NUMBER AND THE SCOPE OF INDEFINITES

by

ELIZABETH ANN FERCH

B.A.(Hons.), Queen’s University, 2007

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in

THE FACULTY OF GRADUATE STUDIES

(Linguistics)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

September 2009

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Abstract

This thesis examines the scopal behaviour of bare singulars and bare plurals in Shona (a Bantu language spoken in Zimbabwe). I treat these expressions as indefinites which are assigned scope via choice functions; the function variable may be existentially closed, yielding an existential or nonspecific interpretation, or it may be free, taking its value from the context and yielding a referential or specific reading.

I argue that apparent scope differences between singulars and plurals can be explained by the semantics of plurality. In Shona, bare plurals appear to be scopally ambiguous with respect to a clausemate scopeless quantifier (a numeral or *shoma* ‘(a) few’), while bare singulars must take wide scope over scopeless quantifiers. I argue that scopeless quantifiers are intersective modifiers rather than quantifying determiners, and that the sentences with bare plurals in fact have only one reading, a cumulative reading, which subsumes the truth conditions for the apparent wide and narrow scope readings. Another modifier, *ose* ‘all’, patterns with scopeless quantifiers in its scopal possibilities; I claim that *ose* denotes an operator which returns the supremum of its complement.

There is also an apparent scope difference in negative clauses and clauses with the universal quantifier *oga-oga* ‘every’ in object position: bare plural subjects appear to have both narrow and wide scope readings, while bare singular subjects appear to be restricted to wide scope. I argue that due to the interaction of information structure and syntactic structure, subjects in Shona must be specific, appearing to take widest scope; apparent narrow scope readings of bare plural subjects are due to nonmaximality and homogeneity.

Contrary to appearances, then, bare singulars and bare plurals do not have different scope possibilities; rather, sentences which contain plurals have more general truth conditions than those which contain singulars.
# Table of Contents

Abstract ................................. ii

Table of Contents .......................... iii

List of Tables ............................... v

List of Figures .............................. vi

List of Abbreviations ........................ vii

Acknowledgements ........................... viii

1 Introduction .............................. 1
   1.1 Shona ................................ 1
   1.2 Bare Singulars and Bare Plurals ....... 3

2 The Semantics of Number .................. 6
   2.1 Plurality ................................ 6
   2.2 Collectivity, Distributivity, and Cumulativity .......... 8
   2.3 Conclusion .............................. 10

3 Nominal Expressions in Shona ............ 11
   3.1 The Noun Class System ................ 12
   3.2 Internal Syntax of the DP .............. 14
   3.3 External Syntax of the DP .............. 16
   3.4 Conclusion .............................. 18

4 (In)definiteness in Shona ............... 19
   4.1 Definite and Indefinite Interpretations ....... 19
   4.2 Interpretation by Choice Function .......... 24
   4.3 Conclusion .............................. 27

5 Cumulativity and Apparent Scope Effects .. 28
   5.1 Number and Apparent Scope Effects ........ 29
      5.1.1 Numerals ........................... 29
List of Tables

2.1 Theories of plurality ................................................. 6
3.1 Noun classes in Shona ............................................... 12
4.1 Tests for definite and indefinite interpretations .................. 19
4.2 Interpretations of bare classified nouns ............................ 24
4.3 Two kinds of choice functions ...................................... 25
5.1 Apparent scopal readings of bare classified nouns w.r.t. scopeless quantifiers ... 31
6.1 Universal quantifiers in Shona ..................................... 43
List of Figures

2.1 A complete join semilattice built on three atoms 7

5.1 Some situations satisfying the truth conditions for a cumulative reading of (5.18) 33
5.2 Compositional derivation tree for (5.17) 34
5.3 Compositional derivation tree for (5.42) 40

6.1 Compositional derivation tree for (6.29a) 50
6.2 Compositional derivation tree for (6.29b) 50
6.3 Some example covers 52
# List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPL</td>
<td>applicative</td>
</tr>
<tr>
<td>ASSOC</td>
<td>associative</td>
</tr>
<tr>
<td>AUX</td>
<td>auxilliary</td>
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<td>CL</td>
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<td>future</td>
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</tr>
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<tr>
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<td>singular</td>
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</tbody>
</table>
Acknowledgements

I am deeply grateful to my thesis committee: Hotze Rullmann, Lisa Matthewson, and Martina Wiltschko. Hotze’s guidance has been invaluable; he suggested many avenues to explore, and let me know when my analyses were more complicated than necessary. Lisa also offered many valuable suggestions, and my discussions with her were always illuminating. Martina always pointed out hidden assumptions and facts that needed checking, and helped me learn to express myself clearly in writing (I hope!).

I am also grateful to my consultant, Calisto Mudzingwa, for his patience in sharing his language with me. Mazviita!

Thanks are also due to Eric Vatikoitis-Bateson and Rose-Marie Déchaîne, who guided me through my first year of fieldwork on Shona in their field methods course, and to Yosuke Sato, whose interface syntax course provided a venue for my work on specificity.

Thanks to all the professors, students, and postdocs I have encountered at UBC – it has been a pleasure to be part of such a vibrant and supportive community. I would particularly like to thank my cohort: Heather Bliss, Raphael Girard, Beth Rogers, Murray Schellenberg, Anita Szakay, and Carmela Toews, as well as Ashleigh Gonzales and Dennis Storoshenko, who joined us for several classes.

I would also like to thank audiences at the 2009 Northwest Linguistics Conference, the 2009 meeting of the Canadian Linguistic Association, and the Meeting of Semanticists Active in Canada workshop, where I received many helpful comments and suggestions on parts of the thesis.

Finally, I am grateful to faculty and fellow students at Queen’s University, where I was introduced to linguistics.
Chapter 1

Introduction

Much has been written about the scope of indefinites and about the semantics of plurality; however, little work has been done on the scope of indefinites or the semantics of number in Bantu languages. This thesis investigates some apparent differences in scope between singular and plural indefinites in Shona, a Bantu language spoken in Zimbabwe. I will argue that many apparent scope differences between singulars and plurals are not really scope differences at all but are due to cumulative and collective readings of plurals.

In this chapter, I give some general information about Shona (§1.1) and a preview of the rest of the thesis (§1.2).

1.1 Shona

Shona is a Bantu language (S10 in Guthrie’s classification), and is spoken by about 10 million people in Zimbabwe and surrounding countries. The major dialects of Shona are Karanga, Zezuru and Korekore; Manyika, Ndau, and Kalanga are considered dialects of Shona by some authors and independent languages by others. This thesis is based on fieldwork with a native speaker of the Karanga dialect.

The basic word order of Shona is SVO, with both subject and object pro-drop. The template in (1.1) shows the inflection found on finite main verbs. The obligatory inflectional elements are a subject agreement prefix, a prefix marking tense and/or aspect, and a suffix known in the Bantu literature as a final vowel. All these obligatory elements are found in (1.2).

(1.1) subject agreement - tense/aspect - (object agreement) - root - (verbal extensions) - FV

(1.2) Nd-aka-bik-a ma-nhanga.
1SG-REM.PST-cook-FV CL6-pumpkin
‘I cooked (the) pumpkins.’

Object agreement on the verb is optional, and does not appear in any of the examples in this thesis\(^1\). Also optional are the verbal extensions; these appear between the verb root and the final vowel, and are generally valence-changing operators, such as the applicative and passive markers in (1.3) and the reciprocal marker in (1.4).

---

\(^1\)There is some evidence that the presence of object agreement affects the information structure and referential properties of objects (Storoshenko 2009; Ferch to appear). This interaction is not fully understood, however, and investigation of it is beyond the scope of this thesis.
Auxiliary verbs take at least a subject agreement prefix (1.5), and sometimes tense marking as well (1.6). Some auxiliaries take a finite verb as complement (1.6), while others take an infinitive (1.5).

(1.5) **Ndi-ri ku-mhany-a.**

1SG-COP INF-run-FV

‘I am running.’

(1.6) **T-aka-nga t-a-teng-a mu-chero.**

1PL-REM.PST-AUX 1PL-REC.PST-buy-FV CL3-fruit

‘We had bought fruit.’

The morphology and syntax of nominal expressions, including the noun class system, are explored in chapter 3.

The examples in the thesis are given in standard orthography, except that hyphens have been added to show morpheme boundaries. Some phonological processes are apparent in the examples, which might make the morphology slightly opaque (the examples below have an extra line which shows their underlying forms). Firstly, there are several strategies for resolving vowel hiatus: the vowel of a subject agreement prefix or noun class prefix is usually deleted before a vowel-initial tense marker or stem (1.7), but if the prefix consists of a single high vowel, it becomes a glide instead (1.8) and (1.9); and vowel coalescence occurs between prepositions and their complements (1.10) and (1.11), reflecting the historical presence of an initial vowel (known in Bantu literature as an augment) which has been lost in Shona.

(1.7) **Nd-a-won-a zvi-garo zv-ose.**

ndi-a-won-a zvi-garo zvi-ose

1SG-REC.PST-see-FV CL8-chair CL8-all

‘I saw all the chairs.’

(1.8) **W-a-sek-a.**

u-a-sek-a

2SG-REC.PST-laugh-FV

‘You laughed.’

(1.9) **Nd-aka-mhang-a u-siku w-ose.**

ndi-aka-mhang-a u-siku u-ose

1SG-REM.PST-run-FV CL14-night CL14-all

‘I ran the whole night.’
The underlying class prefix for classes 9 and 10 is a nasal, which does not appear in the surface form itself but causes changes in the initial consonants of some stems (1.12).

Finally, Shona has a requirement that phonological words contain at least two syllables; because of this, an epenthetic i- appears at the beginning of some nouns (1.13).

1.2 Bare Singualrs and Bare Pluralas

This section gives a brief preview of the data on which this thesis is based, which show several differences between singulars and plurals.

Bare singulars and bare plurals have different apparent scope readings with respect to a class of modifiers which I call “scopeless quantifiers”. For example, the sentences in (1.14) and (1.15) differ only in the number of the subject: the class 1 prefix (mu-) on the subject in (1.14) marks it as singular, while the class 2 prefix (va-) on the subject in (1.15) marks it as plural. Based on the situations in which these two sentences are accepted as true, bare singulars appear to be restricted to wide scope (1.14), while bare plurals appear to be scopally ambiguous (1.15). In chapter 5, I argue that this is the result of cumulativity.

(1.10) Ma-keke a-ka-bik-w-a ne-chi-koro.
ma-keke a-aka-bik-u-a na-i-chi-koro
CL6-cake CL6-REM.PST-cook-PSV-FV ASSOC~CL7-school
‘The cakes were baked by the school.’

(1.11) Mu-kadzi a-ka-tsvod-w-a no-mu-rume.
uu-kadzi a-aka-tsvod-u-a na-u-mu-rume
CL1-woman 3SG-REM.PST-kiss-PSV-FV ASSOC~CL1-man
‘The woman was kissed by the man.’

The underlying class prefix for classes 9 and 10 is a nasal, which does not appear in the surface form itself but causes changes in the initial consonants of some stems (1.12).

(1.12) imbwa nhatu
N-mbwa N-tatu
CL10-dog CL10-three
‘three dogs’

Finally, Shona has a requirement that phonological words contain at least two syllables; because of this, an epenthetic i- appears at the beginning of some nouns (1.13).

(1.13) imbwa diki
N-mbwa N-diki
CL9-dog CL9-young
‘a young dog’

(1.14) Mu-rume a-ka-yambuk-a nzi-izi nhatu.
CL1-man 3SG-REM.PST-cross-FV CL10-river CL10-three
‘A man crossed three rivers.’
accepted if the same man crossed all three
rejected if each river was crossed by a different man
(1.15) Va-rume va-ka-yambuk-a nz-izi nhatu.
c2-man c2-REM.PST-cross-FV c10-river c10.three
Men crossed three rivers.
accepted if the same group of men crossed all three
accepted if each was crossed by a different man or men

Bare singulars and bare plurals also appear to have different scope possibilities when they appear as the subject of a clause whose object contains oga-oga ‘every’: bare singulars are restricted to wide scope (1.16), while bare plurals appear to be scopally ambiguous (1.17). In chapter 6, I argue that subjects must be specific (and therefore take wide scope) due to the interaction of syntactic structure and information structure; the apparent narrow scope reading of the subject in (1.17) can be explained using nonmaximality.

(1.16) Mw-ana a-ka-rum-a chi-ngwa ch-oga-choga.
c1-child 3SG-REM.PST-bite-FV c7-bread c7-every-RED
A child bit every (loaf of) bread.
accepted if the same child bit all the loaves (∃x∀y)
rejected if a different child bit each loaf (∀y∃x)
Consultant’s comment: If I were an employee at the bakery and I said this to my boss, he could say “show me the child”, and if I showed him more than one child he would ask why I said there was only one.

c2-child c2-REM.PST-bite-fv c7-bread c7-every-RED
Children bit every (loaf of) bread.
accepted if the same group of children each bit every loaf (∃x∀y)
accepted if each loaf was bitten by a different set of children (∀y∃x)

Number also affects the domain of quantification of oga-oga ‘every’: when it modifies a singular noun, it quantifies over individuals, but when it modifies a plural noun, it quantifies over groups. I argue in chapter 6 that this follows from the denotations of singular and plural nouns.

(1.18) Mu-kadzi w-oga-woga a-ka-tsvod-a mu-rume.
c1.woman c1.every-RED 3SG-REM.PST-kiss-FV c1-man
every woman kissed a man.
accepted if they all kissed the same man (∃x∀y)
accepted if they each kissed a different man (∀y∃x)

(1.19) Va-rume v-oga-voga va-ka-bat-a mbavha.
c2-man c2.every-RED c2-REM.PST-catch-FV c9.thief
Every [group of] men caught a thief.
accepted if each group caught a different thief (∀y∃x)
accepted if one thief was caught by the first group, escaped, was caught by the second group, escaped again, etc (∃x∀y, distributive)
rejected if the groups, in the course of chasing thieves around the town, came together from various directions and caught a thief between them (∃x∀y, collective)
Overall, then, the claim is that differences between singulars and plurals can be explained by the semantics of plurality and how plurals combine in sentences. Although it may appear that the number of an expression affects its scope possibilities, this is not actually the case.

The thesis is organised as follows. In chapter 2, I present some theoretical background on the semantics of plurality. Chapter 3 gives some background on the morphology and syntax of nominal expressions in Shona. In chapter 4, I show that bare plurals and bare singulars have interpretations similar to those of both definite and indefinite DPs in English, and suggest that these interpretations can be analysed using choice functions. The core of the thesis is chapter 5, where I show that bare singulars and bare plurals appear to have different scope possibilities with respect to numerals and *shoma* ‘(a) few’; I argue that numerals and *shoma* are intersective modifiers, and that apparent scopal ambiguity with bare plurals is due to cumulativity. Chapter 6 addresses some issues connected to the two universal quantifiers *ose* ‘all’ and *oga-oga* ‘every’. Finally, chapter 7 concludes the thesis and suggests some directions for further research.
Chapter 2

The Semantics of Number

In this chapter, I discuss previous approaches to the semantics of plurality (§2.1) and how plurals combine in sentences (§2.2). Readers familiar with the literature may prefer to skip this chapter.

2.1 Plurality

In order to discuss the semantic interpretation of plurals, I need to adopt a theory of plurality. Several such theories have been proposed, most using either a set-theoretic or a lattice-theoretic conceptualisation of the domain of individuals. Set-theoretic accounts interpret singul ars as denoting individuals and plurals as denoting sets (Carpenter 1994; Schwarzschild 1996; Winter 2002; Rullmann 2003, a.o.). Lattice-theoretic accounts interpret singul ars as denoting atoms and plurals as denoting sums; this type of account was first proposed by Link (1983). These theories are summarised in Table 2.1.

