' \subseteq D \}$

The correlation between *dou* and *mei* in (72) is, thus, captured in a straightforward way: *mei* is a canonical $\forall$-quantifier, whereas *dou* is a scalar-focus particle triggering the presupposition that its prejacent is the strongest proposition in a set of formally or contextually relevant alternatives. Plus, since *dou*-sentences have an extra scalar presupposition that non-*dou*-sentences don't have while asserting the same content, given Heim's (1991) MP, sentences without *dou* are predicted to be pragmatically infelicitous, consistent with fact.

(72)   ***Mei**-ge ren   #**(dou)** lai   le.*
       MEI-CLF person DOU   come PERF
       'Every man came.'

(73)   **Maximize Presupposition** (MP) (Heim 1991)
       Make your contribution presuppose as much as possible.

Beyond that, Liu also speculates that *dou*, like other alternative sensitive operators, needs to be associated with a non-singleton set of alternatives (see Xiang's (2020) non-vacuity presupposition of *dou* below). Hence, in such a context that the individuals are intuitively not relevant to the question under discussion (QUD), i.e. they do not figure in C, *dou* is not necessary (Liu 2021:304).

5.6.3   The division of labour between *cũng$_F$* and *đều*

Now, let us take some stock of Mandarin distributor *dou* before returning to Vietnamese *cũng/đều*.

      To recap, the overarching idea in Liu's (2016,2017,2021) EVEN-based account of *dou* is that all of *dou*'s various various uses can be reduced to the assumed primitive likelihood-based scalar use of particle *dou* in *(lian)…dou* constructions, and thus, the universal reading at issue can be derived when *dou*'s scalar presupposition is satisfied. Conversely, Xiang (2020) points out that the EVEN-flavor of *dou* should not be regarded as the primary use, in view of the asymmetries between EVEN-*dou* and non-EVEN-*dou* sentences as shown in (74) and (75) below.

(74)   a.   *Yuehan (*dou) dao-le.*
         John   DOU   arrive-PERF
         'John (*all) arrived.'

b. *(Lian) Yuehan$_F$ **dou** dao-le.*
   LIAN John   DOU arrive-PERF
   'Even JOHN arrived.'

(75) a. *Tamen **dou** mai-le   fangzi.*
         they   DOU buy-PERF house
         'They **dou** bought houses.'   (#collective,✓distributive)

      b. *(Lian) Tamen$_F$ **dou** mai-le   fangzi.*
         LIAN they   DOU buy-PERF house
         'Even THEY bought houses.'   (✓collective,✓distributive)

However, from the Vietnamese perspective, the counterpart of (74), as illustrated by (76) with additive *cũng$_A$*, focus *cũng$_F$* and *đều*, suggests that the EVEN-flavor involving Mandarin *dou* can only arise on the condition that its left nominal associate bears a focus. Without a focused phrase, the only reading accepted is additive (note that *cũng$_F$* is assumed to surface in focus-related constructions only).

(76) a. *Nam **cũng$_A$**/***cũng$_F$**/***đều** tới   rồi.*
         Nam also/CUNG/DEU   arrive PERF
         'Nam also arrived.'

      b. *(Thậm-chí) Nam$_F$ **cũng$_F$**/***đều** tới   rồi.*
         even   Nam CUNG/DEU arrive PERF
         'Even NAM (also) arrived.'

Meanwhile, regarding (75), the comparable data in Vietnamese as in (77) shows a slightly different asymmetry with respect to the availability of the collective reading. Thus, in non-EVEN-sentences, Vietnamese *đều* patterns with Mandarin *dou* in licensing only the distributive reading, whereas in EVEN-sentences with a perceived focus, both collective and distributive readings are available, but empirically, by means of different particles: *cũng$_F$* is only compatible with the collective, whereas *đều* is only compatible with the distributive. In other words, I suggest that the difference between (75)-a and (75)-b might be relevant to some unknown factor that neutralizes the distributive-favored reading involving *dou* in (75)-b in such focus-scalar environments. Hence, this observation doesn't imply that there are two distinct *dou* there, i.e. *dou* in (75)-a cannot be reduced from *dou* in (75)-b as Xiang (2020) claims, since that distributive-favored of *dou* is still observable in Vietnamese comparable fact.

