

A Theory of Distributed Number

Myriam Dali and Eric Mathieu

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Volume 269

A Theory of Distributed Number
by Myriam Dali and Eric Mathieu

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Preface

The main objective of this book is to develop a deeper understanding of the form and interpretation of number, a core feature of human cognition (Dehaene, 1999). Using insights from Generative Syntax and Distributed Morphology, we develop a theory of distributed number, arguing that number can be associated with several functional heads and that these projections exist depending on the features they specify. In doing so, we make a strong claim for a close mapping between the syntactic structure and the semantics in the noun phrase, since each node corresponds to a different interpretation of number.

Although our book contains fairly technical accounts of number and plurals cross-linguistically, we believe that the monograph is accessible to linguists working outside any particular syntax-semantic framework, since we propose generalizations that are applicable in many, if not all, models of grammar.

The book will be of interest to scholars and graduates as well as advanced undergraduate students working not only on number, but also on the noun phrase, agreement, functional heads, gender, language change, comparative syntax, and meaning. Although some of our results have already been published in recent years (Mathieu, 2014; Dali, 2015, 2017; Dali and Mathieu, 2016, 2020), we take full advantage of the book format by giving more details and by adding material not previously released (some chapters are brand new and the book encompasses much data not previously discussed in our work or elsewhere).

This work has benefited greatly from the input of many scholars and language consultants. We wish to thank: Paolo Acquaviva, Saleh AlQahtani, Ana Arregui, George Balabanian, Alan Bale, Hagit Borer, Rose-Marie Déchaine, Jenny Doetjes, Abdelkader Fassi Fehri, Daniel Harbour, Ruth Kramer, Jean Lowenstamm, Sarah Ouwayda, Phoevos Panagiotidis, Elizabeth Ritter, David Willis, and Martina Wiltschko. Thanks are also due to the audiences at Diachronic Generative Syntax (DiGS 21, 2019, Arizona State University), BLS Workshop on countability distinctions (2019, University of Berkeley), Workshop on Co-Distributivity (2017, Paris, CNRS Pouchet), NELS (2015, Concordia University), Canadian Linguistic Association (2015, University of Ottawa; 2017, Ryerson University; 2019, University of British Columbia), Gender, noun classification, and determination conference (2015, University of Ottawa), Lexical plurals workshop (2015, Ghent University),

and at seminars held at the University of Calgary and UQAM. We also thank SSHRC (Social Sciences and Humanities Research Council of Canada – Grant No. 752-2018-1688) for generous funding.

Last, but not least, we wish to thank Florian Grandena and Gino Ndanga. This book is dedicated to them.

Abbreviations

1	first person	i	interpretable
2	second person	IMP	imperfect
3	third person	IND	indicative
ABS	absolute	INDEF	indefinite
ACC	accusative	INTR	intransitive
ADJ	adjective	MASC	masculine
BPL	broken plural	NEG	negation
CA	Classical Arabic	NOM	nominative
COLL	collective	NOMIN	nominal
CON	conditional	NUN	nunation
CONT	continuous (present tense)	PART	participle
CONTEMP	contemporaneous (past)	PAST	past tense
DAT	dative	PERF	perfective
DEF	definite	PL	plural
DET	determiner	POSS	possessive
DM	Distributed Morphology	SG	singular
DU	dual	SING	singulative
EMPH	emphatic	SPL	sound plural
FEM	feminine	u	uninterpretable
FUT	future	VIA	vialis (case)
GENERAL	general number	VI	Vocabulary Item

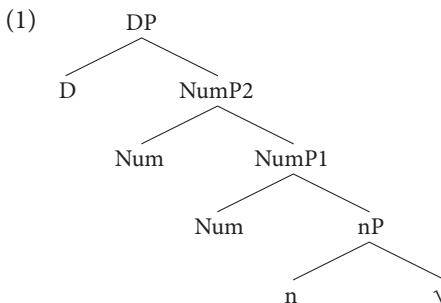
Introduction

1.1 Goal

The aim of this book is to give a comprehensive analysis of number, and of plurals in particular, from a variety of angles: morphological, semantic, and syntactic. Our main proposal is that number is distributed along the nominal spine with different effects depending on the type of functional head (and semantic features) it is associated with (hence the title of the book ‘A theory of distributed number’). This means, in particular, that the plural is not homogeneous: it can have different meanings and be associated with different functional heads.