<table>
<thead>
<tr>
<th>Type of theory</th>
<th>Denotation of singular</th>
<th>Denotation of plural</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set-theoretic</td>
<td>individuals</td>
<td>sets</td>
<td>Carpenter (1994); Schwarzschild (1996); Winter (2002); Rullmann (2003)</td>
</tr>
</tbody>
</table>

Table 2.1: Theories of plurality

To the best of my knowledge, the arguments in this thesis could be made using any of these theories; for concreteness, I assume a lattice-theoretic approach. In such a theory, the domain of individuals is a complete join semilattice; Figure 2.1 shows the domain for a universe containing three individuals. A singular noun denotes a set of atoms (such as the bottom row in Figure 2.1), which represent individuals. The plural of the same noun denotes a lattice built on those atoms by forming all the possible sums composed of those atoms (such as the entire lattice in Figure 2.1).
Figure 2.1: A complete join semilattice built on three atoms

Formally, the sums are introduced by the \(*\)-operator. If the atoms \(a\), \(b\), and \(c\) in Figure 2.1 represent all the cats in the domain, the singular noun \textit{cat} denotes (the property of being one of) those atoms (2.1), while the plural \textit{cats} denotes the atoms and the sums composed of them, and is represented using the \(*\)-operator as in (2.2).

\[(2.1) \ [\text{cat}] = \lambda x. \text{cat}(x)\]
\[(2.2) \ [\text{cats}] = \lambda x. \ast \text{cat}(x)\]

The sums and atoms in the lattice are related by the \(\leq\) operator (2.3), which can be read as “is a part of”.

\[(2.3) \ y \leq x \leftrightarrow y + x = x\]

Another important concept relating to lattices is that of the supremum. The supremum of a lattice is the sum which is composed of all elements in the lattice (in the case of Figure (2.1), the sum \(a+b+c\) at the top of the lattice). The \(+\)-operator, defined in (2.4), applies to a one-place predicate and returns the element of that predicate which is its supremum\(^2\). For example, if the atoms in Figure 2.1 represent the cats in the domain, the \(+\)-operator applied to the plural \textit{cats} (2.5) returns the sum \(a+b+c\) (the supremum of the lattice). The definition in (2.4) requires that the predicate be true of the supremum; if the \(+\)-operator is applied to the singular \textit{cat}, the result (2.6) is undefined, because the singular predicate \textit{cat} is only true of the atoms in the lattice.

\[(2.4) \ + = \lambda P.t x (P(x) \land \forall y(P(y) \rightarrow y \leq x))\]
\[(2.5) \ +(\ast \text{cat}) \quad (= +(\lambda x. \ast \text{cat}(x)))\]
\[(2.6) \ +(\text{cat}) \quad (= +(\lambda x. \text{cat}(x)))\]

Plurals are usually analysed as including both sums and atoms in their denotation (or both singleton sets and larger sets) (Schwarzschild 1996; Rullmann 2003; Farkas 2006; Zweig 2008),

\(^2\)This operator is similar to Link’s (1983) \(\sigma\)-operator.
which is the denotation created by the *-operator. In most contexts, the use of a plural rather than a singular creates an implicature that the referent is a sum; however, at least in English, the interpretation of plural expressions in questions shows that their denotations also contain atoms³ (Krifka 1996; Sauerland 2003; Sauerland et al. 2005; Spector 2007). For example, if the mother of an only child is asked whether she has children, the natural answer is “yes” rather than “no” (2.7). But if the denotation of children contained only sums, the expected answer would be “no”: a “yes” answer to the question in (2.7) would mean that speaker B has more than one child.

(2.7) A: Do you have children?
   B: Yes, I have one./#No, I have one.

2.2 Collectivity, Distributivity, and Cumulativity

Plurals may be interpreted collectively or distributively. On the collective reading, the predicate applies to the group as a whole, not to the individuals which make it up; for example, the most likely interpretation of (2.8) is that all the children worked together and built the treehouse. On the distributive reading, the predicate applies to each individual which is part of the plural, as in (2.9) (laughing can only be done individually).

(2.8) The children built the treehouse.
(2.9) The children laughed.

According to Link (1983), a predicate such as “built the treehouse” may take either a sum or an atom as its argument; if it takes a sum as argument, a collective reading results (represented informally in (2.10)). On this reading, it is true of the children as a group that they built the treehouse, but it need not be true of any individual child.

(2.10) built(the children, the treehouse)

Distributive predicates such as “laugh”, on the other hand, can only take atoms as arguments, so (2.11) is necessarily false. Before a distributive predicate can combine with a plural argument, it must have the *-operator (defined in the previous section) applied to it, yielding a denotation which includes both the atoms denoted by the original predicate and all the sums composed of them. A representation such as (2.12) gives a distributive interpretation because no sum is in []*laugh] unless all its component atoms are in []laugh].

(2.11) laugh(the children)
(2.12) *laugh(the children)

³This is not true of all languages; however, I will show in §3.1 that it does seem to be the case in Shona.
When two plurals are used together (with the right type of predicate), all four logically possible combinations of collective and distributive readings are available, as in (2.13).

(2.13) The boys wrote to the girls.
   a. The boys, as a group, wrote one letter addressed to all the girls. (collective-collective)
   b. Each boy wrote one letter addressed to all the girls. (distributive-collective)
   c. The boys, as a group, wrote a letter to each girl. (collective-distributive)
   d. Each boy wrote a letter to each girl. (distributive-distributive)

Distributive readings may arise from a plural argument combining with a distributive predicate to which the *-operator has applied (as in (2.12) above), but they can also be derived using a distributive operator such as the one given in (2.14)⁴ (Link 1987; Roberts 1987; Schwarzschild 1996; Lasersohn 1998; Landman 2000, a.o.). The *-operator and D-operator are equivalent on distributive predicates, but on predicates which can be true of sums, only the D-operator requires that the predicate is true of each atom individually (the *-operator also allows distribution to subgroups).

(2.14) \[ D = \lambda P. \lambda y. \forall x[AT(x) \land x \leq y \rightarrow P(x)] \]

The collective-collective reading in (2.13a) can be represented as (2.15), where the predicate combines directly with its plural arguments. (2.13b), where the subject is interpreted distributively and the object is interpreted collectively, can be represented as (2.16); this reading is derived by first combining the verb and the object, then applying the D-operator, and finally combining with the subject.

(2.15) wrote-to(the boys, the girls)

(2.16) \[ \forall x[AT(x) \land x \leq \text{the boys} \rightarrow \text{wrote-to}(x, \text{the girls})] \]

A distributive reading of the object, as in (2.13c), could be derived either by moving the object via Quantifier Raising or by using a generalised distributive operator such as that of Lasersohn (1998). The four readings of (2.13) can then be derived by varying the number and placement of distributive operators: no D-operator (a), a D-operator associated with the subject (b), a D-operator associated with the object (c), or two D-operators associated with the two arguments (d).

A sentence involving two plurals may also have a cumulative reading (Scha 1981), which is the most salient reading for sentences involving large numerals, such as (2.17):

(2.17) 500 children wrote 4800 math tests at this school last year.

⁴The predicate AT(x) means “x is an atom”.
The cumulative reading of (2.17) can be paraphrased as “500 children wrote math tests at this school last year, and 4800 math tests were written by children at this school last year”. This reading is distinct both from a collective reading (500 children collaborated to write the tests) and from readings where one numeral distributes over the other (each child wrote 4800 tests, or each test was written by 500 children).

Following Sternefeld (1998) and Beck and Sauerland (2000), I treat the cumulative reading as derived using the **-operator (2.18), which was first proposed by Krifka (1986, cited in Beck and Sauerland 2000)\(^5\).

\[
(2.18) \quad **R(x,y) = 1 \text{ iff } \forall x' \leq x \exists y' \leq y \text{ s.t. } R(x',y') \text{ and } \forall y' \leq y \exists x' \leq x \text{ s.t. } R(x',y')
\]

The **-operator is the equivalent of Link’s *-operator for two-place predicates: while the *-operator adds sums as potential arguments of a one-place predicate, the **-operator adds sums as both potential subjects and objects. For example, love is (primarily) a predicate which holds between individuals; the **-operator captures the intuition that (2.19a) and (b) together entail (2.19c).

\[
(2.19) \quad \begin{align*}
\text{a. John loves Mary.} & \quad \text{love}(j,m) \\
\text{b. Bill loves Sue.} & \quad \text{love}(b,s) \\
\text{c. John and Bill love Mary and Sue.} & \quad **\text{love}(j \oplus b, m \oplus s)
\end{align*}
\]

Beck and Sauerland (2000) use the **-operator to derive dependent readings of plural definites, which they treat as cumulative readings; they also extend their analysis to numeral definites and indefinites and to conjunctions. In chapter 5 I will use this operator to derive cumulative readings in Shona, as well as extending Beck and Sauerland’s analysis to dependent readings of indefinite plurals in English.

### 2.3 Conclusion

This chapter has introduced several theoretical devices which I will use in later chapters of the thesis: Link’s theory of plurality is used throughout; the **-operator and the cumulative reading derived using it are used in chapter 5 and in §6.1; the +-operator is used in §6.1; and the distributive operator is used in §§5.3-5.4. The next chapter provides some background on the morphology and syntax of nominal expressions in Shona.

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\(^5\)Krifka’s, Sternefeld’s, and Beck and Sauerland’s definitions are formulated slightly differently from that given here.
Chapter 3

Nominal Expressions in Shona

This chapter gives some background on the syntax of Shona nominals.

Noun stems in Shona are obligatorily accompanied by noun class prefixes, which mark number and inflectional category (similar to grammatical gender). Thus, bare noun stems such as ana ‘child’ and chero ‘fruit’ cannot appear either as arguments (object in (3.1), subject in (3.2)) or as predicates (3.3); however, these same stems with the appropriate class prefix attached are grammatical in all these positions.

(3.1) a. *Nd-a-won-a    ana.
    1SG-REC.PST-see-FV  child
    Intended: ‘I saw (a) child.’

    b. Nd-a-won-a      mw-ana.
    1SG-REC.PST-see-FV  CL1-child
    ‘I saw a/the child.’

(3.2) a. *Ana    a-ka-sek-a.
    child  3SG-REM.PST-laugh-FV
    Intended: ‘(A) child laughed.’

    b. Mw-ana   a-ka-sek-a.
    CL1-child  3SG-REM.PST-laugh-FV
    ‘A/the child laughed.’

(3.3) a. *Damba    chero.
    CL5.damba   fruit
    Intended: ‘A damba (klapper apple) is a fruit.’

    b. Damba    mu-chero.
    CL5.damba  CL3-fruit
    ‘A damba is a fruit.’

I use the term “bare classified nouns” to refer to bare plurals and bare singulars: nouns which are marked for number, but are not accompanied by any modifiers such as adjectives, quantifiers, or demonstratives. Unlike truly bare nouns in other languages, bare classified nouns have some functional structure (at least number marking). Bare classified nouns are interpreted as singular or plural, depending on the class prefix, whereas bare nouns in many other languages have general number\(^6\). Bare classified nouns are also able to take wide or narrow scope, unlike

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\(^6\)Nouns with general number are unmarked for number; the same morphological form may be interpreted as singular or plural depending on the discourse context (Corbett 2000).
bare nouns which are generally restricted to only narrow scope. This thesis deals primarily with interactions between bare classified nouns and quantified DPs.

In this chapter, I describe the system of noun classes (§3.1), the internal syntax of nominal expressions (§3.2), and the external syntax of bare classified nouns and other DPs (§3.3).

### 3.1 The Noun Class System

There are twenty-one noun classes in Shona. Table 3.1, adapted from Fortune (1981) and Brauner (1995), shows the class prefixes and some examples of the types of meaning that nouns of each class have. Some classes (e.g. class 1 and 2) cover a well-defined semantic category, so that almost all nouns of the class fit into the category given in the table. Other classes (e.g. class 5 and 6) are very broad and hard to generalise; for these classes, the categories given in the table are only a few examples of categories which often fall into this class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Marker</th>
<th>Number</th>
<th>Typical Meanings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>mu-</td>
<td>singular</td>
<td>human beings</td>
</tr>
<tr>
<td>2</td>
<td>va-</td>
<td>plural</td>
<td>human beings</td>
</tr>
<tr>
<td>3</td>
<td>mu-</td>
<td>singular</td>
<td>trees, plants, things made of wood</td>
</tr>
<tr>
<td>4</td>
<td>mi-</td>
<td>plural</td>
<td>trees, plants, things made of wood</td>
</tr>
<tr>
<td>5</td>
<td>Ø- (ri-)</td>
<td>singular</td>
<td>types of landscape, fruits, liquids, animals</td>
</tr>
<tr>
<td>6</td>
<td>ma-</td>
<td>plural or mass</td>
<td>fruits, substances, activities, times</td>
</tr>
<tr>
<td>7</td>
<td>chi-</td>
<td>singular or mass</td>
<td>objects, utensils, sicknesses</td>
</tr>
<tr>
<td>8</td>
<td>zvi-</td>
<td>plural</td>
<td>objects, utensils, sicknesses</td>
</tr>
<tr>
<td>9</td>
<td>N- (i-)</td>
<td>singular or mass</td>
<td>animals, most borrowings</td>
</tr>
<tr>
<td>10</td>
<td>N- (dzi-)</td>
<td>plural</td>
<td>animals, circular things, most borrowings</td>
</tr>
<tr>
<td>11</td>
<td>ru-</td>
<td>singular</td>
<td>long thin things, circular things, times</td>
</tr>
<tr>
<td>12</td>
<td>ka-</td>
<td>singular or mass</td>
<td>diminutive, miscellaneous objects</td>
</tr>
<tr>
<td>13</td>
<td>tu-</td>
<td>plural or mass</td>
<td>diminutive, small quantities</td>
</tr>
<tr>
<td>14</td>
<td>u-</td>
<td>singular or unspecified</td>
<td>substances, structures, abstractions</td>
</tr>
<tr>
<td>15</td>
<td>ku-</td>
<td>neutral</td>
<td>verbal actions (infinitive)</td>
</tr>
<tr>
<td>16</td>
<td>pa-</td>
<td>neutral</td>
<td>locative</td>
</tr>
<tr>
<td>17</td>
<td>ku-</td>
<td>neutral</td>
<td>locative</td>
</tr>
<tr>
<td>18</td>
<td>mu-</td>
<td>neutral</td>
<td>locative</td>
</tr>
<tr>
<td>19</td>
<td>svi-</td>
<td>singular</td>
<td>diminutive (only Karanga)</td>
</tr>
<tr>
<td>20</td>
<td>ku-</td>
<td>singular</td>
<td>diminutive (only Kalanga)</td>
</tr>
<tr>
<td>21</td>
<td>zi-</td>
<td>singular</td>
<td>augmentative</td>
</tr>
</tbody>
</table>

Table 3.1: Noun classes in Shona

Each noun stem is associated with one or a pair of class prefixes from classes 1 through 14⁷;

⁷In some cases, a stem can be associated with more than one pair of class prefixes, but with different meanings for each pair. For example, the stem *kadzi* is found in both *mu-kadzi* ‘woman’ (class 1) and *u-kadzi* ‘womanhood’ (class 14) (Fortune 1981).
the association is not completely arbitrary, but not entirely predictable either (for example, nouns denoting human beings are usually associated with classes 1 and 2, but some are class 5/6 or 9/10 instead). No identifiable class prefix appears on nouns of class 5; the prefix of classes 9 and 10 appears as a nasal consonant on vowel-initial stems, and affects the initial consonant of many consonant-initial stems. The prefixes in brackets appear as agreement on elements other than noun stems, such as adjectives and verbs (agreement is discussed below).

The class prefixes for classes 1-14 mark the number of the noun they attach to, as indicated in the third column of Table 3.1. Some classes include both singular and mass nouns or both plural and mass nouns; for example, class 9 contains *imbwa* ‘dog’, which is singular, and *nvura* ‘water’, which is a mass noun. Class 14 includes some mass nouns, such as *upfu* ‘meal’, but can also be unmarked for number, as with *usiku* ‘night(s)’.

Class 15 contains verbal infinitives, which behave like nouns in some ways (see Fortune (1981) for discussion). Classes 16-18 are locatives; these prefixes attach outside another class prefix (for example, *mu-mi-ti* ‘in (the) trees’ consists of a locative (class 18) prefix *mu*, another class prefix *mi*, and the noun stem *ti* ‘tree’). Neither the infinitive nor locative prefixes mark number.

Classes 19-21 are diminutives and augmentatives; they are either substituted for or added to the primary class prefix for the noun stem that they modify.

Noun class agreement is pervasive, appearing on many lexical categories. Examples (3.4)-(3.8) show various nominal modifiers agreeing with their head nouns: adjectives ((3.4), (3.7), (3.8)), demonstratives ((3.6), (3.8)), possessors ((3.5), (3.7)), the quantifier *ose* ‘all’ (3.4), and the numeral *shanu* ‘five’ (3.6). This agreement is often alliterative, as in (3.4), (3.5), and on some of the modifiers in (3.6) and (3.7); however, this is not always the case, as with the possessor in (3.7) and the demonstratives in (3.6) and (3.8).

(3.4) va-rume va-diki v-ose  
CL2-man CL2-young CL2-all  
‘all young men’

(3.5) v-ana v-o-mu-rume  
CL2-child CL2-POSS-CL1-man  
‘the man’s children’

(3.6) zvi-garo zvi-shanu izv-o  
CL8-chair CL8-five CL8-that  
‘those five chairs’

(3.7) mi-ti mi-diki y-o-mu-rume  
CL4-tree CL4-small CL4-POSS-CL1-man  
‘the man’s small trees’

---

8 These locative prefixes could perhaps be analysed as prepositions; however, in this thesis I adopt the traditional description of them as class prefixes.

9 The choice of whether to add or substitute seems to be idiosyncratic. Prefixes from other classes can also be used in a similar way, particularly class 5 and 6 as augmentatives and class 12 and 13 as diminutives.
I take the denotation of noun stems in Shona to be number neutral, including both atoms and sums\textsuperscript{10}. The primary class marker gives the number of the noun, as well as encoding the inflectional category of the noun stem. Plurals seem to include atoms as well as sums in questions in Shona, as in English: in (3.9), if speaker B has exactly one child, the appropriate answer to “Do you have children?” is “yes”.

\begin{align*}
\text{(3.9) A:} \quad & \text{U-ne } v-ana \text{ here?} \\
& 2\text{SG-have } \text{Cl2-child} \text{ Q} \\
& \text{‘Do you have children?’} \\
\text{B:} \quad & \text{Ehe, ndi-ne mw-ana mu-mwe (chete).} \\
& \text{yes } 1\text{SG-have } \text{Cl1-child} \text{ Cl1-one} \text{ only} \\
& \text{‘Yes, I have (only) one child.’}
\end{align*}

If a singular class marker is attached to a noun stem, its denotation is restricted to just the atoms in its original denotation. If a plural class marker is attached, its denotation is unchanged, but an implicature of reference to sums is created. (Note that this only applies to singular and plural class markers; the infinitive and locative class markers do not affect the number of the noun phrases they combine with.)