(77) a. *Bọn-họ ***cũng$_F$**/**đều** đã   mua nhà   rồi.*
         they   CUNG/DEU PST buy house PERF
         'They **đều** bought houses.'   (#collective,✓distributive)

b. *(Thậm-chí) bọn-họ_F **cũng_F/đều** đã mua nhà rồi.*
   even they CUNG/DEU PST buy house PERF
   'Even THEY bought houses.'   (✓collective,✓distributive)

c. *(Thậm-chí) bọn-họ_F **cũng_F/?đều** đã cùng-nhau mua nhà rồi.*
   even they CUNG/DEU PST together buy house PERF
   'Even THEY bought houses together.'   (collective only)

d. *(Thậm-chí) bọn-họ_F mỗi-người ?**cũng_F/đều** đã mua nhà rồi.*
   even they each-CLF CUNG/DEU PST buy house PERF
   'Even THEY each bought houses.'   (distributive only)

As far as Vietnamese *cũng/đều* is concerned, there is an almost perfect division of labor between *cũng_F* and *đều* in focus-related sentences in parallel with Mandarin *dou*-quantification[22]. These focus environments, following Xiang (2020), can be subcategorized into three contexts with respect to three essential uses involving *cũng_F* and *đều* as summarized in **Table 5.4** below. Note that our focus here concerns the distributor and scalar-marker uses only. Regarding the free choice item (FCI)-licenser use, as illustrated in (78), I will leave it open for future extension.

(78)   [Context: Nam and Mi are discussing their plan to have a baby. Nam says...]

a. *Với anh, {trai hay gái} *(gì_F) **cũng_F** được.*
   to me boy or girl what CUNG okie
   'To me, boy or girl, it doesn't matter.'

b. *Với anh, {trai hay gái}_F (*gì) **đều** được.*
   to me boy or girl what DEU okie
   'To me, boy or girl, it doesn't matter.'
   → [A boy is okie] ∧ [A girl is okie]

Table 5.4: The division of labour between *cũng_F* and *đều* in Vietnamese

	Distributor use (79)	FCI-licenser use (78)	Scalar marker use (76),(77)
cũng_F	OK (wh-indefinites _)	OK (wh-indefinites _)	OK (collective-favored)
đều	OK (non-wh-indefinites _)	OK (non-wh-indefinites _)	OK (pl.DP only, distributive-favored)

In sum, we have fewer reasons not to extend Liu's (2021) idea of reducing the distributor use of Mandarin *dou* to be some sort of *EVEN*'s effect to Vietnamese *cũng/đều*.

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[22]The only focus environments where both *cũng_F* and *đều* can appear, perhaps, are ones involving ambiguous predicates between collectivity and distributivity like 'buy a house', 'eat a pizza', etc.

In what follows, I will adopt his general idea and submit that *cũng/đều*, as Vietnamese counterparts of Mandarin *dou*, can be taken as a focus particle on par with EVEN located in SPEC-CP that affects the non-truth-conditional content of their prejacent, and consequently, and their presence can be regulated by a pragmatic principle like Heim's (1991) MP. Before fleshing out this idea, however, I will first attempt to adopt Xiang's (2020) approach to Mandarin *dou*, which also makes use of alternative semantics, to see how such a unified account of *cũng/đều* can capture their distributor use in Vietnamese. Then, I will show that an EVEN-based account of *cũng/đều*, along the lines of Liu (2016,2017,2021), seems to fare out better for analyzing Vietnamese counterparts of *dou*.

5.6.4   The proposal

(79)   a.   *Họ/Mọi-người/Các-bạn **đều**/*cũng$_F$ *đã   giúp   Nam.*
           they/everyone/friends DEU/CUNG   PST help Nam
           'They/The friends/Everyone all helped Nam.'   (Vietnamese *đều*)

     b.   *Ai*$_F$ ***cũng***$_F$/*đều *đã   giúp   Nam.*
           who CUNG/DEU   PST help Nam
           'Everyone helped Nam.'   (Vietnamese *cũng*)

     c.   *Tamen/Xuesheng-men/Mei-ge-ren/Shei **dou** renshi ta.*
           they/students/everyone/who   DOU know him
           'They/The students/Everyone all know him.'   (Mandarin *dou*)

Thus, following Xiang's (2020) account of *dou* which draws same ideas as Liu's from alternative semantics but differs in extracting ingredients from ONLY, but not EVEN, Vietnamese*cũng*$_F$ and *đều* (with another hybrid form *cũng-đều*) can be assumed to belong to a series of special exhaustifiers, as defined in (80).