Our claim is in line with a growing trend expressed by a variety of authors (Acquaviva, 2008; Alexiadou, 2011; Butler, 2012; Mathieu, 2009, 2012, 2013, 2014; Mathieu and Zareikar, 2015; Dali and Mathieu, 2016; Harbour, 2008, 2011; Gillon, 2015; Kramer, 2016; Wiltschko, 2008, 2012) for whom plurality is heterogeneous or split and thus not fixed to one position.

On our view, number, including plurals, can be associated with bare *n*Ps and a lower NumP (NumP1) but also with a higher NumP (NumP2), as illustrated schematically in (1).



Our main focus will be on the division of labour between NumP1 and NumP2 whereas most scholars concentrate on the division of labour between *n* and NumP1 (Acquaviva, 2008; Kramer, 2016).

The flexible account of plurality presented in this book is in contradiction with more rigid views of plurality (such as Borer 2005, and to some extent Chierchia

1998, and the many articles that follow these approaches).¹ Since plurals in some languages can be derived after division (in the sense of Borer 2005), as we shall see, we conclude that the plural is not one but many.² In doing so, we make a strong claim for a close mapping between the syntactic structure and the semantics in the DP, since each node corresponds to a different interpretation of the plural and propose that different number projections exist depending on the features they specify (see also Vásquez-Rojas, 2012; Watanabe, 2010).³

Although our survey of languages is vast (it includes English, French, Ojibwe, Blackfoot, Hebrew, Arabic, Japanese, Korean, Chinese, Turkish, Persian, Western Armenian, etc.), we choose to focus on Arabic. The reason for this move is that this language is extremely interesting with regard to the way it expresses number. In particular, the grammar of Arabic includes a singulative alongside a singular as well as many plurals (broken plurals, sound plurals, plurals of singulatives, plurals of collectives, plurals of plurals) together with a dual and a paucal. Since Modern Standard Arabic is generally not spoken as a mother tongue (its use being reserved for books, newspapers, and academic settings), this book focuses on a dialect, namely Tunisian Arabic, and relies exclusively on Tunisian informants for the original Arabic data. We will only make references to other dialects or Modern Standard Arabic when the need to compare with Tunisian Arabic arises (transcription is IPA-based).

As just mentioned, number in Arabic is notoriously complex (Wright, 1967; Ojeda, 1992; Brustad, 2000). It displays various forms of plurals that are somehow unusual and the constraints on plural marking are intricate, exhibiting an interesting division of labour between syntax and semantics. Using a feature-based theory of number categories (Noyer, 1992; Harbour, 2011, 2014; Nevins, 2011), we show in this book that these special forms are nevertheless reducible to a restricted set of binary features (e.g. [\pm atomic] and [\pm additive]).

More generally, Arabic also provides insights on the relationship between gender and number, showing in particular that feminine exponents can represent

1. This flexible view of plurality goes hand in hand with the flexible view of classifiers (based on typological work, Aikhenvald 1991, since the latter can also appear in different positions: some classifiers are in Div (Borer 2005) or Num1, but others are in # or Num2 (as in the case of numeral classifiers).

2. On the basis of Arabic, and following Abdelkader Fassi Fehri's suggestion, Borer (2005) herself notes in a footnote that it may be the case, after all, that plurality is not a unified notion and may consist of two different grammatical objects with diverse semantic, syntactic, and, at times, morphological properties – one interacting with $\langle e \rangle_{DIV}$, the other with $\langle e \rangle_{\#}$, but she does not pursue this idea (neither in the book or in later work, see Borer and Ouwayda 2010). Our research program is one that takes this idea seriously.