Contra Myers (1987), I consider primary class prefixes to be inflectional affixes, rather than proclitics which take a phrasal complement; however, the examples which Myers uses to support his analysis are cases of nominalisation or secondary prefixation (with one prefix attaching outside of another one), and his analysis may well be correct for these more complex constructions.

\subsection{3.2 Internal Syntax of the DP}

Word order within the DP is fairly free. For example, the subject in (3.10) consists of a noun, a demonstrative, and an adjective; as (3.10a-f) show, these three elements can appear in all six logically possible orders\textsuperscript{11}.

\textsuperscript{10}Since bare noun stems do not occur alone, this is speculative. An alternative possibility is that noun stems denote only atoms; in this case, the denotations of bare singulars and bare plurals could be derived just as easily: singular class markers do not change the denotation, while plural class markers denote the \textsuperscript{*}-operator and add sums to the denotation. A study of the meanings of compounds might provide evidence for one of these possibilities: two noun stems may form a compound noun which then has a class prefix added (such as \textit{mw-ana-komana} ‘son’, which consists of a class 1 prefix \textit{mu}- and two noun stems \textit{ana} ‘child’ and \textit{komana} ‘boy’).

\textsuperscript{11}The data I have collected do not agree in this respect with those of Myers (1987), in which only one modifier may precede the head noun; this may indicate a dialect difference or a change in progress.
   CL1-child CL1-this CL1-small 3SG-COP INF-run-FV
   ‘This young child is running.’

b. Mwana mudiki uyu ari kumhanya.

c. Mudiki mwana uyu ari kumhanya.

d. Mudiki uyu mwana ari kumhanya.

e. Uyu mudiki mwana ari kumhanya.

f. Uyu mwana mudiki ari kumhanya.

The unmarked order in Shona is noun-initial. Elements which appear before the noun, such as the numeral *vaviri* in (3.11b), are emphasised.

   CL2-two CL2-child CL2-COP INF-run-FV
   ‘TWO children are running.’

In later chapters, I will focus on scopal interactions between bare classified nouns and nominal expressions containing a small set of modifiers: numerals, *shoma* ‘few’, *ose* ‘all’, and *oga-oga* ‘every’. *Oga-oga* ‘every’ differs syntactically from the other modifiers in a few ways. Firstly, its ordering within the DP is somewhat restricted: a DP which consists solely of *oga-oga* and a noun must be noun-initial (3.12). (If another modifier is present in the DP, *oga-oga* can be prenominal, to varying degrees of naturalness (3.13).)

   CL1-child CL1-every-RED 3SG-COP INF-run-FV
   ‘Every child is running.’


   CL1-child CL1-young CL1-every-RED 3SG-COP INF-run-FV
   ‘Every young child is running.’

b. Wogawoga mwana mudiki ari kumhanya.

c. Wogawoga mudiki mwana ari kumhanya.

d. ?Mudiki wogawoga mwana ari kumhanya.

*Oga-oga* also has some co-occurrence restrictions which the other modifiers do not have: it cannot co-occur with a demonstrative, and can only co-occur with numerals in the construction shown in (3.15).
I will argue in chapter 6 that *oga-oga* also differs in mode of composition from the other modifiers; these syntactic differences may provide some support for this idea.

### 3.3 External Syntax of the DP

Bare classified nouns appear freely as arguments in Shona. For example, the intransitive and transitive subjects in (3.16) and (3.17), the direct and applied objects in (3.18) and (3.19), and the prepositional object in (3.20) (as well as the subject) are all bare classified nouns.

   
   CL1-child CL1-this CL1-every-RED 3SG-COP INF-run-FV
   
   Intended: ‘Every this child is running.’

   
   CL16-CL2-child CL2-five CL2-every-RED CL1-one 3SG-COP INF-run-FV
   
   ‘One of every five children is running.’

Nouns which are not bare, such as the noun and demonstrative combination in (3.21)-(3.25), can also appear in the same positions.

(3.16) * Mw-ana a-ri ku-mhany-a.
   
   CL1-child 3SG-COP INF-run-FV
   
   ‘The child is running.’

(3.17) Mw-ana a-no-won-a imbwa.
   
   CL1-child 3SG-HAB-see-FV CL9.dog
   
   ‘The child sees the dog.’

(3.18) Ndi-no-d-a mw-ana.
   
   1SG-HAB-like-FV CL1-child
   
   ‘I like a/the child.’

(3.19) Nd-aka-bik-ir-a mw-ana.
   
   1SG-REM.PST-cook-APPL-FV CL1-child
   
   ‘I cooked for the child.’

(3.20) Tsamba y-aka-nyor-w-a no-mw-ana.
   
   CL9.letter CL9-REM.PST-write-PSV-FV ASSOC-CL1-child
   
   ‘The letter was written by a/the child.’
(3.23) *Ndí-no-d-a  *mw-ana  uy-u.
1SG-HAB-like-FV  CL1-child  CL1-this
‘I like this child.’

(3.24) *Nd-aka-bik-ir-a  mw-ana  uy-u.
1SG-REM.PST-cook-APPL-FV  CL1-child  CL1-this
‘I cooked for this child.’

(3.25) *Tsamba  y-aka-nyor-w-a  no-mw-ana  uy-u.
CL9.letter  CL9-REM.PST-write-PSV-FV  ASSOC-CL1-child  CL1-this
‘A/the letter was written by this child.’

There are some restrictions on the distribution of nominal expressions containing certain modifiers. For example, bare classified nouns and expressions containing numerals or ose ‘all’ may appear in predicate position (3.26)-(3.28), but oga-oga ‘every’ may not (3.29):

(3.26) *Ich-i  chi-garo.
CL7-this  CL7.COP-chair
‘This is a/the chair.’

(3.27) *Izv-i  zvi-garo  zvi-viri.
CL8-this  CL8.COP-chair  CL8-two
‘These are (the) two chairs.’

(3.28) *Izv-i  zvi-garo  zv-ose.
CL8-this  CL8.COP-chair  CL8-all
‘These are all (the) chairs.’

CL7-this  CL7.COP-chair  CL7-every-RED
Intended: ‘This is every chair.’

Existential constructions also allow bare classified nouns (3.30) and expressions containing numerals (3.31), but in this case both ose ‘all’ (3.32) and oga-oga ‘every’ (3.33) are disallowed.

(3.30) Pane  chi-ngwa  mu-mba.
EXIST  CL7-bread  CL18-CL9.house
‘There’s bread in the house.’

(3.31) Pane  zvi-garo  zvi-shanu  mu-mba.
EXIST  CL8-chair  CL8-five  CL18-CL9.house
‘There are five chairs in the house.’

(3.32) * Pane  v-ana  v-ose  mu-mba.
EXIST  CL2-child  CL2-all  CL18-CL9.house
Intended: ‘There are all (the) children in the house.’
(3.33)  * Pane  imbwa  y-oga-yoga  mu-mba.
        EXIST  cl9.dog  cl9-every-red  cl18-cl9.house

Intended: ‘There’s every dog in the house.’

3.4 Conclusion

This chapter provided some background on the morphology and syntax of nominal expressions in Shona. I have shown that Shona has obligatory number marking; introduced bare classified nouns and modifiers seen in later chapters; and noted some syntactic differences between *oga-oga ‘every’ and the other modifiers seen in the thesis. In the next chapter, I show that bare classified nouns are unmarked for definiteness, and sketch the semantic analysis I use for them.
(In)definiteness in Shona

In this chapter, I give some background on the semantic analysis I assume for bare classified nouns. The goal of this chapter is not to argue for this particular analysis (or against other possible analyses), but only to set up a way of representing bare classified nouns in the semantic formulas in later chapters. Many interesting questions connected with definiteness, indefiniteness, and specificity are therefore left unexplored in this thesis.

I first show that bare classified nouns in Shona are unmarked for definiteness, appearing to have both definite and indefinite interpretations (§4.1). Then I describe the semantic analysis I will assume in the rest of the thesis (§4.2): I will analyse bare classified nouns (and many other DPs in Shona) as interpreted with choice functions, allowing both existentially closed function variables (for an indefinite interpretation) and free function variables (for a definite or specific interpretation).

4.1 Definite and Indefinite Interpretations

In this section I use several tests taken from Matthewson (1999) to show that both definite and indefinite interpretations of bare classified nouns are possible; I also show that bare classified nouns need not be referential. Table 4.1 shows the contexts used as tests and the interpretations associated with each.

<table>
<thead>
<tr>
<th>Context</th>
<th>Definite</th>
<th>Referential indefinite</th>
<th>Non-referential indefinite</th>
</tr>
</thead>
<tbody>
<tr>
<td>unique referent</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>no unique referent</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>twice in same sentence</td>
<td>✓</td>
<td>?</td>
<td>×</td>
</tr>
<tr>
<td>- same individual</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
</tr>
<tr>
<td>- different individuals</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>antecedent of wh-word in sluice</td>
<td>×</td>
<td>?</td>
<td>✓</td>
</tr>
<tr>
<td>in scope of negation (¬∃)</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>in scope of universal (∀∃)</td>
<td>×</td>
<td>×</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 4.1: Tests for definite and indefinite interpretations

Contexts in which there is a unique individual that satisfies the nominal predicate, or where two instances of the same noun refer to the same individual, favour definite expressions, although
referential indefinites are also possible in these contexts. On the other hand, contexts in which there is no unique referent, or where two instances of the same noun refer to different individuals, allow either a referential or non-referential indefinite interpretation, but not a definite one. In sluicing constructions (such as *He bought something but I don’t know what*), only non-referential indefinite expressions are fully grammatical as antecedents to the wh-word; referential indefinites are at least marginal, if not ungrammatical, and definite expressions are entirely ruled out. Finally, an existential interpretation within the scope of another operator, such as negation or a universal quantifier, must be non-referential. I will consider each of these contexts in turn.

The first three tests concern uniqueness and familiarity, which are the two main components of the definiteness distinction. In English, definite descriptions usually have unique referents and denote individuals which are familiar in the discourse context; because of this, if the same definite description is repeated in the same sentence, both instances refer to the same individual. Indefinite descriptions, on the other hand, denote unfamiliar individuals or those which are not unique, so an indefinite is used if there is more than one individual in the context which is in the denotation of the NP, and an indefinite description which occurs twice in the same sentence may refer to two different individuals.

Following Heim (1991), Hawkins (1991) and Matthewson (1999) I assume that indefinites are unmarked for uniqueness and familiarity, and that in languages with contrasting definite expressions (which denote unique, familiar individuals) the use of an indefinite expression implicates nonuniqueness and unfamiliarity. Since Shona does not mark definiteness, this would mean that Shona bare classified nouns are always indefinite, and that apparent definite readings are actually specific/referential indefinite readings. In this section I will compare bare classified nouns to definite and indefinite DPs in English, but in the rest of the thesis I will refer to specific and nonspecific readings of bare classified nouns rather than definite and indefinite readings.

Bare classified nouns in Shona can be used to describe unique referents, as in (4.1) - (4.3); these would require a definite article in English.

(4.1) *Nd-aka-won-a zuva.*
1SG-REM.PST-see-FV CL5.sun
‘I saw the sun.’

(4.2) *Nd-a-won-a mu-tungamiriri.*
1SG-REC.PST-see-FV CL1-president
‘I saw the president.’

(4.3) Context: Chairs have just been invented. There is one set of chairs in the entire world, and I want to buy it.

*Ndí-cha-teng-a zvi-garo.*
1SG-FUT-buy-FV CL8-chair
‘I will buy the chairs.’
Bare classified nouns can also be used if there is no unique referent. For example, when (4.4) is used out of the blue, any one of the hundreds of visible stars could be intended. Similarly, in (4.5) and (4.6), the grocery store contains multiple loaves of bread, cartons of milk, and pumpkins, and the flower shop has many flowers available for sale. In these contexts, a definite article would be infelicitous in English, and an indefinite expression would be used.

(4.4) *Nyenyedzi* y-aka-bud-a.

CL9.star CL9-REM.PST-rise-FV

‘A star rose.’

(4.5) Context: Before going to the grocery store, I confirm my shopping list with my roommate.

*Ti-no-d-a* chi-ngwa, *mu-kaka, ne-nhanga*.

IPL-HAB-want-FV CL7-bread CL3-milk ASSOC-CL5.pumpkin

‘We need a loaf of bread, a carton of milk, and a pumpkin.’

(4.6) Context: I’m about to go to a flower shop.

*Ndi-cha-teng-a* ruva.

1SG-FUT-buy-FV CL5.flower

‘I will buy a flower.’

As far as uniqueness is concerned, it seems that bare classified nouns can be used both in contexts which would require definite DPs in English and in those which would require indefinites. A second property which distinguishes definites from indefinites is discourse familiarity (Heim 1982); one way to test whether an expression can refer to discourse old or discourse new individuals is by placing the same expression in two adjacent clauses to see whether the two occurrences refer to the same individual or to different individuals.

When the same definite DP is used twice in a sentence, it must refer to the same individual; for example, (4.7) could mean that John and Sarah both saw Fido, but not that John saw Fido and Sarah saw Spot. Two occurrences of the same indefinite DP, as in (4.8), are most naturally interpreted as referring to two different individuals.

(4.7) John saw the dog and Sarah saw the dog too.

(4.8) John saw a dog and Sarah saw a dog too.

In (4.9), the noun *damba* is used twice\(^{12}\); it may be taken either as referring to the same object (the definite interpretation) or as referring to different objects (the indefinite interpretation). The same holds of *vana* ‘children’ in (4.10).

\(^{12}\)Shona does not have a conjunction *and*; however, even if this example really involves two sentences, the effect does hold across adjacent sentences in English.
(4.9) **Mu-rume a-ka-dy-a damba, mu-kadzi a-ka-dy-a-wo**
CL1-man 3SG-REM.PST-eat-FV CL5.damba CL1-woman 3SG-REM.PST-eat-FV-also
damba.
CL5.damba
‘The man ate a/the damba (klapper apple) and the woman ate a/the damba too.’
(could mean that they shared one or that they each ate one)

(4.10) **Mu-rume a-ka-gez-a v-ana, mu-kadzi a-ka-gez-a-wo**
CL1-man 3SG-REM.PST-wash-FV CL2-child CL1-woman 3SG-REM.PST-wash-FV-also
v-ana.
CL2-child
‘The man washed (the) children and the woman washed (the) children too.’ (could be
the same children washed twice or two groups of children washed)

In a given syntactic context, bare classified nouns may prefer a definite or an indefinite interpretation. For example, in subject position, a definite interpretation is strongly preferred; (4.11) is therefore pragmatically odd, as it is interpreted as meaning that one dog is in the house and in the forest at the same time. The idea that a dog is in the house and a different dog is in the forest can be expressed by using an existential construction (4.12) or by using *imwe* ‘another’ in the second clause rather than repeating *imbwa* ‘dog’ (4.13).

(4.11) */Imbwa i-ri mu-mba, (asi) imbwa i-ri mu-sango.*
‘The dog is in the house, (but) the dog is in the forest.’

(4.12) **Pane imbwa mu-mba, pane imbwa mu-sango.**
‘There’s a dog in the house, there’s a dog in the forest.’

(4.13) **Imbwa i-ri mu-mba asi i-mwe i-ri mu-sango.**
‘A dog is in the house but another is in the forest.’

Another test of indefiniteness is found in sluicing constructions such as (4.14), in which a wh-phrase stands alone where an entire wh-question might be expected. If the wh-word in the sluice has an overt antecedent, as in the sentences below, that antecedent must be indefinite; sentences such as (4.15), where a definite DP is the antecedent, are ungrammatical (Chung et al. 1995).

(4.14) He ate **an apple**, but I don’t know **which one**.

(4.15) *He ate **the apple**, but I don’t know **which one**.

Bare classified nouns can be antecedents in sluicing constructions in Shona, as in (4.16)-(4.18), showing that they must have an indefinite interpretation:
Bare classified nouns can also appear in contexts where they must be non-referential. Depending on the context, a bare classified noun in the syntactic scope of negation may be referential, as in (4.19); however, it may also have a narrow scope existential reading, as in (4.20). Unlike its English translation, (4.20) is only true if the speaker didn’t cook any pumpkins; if nhanga were interpreted as referring to some particular pumpkin, it should also be true if the speaker cooked some other pumpkins but not the one being referred to.

(4.19) Context: I went to see a friend’s child perform at a stand-up comedy contest for children. Most of the contestants were quite funny, but unfortunately my friend’s child was not.

Ha-ndi-na ku-sek-a mw-ana.
NEG1-1SG-PST INF-laugh-FV CL1-child
‘I didn’t laugh at a/the child.’

accepted if I laughed at all of them except my friend’s child
rejected if I laughed at some children, including my friend’s, but not all
rejected if I didn’t laugh at any children

(4.20) Ha-ndi-na ku-bik-a nhanga.
NEG1-1SG-PST INF-cook-FV CL5-pumpkin
‘I didn’t cook a pumpkin.’