(80)   Semantics of *cũng*$_F$/*đều* as a special exhaustifier (following Xiang 2020)
       $⟦ \textit{cũng}_F ⟧ = ⟦ \textit{đều} ⟧ = ⟦ \textit{cũng-đều} ⟧$ (= Mandarin $⟦ \textit{dou}_C ⟧$)

       $= \lambda p \lambda w: \underbrace{\exists q \in \text{SUB}(p, \text{C}).}_{\text{non-vacuity}} \underbrace{p(w) = 1}_{\text{prejacent}} \wedge \underbrace{\forall q \in \text{SUB}(p, \text{C})[O_C(q)(w) = 0]}_{\text{anti-exhaustivity}}$

       where SUB(p, C) = { q : p ⊂ q, q ∈ C } & = (C – EXCL(p, C) – {p})
       (Informally, the sub-alternatives of p in the context C is the set of q such that q is relevant to C but **logically weaker** than p. Moreover, SUB(p, C) are alternatives that are non-excludable and distinct from the prejacent)

       a.   Non-vacuity presupposition: the prejacent has at least one sub-alternative.
       b.   Prejacent assertion: the prejacent is asserted to be true.
       c.   Anti-exhaustification assertion: the exhaustification of each sub-alternative

is asserted to be false.

    d.   The O-operator, aka the semantics of *only* (Chierchia et al. 2012)

$O_C = \lambda p \lambda w\colon p(w) = 1 \wedge \forall q \in \mathrm{EXCL}(p, C)[q(w) = 0].\ p(w)$

(Informally, the function O_C presupposes that its prejacent is true, and all the excludable alternatives w.r.t to the prejacent in C are false.)

Under Xiang's (2020) approach, a *dou*-sentence of the form $dou(\mathrm{S}_A)$ roughly conveys 'S$_A$ and not only S$_{A'}$' where S$_{A'}$ is a sub-alternative which is logically weaker or a proper subpart than S$_A$ given that A′ can be a proper subpart of A, a weaker scale-mate of A, or a disjunct of A, etc. For instance, *Nam and Mi **dou** arrived* means that Nam and Mi arrived, and it is only Nam arrived, and it is not only Mi arrived. Accordingly, regarding the distributive-universal reading at issue, Xiang (2020) assumes that it is a consequence of the non-vacuity presupposition imposed on the sub-alternative set by *dou*. Thus, if C is non-singleton, its prejacent clause will have a (pure or impure) atomic distributive reading since this set of sub-alternatives consists of logically weaker alternatives than the assertion. For instance, by the time *đều* "sees" its prejacent whose subject as a group of individuals, i.e. {a⊕b⊕c}, the derivation in cases like *Nam and Mi **đều** arrived* can be sketched out as follows.

(81)   [Nam and Mi] **đều** arrived.

    a.   LF: **đều**$_C$[$_S$[Nam and Mi] arrived]

    b.   ⟦S⟧ = arrive′(N⊕M)

    c.   C = {arrived′(x) : x is a relevant individual}

    d.   SUB(⟦S⟧, C) = {arrive′(N), arrive′(M)}

    e.   ⟦**đều**⟧ = arrive′(N⊕M) ∧ ¬O(arrive′(N)) ∧ ¬O(arrive′(M)) = arrive′(N⊕M).

Given the non-vacuity presupposition of *đều/cũng$_F$*, singularity-denoting expressions are blocked to co-occur with them, e.g. **Nam đều đã tới*, since there is no sub-alternative weaker than Nam for the O-operator to operate on. The plurality condition involving *đều* is thus also captured straightforwardly under this approach.

However, given that the wh-indefinite like *ai* can be regarded as a set of individuals, for instance {a,b,c}, how can we get a maximal denotation on par with the sum *Nam and Mi*? In other words, under Xiang's (2020) approach, it is not obvious how to capture the universal force involving *ai* and *cũng$_F$* in prosodic environments as in (79). Regarding these environments, they are clearly focus-related contexts, but whether or not there is a covert modal there, corresponding to apparent modalized context like (82-b), to license the ∀-FCI use of the non-interrogative *ai* 'who', in parallel with the treatment of the co-occurrence *shei-dou* along the lines of Giannakidou & Cheng (2006) is entirely not clear.