Bare classified nouns must also be non-referential when they appear within the scope of a universal quantifier (4.21). In this case, both a wide scope reading (which may be referential) and a narrow scope reading (which cannot) are possible. On the wide scope reading, murume may be referential; however, on the narrow scope reading (where each woman kissed a different man), murume cannot be referential because there is no one man of whom the sentence is true.

13The factors determining which reading appears in a given sentence are not entirely clear; see Ferch (to appear) for discussion.
(4.21) *Mu-kadzi* *w-oga-woga*a-ka-tsvod-a *mu-rume.*

CL1-woman CL1-every-RED 3SG-REM.PST-kiss-FV CL1-man

‘Every woman kissed a man.’

accepted if they all kissed the same man

accepted if they each kissed a different man

(∃x∀y)  

(∀y∃x)

This section has compared bare classified nouns in Shona to definite and indefinite DPs in English, using several different tests; Table 4.2 shows how the distribution of bare classified nouns compares to that of definite, referential indefinite and non-referential DPs in English. The tests show that bare classified nouns can have a unique referent or refer to a recently mentioned referent (like definite DPs), can be used if there are many potential referents, refer to a referent distinct from one recently mentioned, or appear as the antecedent of a sluiced wh-word (like indefinite DPs), and can be used in the scope of operators such as negation and universal quantifiers (showing they can be interpreted as non-referential).

<table>
<thead>
<tr>
<th>Context</th>
<th>Definite</th>
<th>Referential indefinite</th>
<th>Non-referential indefinite</th>
<th>Bare classified nouns</th>
</tr>
</thead>
<tbody>
<tr>
<td>unique referent</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>no unique referent</td>
<td>X</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>twice in same sentence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- same individual</td>
<td>✓</td>
<td>✓</td>
<td>≈</td>
<td>✓</td>
</tr>
<tr>
<td>- different individuals</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>antecedent of wh-word in sluice</td>
<td>X</td>
<td>X?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>in scope of negation (¬∃)</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>in scope of universal (∀∃)</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 4.2: Interpretations of bare classified nouns

In the next section, I present the semantic representations I will use for bare classified nouns.

4.2 Interpretation by Choice Function

Analysing bare classified nouns as indefinites raises the question of how they get scope. There are several theories on the scopal interpretation of indefinites (Heim 1982; Fodor and Sag 1982; Abusch 1994; Reinhart 1997; Winter 1997; Kratzer 1998; Matthewson 1999; Chung and Ladusaw 2003). A detailed comparison of all theories is beyond the scope of this thesis; in order to give concrete representations in later chapters, I will assume a choice function analysis incorporating the proposals of Reinhart (1997) and Kratzer (1998).

A choice function maps the set denoted by the noun onto one of its members, effectively “choosing” one individual to be an argument of the predicate. This type of analysis was first
proposed for English indefinites by Reinhart (1997), using existential quantification over choice functions, as in (4.22), which can be read as “there is a function f such that f is a choice function and Spot saw the cat chosen by that function”.

\[
(4.22) \ [\text{Spot saw a cat}] = \exists f (\text{CH}(f) \land \text{saw}(s,f(\text{cat})))
\]

On Reinhart’s analysis\(^{14}\), the function variable, with the indefinite expression as its argument, is located in the base position of the indefinite, while the existential operator which binds it and the restrictive term stating that it is a choice function are found higher in the clause. This means that existential quantification over choice functions allows the indefinite to be interpreted as taking wide scope without actually moving; they can effectively take any scope, either narrow or wide, as the function is bound by an existential operator arbitrarily far away (Reinhart 1997: 372).

Kratzer (1998) proposes a slightly different analysis: rather than being bound by an existential quantifier, the function variable is free, with its value determined by the context. This gives the indefinite a specific or referential reading, which is scopeless in the same way that definite descriptions are, appearing to take widest scope. Narrow scope readings of indefinites are produced by an alternative interpretation as generalised quantifiers.

I suggest that both kinds of choice functions are possible in Shona: nouns are always interpreted using choice functions, but the function variables are sometimes existentially closed (giving a nonspecific or indefinite reading) and sometimes determined by context (giving a definite or specific reading)\(^{15}\). Given a choice function analysis, this is actually the null hypothesis; in general, variables (for instance, pronouns) are not restricted to always being bound or always being free, but may be either bound or free in different contexts. In addition, this analysis allows a unified account of specific and nonspecific readings.

<table>
<thead>
<tr>
<th>Function variable</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existentially closed</td>
<td>nonspecific</td>
</tr>
<tr>
<td>Free</td>
<td>specific</td>
</tr>
</tbody>
</table>

Table 4.3: Two kinds of choice functions

On this analysis, (4.23) (repeated from (4.1) above) has the interpretation in (4.24). Since

---

\(^{14}\)The analysis proposed by Winter (1997) is very similar.

\(^{15}\)The idea that the choice function variable may be either existentially closed or determined by context mirrors Fodor and Sag’s (1982) proposal to some extent: they also propose that indefinites are ambiguous between an existential interpretation and a specific/referential interpretation, but they analyse the readings as derived from two different interpretations of a rather than from choice functions. It is also compatible with Chung and Ladusaw’s (2003) proposal that a given indefinite expression may be interpreted either by (existentially closed) choice functions or by a Restrict operation which yields obligatory narrow scope; although bare classified nouns in Shona are not interpreted using Restrict, this does not rule out the possibility that other indefinite expressions are (such as the Maori he indefinites which Chung and Ladusaw discuss, and possibly English bare plurals as well).
the function variable is free, its value is determined by the context, so it will pick out the most contextually salient referent, which in this case also happens to be the only possible referent\textsuperscript{16}.

\begin{equation}
Nd-aka-won-a \quad zuva. \\
1sg-rem.pst-see-fv \quad cl5.sun \\
‘I saw the sun.’
\end{equation}

\begin{equation}
CH(f) \land \text{saw(speaker, } f(\text{sun}))
\end{equation}

In (4.25) (repeated from (4.6) above), the speaker is most likely not referring to a particular flower. In this case, the function variable is existentially closed, as in (4.26). On this interpretation, out of various different choice functions which pick different flowers, there is at least one function such that the speaker will buy the flower that it picks out. In a different context, the same sentence might have the interpretation in (4.27), with a free function variable that picks out the most salient flower in the context.

\begin{equation}
\text{Context: } I’m about to go to a flower shop. \\
\end{equation}

\begin{eqnarray*}
Nd-cha-teng-a \quad ruva. \\
1sg-fut-buy-fv \quad cl5.flower \\
‘I will buy a flower.’
\end{eqnarray*}

\begin{equation}
\exists f[(CH(f) \land \text{FUT(buy(speaker, } f(\text{flower})))]
\end{equation}

\begin{equation}
CH(f) \land \text{FUT(buy(speaker, } f(\text{flower})))
\end{equation}

A slightly more complicated example is given in (4.28) (repeated from (4.11)), which has two function variables, each associated with one instance of \textit{imbwa} ‘dog’. (For the sake of simplicity I translate the locatives as unanalysed one-place predicates.) Bare classified nouns in subject position prefer to be specific, with free choice function variables, so (4.28) is interpreted as (4.29). Since there is no difference in the discourse context between the two clauses\textsuperscript{17}, the most salient value for function \( f \) in the first clause will also be the most salient value for function \( g \) in the second clause; the two functions will therefore both pick out the same dog, leading to the pragmatically odd reading that the same dog is both in the house and in the forest.

\begin{equation}
\#\text{Imbwa} \quad i-ri \quad mu-mba, \quad (asi) \quad \text{imbwa} \quad i-ri \quad mu-sango. \\
cl9.dog \quad cl9-cop \quad cl18-cl9.house \quad \text{but} \quad cl9.dog \quad cl9-cop \quad cl18-cl5.forest \\
‘The dog is in the house, (but) the dog is in the forest.’
\end{equation}

\begin{equation}
[CH(f) \land \text{in-house}(f(\text{dog}))] \land [CH(g) \land \text{in-forest}(g(\text{dog}))]
\end{equation}

\textsuperscript{16}In fact, since there is only one possible referent, an interpretation with an existentially closed function variable would be equivalent to (4.24).

\textsuperscript{17}Or if there is a difference between the two, it would be that referents mentioned in the first clause would be more salient in the second clause, which would make it even more likely that the second function variable would have the same value as the first.
Unlike those in (4.28), the bare classified nouns in (4.30) (repeated from (4.12)) appear in an existential construction; their associated choice function variables are therefore existentially closed rather than free (4.31). In this case, there are two potentially different choice functions, selecting potentially different dogs, one of which is in the house and the other of which is in the forest. In theory, the two functions could happen to be the same; however, since the same dog cannot be in the house and in the forest at the same time, this possibility is pragmatically ruled out in (4.30).

(4.30) \textit{Pane imbwa mu-mba, pane imbwa mu-sango.}
\begin{align*}
\text{EXIST CL9.dog CL18-CL9.house } & \text{EXIST CL9.dog CL18-CL5.forest} \\
\text{‘There’s a dog in the house, there’s a dog in the forest.’}
\end{align*}

(4.31) \exists f[\text{CH}(f) \land \text{in-house}(f(\text{dog}))] \land \exists g[\text{CH}(g) \land \text{in-forest}(g(\text{dog}))]

This choice function analysis does not apply solely to bare classified nouns: it can be extended at least to nominal expressions containing scopeless quantifiers (discussed in chapter 5) and adjectives, and perhaps also to those containing possessors, PPs, and relative clauses.

The only part of this analysis which is crucial for the analysis in chapter 5 is that arguments of predicates may be pluralities (sums in the theory I adopt); this is the case for choice functions applied to starred predicates, but also for variables which range over sums. It would therefore be possible to treat bare classified nouns (at least on their existential/nonspecific interpretation) as generalised quantifiers, as introducing variables as in Heim’s (1982) analysis, or as using some other combination of theories.

4.3 Conclusion

I have shown that bare classified nouns are unmarked for definiteness, and suggested that a choice function analysis in which the function variable may be either free or existentially closed can capture the range of possible readings. This analysis will be used in semantic formulas in the rest of the thesis; however, other analyses would also be possible, and more investigation would be needed to decide which best fits the language.

In the next chapter, I turn to the core observation of the thesis: transitive sentences in which one argument contains certain quantifiers, including numerals, appear to be scopally ambiguous if the other argument is a bare plural but not if it is a bare singular. I claim that this apparent difference in scope derives from a cumulative interpretation, which has more general truth conditions in the plural than in the singular.
Chapter 5

Cumulativity and Apparent Scope Effects

In English, sentences such as (5.1) are scopally ambiguous: (5.1) can either mean that three boys ordered one salad to share, or that three boys each ordered a salad (so three salads were ordered in total). On a standard analysis of scopal ambiguity, both *three* and *a* would be treated as generalised quantifiers, of type \(<(<e,t>),<(<e,t>,t)>\); the two scope orders would be derived by Quantifier Raising, adjoining the two DPs to the sentence either with *a salad* c-commanding *three boys* (one salad ordered) or with *three boys* c-commanding *a salad* (three salads ordered).

(5.1) Three boys ordered a salad.

I show that various quantifiers in Shona, which I call “scopeless quantifiers”, do not participate in scopal ambiguity, unlike their closest English translations. For example, the Shona sentence in (5.2) is judged false if each boy broke a different chair; it only has the interpretation on which one chair was broken in total. (5.3), which differs from (5.2) only in that the object is plural rather than singular, appears to have two readings; however, I will argue that this is due to generality (in the sense of Cruse (1986)) rather than ambiguity.

(5.2) *Va-komana va-tatu va-ka-tyor-a chi-garo.*

CL2-boy CL2-three CL2-REM.PST-break-FV CL7-chair

‘Three boys broke a chair.’

accepted if one chair was broken
rejected if three chairs were broken, one by each boy

(5.3) *Va-komana va-tatu va-ka-tyor-a zvi-garo.*

CL2-boy CL2-three CL2-REM.PST-break-FV CL8-chair

‘Three boys broke chairs.’

accepted if they broke the same chairs
accepted if each broke a different chair or chairs

I propose that scopeless quantifiers such as the numeral *tatu* in (5.2) and (5.3) are intersective modifiers rather than scope-bearing elements. DPs consisting of a scopeless quantifier and a noun are interpreted in the same way as bare classified nouns, using choice functions (see §4.2); sentences containing two plural arguments receive a cumulative reading, with truth conditions which are satisfied in both the situations given in (5.3).
In this chapter, I describe apparent differences in scope possibilities between bare singulars and bare plurals in sentences with scopeless quantifiers (§5.1), show how treating scopeless quantifiers as intersective modifiers explains the apparent scope readings (§5.2), apply the same ideas to dependent plurality in English (§5.3), and finally show how some readings where numerals appear to behave as generalised quantifiers can be explained using a distributive operator (§5.4).

5.1 Number and Apparent Scope Effects

As seen in the introduction to this chapter, scopeless quantifiers appear to be restricted to narrow scope when they appear in a sentence whose other argument is a bare singular, whereas if the other argument is a bare plural, the scopeless quantifier appears to have both narrow and wide scope readings. In §5.2, I propose an analysis on which scopeless quantifiers are intersective modifiers rather than scope-bearing elements, and the apparent scopal ambiguity with bare plurals is due to cumulativity. The examples in this section demonstrate that this pattern holds for numerals (§5.1.1) and for *shoma* ‘(a) few’ (§5.1.2), in both subject and object position.

5.1.1 Numerals

The same pattern seen in sentences where the subject is a plural DP containing a numeral (as in (5.2) and (5.3) above) also appears in (5.4) and (5.5), where the DP containing the numeral appears as the object; a singular subject is felicitous if one man crosses all three rivers, but not if three men each cross one river, while a plural subject is felicitous whether the three rivers are crossed by the same or different men.

(5.4) *Mu-rume a-ka-yambuk-a nz-izi nhatu.*
\[ \text{CL1-man 3SG-REM.PST-cross-FV CL10-river CL10.three} \]
‘A man crossed three rivers.’
accepted if the same man crossed all three
rejected if each river was crossed by a different man

(5.5) *Va-rume va-ka-yambuk-a nz-izi nhatu.*
\[ \text{CL2-man CL2-REM.PST-cross-FV CL10-river CL10.three} \]
‘Men crossed three rivers.’
accepted if the same group of men crossed all three
accepted if each was crossed by a different man or men

---

18 Rice (2000) notes that there are two senses of scope in the literature. One sense, which could be termed structural scope, describes the order of composition of elements: if two items X and Y combine with each other and then a third item Z combines with X+Y, Z has structural scope over X and Y. In this sense, all words and morphemes have scope. This thesis deals with the second sense of scope, namely quantifier scope; when I say that scopeless quantifiers are not scope-bearing elements, I mean that they do not participate in scopal relationships with other operators in the way that quantifiers such as English *every* and *most* do.

19 The same pattern also holds for *ose* ‘all’, which will be discussed in §6.1.
5.1.2 *Shoma* ‘(a) few’

In (5.6) and (5.7), the subject is a plural quantified with *shoma* ‘(a) few’. Once again, the singular object is felicitous only if all the children involved bit the same man, and the plural is felicitous whether they bit the same or different men.

(5.6) \( V-\text{ana} \, \text{va-shoma} \, \text{va-ka-rum-a} \, \text{mu-rume.} \)
\( \text{CL2-child} \, \text{CL2-few} \, \text{CL2-REM.PST-bite-FV} \, \text{CL1-man} \)
‘(A) few children bit a man.’
accepted if they bit the same man
rejected if they bit different men

(5.7) \( V-\text{ana} \, \text{va-shoma} \, \text{va-ka-rum-a} \, \text{va-rume.} \)
\( \text{CL2-child} \, \text{CL2-few} \, \text{CL2-REM.PST-bite-FV} \, \text{CL2-man} \)
‘(A) few children bit men.’
accepted if they bit the same men
accepted if they bit different men

In (5.8) and (5.9), singular and plural subjects appear with a plural object quantified with *shoma*. Again, the singular subject is felicitous only if all the doors were closed by the same woman, while the plural subject is felicitous if the doors were closed by the same group of women or if each door was closed by a different group.

(5.8) \( \text{Mu-kadzi} \, \text{a-ka-var-a} \, \text{ma-goni} \, \text{ma-shoma.} \)
\( \text{CL1-woman} \, \text{3SG-REM.PST-close-FV} \, \text{CL6-door} \, \text{CL6-few} \)
‘A woman closed (a) few doors.’
accepted if one woman closed a few doors
rejected if a few doors were each closed by a different woman

(5.9) \( \text{Va-kadzi} \, \text{va-ka-var-a} \, \text{ma-goni} \, \text{ma-shoma.} \)
\( \text{CL2-woman} \, \text{CL2-REM.PST-close-FV} \, \text{CL6-door} \, \text{CL6-few} \)
‘Women closed (a) few doors.’
accepted if the same group of women worked together to close each door
accepted if each door was closed by a different group of women

In fact, there are two possible readings of *shoma*. One is a cardinal reading, similar to *a few* (5.10); on this reading, the plurality picked out by *vana vashoma* ‘a few children’ may be many or even all of the children in the context, so long as its cardinality is small. The second reading is a proportional reading, similar to *few* (5.11); in this example the cardinality of the plurality that *vazidzi vashoma* ‘few students’ refers to is not small in itself, but is a small percentage of all the students in the context.
(5.10) Context: I went to a movie late at night. I wasn’t expecting to see any children there, but there were three or four children in the audience.

V-ana va-shoma va-ka-uy-a.
CL2-child CL2-few CL2-REM.PST-come-FV
‘A few children came.’

(5.11) Context: A university organised a festival. Only 200 of the 15000 students at the university attended the festival.

Va-dzidzi va-shoma va-ka-uy-a.
CL2-student CL2-few CL2-REM.PST-come-FV
‘Few students came.’

The issue of proportional readings of shoma will be discussed in §5.2.

5.1.3 Summary

Table 5.1 shows the apparent scopal readings which bare classified nouns may have with respect to a nominal expression containing a scopeless quantifier: bare singulars appear to be restricted to wide scope, while bare plurals appear to have both wide and narrow scope readings. The same relations hold regardless of whether the bare classified noun is in subject position and the scopeless quantifier in object position or vice versa.

<table>
<thead>
<tr>
<th></th>
<th>Wide scope</th>
<th>Narrow scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singular</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Plural</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

Table 5.1: Apparent scopal readings of bare classified nouns w.r.t. scopeless quantifiers

If this were truly a difference in scopal possibilities, it would be surprising: the number of an expression does not normally affect its scope. In the next section I develop an analysis of scopeless quantifiers as intersective adjectives rather than generalised quantifiers, on which the number of other arguments in the sentence does not actually affect their scope; the differences in interpretation are due to sentences with plural arguments having more general truth conditions than those with singular arguments.

5.2 Scopeless Quantifiers as Adjectives

The data in §5.1 can be analysed using theoretical devices introduced in §2.2, most importantly the **-operator, which causes a cumulative reading. Consider numeral expressions such as vakomana vatatu ‘three boys’ ((5.12), repeated from (5.2) above):
(5.12) Va-komana va-tatu va-ka-tyor-a chi-garo.
cl2-boy cl2-three cl2-rem.pst-break-fv cl7-chair
‘Three boys broke a chair.’
accepted if one chair is broken
rejected if three chairs are broken

The numeral *tatu* ‘three’ denotes the set of all sums containing three atoms, formally represented as in (5.13) (in later examples I will simply use the shorthand “three”). It combines intersectively with the denotation of its head noun, which must be plural in order for the intersection to be nonempty. Using a numeral greater than one to modify a singular noun therefore results in ungrammaticality (5.14).

(5.13) three = λx.|{y : AT(y) ∧ y ≤ x}| = 3

(5.14) * Va-ka-tyor-a chi-garo chi-viri.
cl2-rem.pst-break-fv cl7-chair cl7-two
Intended: ‘They broke two parts of the chair.’

The denotation of *vakomana vatatu* is given in (5.15); informally, it denotes the set of sums of three atomic boys. The sentence in (5.12), with both DPs interpreted existentially using choice functions (as described in §4.2), has the denotation in (5.16)\(^2\). The two arguments of the verb in (5.16) are a sum composed of three boys and an atom which is a chair. With the **-operator applied to the verb, the sentence is true if each of the three boys who are part of the sum chosen by f broke the chair selected by g and the chair selected by g was broken by at least one of the three boys who are part of the sum chosen by f.

(5.15) λx.*boy(x) ∧ three(x)

(5.16) ∃f,g(CH(f) ∧ CH(g) ∧ **broke(f(λx.*boy(x) ∧ three(x)), g(chair)))

The numeral in this structure behaves like an intersective adjective rather than like a generalised quantifier; it is effectively trapped inside its containing DP and cannot take scope over other elements in the sentence. The analysis of numerals as intersective modifiers is not uncommon in the literature (Link 1983, 1987; Partee 1986; Carpenter 1994; Krifka 1999; Landman 2003; Carlson 2003, a.o.).

The cumulative interpretation also explains why bare plurals appear to have both narrow scope and wide scope readings. (5.17), which differs from (5.12) only in the number of the object, has the semantic interpretation in (5.18), which is parallel to (5.16) except for the number of chairs and can be paraphrased as “a sum of three boys broke a sum of chairs”.

\(^2\)One or both choice functions variables could be free (determined by context) rather than existentially closed; this would not substantially affect the analysis.
(5.17) Va-komana va-tatu va-ka-tyor-a zvi-garo.
cl2-boy cl2-three cl2-REM.PST-break-FV cl8-chair
‘Three boys broke chairs.’
accepted if they broke the same chairs
accepted if each broke a different chair or chairs

(5.18) \( \exists f,g[CH(f) \land CH(g) \land \text{**broke}(f(\lambda x.*\text{boy}(x) \land \text{three}(x)), g(*\text{chair}))] \)

More exactly, due to the **-operator, two conditions must be met in order for (5.18) to be true: each of the three boys making up the sum chosen by the function \( f \) must have broken at least one of the chairs making up the sum chosen by the function \( g \), and each of the chairs making up the sum chosen by \( g \) must have been broken by at least one of the boys making up the sum chosen by \( f \). These conditions are satisfied in both of the situations given in (5.17).

Several situations in which the cumulative reading of (5.18) is true are represented graphically in Figure 5.1, where the letters represent boys and the numbers represent chairs. In the first diagram, three boys each broke one chair; in the second, three boys each broke two chairs; and in the third, the three boys acted together to break two chairs. In all cases, however, three boys were involved in breaking chairs, and more than one chair was broken.

![Figure 5.1: Some situations satisfying the truth conditions for a cumulative reading of (5.18)](image)

The analysis given here is a cumulative interpretation in the sense of Scha (1981); as described in §2.2, Sternefeld (1998) and Beck and Sauerland (2000) also use the **-operator to derive this interpretation. The apparent scopal ambiguity of (5.17) is actually an instance of generality. A sentence or word is general if its meaning is broad enough to encompass different possibilities; for example, \textit{child} is general with respect to gender (it could mean a male child or a female child). Generality is distinct from both ambiguity and vagueness: an ambiguous word or sentence has different readings which are not subcases of a single broader meaning (such as the different readings of \textit{bank}), while a vague word or sentence has an ill-defined meaning (for example, \textit{child} is vague with respect to age, so that it is not clear exactly when one stops being a child).
A compositional derivation of (5.18) is given in Figure 5.2. The two DP arguments are formed by first combining any intersective modifiers with the noun (here shown using Heim and Kratzer’s (1998) Predicate Modification rule), then adding a free choice function variable. This yields two type e DPs, which combine as the arguments of the verb. Finally, existential closure applies, binding the two choice function variables.

\begin{align*}
\exists f[\text{CH}(f) \land \exists g[\text{CH}(g) \land \text{broke}(f(\lambda x.*\text{boy}(x) \land \text{three}(x)), g(\lambda y.*\text{chair}(y)))]]
\end{align*}

Figure 5.2: Compositional derivation tree for (5.17)

The other scopeless quantifier treated in this chapter is shoma ‘(a) few’, which has both a cardinal and a proportional reading. On its cardinal reading, shoma functions the same way as a numeral, except that its exact value is vague; it denotes the set of sums which are composed of a small number of atoms. Like numerals, shoma cannot be used to modify a singular noun, as its denotation does not contain atoms (5.19).

(5.19) * Va-ka-gez-a mw-ana mu-shoma.
\text{CL2-REM.PST-wash-FV CL1-child CL1-few}

Intended: ‘They washed (a) few parts of the baby.’

The sentences in (5.20) and (5.22) (repeated from (5.8) and (5.9) above) therefore have the semantic interpretations in (5.21) and (5.23) respectively.

(5.20) Mu-kadzi a-ka-var-a ma-goni ma-shoma.
\text{CL1-woman 3SG-REM.PST-close-FV CL6-door CL6-few}

‘A woman closed (a) few doors.’
accepted if one woman closed a few doors
rejected if a few doors were each closed by a different woman

(5.21) \exists f,g[\text{CH}(f) \land \text{CH}(g) \land \text{close}(f(\text{woman}), g(\lambda x.*\text{door}(x) \land \text{few}(x)))]

\footnote{If an argument is interpreted as specific, its choice function variable is not existentially closed; the cumulative reading still occurs.}
(5.22) Va-kadzi va-ka-var-a ma-goni ma-shoma.
   CL2-woman CL2-REM.PST-close-FV CL6-door CL6-few
   ‘Women closed (a) few doors.’
   accepted if the same group of women worked together to close each door
   accepted if each door was closed by a different group of women

(5.23) \exists f,g[CH(f) \land CH(g) \land \mathbf{close}(f(*\text{woman}), g(\lambda x.*\text{door}(x) \land \text{few}(x))))]

Partee (1989) argues that the cardinal reading of many and few in English is adjectival (that is, cardinal few is an intersective modifier), while the proportional reading is quantificational and appears when many/few are determiners.

There are two possible analyses for apparent proportional readings of shoma. One is that shoma is truly ambiguous between a cardinal and a proportional reading; like English few, it would be an intersective modifier on the cardinal reading and a quantifying determiner on the proportional reading. Although shoma behaves as an intersective modifier in all the examples I have collected, the contexts I gave when testing the scope of shoma all involved small cardinalities, so it may be that all my examples are instances of the cardinal reading. The second possibility is that shoma, unlike English few, does not truly have a proportional reading. If this is the case, apparent proportional readings would be a case of context dependence: 200 out of 15,000 students counts as a small number in the same way that a 6-storey building might count as a small skyscraper, not small in an absolute sense but small with respect to the frame of reference given by the context.

Two types of evidence could be used to distinguish between the two analyses. An ambiguity analysis of shoma would predict that in contexts which favour the proportional reading, shoma should be scopally ambiguous with respect to both bare plurals and bare singulars (at least in subject position — see §6.2 for discussion of the scopal behaviour of a quantifying determiner in Shona); if shoma is not ambiguous, it should show the same scope behaviour in these contexts as in sentences such as (5.20) and (5.22). In English, proportional few also differs from cardinal few in that it is downward entailing; the entailment patterns of shoma in cardinal and proportional contexts might provide evidence for one analysis or the other. I leave this as an issue for further research.

In this section I have proposed that scopeless quantifiers are intersective modifiers rather than quantifying determiners; their apparent scopal ambiguity with respect to bare plurals is due to the \(*\)-operator, which yields a cumulative reading with truth conditions that encompass those of both potential scope orders. The next section relates this analysis to the phenomenon of dependent plurality in English.

5.3 Dependent Plurality in English

In the Shona examples in the previous sections, a bare plural can be interpreted as “one each”, while a bare singular must be interpreted as “one in total”. For example, in a situation
where three boys each broke one chair, so that three chairs are broken in total, (5.24), with a bare plural object, is true, while (5.25), with a bare singular object, is false.

(5.24) Va-komana va-tatu va-ka-tyor-a zvi-garo.
cl2-boy cl2-three cl2-REM.PST-break-FV cl8-chair
‘Three boys broke chairs.’
accepted if they broke the same chairs
accepted if each broke a different chair or chairs

(5.25) Va-komana va-tatu va-ka-tyor-a chi-garo.
cl2-boy cl2-three cl2-REM.PST-break-FV cl7-chair
‘Three boys broke a chair.’
accepted if one chair was broken
rejected if three chairs were broken, one by each boy

There is a similar phenomenon in English, first noticed by Chomsky (1975) and known in the literature as “dependent plurality” (de Mey 1981; Roberts 1987; Winter 2000; Beck and Sauerland 2000; Zweig 2008). For example, (5.26) is most naturally interpreted as meaning that each woman was wearing one hat, while the most prominent interpretation of (5.27) is that all the women were somehow sharing the same hat.

(5.26) The women were wearing hats.
(5.27) The women were wearing a hat.

Beck and Sauerland (2000) argue that dependent plurality with two definite plurals, as in (5.28), is really a case of cumulativity; they use the **-operator to derive these dependent plural readings (5.29). They also apply the **-operator to similar sentences involving conjunctions (5.30) and to numeral definites and indefinites.

(5.28) The soldiers hit the targets.
(5.29) **hit(the soldiers, the targets)
(5.30) Jim and Frank want to marry Sue and Amy.

I propose that the **-operator can also be used to derive dependent readings of bare plurals in English and other indefinite expressions. As a first approximation, (5.26) could be interpreted as in (5.31). The **-operator provides a cumulative reading, on which each woman was wearing one or more hats and each hat was worn by one or more women; the most natural reading of the sentence, one hat per woman, is a subcase of this, which is the most salient interpretation in this case because of general knowledge about the world.

(5.31) [The women were wearing hats.] = ∃f(CH(f) ∧ **wear(the women,f(*hat)))]
In (5.31), the bare plural *hats* is interpreted using a choice function. There is reason to think that bare plurals in English are not interpreted using choice functions, however: they are restricted to narrowest scope (Carlson 1977). This restriction would be predicted if English bare plurals are interpreted using Chung and Ladusaw’s (2003) Restrict operation. Restrict combines an indefinite with the verb to create a complex predicate with an additional restriction on one argument of the verb; thus, it interprets the indefinite without saturating an argument position. Arguments combined via Restrict are existentially closed just below the event level, while other quantificational elements must appear above the event level, so indefinites interpreted by Restrict always take narrow scope.

A semantic interpretation for (5.26) using Restrict is given in (5.32). This formula can be roughly paraphrased as “there is some sum (or atom) which is a group of hats; each of the women wore one or more hats in that group and each of the hats in that group was worn by one or more of the women”. Since the variable ranges over sums, cumulativity applies just as it does with a choice function interpretation\(^{22}\).

\[
(5.32) \exists x[**\text{wear}(\text{the women}, \, x) \land \*\text{hat}(x)]
\]

Bare plurals in English have a generic reading as well as an existential reading; for example, the subject in (5.33) is a generic bare plural (this sentence is Chomsky’s (1975) original example of dependent plurality).

(5.33) Unicycles have wheels.

Generic bare plurals have been analysed as kind-referring or as being quantified over by a generic operator\(^{23}\). If generic readings are due to a generic operator, (5.33) could have the interpretation given in (5.34). This could be paraphrased as “in general, for any individual or plurality of unicycles, there is one or more wheels which the unicycle(s) have”; as long as both variables range over sums as well as atoms, the cumulative interpretation will allow a “one each” reading.

\[
(5.34) \text{Gen}(x)[\*\text{unicycle}(x) \rightarrow \exists y[**\text{have}(x,y) \land \*\text{wheel}(y)]]
\]

The cumulative reading gives a good interpretation for sentences containing dependent plurals. Corresponding sentences with singular objects, such as those in (5.35), do not fare so well. The most salient interpretation of (5.35a) is (5.36a); this interpretation picks out a single hat and says that the women were wearing that hat. Similarly, the interpretation of (5.35b) given in (5.36b) can be paraphrased as “in general, for any individual or plurality of unicycles,\(^{22}\) This also applies to other possible interpretations of indefinites which make use of type e variables, such as a generalised quantifier interpretation.\(^{23}\) An interpretation of English bare plurals as kind-referring expressions similar to proper names (Carlson 1977) is a bit more difficult to incorporate into this analysis. In order for the cumulative interpretation to work, the **-operator would have to be able to quantify over instances of the kind referred to; this could be accomplished by a type-shifting operator such as Chierchia’s (1998) ‘up’-operator.
there is a wheel which the unicycle(s) have’; this incorrectly suggests that in addition to each individual unicycle having a wheel, each possible group of unicycles shares a single wheel.

(5.35) a. The women were wearing a hat.
    b. Unicycles have a wheel.

(5.36) a. \( \exists f[CH(f) \land \text{wear}(\text{the women}, f(\text{hat}))] \)
    b. Gen(x)[*unicycle(x) \rightarrow \exists y[*\text{have}(x, y) \land \text{wheel}(y)]]

More sensible interpretations for the sentences in (5.35), on which each woman wears a different hat or each unicycle has a different wheel, could be derived using the distributive operator introduced in §2.2:

(5.37) a. \( \forall x[\text{AT}(x) \land x \leq \text{the women} \rightarrow \text{wear}(x, f(\text{hat}))] \)
    b. Gen(z)[*unicycle(z) \rightarrow \forall x[\text{AT}(x) \land x \leq z \rightarrow \exists y[\text{have}(x, y) \land \text{wheel}(y)]]]

This reading is difficult to get, and its availability varies across contexts and across speakers; I find it easier to get if the context is habitual rather than episodic. For example, (5.38) could be used as part of a description of a school uniform, without implying that all the girls at the school share one skirt.

(5.38) The girls wear a navy blue skirt.

In this and the previous section, I have shown that both Shona and English allow “one each” readings of sentences with two plural arguments. In English but not in Shona, sentences with a plural subject and singular object can also have this reading in some contexts. This difference may be due to a distributive operator being more easily available in English; in the next section, I will show that although the distributive operator is not as freely used in Shona, it is available in some contexts.

5.4 Deriving Distributive Readings

The analysis in §5.2 accounts for the most easily available readings of sentences containing scopeless quantifiers\(^{24}\), but in some cases other readings are available, given the right context. Sentences such as (5.39), in which the two arguments of the verb both include numerals, pose a challenge for the analysis in the previous section. The only reading predicted by the analysis as developed so far is a cumulative reading, on which five men each crossed at least one river and three rivers were each crossed by at least one man; however, the sentence in (5.39) can be used to describe pictures showing any of the situations in (a)-(d).