(82)   a.   *Ai$_F$ **cũng$_F$**/***đều** đã giúp Nam.*
who CUNG/DEU PST help Nam
'Everyone helped Nam.'   (prosodic)

         b.   *(Bất-kỳ) ai$_F$ **cũng$_F$**/***đều** có-thể giúp Nam.*
any who CUNG can help Nam
'Anyone can help Nam.'   (existentially modalized)

In fact, the bare wh-indefinites like *ai* 'who' in Vietnamese also have a reduplicative variation, e.g. *ai ai* 'whoever/everyone' (see Chapter 4, Section 4.3 on reduplication as quantification), that only surfaces in obligatory patterns with *cũng$_F$* and triggers the same universal reading, as shown in (83).

(83)   a.   *ai* 'who' → *ai ai* 'whoever/everyone'

         b.   *đâu* 'where' → *đâu đâu* 'wherever/everywhere'

         c.   *gì* 'what' → *gì gì* 'whatever/everything'

(84)   a.   *Ai$_F$ *(**cũng$_F$**) đã giúp Nam.*
who CUNG PST help Nam
'Everyone helped Nam.'

         b.   *Ai-ai$_F$ *(**cũng$_F$**) đã giúp Nam.*
who CUNG PST help Nam
'Everyone helped Nam.'

Furthermore, it is observed that *ai* can also be D-linked to a covert or overt domain introduced in the discourse, as indicated by the subscript D in the following examples.

(85)   a.   *{Trong lớp}$_D$, ai$_D$ **cũng$_F$** đã giúp Nam.*
in class who CUNG PST help Nam
'Everyone in the class helped Nam.'

         b.   *{Nam hay Mi hay Hùng}$_D$, ai$_D$ **cũng$_F$** đã giúp Nam.*
Nam or Mi or Hung who CUNG PST help Nam
'Nam, Mi, and Hùng all helped Nam.'

Put differently, *ai$_D$* seems to introduce an ambiguous domain of alternatives, i.e. involving different "cover sets" derived from a default atomic set like {a,b,c,...}, in Schwarzschild's term. This ambiguous domain, then, is assumed to be disambiguated when it features in *cũng$_F$*-constructions in the same way, namely, the maximal or "strongest" set of relevant entities/situations, as shown in the set of all students in class in (85-a) or the group of three individuals {Nam⊕Mi⊕Hùng}. I submit that this disambiguating mechanism involving *ai$_D$* can be captured in a straightforward way if we extend Liu's (2021) account of *dou,* as presented in (65), to *cũng/đều* in the sense that *cũng$_F$* or *đều* are considered as scalar particles that pre-

suppose their prejacent to be the strongest proposition in terms of logical entailment or (un)likelihood scales among a set of contextually/formally relevant alternatives introduced by the wh-indefinite at issue. And since *đều* and *cũng$_F$* are in a (near) complementary distribution as shown in Subsection 5.6.3, I assume the following proposal works for both.

(86)   Proposal for unifying semantics of *cũng$_F$*/*đều*

$[\![$ ***cũng$_F$*** $]\!]$ = $[\![$ ***đều*** $]\!]$ (= Mandarin $[\![$ *dou* $]\!]$)

= λp.λw: ∀q ∈ { $[\![q]\!]$: q ∈ ALT(p)(w)} ∩ C(w)[$[\![p]\!]$ ≠ q → $[\![p]\!]$ ≺ q].p(w)

(where ≺ is either ≺$_{likely}$ or ⊂)

ALT(p)(w) = {q: q is derived from p in w by a finite series of deletions, contractions, and replacements of constituents in S with constituents of the same category taken from the lexicon.}

(Katzir's (2007), Fox & Katzir's (2011) "Formal Alternatives")

C(w) = {q: q is contextually relevant to p in w}   (Rooth 1992)

In sum, given this assumption, the wh-quantification involving *cũng$_F$* can be sketched out as in (87) below (note that *cũng$_F$* cannot be omitted in these cases, presumably, due to Heim's MP).

(87)   a.   *Ai$_F$ *(cũng$_F$) đã giúp Nam.*
            who CUNG   PST help Nam
            'Everyone helped Nam.'

        b.   LF: [***cũng$_F$*** [*ai$_D$* helped Nam in w]]

        c. $[\![$ *ai$_D$* $]\!]$ = {a, b, c} (= 'some people')

        d. $[\![$ LF $]\!]$ is defined iff $[\![$ *ai$_D$* helped Nam in w $]\!]$ is logically strongest, i.e.
            iff $[\![$ *ai$_D$* helped Nam in w $]\!]$ = $[\![$ *ai-ai$_D$* helped Nam in w $]\!]$
            = ∀x[x∈ $[\![$ ai$_D$ $]\!]$ → x helped Nam] = 'everyone helped Nam in w'
            when defined, $[\![$ LF $]\!]$ = $[\![$ *ai$_D$* helped Nam in w $]\!]$
            = 'some people helped Nam in w'   (given (86) and FA)

As for the co-occurrence between ∀-QP and *đều*, the compositional labor is thus assumed to be divided straightforwardly as follows: the clausal *đều* adjoins to the SPEC-CP of the universal statement at issue and presupposes that statement is the strongest alternative along the dimensions of logical strength or (un)likelihood, i.e. *mọi người$_F$ đều đã giúp Nam* roughly means 'even EVERYONE helped Nam', as illustrated by (88).

(88) a. *{Mọi người}*_F *?(đều) đã giúp Nam.*
       every person DEU PST help Nam
       '(Even) Everyone helped Nam.'

   b. LF: [*đều* [*mọi người*_D helped Nam in w]]

   c. ⟦*mọi người*_D⟧ = λQ. $\forall$x. person'$_{atom}$(x) → Q(x)

   d. ⟦LF⟧ is defined iff ⟦*mọi người*_D helped Nam in w⟧ is logically strongest,
       i.e. iff ⟦*mọi người*_D helped Nam in w⟧ = ⟦*ai-ai*_D helped Nam in w⟧
       = $\forall$x[x∈ ⟦ai_D⟧ → x helped Nam] = 'everyone helped Nam in w'
       when defined, ⟦LF⟧ = ⟦*mọi người*_D helped Nam in w⟧
       = 'everyone helped Nam in w'   (given (86) and FA)

However, differing from Liu, I leave it open to the question whether *cũng*_F/*đều*
can be equated with the EVEN particle itself (e.g. *thậm-chí, tới/đến/ngay-cả* in Viet-
namese) as we now learn that, thanks to Liao & Jheng (2025), there presumably
are (at least) two types of EVENs attested across languages, i.e. the phrasal EVEN
with an inherent additive component which can have an extra scalar effect, and
the clausal EVEN with just an inherent scalar component. Up to this point, it's still
not transparent what kind of EVEN *cũng*_F/*đều* looks like. All in all, this and other
relevant issues regarding them all are worth exploring in future extensions.

5.7 Summary

In this chapter, I have investigated the remaining unsolved puzzles pertaining to the interaction between PMs and quantifiers in various quantificational constructions in Vietnamese.

Thus, in consistency with the claims established in Chapter 4 regarding the non-article status of *các/những*, I have shown that the plural markers *các/những* are only necessary for compositional reasons in cases when quantifiers require non-atomic restrictors, as illustrated by (89) and (89-b), whereas their optionality in (89-c) and (89-d) where the plural reading of the restrictors is implied by the contextually relevant place-adverbial *khu-này* 'this area' is suggested to be just phonetic one due to the existence of a silent PL_S marker.

(89)   Co-occurrence between *các/những* and universal quantifiers

    a.   *Tất-cả *(**các/những**) sinh-viên/gia-đình này đã bỏ phiếu.*
        all   PL   student/family DEM PST cast vote
        'All these students/families cast the vote.'

    b.   *Tất-cả *(**các/những**) con chó này rất   ngoan.*
        all   PL   CLF dog DEM very well-behaved
        'All these dogs are very well-behaved.'

    c.   *Tất-cả (**các/những**) sinh-viên/gia-đình khu này đã bỏ   phiếu.*
        all   PL   student/family   area DEM PST cast vote
        'All of the students/families in this area cast the vote.'

    d.   *Tất-cả (**các/những**) con chó khu này rất   ngoan.*
        all   PL   CLF dog area DEM very well-behaved
        'All the dogs in this area are very well-behaved.'