\(^{24}\) By “most easily available”, I mean readings that are always judged acceptable, as opposed to those which are only accepted in certain contexts.
(5.39) Va-rume va-shanu va-ka-yambuk-a nz-i zi nhatu.
cl2-man cl2-five cl2-REM.PST-cross-FV cl10-river cl10.three

‘Five men crossed three rivers.’

a. five men travelled as a group across three rivers (collective)
b. five men each crossed a different three rivers (fifteen rivers crossed) (distributive)
c. three rivers were each crossed by five men (fifteen men in total) (inverse scope distributive)
d. five men travelled to meet each other; two of them crossed one river, another two crossed another river, and the last man crossed a third river (cumulative)

(5.39d) is the cumulative reading predicted by the analysis. I have labelled the reading in (a) “collective”; since transitive “cross” is a distributive predicate\(^{25}\), this reading is really a subcase of the cumulative reading, in which five men each crossed three rivers and three rivers were each crossed by five men. The distributive readings in (b) and (c), however, cannot be derived without some additional mechanism, since in each case the cardinality of one of the pluralities involved differs from that given by the cumulative reading. This may not be an undesirable result: these readings do seem to be more difficult to get than the cumulative readings, and are often rejected\(^{26}\) (see Gil (1982) for similar findings in Hebrew and Dutch).

The (b) reading could be explained using the distributive operator introduced in §2.2 (5.40). This operator applied to the predicate “crossed three rivers” gives the denotation in (5.41); the sentence in (5.39) then has the denotation in (5.42).

(5.40) \(D = \lambda P. \lambda z. \forall x[AT(x) \land x \leq z \rightarrow P(x)]\)

(5.41) \(D[\text{crossed three rivers}] = \lambda z. \forall x[AT(x) \land x \leq z \rightarrow **\text{cross}(x, f(\lambda y. *\text{river}(y) \land \text{three}(y)))]\)

(5.42) \(\exists f, g[\text{CH}(f) \land \text{CH}(g) \land \forall x[AT(x) \land x \leq g(\lambda z. *\text{man}(z) \land \text{five}(z)) \rightarrow **\text{cross}(x, f(\lambda y. *\text{river}(y) \land \text{three}(y))))]\)

In (5.42), the choice function \(g\) picks out a sum consisting of five men, and the distributive operator introduces universal quantification over the atoms making up that sum. Then, effectively, each of those atoms is treated as a singular argument in a cumulative sentence: each (of the single) atom in the subject crossed at least one of the atoms in the object, and each atom in the object was crossed by at least one (of the single) atom in the subject (5.43)). Essentially, the **-operator distributes over one argument and the D-operator over the other; since the distribution over the two arguments comes from two different sources, a double distributive reading rather than a cumulative reading is the result.

\(^{25}\)If five men crossed a river, it follows that each of the five men crossed the river; if a man crossed three rivers, it follows that the man crossed each of the three rivers.

\(^{26}\)I assume that the addition of an extra covert mechanism is costly and therefore dispreferred, making readings which require it more difficult to get.
(5.43) if \( g(\lambda z. *\text{man}(z) \land \text{five}(z)) \) = the sum composed of \( m_1, m_2, m_3, m_4 \) and \( m_5 \), then (5.42) means that there is a choice function \( f \) such that...

a. \( **\text{cross}(m_1, f(\lambda y. *\text{river}(y) \land \text{three}(y))) \)

b. \( **\text{cross}(m_2, f(\lambda y. *\text{river}(y) \land \text{three}(y))) \)

c. \( **\text{cross}(m_3, f(\lambda y. *\text{river}(y) \land \text{three}(y))) \)

d. \( **\text{cross}(m_4, f(\lambda y. *\text{river}(y) \land \text{three}(y))) \)

e. \( **\text{cross}(m_5, f(\lambda y. *\text{river}(y) \land \text{three}(y))) \)

A derivation tree for the interpretation in (5.42) is shown in Figure 5.3. The two arguments are both formed by combining a noun with a numeral and then adding a function variable. The object then combines with the verb, and the D-operator applies to the resulting one-place predicate before the subject is added.

\[
\exists f, g \left[ \text{CH}(f) \land \text{CH}(g) \land \forall x [\text{AT}(x) \land x \leq g(\lambda z. *\text{man}(z) \land \text{five}(z)) \rightarrow **\text{cross}(x, f(\lambda y. *\text{river}(y) \land \text{three}(y)))] \right]
\]

\[
\exists f, g \forall x [\text{AT}(x) \land x \leq g(\lambda z. *\text{man}(z) \land \text{five}(z)) \rightarrow **\text{cross}(x, f(\lambda y. *\text{river}(y) \land \text{three}(y)))]
\]

\[
g(\lambda z. *\text{man}(z) \land \text{five}(z)) \land y. \forall x [\text{AT}(x) \land x \leq y \rightarrow **\text{cross}(x, f(\lambda y. *\text{river}(y) \land \text{three}(y)))]
\]

\[
\lambda z. *\text{man}(z) \land \text{five}(z) \quad g \quad D \quad \lambda z. **\text{cross}(z, f(\lambda y. *\text{river}(y) \land \text{three}(y)))
\]

\[
\text{Varume} \quad \text{vashanu} \quad \text{vakayambuka} \quad \text{nzizi} \quad \text{f}
\]

\[
\lambda z. *\text{man}(z) \quad \lambda z. \text{five}(z) \quad \lambda x. \lambda z. **\text{cross}(z, x) \quad \lambda y. *\text{river}(y) \land \text{three}(y)
\]

\[
\text{nhatu} \quad \text{ly. three}(y)
\]

Figure 5.3: Compositional derivation tree for (5.42)

The inverse scope distributive reading (5.39c) could be derived either by moving the object via Quantifier Raising or by using a generalised distributive operator such as that of Lasersohn (1998).

This revised analysis predicts that distributive readings should be (marginally) available for the examples in §5.1, which does not seem to be the case. Perhaps there are language-specific restrictions on where the D-operator can apply; I leave this as an issue for further research.
5.5 Conclusion

In this chapter, I have shown that expressions containing scopeless quantifiers appear to afford more scopal possibilities to bare plurals than to bare singulars. I have proposed an analysis on which scopeless quantifiers are intersective adjectives rather than scope-bearing elements, and the differences in the truth conditions of sentences with bare plurals and bare singulars are due to the cumulative reading of plurals; the truth conditions with plurals take in a wider range of situations because not every part of the plurality need be involved in every part of the event.

In the next chapter, I look at several issues connected with universal quantifiers in Shona.
Chapter 6

Two Universal Quantifiers

This chapter covers several different issues related to the scope of universal quantifiers. Shona has two main universal quantifiers, *ose* (6.1) and *oga-oga* (6.2); for convenience, these will be translated as ‘all’ and ‘every’ respectively.\(^{27}\)

(6.1) \[ V \text{-} ana \ v \text{-} ose \ va \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL2-child} & \text{CL2-all} & \text{CL2-COP INF-run-FV} \\
\end{array}
\]
‘All (the) children are running.’

(6.2) \[ Mw \text{-} ana \ w \text{-} oga-woga \ a \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL1-child} & \text{CL1-every-RED} & \text{3SG-COP INF-run-FV} \\
\end{array}
\]
‘Every child is running.’

There are several morphosyntactic differences between these items. The most obvious is reduplication: *ose* is not reduplicated, while *oga-oga* is.\(^{28}\) As mentioned in §3.2 and §3.3, *ose* can appear in several environments where *oga-oga* cannot: in prenominal position as the only modifier, in a DP that also contains a numeral or a demonstrative, and in predicate position. *Ose* and *oga-oga* also have different scope behaviour: *ose* behaves like the scopeless quantifiers

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\(^{27}\)A reduplicated version of *ose* is also sometimes used (i), though it seems to be less productive.

i. \[ Mw \text{-} ana \ w \text{-} ose-wose \ a \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL1-child} & \text{CL1-all-RED} & \text{3SG-COP INF-run-FV} \\
\end{array}
\]
‘Every child is running.’

The distribution of *ose-ose* is not quite the same as that of either *ose* or *oga-oga*. Like *ose*, it can appear prenominally (ii); like *oga-oga*, it cannot appear in the same DP as a numeral (iii); and it can appear in the same DP as a demonstrative in the plural (iv) but not in the singular (v).

ii. \[ W \text{-} ose-wose \ mw \text{-} ana \ a \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL1-all-RED} & \text{CL1-child} & \text{3SG-COP INF-run-FV} \\
\end{array}
\]
‘Every child is running.’

iii. \[ *V \text{-} ana \ v \text{-} ose-vose \ gumi \ va \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL2-child} & \text{CL2-all-RED} & \text{ten CL2-COP INF-run-FV} \\
\end{array}
\]
Intended: ‘All ten children are running.’

iv. \[ V \text{-} ana \ v \text{-} ose-vose \ av \text{-} a \ va \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL2-child} & \text{CL2-all-RED} & \text{CL2-this CL2-COP INF-run-FV} \\
\end{array}
\]
‘All these children are running.’

v. \[ *Mw \text{-} ana \ w \text{-} ose-wose \ uy \text{-} u \ a \text{-} ri \ ku \text{-} mhang-a. \]
\[
\begin{array}{lcl}
\text{CL1-child} & \text{CL1-all-RED} & \text{CL1-this 3SG-COP INF-run-FV} \\
\end{array}
\]
Intended: ‘Every this child/This every child is running.’

Preliminary work suggests that *oga-oga* may pattern with *oga-oga* in terms of scope behaviour; however, more work is needed.

---

\(^{28}\)An unreduplicated form *oga* also exists, with the meaning ‘only’ or ‘alone’.

i. \[ Mu \text{-} rume \ a \text{-} ka-tsvod-a \ mu \text{-} kadzi \ w \text{-} oga. \]
\[
\begin{array}{lcl}
\text{cl1-man} & \text{3SG-REM.PST-kiss-FV} & \text{CL1-woman CL1-only} \\
\end{array}
\]
‘The man kissed only the woman.’
in the previous chapter, while *oga-oga* behaves like a quantifying determiner. The differences between *ose* and *oga-oga* are summarised in Table 6.1.

<table>
<thead>
<tr>
<th></th>
<th><em>ose</em></th>
<th><em>oga-oga</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduplicated</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Can be prenominal</td>
<td>yes</td>
<td>restricted</td>
</tr>
<tr>
<td>Co-occurs with numerals</td>
<td>yes</td>
<td>restricted</td>
</tr>
<tr>
<td>Co-occurs with demonstratives</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Can be predicate</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Scope behaviour</td>
<td>scopeless quantifier</td>
<td>quantifying determiner</td>
</tr>
</tbody>
</table>

Table 6.1: Universal quantifiers in Shona

The remainder of this chapter focuses on the scope behaviour of *ose* and *oga-oga*. In §6.1 I discuss the scope behaviour of *ose* ‘all’, and propose a denotation for it. Then, in §6.2, I discuss the interpretation of *oga-oga* ‘every’ as a quantifying determiner and the role of number in determining the domain of quantification (§6.2.1), as well as the interaction of information structure with specificity (§6.2.2).

### 6.1 *Ose*

In this section I discuss *ose* ‘all’, which patterns with numerals and other scopeless quantifiers in terms of its apparent scope behaviour, but also allows a singular usage.

§6.1.1 shows that *ose*, like other scopeless quantifiers, appears to be scopally ambiguous with respect to bare plurals but not bare singulars, and that *ose* can be used to modify a singular noun. In §6.1.2 I argue that *ose* is best interpreted as an operator that returns the supremum of the denotation of the noun it modifies. Finally, in §6.1.3 I discuss some similar analyses of English *all*.

#### 6.1.1 Apparent Scope of *Ose*

In (6.3) and (6.4), a plural universally quantified subject appears with a singular and plural object respectively. The singular object is felicitous if only one chair is stepped on, but not if one chair is stepped on by each man, while the plural object is felicitous either if the same group of chairs is stepped on by all the men or if each man steps on different chairs.

(6.3) Va-rume v-ose va-ka-tsik-a chi-garo.

CL2-man CL2-all CL2-REM.PST-step-on-FV CL7-chair

‘All (the) men stepped on a chair.’

accepted if they all stepped on the same chair
rejected if they each stepped on a different chair
In (6.5) and (6.6), the subject is a singular or plural noun (respectively), with a plural universally quantified object. The singular subject is felicitous only if the same boy caught each fish, while the plural subject is felicitous whether the same group of boys catches all the fish or a different boy catches each one.

(6.5) Mu-komana a-ka-bat-a hove dz-ose.
   CL1-boy 3SG-REM.PST-catch-FV CL10.fish CL10-all
   ‘A boy caught all the fish.’
   accepted if one boy caught them all
   rejected if each fish was caught by a different boy

(6.6) Va-komana va-ka-bat-a hove dz-ose.
   CL2-boy CL2-REM.PST-catch-FV CL10.fish CL10-all
   ‘Boys caught all the fish.’
   accepted if every fish was caught by the same group of boys
   accepted if each fish was caught by a different boy or group of boys

The examples above show ose modifying a plural noun; it may also be used in a singular DP, as in (6.7), where a singular object modified by ose appears with a singular subject. This example is only felicitous if the same child ate every part, not if each part was eaten by a different child.

(6.7) Mw-ana a-ka-dy-a damba r-ose.
   CL1-child 3SG-REM.PST-eat-FV CL5.damba CL5-all
   ‘A child ate the whole damba (klapper apple).’
   accepted if one child ate the whole thing
   rejected if every part was eaten by a different child

This is unexpected in the light of the previous chapter: unlike ose, numerals and shoma ‘(a) few’ cannot quantify over a singular, since their denotations include only sums. In the next section, I will show that the denotation of ose differs from those of numerals and shoma in a way that makes quantification over the parts of a singular possible while still using cumulativity to derive the apparent scope readings.

6.1.2 The Denotation of Ose

In the previous chapter, I argued that numerals in Shona are intersective modifiers; for example, tatu ‘three’ denotes the set of all sums composed of three atoms (6.8). Since ose has the same apparent scope possibilities as numerals, one might want to give ose a denotation
parallel to that of numerals, such as that in (6.9), on which the denotation of \textit{ose} includes all sums and atoms that are the supremum of some (contextually relevant) set:

\begin{align*}
(6.8) \quad \llbracket \text{tatu} \rrbracket &= \lambda x.\text{three}(x) \\
(6.9) \quad \llbracket \text{ose} \rrbracket &= \lambda x.\text{supremum}(x)
\end{align*}

However, the denotation in (6.9) is problematic. Firstly, the notion of supremum is relative to particular sets; every sum and atom is the supremum of some set. Although this problem could be somewhat reduced by limiting the denotation to suprema of contextually relevant sets, a denotation of this type still would not require that \textit{varume vose} ‘all men’ denote the supremum of the contextually relevant men. For example, if all the contextually relevant golfers happen to be men, the supremum of the golfers will be in the denotation of \textit{varume} ‘men’; in this situation, an intersective denotation of \textit{ose} would predict that \textit{varume vose} could denote the supremum of the golfers rather than the supremum of the men.

A more likely denotation of \textit{ose} is given in (6.10). On this denotation, \textit{ose} denotes the $+$-operator defined in §2.1 (6.11); $+P$ denotes the supremum of $P$ if that supremum is in the denotation of $P$, and is undefined otherwise. This denotation therefore means that \textit{ose} combines with a one place predicate to denote the supremum of that predicate.

\begin{align*}
(6.10) \quad \llbracket \text{ose} \rrbracket &= \lambda P.\, +P \\
(6.11) \quad \llbracket +P \rrbracket &= \lambda x(P(x) \land \forall y(P(y) \rightarrow y \leq x))
\end{align*}

In many contexts, a DP containing \textit{ose} does not refer to all individuals in the entire world which are in the denotation of the noun, but only to all contextually relevant individuals. This can be accounted for by quantifier domain restriction (von Fintel 1994; Stanley and Szabó 2000; Gillon 2006): essentially, the denotation of the noun is first intersected with the set of contextually relevant entities, and the resulting set is then quantified over. The denotation of \textit{varume vose} ‘all (the) men’ would then be something like (6.12), where $C(x)$ can be read as “$x$ is in the set of contextually relevant entities”.

\begin{align*}
(6.12) \quad +(\lambda x.\, C(x) \land *\text{man}(x))
\end{align*}

The sentence in (6.13) has the denotation in (6.14), roughly paraphrasable as “the supremum of contextually relevant men stepped on a sum of chairs”. This denotation gives a cumulative reading and does not directly make reference to the individual men involved in the action. If the bare plural is replaced with a bare singular (6.15), the denotation in (6.16) results; in this case, all the men must have stepped on the same chair because only one chair is involved in the event.
(6.13) **Va-rume vose va-ka-tsik-a zvi-garo.**
CL2-man CL2-all CL2-REM.PST-step.on-FV CL8-chair
‘All (the) men stepped on chairs.’
accepted if they all stepped on the same chairs
accepted if each stepped on a different chair or chairs

(6.14) \[\exists f[CH(f) \land \neg stepped-on(+((\lambda x.C(x) \land \neg man(x)), f(\text{chair})))]\]

(6.15) **Va-rume vose va-ka-tsik-a chi-garo.**
CL2-man CL2-all CL2-REM.PST-step.on-FV CL7-chair
‘All (the) men stepped on a chair.’
accepted if they all stepped on the same chair
rejected if they each stepped on a different chair

(6.16) \[\exists f[CH(f) \land \neg stepped-on(+((\lambda x.C(x) \land \neg man(x)), f(\text{chair})))]\]

This denotation predicts that if *ose* modifies a singular noun, there must be only one contextually relevant individual in that noun’s denotation: the denotations of singular nouns contain only atoms, and an atom can only be the supremum of a set if it is the only atom in that set. This prediction is not borne out, however: (6.17) can be used even if there are multiple letters in the context.