Beyond that, in the final part of this chapter, I have revisited an overlooked vanishing of the universal force involving 'plural' wh-elements like *những ai* and the alleged universal A-quantifier *cũng* as illustrated in (90).

(90)   a.   *Ai_F **cũng** đã giúp Nam.*
        who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?'   (interrogative)
        = 'Everyone helped Nam.'   (wh-quantification)
    b.   *{Những ai}_F **cũng** đã giúp Nam.*
        PL   who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?'   (interrogative)
        ≠ 'Everyone helped Nam.'

Accordingly, in Section 5.5, I have shown that Tran's (2009) quantifier-account of *cũng_F* can still be maintained on the assumption that the universal reading can only

be obtained if and only if *cũng$_F$* gains access to the set of alternatives consisting of atomic, non-scalar propositions (i.e., they are logically independent of each other). Thus, I posit that the semantics of *cũng$_F$* should be revised so as to rule out its access to domains whose alternatives can be inferred from each other (i.e., there are stronger/weaker ones), as explicated in (91).

(91)   The proposal
$[\![\boldsymbol{cũng}]\!]^{w,g} = \lambda\alpha_{<st,t>}.\lambda w'_s$: $\exists p,q \in \alpha$ $[p(w') \not\subseteq q(w') \wedge q(w') \not\subseteq p(w')]$. $\forall p \in D_{<s,t>}$. $\alpha(p) = 1 \rightarrow p(w') = 1$

<div align="right">(revised version)</div>

Furthermore, in Section 5.6, I have sketched out two non-quantificational analyses of both *cũng$_F$* and *đều,* along the lines of Xiang's (2020) and Liu's (2021) accounts of Mandarin *dou,* and showed that the latter approach, i.e. an EVEN-based account seems to fare better to uniformly capture their distributor use in the awareness of the doubling problem involving their co-occurrence with universal QPs. However, many peculiar behaviors involving these two particles, especially those with *đều,* still require an elaborate explanation, including their FCI/NPI uses. I leave these issues open for future extensions.

Chapter 6

Conclusion

Through an investigation into the distributions and interpretations of the most common D-quantifiers in Vietnamese from a compositional perspective, I have suggested that the four D-quantifiers *tất-cả*, *cả*, *mọi*, and *mỗi* differ in their number-sensitive presuppositions and c-selections imposing on their restrictor. Thus, their distinctive domain-restricting strategies are taken to be the essential factor underlying their various peculiar behaviors concerning different semantic sub-categories of nominals.

More specifically, in Chapter 3, I have shown that many peculiar distributions involving *tất-cả*, *cả*, *mọi*, and *mỗi* with their restrictors can be captured on the ground of different presuppositions pertaining to cardinality, atomicity, and uniformity, given Link's (1987) ontology as presented in (1).

(1)   a. $[\![\,\textbf{Nam}\,]\!] = N$ (pure) atom

        b. $[\![\,\textbf{Nam và Mi}_{\text{sum}}\,]\!] = N \oplus M$ sum

        c. $[\![\,\textbf{Nam và Mi}_{\text{group}}\,]\!] = \uparrow(N \oplus M)$ group/impure atom

In addition to quantification issues, I have also argued against the article-based and quantifier-based approaches to plural markers in Vietnamese in Chapter 4. Concretely, I have also demonstrated that *các* and *những* resemble each other more than they might look from the surface. Thus, both of them can be assumed to be syntactically modifying plurals in the sense of Wiltschko (2008), and semantically instantiations of the inclusive PL operator in the sense of Chierchia (2010) with slightly different presuppositions: *những* is encoded with atomicity and domain widening presuppositions, whereas *các* is encoded with a contextually determined assignment function instead of the domain widening presupposition, but sharing the atomicity selection in aligning with *những*. Given these presuppositional accounts of *các* and *những*, all of their four essential uses, including (i) the

predicative use, (ii) the argument use (i.e., the definite/anaphoric use), (iii) the generic use, and (iv) the wh-indefinite use, can be captured in a systematic way.

Finally, in Chapter 5, I have investigated a number of peculiar interactions between plural markers (PMs) and various kinds of quantification in Vietnamese so that we can predict precisely when PMs are needed for quantification in this language. Accordingly, I have suggested, consistent with the findings in the previous chapters, that the presence of the PMs like *các* and *những* is subject to the presuppositional requirements of the quantifiers involved. In other words, PMs are predicted to be optional in quantification if the relevant quantifier imposes no number-related presuppositions on its restrictor. Meanwhile, in a few quantificational constructions where the plurality of the restrictor is contextually determined (i.e., without overt PMs), I have posited that there still is a silent instantiation of the PL operator in those quantifications. In other words, the superficial optionality of PMs in those cases is suggested to be a phonetic one only.