(6.17) **Mw-ana a-ka-nyor-a tsamba y-ose.**
CL1-child 3SG-REM.PST-write-FV CL9.letter CL9-all
‘A/the child wrote a/the whole letter.’

In fact, this may be true of the plural as well: *ose* can be used to refer to a very salient group, even if there are other individuals in the context (6.18). However, it is difficult to determine what exactly is in the set of contextually relevant entities; it could be argued that only the group from the boys’ school is truly relevant to the sentence in (6.18).

(6.18) **Context:** I’m at a museum with a school group. There are three groups at the museum: one from an all-girls school, one from an all-boys school, and one from a co-ed school.
I’m in charge of the group from the boys’ school, so I’m watching them, but I’m not paying attention to the boys from the co-ed school.

**Nd-i-no-tares-a va-komana v-ose.**
1SG-HAB-watch-FV CL2-boy CL2-all
‘I’m watching all the boys.’
Consultant’s comment: *vose* refers to your group

The singular example in (6.17) could be interpreted in the following way: First, a single individual is selected, either by a choice function or by domain restriction. Next, a type-shifting operator introduces the parts of that individual. I will use the \( \vee \)-operator defined in (6.19), which is similar to Chierchia’s (1998) \( \cup \)-operator except that it applies to individuals rather than kinds; \( \vee x \) would denote the set of material parts of \( x^{29} \). Finally, *ose* applies to the result,

\[\text{for a discussion of the difference between material parts and individual parts, see Link (1983)}\]
so that the DP as a whole denotes the supremum of the parts.

\[(6.19) \quad \forall x = \lambda y. y \leq x\]

The denotation for tsamba yose ‘the whole letter’ in (6.17), using this method of interpretation, is given in (6.20).

\[(6.20) \quad +\forall f(\text{letter})\]

In the next section, I will discuss some previous non-quantificational analyses of English *all*.

### 6.1.3 Similar Analyses of *All*

Dowty (1987) and Brisson (1998, 2003) have proposed accounts of *all* as a maximiser rather than a quantifier. Dowty argues that predicates have entailments about what must be true of the members of a plurality in order for the predicate to be true of the plurality, which he calls distributive subentailments. For example, for the predicate “gather in the hall” to be true of a plurality, the members of that plurality must come to the hall at the same time. When *all* is not present, these subentailments need not be true of every member of the plurality; when *all* is present, the subentailments are maximised, and must be true of every member of the plurality. Similarly, on Brisson’s analysis, predicates which can be modified by *all* involve overt or covert distributivity; *all* ensures that no members of the plurality are ignored, so that every member must be involved in the event\(^{30}\). These analyses explain the difference between (6.21), which may be true if some students voted against the agreement, and (6.22), which requires that every relevant student voted in favour of it.

\[(6.21) \quad \text{The students voted to accept the agreement.}\]

\[(6.22) \quad \text{All the students voted to accept the agreement.}\]

This same contrast is seen in (6.23) and (6.24), the Shona equivalents of (6.21) and (6.22):

\[(6.23) \quad \text{Va-dzidzi va-ka-sarudz-a ku-wirir-an-a ne-chi-tsidzo.}\]
\[
\begin{align*}
\text{cl2-student} & \quad \text{cl2-rem.pst-choose-fv} & \quad \text{inf-agree-recip-fv} & \quad \text{assoc-cl7-agreement} \\
\text{‘The students voted to accept the agreement.’} & \\
\text{true if 20/30 students voted yes} & \\
\text{true if 30/30 students voted yes}
\end{align*}
\]

\(^{30}\)Brisson analyses maximality using covers (I will discuss covers in §6.2.1). A well-fitting cover of, for example, *students* puts every sum or atom in the denotation into a cell which does not contain anything that is not in the denotation; an ill-fitting cover puts at least one atom or sum into a cell which contains something that does not belong to the denotation of *students*. Brisson proposes that if an ill-fitting cover is used, cells containing elements which are not members of the relevant plurality are ignored; the function of *all* is to disallow ill-fitting covers.
Both Dowty’s and Brisson’s analyses predict that *all* cannot appear with predicates that do not have any kind of distributivity. For example, the predicate *be a big group* does not entail anything about the individual members of the plurality it combines with; this means that there is nothing for *all* to maximise, so that sentences like (6.25) are ungrammatical. This prediction seems to be true for English; however, the Shona equivalent is grammatical (6.26).

(6.25) *All the children are a big group.*

(6.26) V-ana v-ose i-boka guru.

   cl2-child cl2-all cop-cl5.group cl5.big

   ‘All the children are a big group.’

The grammaticality of (6.26) is not a problem for my analysis, since *vana vose* simply denotes the supremum of the (contextually relevant) children, with no requirement that it combine with a distributive predicate. The contrast in (6.23) and (6.24) is not explained by my analysis, however; clearly more work is needed on this issue.

### 6.1.4 Conclusion

In this section, I have shown that *ose* ‘all’ patterns with scopeless quantifiers in terms of its scope behaviour. I have argued that *ose* denotes the + operator, which returns the supremum of the noun it combines with. Finally, I noted some similar analyses of English *all*.

In the next section, I will discuss *oga-oga*, the other universal quantifier in Shona.

### 6.2 Oga-oga

This section deals with the behaviour of *oga-oga* ‘every’. While *ose* ‘all’ patterns with scopeless quantifiers, both syntactically and in its scope behaviour, *oga-oga* has a slightly more restricted distribution and shows more complex scope behaviour.

There is a subject/object asymmetry in the scope behaviour of *oga-oga*. In subject position, it behaves as we would expect a universal quantifying determiner to do, showing scopal ambiguity; in object position, however, it behaves more like the scopeless quantifiers seen in the previous chapter, seeming to be scopally ambiguous with respect to bare plurals but having obligatory narrow scope with respect to bare singulars.
In subject position, the number of the noun that oga-oga quantifies over determines whether its domain of quantification contains sums as well as atoms (§6.2.1); in object position, apparent scopal restrictions appear because subjects are topics so prefer to be specific, while bare plural subjects can appear to have more scope readings than bare singular subjects due to nonmaximality or homogeneity (§6.2.2).

6.2.1 Oga-oga as Subject: Number and the Domain of Quantification

This section presents the scope behaviour of oga-oga in subject position and discusses how the number of the noun it modifies contributes to the domain of quantification.

Oga-oga and Scopal Ambiguity

In (6.27) and (6.28), a singular universally quantified subject appears with singular and plural objects. The object may take either wide or narrow scope, regardless of its number.

CL1-woman CL1-every-RED 3SG-REM.PST-kiss-FV CL1-man
‘Every woman kissed a man.’
accepted if they all kissed the same man
accepted if they each kissed a different man
(∃x∀y) (∀y∃x)

CL1-woman CL1-every-RED 3SG-REM.PST-kiss-FV CL2-man
‘Every woman kissed men.’
accepted if they all kissed the same men
accepted if they each kissed a different group of men
(∃x∀y) (∀y∃x)

Unlike ose and the scopeless quantifiers seen in the previous chapter, oga-oga does quantify over individuals. Thus, (6.28) is only true if each woman kissed more than one man; if there is even one woman in the group who kissed only one man, the sentence is judged to be false, although the total number of men kissed by all the women is still plural. Since oga-oga can participate in scopal ambiguity, unlike scopeless quantifiers, (6.28) has the two interpretations in (6.29).

(6.29) a. ∃f[CH(f) ∧ ∀x[woman(x) → kiss(x,f(*man))]]

b. ∀x[woman(x) → ∃f[CH(f) ∧ kiss(x,f(*man))]]

Compositional derivations for the two interpretations in (6.29) are given in Figures 6.1 and 6.2. In both cases, oga-oga combines first with the bare singular mukadzi ‘woman’, which provides its domain of quantification, and the verb akatsvoda ‘kissed’ combines with its object varume ‘men’ to create a one-place predicate. In Figure 6.1, the subject combines with the predicate before the choice function variable contained in the predicate is existentially closed;
this leads to a narrow scope reading of *oga-oga*. In Figure 6.2, on the other hand, existential closure applies to the predicate before it combines with the subject; in this case, *oga-oga* has scope over the existential operator.

\[
\exists f [CH(f) \land \forall x[woman(x) \rightarrow kiss(x,f(*man))]}
\]
\[
\forall x[woman(x) \rightarrow kiss(x,f(*man))]
\]
\[
\lambda v. \forall x[woman(x) \rightarrow V(x)]
\]
\[
\lambda y.kiss(y,f(*man))
\]
\[
\lambda z.woman(z) \quad \lambda N.\lambda v.[N(x) \rightarrow V(x)] \quad \lambda x.\lambda y.kiss(y,x)
\]
\[
\lambda y.*man(y)
\]

Figure 6.1: Compositional derivation tree for (6.29a)

\[
\forall x[woman(x) \rightarrow \exists f [CH(f) \land kiss(x,f(*man))]]
\]
\[
\lambda v.\forall x[woman(x) \rightarrow V(x)]
\]
\[
\lambda y.\exists f [CH(f) \land kiss(y,f(*man))]
\]
\[
\lambda z.woman(z) \quad \lambda N.\lambda v.[N(x) \rightarrow V(x)] \quad \lambda x.\lambda y.kiss(y,x)
\]
\[
\lambda y.*man(y)
\]

Figure 6.2: Compositional derivation tree for (6.29b)

**Plurals and the Domain of Quantification**

Unlike English *every*, *oga-oga* may be used in plural DPs as well as singulars, although the plural usage is marginal. In (6.30a), a plural subject quantified by *oga-oga* appears with a singular object; the object may take either wide or narrow scope, but the subject must be interpreted distributively. (The same pattern is found with a plural object, as in (6.30b).) Here, *oga-oga* is interpreted as quantifying over groups rather than individuals.

\[^{31}\text{*oga-oga* would also appear to have narrow scope if the choice function variable remains free.}\]
(6.30) **Context:** A town has been troubled by thieves; the men in town organise themselves into several groups and try to catch the thieves.

a. \( \text{Va-\textit{rume} } \text{v-\textit{oga-\textit{oga}}} \text{ va-\textit{ka-\textit{bat-a}}} \text{ mbavha.} \)

\( \text{CL2-man} \text{ CL2-every-\textit{red} CL2-REM.PST-catch-FV CL9.thief} \)

‘Every [group of] men caught a thief.’

accepted if each group caught a different thief \((\forall y \exists x)\)

accepted if one thief was caught by the first group, escaped, was caught by the second group, escaped again, etc \((\exists x \forall y, \text{distributive})\)

rejected if the groups, in the course of chasing thieves around the town, came together from various directions and caught a thief between them \((\exists x \forall y, \text{collective})\)

b. \( \text{Va-\textit{rume} } \text{v-\textit{oga-\textit{oga}}} \text{ va-\textit{ka-\textit{bat-a}}} \text{ mbavha.} \)

\( \text{CL2-man} \text{ CL2-every-\textit{red} CL2-REM.PST-catch-FV CL10.thief} \)

‘Every [group of] men caught thieves.’

accepted if each group (separately) caught a few thieves \((\forall y \exists x)\)

accepted if a few thieves were caught by one group, escaped, were caught by another group, escaped again, etc \((\exists x \forall y, \text{distributive})\)

rejected if the groups, in the course of chasing thieves around the town, came together from various directions and caught a few thieves between them \((\exists x \forall y, \text{collective})\)

The domain of quantification for \textit{oga-oga} is given by the denotation of its restrictive term. When the restrictive term is singular, as in (6.28) above, its denotation contains only atoms, and \textit{oga-oga} therefore quantifies over atoms. When the restrictive term is plural, its denotation contains sums as well; in this case, \textit{oga-oga} quantifies (primarily) over sums.

The domain of quantification for \textit{oga-oga} is not simply the denotation of \textit{varume} in this case: the property of having caught a thief must distribute over the organised groups of men, but need not distribute over other combinations of men or over individual men, although \textit{varume} denotes not only the organised groups but all the individual men and all possible combinations of them. This can be captured using a contextually defined cover variable\(^{32}\) (Schwarzschild 1996). A cover of a set is a group of subsets which between them contain all the members of the overall set; several covers of the set \{a, b, c, d, e\} are shown in Figure 6.3\(^{33}\).

\(^{32}\)The cover variable is one instance of contextual domain restriction; see §6.1.2, as well as von Fintel (1994), Stanley and Szabó (2000), and Gillon (2006).

\(^{33}\)The covers in Figure 6.3 are all partitions (i.e., they contain no overlapping cells), and are all well-fitting covers (i.e., none of their cells contain elements that are not members of the overall set); see Schwarzschild (1996) and Brisson (1998, 2003) for a more detailed discussion of covers.
By quantifying over the member cells of a cover, we can obtain partially distributive readings on which a property distributes to subgroups but not necessarily to individuals. For example, the sentence in (6.31) need not mean that all the students came together into one group: it could be that several smaller groups of students formed. This partially distributive reading is represented, without the adverbials, in (6.32); “Cov(x)” can be read as “x is the supremum of a cell of the contextually salient cover”.

(6.31) The students gathered outside after school.

(6.32) \( \forall x[\text{student}(x) \land \text{Cov}(x)] \rightarrow \text{gather}(x) \)

In the case of (6.30), the most salient cover is one where each of the groups chasing the thieves corresponds to a cell in the cover; the Cov variable restricts the domain of quantification to the cells of this cover. The two available readings for (6.30a), which has a plural restrictive term and a singular object, are given in (6.33).

(6.33) a. \( \forall x[\text{man}(x) \land \text{Cov}(x)] \rightarrow \exists f[\text{CH}(f) \land \text{catch}(x,f(\text{thief}))] \)

b. \( \exists f[\text{CH}(f) \land \forall x[\text{man}(x) \land \text{Cov}(x)] \rightarrow \text{catch}(x,f(\text{thief}))] \)

The groups in the domain of quantification can include individuals, if those individuals are contextually conceived of as “singleton groups”:

(6.34) **Context:** Several children are in a class learning how to bake cakes.

V-ana v-oga-oga va-ri ku-bik-a keke.
CL2-child CL2-every-RED CL2-COP INF-cook-FV CL5.cake

‘Every [group of] children is baking a cake.’
accepted if the children are working in groups of two or three
accepted if some children are working in pairs and some are working alone
marginal if each child is working alone

In the next section, I discuss the behaviour of oga-oga in object position, focusing on cases with a singular restrictive term.
6.2.2 *Oga-oga* as Object: Specificity and Nonmaximality

This section examines the scopal behaviour of *oga-oga* in object position and how it interacts with the specificity of the subject. Since subjects are topics, they strongly prefer to be specific; because of this, bare singular subjects appear to be restricted to wide scope. Bare plural subjects appear to have narrow scope readings; however, I argue that these are really collective readings.

**Oga-oga and Specificity**

When the object is quantified by *oga-oga*, a plural subject appears to be able to take either wide or narrow scope (6.35); however, a singular subject strongly prefers a wide scope reading (6.36). The comment offered by my consultant on (6.36) suggests that the subject *mwana* receives a specific reading.

(6.35) \( V-ana \ va-ka-rum-a \ chi-ngwa \ ch-oga-choga. \)
\( \text{CL2-child} \ CL2-REM.PST-bite-fv \ CL7-bread \ CL7-every-RED \)

‘Children bit every (loaf of) bread.’
accepted if the same group of children each bit every loaf (\( \exists x \forall y \))
accepted if each loaf was bitten by a different set of children (\( \forall y \exists x \))

(6.36) \( Mw-ana \ a-ka-rum-a \ chi-ngwa \ ch-oga-choga. \)
\( \text{CL1-child} \ 3SG-REM.PST-bite-FV \ CL7-bread \ CL7-every-RED \)

‘A child bit every (loaf of) bread.’
accepted if the same child bit all the loaves (\( \exists x \forall y \))
rejected if a different child bit each loaf (\( \forall y \exists x \))

Consultant’s comment: If I were an employee at the bakery and I said this to my boss, he could say “show me the child”, and if I showed him more than one child he would ask why I said there was only one.

Even in sentences where the inverse scope order is pragmatically favoured, the direct scope order is the first to come to mind, as shown by my consultant’s initial reaction to (6.37) and (6.38); in the case of (6.37), the direct scope order interpretation is also consistent with world knowledge, while in (6.38) it is epistemically impossible, leading to infelicity. The preferred way to express the meaning of the inverse scope order in (6.38) is to use a plural subject, as in (6.39).

(6.37) \( Mu-dzidzi \ a-ka-sarudz-a \ mu-kwikwidzi \ w-oga-woga. \)
\( \text{CL1-student} \ 3SG-REM.PST-choose-FV \ CL1-candidate \ CL1-every-RED \)

‘A/the student voted for every candidate.’
Consultant’s comment: He spoiled his ballot.
also accepted, after some thought, if each candidate was voted for by a different student.
‘A girl was born in every city.’
Consultant’s comment: It would be one girl born in every city.
also accepted, after some thought, if a different girl was born in each city

‘Girls were born in every city.’
(suggested as translation for ‘A girl was born in every city.’)

Subjects, Topics, and Specificity

As shown in the previous section (and also mentioned in §4.1), bare singulars as subjects strongly prefer to be specific, leading to an apparent preference for wide scope over oga-oga. The specificity preference of subjects is also evident in negative clauses (see Perch (to appear) for discussion):

(6.40) **Context:** a group of children are playing ring-around-the-rosy. After they finish singing, one child stays standing up.

\[Mu-ana\quad ha-a-na\quad ku-don-a.\]
\[CL1\text{-child} \quad \text{NEG1-3SG-PST} \quad \text{INF-fall-FV}\]
‘A child didn’t fall.’
accepted if the child who didn’t fall is younger than the others and doesn’t seem to understand the game
rejected if there is nothing special about the child who didn’t fall

The reason for this specificity preference lies in the relationship between syntactic structure and information structure. Based on facts about passivisation, Bliss and Storoshenko (2008) argue that grammatical subjects in Shona are actually topics (this has also been proposed for other Bantu languages (Creissels and Robert 1998; Demuth and Harford 1999)). It has often been noted that topichood is related to definiteness (Gundel and Fretheim 2004), and a link has been proposed between topichood and the specific interpretation of indefinites (Cresti 1995; Portner and Yabushita 2001).

On the analysis I outlined in §4.2, specific readings have the choice function taking its reference from the context, as in Kratzer (1998); the interpretation this gives for (6.41) is shown in (6.42).

(6.41) **Mu-dzidzi\ a-ka-sarudz-a\ mu-kwikwidzi\ w-oga-woga.**
\[CL1\text{-student} \quad 3SG\text{-REM.PST-choose-FV} \quad \text{CL1-candidate} \quad \text{CL1-every-RED}\]
‘A/the student voted for every candidate.’

(6.42) \[[CH(f) \land \forall x[\text{candidate}(x) \rightarrow \text{voted-for}(f(\text{student}),x)]]\]
If subjects are specific, the interpretations of the sentences in chapter 5 should reflect this. The translation of (6.43) would therefore be something like (6.44), in which the function variable which applies to the subject is left free and only the variable applying to the object is existentially closed. (Alternately, both variables might be free.) Since the \**-operator still creates a cumulative reading if one or both choice function variables are free, specificity doesn’t affect the analysis of scopeless quantifiers presented in chapter 5.

(6.43) \textit{Va-rume va-ka-gambuk-a nzi-izi nhatu.} \\
\textit{CL2-man CL2-REM.PST-cross-FV CL10-river CL10.three} \\
‘(The) men crossed three rivers.’ \\
accepted if the same group of men crossed all three \\
accepted if each was crossed by a different man or men

(6.44) \[ \exists f[\text{CH}(f) \land \text{CH}(g) \land \text{**cross}(g(*\text{man}), f(\lambda x.\text{river}(x) \land \text{three}(x)))] \]

The correlation between specificity and subjecthood is reminiscent of Diesing’s (1992) proposal that indefinites appearing within the VP (at LF) are interpreted as existential while those appearing outside the VP are interpreted as presuppositional or generic. Unlike Diesing, I assume that existential closure may take place above the VP level as well, and the two readings I consider for bare classified nouns are existential and referential rather than existential and partitive; nonetheless, the similarity is suggestive of some kind of parallel between Shona and better-studied languages like German.

**Plurals and Specificity I: Nonmaximality**

If subjects are topics and therefore specific, they should appear to be restricted to wide scope. As shown in the previous section, this is indeed the case for bare singular subjects; bare plural subjects, however, seem to falsify this predication. For example, (6.45) (repeated from (6.35) above) should only have the interpretation in (6.46), which is parallel to the interpretation of sentences with a bare singular subject (6.42), but it appears to also allow the narrow scope reading given in (6.47).

(6.45) \textit{V-ana va-ka-rum-a chi-ngwa ch-oga-choga.} \\
\textit{CL2-child CL2-REM.PST-bite-fv CL7-bread CL7-every-RED} \\
‘Children bit every (loaf of) bread.’ \\
accepted if the same group of children each bit every loaf (\(\exists x\forall y\)) \\
accepted if each loaf was bitten by a different set of children (\(\forall y\exists x\))

(6.46) \[ \text{CH}(f) \land \forall x[\text{bread}(x) \rightarrow \text{bite}(f(*\text{child}),x)] \]

(6.47) \[ \forall x[\text{bread}(x) \rightarrow \exists f[\text{CH}(f) \land \text{bite}(f(*\text{child}),x)]] \]

In object position, \textit{oga-oga} seems to have different scope possibilities depending on the number of the subject; this is different from its behaviour in subject position, and is unexpected
if oga-oga is analysed as a quantifying determiner. Two solutions present themselves: oga-oga might be lexically ambiguous, or the apparent narrow scope reading might be derived from the semantics of the bare plural subject.

If oga-oga were ambiguous between a quantifying determiner reading and a scopeless quantifier reading, with the former reading appearing in subject position and the latter in object position, the apparent scopal ambiguity with bare plural subjects could be derived using cumulativity, as in the representation in (6.48)\textsuperscript{34}:

\[ (6.48) \quad [\text{CH}(f) \land **\text{bite}(f(*\text{child}),+(+\text{bread}))] \]

In keeping with the other claims in the thesis, however, I would like to propose that the behaviour of oga-oga in object position can be derived from independently motivated principles. Specifically, the apparent availability of (6.47) could be derived from nonmaximality. It has been noted that a predicate can be true of a plurality without being true of every member of the plurality (Dowty 1987; Brisson 1998, 2003; Landman 2000); for example, (6.49) does not require that every reporter at the press conference had the chance to ask a question. Nonmaximality can also be observed in (6.50): for this sentence to be true, it does not have to be the case that every girl ate every cookie, only that every cookie was eaten by one (or more) of the girls.

\[ (6.49) \quad \text{At the end of the press conference, the reporters asked the president questions.} \]
\[ \text{(Dowty 1987, p. 103)} \]

\[ (6.50) \quad \text{The girls ate every cookie.} \]

Parallel to (6.50), (6.45) requires that there is some contextually relevant plurality of children such that every loaf of bread was bitten by one or more of those children. This would follow from the interpretation in (6.51) if the denotation of “bite” were expanded to include any sum of children which contains a child who bit.

\[ (6.51) \quad [\text{CH}(f) \land \forall x[\text{bread}(x) \rightarrow \text{bite}(f(*\text{child}),x)]] \]

This idea is somewhat similar to Landman’s (2000) proposal that collective predication is really a kind of singular predication. Landman argues that there is no need for a special theory about collective inferences or distributive subentailments, and that mixed predicates (which can be true of both individuals and pluralities) have the same interpretation whether they apply to a plurality or an individual. For example, the sentence “I touch the ceiling” requires that “part of my body is in surface contact with part of the ceiling” (p. 166); “the boys touch the ceiling” has the same requirement with respect to the group of boys.

This form of nonmaximality does not affect the cumulative readings seen in previous sections because the denotation of the **-operator, repeated here as (6.52), guarantees that all members of each argument were involved in the event.

\textsuperscript{34}This representation assumes that the scopeless reading of chingwa chogachoga ‘every (loaf of) bread’ is equivalent to zvingwa zvose ‘all the (loaves of) bread’ (see §6.1.2).
(6.52) \[ *R(x,y) = 1 \text{ iff } \forall x' \leq x \; \exists y' \leq y \text{ s.t. } R(x',y') \text{ and } \forall y' \leq y \; \exists x' \leq x \text{ s.t. } R(x',y') \]

**Plurals and Specificity II: Homogeneity**

There is a further puzzle in the behaviour of bare plural subjects which cannot be explained by nonmaximality\(^{35}\). Bare plural subjects in negative clauses also appear to be scopally ambiguous, as in (6.53):

(6.53) **Context:** A group of students organised a race on campus.

\[ \text{Va-dzidzi } ha-va-na \text{ ku-mhany-a.} \]

\( \text{CL2-student } \text{NEG1-CL2-PST INF-run-FV} \)

‘(The) students didn’t run.’

accepted if all the students ran except for the ones who organised the race

rejected if some of the students ran and some didn’t

accepted if no students ran

(6.54) \[ [\text{CH}(f) \land \neg \text{run}(f(*\text{student}))] \]

(6.55) \[ \neg \exists f[\text{CH}(f) \land \text{run}(f(*\text{student}))] \]

The interpretation expected for (6.53), if subjects must be specific, is (6.54); however, the narrow scope nonspecific reading in (6.55) is also possible. I suggest that this is due to the possibility of a specific plural referring to all (contextually relevant) individuals, together with a principle of homogeneity.

Löbner (2000) notes that in some cases, a sentence and its negation may both be undefined. For example, consider the two sentences in (6.56), borrowed from Löbner (p. 233-234):

(6.56) a. The cow is black.

b. The cow is not black.

If the cow is in fact half black and half white, neither (6.56a) nor (6.56b) is true, but intuitively neither is quite false either. To account for this intuition, Löbner proposes a presupposition of homogeneity (or indivisibility) – that is, predicates are presupposed to apply to either all or no relevant parts of their arguments, making (6.56a) and (b) both cases of presupposition failure. The formulation given in (6.57) is based on that of Beck (2001), who uses homogeneity to explain stronger than expected readings of reciprocals and plurals in the scope of negation.

(6.57) \[ *P(x) = 1 \text{ iff } \forall y[y \leq x \rightarrow P(y)] \]

\[ 0 \text{ iff } \forall y[y \leq x \rightarrow \neg P(y)] \]

undefined otherwise

This presupposition causes (6.54) to be interpreted as meaning that the predicate run is true of none of the individuals making up the sum which is its argument. If the choice function picks out the sum of all students (arguably the most likely referent in the absence of any salient subgroups), this will be equivalent to (6.55), the narrow scope reading.

There is a remaining problem, however. Nonmaximality and homogeneity seem to contradict each other: in negative sentences, the sentence must be true only if it is true of each of the individuals making up the plurality, while in sentences with oga-oga, the sentence must be able to be true even if it is true of only one individual member of the plurality. I leave this as an issue for further research.

6.3 Conclusion

This chapter has examined two universal quantifiers in Shona, ose ‘all’ and oga-oga ‘every’, as well as some issues relating to specificity and plurality which affect the apparent scope of oga-oga in object position.

I have shown that ose behaves like the scopeless quantifiers discussed in chapter 5, except that it can modify a singular noun, and I have argued that it denotes an operator which returns the supremum of the noun it modifies. I have also argued that oga-oga is a quantifying determiner. In subject position, it behaves as expected, participating in scopal ambiguity, and its domain of quantification is (partially) determined by its restrictive term. In object position, oga-oga seems to have fewer scope possibilities, but this is due to the subject being a topic and therefore specific; the apparent scopal ambiguity with plural subjects is due to the interpretation of specific plurals.

The next and final chapter sums up the arguments made in the thesis and points out some directions for further research.
Chapter 7

Conclusion

I have described several apparent scope differences between bare singulars and bare plurals in Shona, and argued that they are not actually differences in scope but that they are derived from the semantics of plurality. The theoretical devices used in this thesis are not new; rather, I have argued that various proposals originally applied to definite plurals in English can also be applied to bare plurals in Shona. The overarching theme is that generality of the truth conditions for sentences containing plurals can give the appearance of scopal ambiguity.

Chapters 1 to 4 gave some background on the semantics of plurals and on the Shona language. One unusual background assumption I adopted is the semantic analysis of bare classified nouns presented in chapter 4: I suggested that they are interpreted using choice functions, with the function variable allowed to be either existentially closed or free, an idea which differs slightly from previous choice function analyses of indefinites.

In chapter 5, I showed that bare singulars appear to be restricted to wide scope with respect to a clausemate scopeless quantifier, while bare plurals appear to be scopally ambiguous. I argued that this apparent difference between singulars and plurals is due to the combination of cumulativity and the denotations of scopeless quantifiers: numerals and shoma ‘(a) few’ are intersective modifiers.

In chapter 6 I showed that ose ‘all’ patterns with scopeless quantifiers in its scope behaviour, and argued that it denotes an operator which returns the supremum of the noun it modifies. Oga-oga ‘every’, on the other hand, displays a subject/object asymmetry: in subject position it is scopally ambiguous with respect to both bare singulars and bare plurals, but in object position it is restricted to narrow scope with respect to bare singulars, although it appears to be scopally ambiguous with respect to bare plurals. I argued that the narrow scope restriction in object position is due to a preference for subjects to be specific, which stems from their information structure status as topics; bare plural subjects appear to be ambiguous due to nonmaximality.

In the course of the thesis, I have touched on several questions which deserve further investigation. For instance, in chapter 4 I discussed specific and nonspecific (or definite and indefinite) interpretations of bare classified nouns. There is an ongoing debate as to the nature of definiteness and specificity (see for example Heim (1982, 1991); Kadmon (1990); Hawkins (1991); Gundel et al. (1993, 2001); von Heusinger (2002)); however, in this thesis I have simply assumed that indefiniteness is unmarked and equated specificity with referentiality. I also assumed that bare classified nouns are interpreted using choice functions, while noting that this
interpretation is not crucial for my analysis of scopeless quantifiers. It might be possible to determine whether this really is the best interpretation for bare classified nouns, with a thorough investigation of their scopal properties in various syntactic contexts, particularly in contexts where the descriptive content of the indefinite is interpreted in a different position from the existential component.

I have analysed cumulative readings as derived using the **-operator. All the examples in this thesis involve sentences with two arguments; however, Beck and Sauerland (2000) show that cumulative readings are also possible in more complex structures. For example, (7.1) can be true in the situation described in (7.2), although this situation is not consistent with either a collective or a distributive reading.

(7.1) Three boys gave a present to five girls. (Beck and Sauerland 2000, p. 357)
(7.2) Bill gave a present each to Ann and Sarah
    Jim gave a present to Lily
    Tommy gave a present each to Jane and Sue

Beck and Sauerland argue that the **-operator can be applied to any expression that is a syntactic constituent at some point in the derivation; in (7.1), for instance, the verb combines with the direct object before it combines with the two arguments which participate in the cumulative reading, and the **-operator can apply to this derived two-place predicate as shown in (7.3).

(7.3) **\(\lambda y.\lambda z.\text{give}(z, a\ \text{present}, y)\)

It would be interesting to investigate these syntactic restrictions in Shona, which has valence-changing verbal suffixes which might interact with the **-operator.

The typology of universal quantifiers is also an interesting issue. English has three universal quantifiers: *every* and *each*, which can appear in a singular DP but not a plural one, and *all*, which can appear with plural and mass nouns but not with singular count nouns\(^{36}\). Shona also has two commonly used universal quantifiers, *ose* ‘all’ and *oga-oga* ‘every’, both of which can appear in singular and plural DPs\(^{37}\), and which have different meanings both in the singular and in the plural. A third pattern is seen in Hebrew, which has a single word, *kol*, which has an interpretation similar to that of ‘every’ when used with a singular indefinite (7.4), but is interpreted more like ‘all’ when used with a plural definite (7.5) (Gil 1992, 1995).

(7.4) *kol iš saḥav šaloš mizvadot.*
    all man carry.PST.3SG.MASC three.FEM suitcase.PL.FEM
    ‘Every man carried three suitcases.’ (Gil 1992, p. 317)

\(^{36}\)Occasionally, *all* can be used with a singular count noun (as in *all the world*), but this usage is not productive.

\(^{37}\)Although the use of *oga-oga* with plurals is marginal.
(7.5) Kol haʔanašim saḥvu šaloš mizvadot.
   all man.def.pl.masc carry.pst.3pl three.fem suitcase.pl.fem

   ‘All men carried three suitcases.’ (Gil 1992, p. 317)

It would be interesting to investigate what inventories of universal quantifiers are allowed
cross-linguistically, and whether these inventories correlate with other properties such as number
marking. Some work has been done in this area (see for example Gil (1995) and several papers
in Matthewson (2008)), but much remains to be done.

Finally, I have been non-committal as to the syntactic representation of the sentences I
have analysed semantically. The syntax of the constructions studied in this thesis, and the
relation of their syntactic structure to their semantic interpretation, would be interesting areas
to investigate.
Bibliography


Appendix A

Research Ethics Board Certificates of Approval
The University of British Columbia  
Office of Research Services  
Behavioural Research Ethics Board  
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

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Hoetz Rullmann

SPONSORING AGENCIES:
Social Sciences and Humanities Research Council of Canada (SSHRC)

PROJECT TITLE:
Cross-linguistic Pragmatics

CERTIFICATE EXPIRY DATE: July 11, 2008

DOCUMENTS INCLUDED IN THIS APPROVAL:  

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Social Sciences and Humanities Research Council of Canada (SSHRC)
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PROJECT TITLE:
Cross-linguistic Pragmatics

EXPIRY DATE OF THIS APPROVAL: May 22, 2010

APPROVAL DATE: May 22, 2009

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