Beyond that, in the final part of Chapter 5, I have also revisited an overlooked vanishing of the universal force involving 'plural' wh-elements like *những ai* and the alleged universal A-quantifier *cũng* as illustrated in (2).

(2)   a.   *Ai_F* **cũng** *đã giúp Nam.*
        who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?'   (interrogative)
        = 'Everyone helped Nam.'   (wh-quantification)

      b.   *{Những ai}_F* **cũng** *đã giúp Nam.*
        PL   who CUNG PST help Nam
        = 'For those who also helped Nam, who are they?'   (interrogative)
        $\neq$ 'Everyone helped Nam.'   (#wh-quantification)

Thus, in Section 5.5, I have shown that Tran's (2009) quantifier-account of *cũng_F* still can be maintained if the composition between the quantifier *cũng_F* with *những* wh-items is disallowed in the first place, given the presupposition that *cũng_F* s-selects domains whose atomic, non-scalar propositions (i.e., logically independent ones) only. Lastly, diverging from Tran's (2009) approach, in Section 5.6, I have showcased two non-quantificational accounts of *cũng_F/đều*, along the lines of Xiang's (2020) and Liu's (2021) accounts of Mandarin *dou* and showed that the latter fares out better for the Vietnamese case.

All in all, the investigation here has shed light on several aspects of the semantics and syntax of quantification and plurality from a classifier language perspective within a general framework of compositional semantics.

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Appendices

Appendix A: Nominal & pronominal plural markers in Vietnamese

As suggested in Chapter 4, there are two types of plural markers in Vietnamese, namely (i) nominal plural markers (PM_{nom}), and (ii) pronominal plural markers (PM_{pro}). The most important distinctive feature of the latter group is unlike the former which includes *những, các* and presumably *mấy*, pronominal plural markers are compulsory elements for marking plural pronouns in Vietnamese.

(3)   Two types of plural markers in Vietnamese

   (i)   Nominal plural markers (PL_{pro}): *những, các, mấy*
   (ii) Pronominal plural markers (PL_{nom}): *các, mấy, chúng, bọn, tụi, lũ,* etc.

The contrast between nominal PMs vs. pronominal PMs, for illustration, can be partially appreciated by the different behaviors between *các$_{pro}$* vs. *các$_{nom}$* with respect to pre-nominal numeral-classifier sequence as shown in (4) (also see Emeneau 1951:117, Cooke 1965:208).[1]

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[1]See the comparable contrast between pronoun-*men* vs. N-*men* sequences in co-occurrence with a post-nominal numeral-classifier sequence in Mandarin, which is suggested to be on par with the contrast between plural pronouns and anaphoric plurals on the one hand vs. definite plurals on the other hand, in English below (Bošković & Hsieh 2013:199–200)

(i)   a.   *ta-men   san   ge (xuesheng)*
             3.SG-MEN three CLF student
             'they three (students)'   (pronoun-*men*)
        b.   *zhe   san   ge xuesheng*
             3.DEM three CLF student
             'these three student'   (anaphoric plural)
        c.   **xuesheng-men san   ge*
             student-MEN   three CLF
             Intended: 'the three students'   (N-*men*)

(ii)   a.   We/you/they (three) linguists will have a meeting today.
        b.   Those (three) linguists will have a meeting today.
        c.   *The professors (three) linguists will have a meeting today.

(4) a. *Ba đứa **các** cậu (muốn làm gì?)*
three CLF PL$_{pro}$ 2.SG (want do what)
'you three (want to do what?)' (pronominal PM)

b. **Ba đứa **các** sinh-viên này*
three CLF PL$_{nom}$ student DEM
Intended: 'these three students' (nominal PM)

Semantically speaking, pronouns created with pronominal PMs show clear traits of definite phrases (DPs) – for instance, being capable of surfacing in restrictor position of *tất-cả* (e.g. *tất-cả chúng-nó* 'all of them'), whereas nominals created with nominal PMs, as showcased with *các/những*-phrases in Chapter 4, has been shown to be inherently predicative expressions which can turn into definite ones by means of a covert iota operator when embedded in anaphoric, contrastive contexts or immediate situations (or become kinds via the K/GEN operators in generic contexts).

Furthermore, by contrast to nominal counterparts, PMs$_{pro}$ tend to give rise to extra lexical connotations to their corresponding pronouns (implied by the superscript asterisk). For instance, *bọn nó* 'they' and *tụi nó* 'they' both imply the third plural person in a very informal manner (plus, the latter is only common in Southern Vietnamese).

Overall, the distributional characteristics of both types of plural morphemes in Vietnamese can be appreciated in **Table A.1** below. Some of these facts are very worth investigating and explaining in future extensions, such as the so-called associative plural use[2] of *mấy* and *bọn/tụi/lũ* in combination with proper nouns as illustrated by (5), or the peculiar group-forming use of 'pronominal' PMs *bọn/tụi/lũ* with nominals as illustrated by (6).

(5) a. *mấy/*các/*những *(đứa) Nam*
MAY/CAC/NHUNG CLF Nam
'a group of people where Nam is included', or 'Nam and others//his associates'

b. *bọn/tụi/lũ (thằng) Nam*
BON/TUI/LU CLF Nam
'a group of people where Nam is included', or 'Nam and others/his associates'

(6) *bọn/tụi/lũ sinh-viên này*
BON/TUI/LU student DEM
'This group of students'

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[2]See Vassilieva (2005) for an investigation of associative pronominal plurals in several Slavic languages, Jiang (2017) for an analysis of Mandarin *-men* as an associative plural marker, and Nakanishi & Tomioka (2004) for an associative account of Japanese plural marker *-tati*.

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Table A.1: Co-occurrences between plural morphemes and nouns/pronouns in Vietnamese (revised from Luong Van Hy 1987)

Plural morphemes	những	các	mấy	chúng	bọn*	tụi*	lũ*
Common & proper nouns							
*(quyển) sách 'a book'	+	+	+	−	−	−	−
sinh-viên 'student(s)'	+	+	+	−	+	+	+
Nam 'Nam'	−	−	−	−	+(3)	+(3)	+(3)
Selected proper pronouns							
tôi '1.SG' (neutral)	−	−	−	+(−2)	+(−2)	+(−2)	−
tao '1.SG' (informal)	−	−	−	+(−2)	+(−2)	+(−2)	(+)
mày '2.SG' (informal)	−	−	−	+	+	+	+
nó '3.SG' (neutral)	−	−	−	+	+	+	−
ta '1.SG/1.PL' (neutral)	−	−	−	+(+2)	+(+2)	−	−
Selected non-kinship terms							
ngài 'Your Honor'	−	+(2)	+(2)	−	−	−	−
thầy 'teacher'	−	+(1,2)	+(1,2)	−	−	−	−
sếp 'boss'	−	+(2)	+(2)	−	−	−	−
Selected kinship terms							
cụ 'great-grandparent'	−	+(1,2)	+(2)	−	−	−	−
ông 'grandfather'	−	+(1,2)	+(1,2)	−	(+)(1)	(+)(1)	−
bà 'grandmother'	−	+(1,2)	+(1,2)	−	(+)(1)	(+)(1)	−
bác 'uncle'	−	+(1,2)	+(1,2)	−	−	−	−
cô 'paternal junior aunt'	−	+(1,2)	+(1,2)	−	(+)(1)	−	−
chú 'paternal junior uncle'	−	+(1,2)	+(1,2)	−	(+)(1)	−	−
anh 'elder brother'	−	+(1,2)	+(1,2)	−	(+)(1)	(+)(1)	−
chị 'elder sister'	−	+(1,2)	+(1,2)	−	(+)(1)	(+)(1)	−
em 'junior sibling'	−	+(2)	+(2)	+(1)	+(1)	+(1)	−
con 'child'	−	+(2)	+(2)	+(1)	+(1)	+(1)	−
cháu 'grandchild/niece/nephew'	−	+(2)	+(2)	+(1)	+(1)	+(1)	−

Notes: +(1/2/3): capable of referring to the speaker(s)/hearer(s)/the ones mentioned in the discourse but are neither the speaker(s) nor the hearer(s); (+/−2): include/exclude the hearer(s).