3. NumP2 is equivalent to Borer's #P, except that plural forms in this position have no semantic content, they are simply agreement markers (Borer and Ouwayda, 2010; Ouwayda, 2014).

number across the board. There appears to be a close relationship between gender and number (Wurmbrand, 2015) and Arabic provides further evidence that the two are closely linked (both diachronically and synchronically).⁴

Our account builds on a vast amount of research on number (Borer, 2005; Krifka, 1995; Doetjes, 2012; Chierchia, 1998; Rothstein, 2010), and on Arabic number, more specifically (Ojeda, 1992; Fassi Fehri, 1988, 2003, 1993, 2019, 2018; Zabbal, 2002; Acquaviva, 2008), but in this book, we focus on two issues of growing interest in the literature, namely paucity and clusivity (inclusive versus exclusive interpretations of plurals), while providing two specific proposals. One is that plurals of singulatives, unlike regular broken and sound plurals, are interpreted both exclusively and as paucals; the other is that certain nouns can exhibit two plural forms, one sound and one broken, and that the sound plural in this case receives an exclusive interpretation together with a paucal construal.

This introductory chapter is organized as follows: Section 1.2 introduces our theoretical assumptions. Section 1.3 explains what paucity is and how it is relevant for the data examined in this book. Section 1.4 summarizes the distinction between inclusive versus exclusive readings of plurals, a topic of much recent interest in the literature, and directly relevant for the topic of number in Arabic. Section 1.5 lists the various questions that motivate our investigation of number and gender in this book and briefly discusses the hypotheses put forward in this project, foreshadowing many of the claims that we will make throughout this volume. Finally, Section 1.6 provides an overview of the book, providing a brief summary of each chapter.

1.2 Theoretical assumptions

Our account of number is framed within the context of Minimalism (Chomsky, 2000, 2001) and Distributed Morphology (Halle and Marantz, 1993, 1994). As its name suggests, Minimalism aims to achieve a minimal formulation of syntactic theory, both from a methodological and conceptual perspective, by reducing the set of theoretical mechanisms to a bare minimum.

Chomsky proposes that the language faculty involves a computational system that feeds into the two components of the mind dealing with sound and meaning: the articulatory-perceptual (A-P) system and the conceptual-intentional (C-I) system. The computational system of language interacts with these systems through two distinct interface levels: Phonetic Form (PF) and Logical Form (LF). The sound-meaning relationship is described as a derivation, taking a single array of

4. Gender has also been claimed to be split; the higher gender being the agreeing gender and the lower gender being interpretable (see Steriopo and Wiltschko 2010 and of course Ritter 1993 for the idea that, depending on the language, gender is either high or low).

lexical elements as its output. The two interface representations are distinct and parallel. One representation is not derived by the other. Syntactic structures are interpreted semantically at LF, and are assigned phonological material at PF. The point in the derivation where computation splits is called “Spell Out”.

The relations between the lexical elements used in the syntactic derivation (the Numeration) are represented by two basic operations: Merge and Agree. Merge is a function that combines two objects (say α and β) into a new phrase representation, with a label (either α or β), as illustrated in (2).

$$(2) \text{ Merge } (\alpha, \beta) \rightarrow \alpha$$

In (2), the label is α , and as such, it identifies the properties of α as the properties of the newly-formed phrase. Move involves another instance of Merge and displacement of a lower XP, for example, to the specifier of a higher phrase (Move = re-Merge). Agree involves a pair of ϕ -features α and β that enter into an agreement relationship. One is unvalued (the probe), the other is valued (the goal), and by agreeing, the unvalued features are satisfied.

Distributed Morphology (DM) is a theory of the architecture of grammar that proposes that the internal hierarchical structure of words is syntactic and that the syntax operates on abstract morphemes, defined in terms of morphosyntactic features. According to DM, the syntactic component can only manipulate terminal nodes that consist of formal features or bundles of features (feature bundles are often called morphemes in DM), which are devoid of any phonological material when they enter the derivation. Once the syntactic operations are completed, morphological operations can manipulate feature bundles at the terminal nodes in a post-syntactic component. A key feature of the theory is that the spell out of these abstract morphemes, also called Vocabulary Insertion, occurs after the syntax. Vocabulary Insertion is the process whereby it is decided which Vocabulary Item should be inserted at a particular feature bundle. (3) gives examples of Vocabulary items for the past tense node T[past] in English.

- (3) *Vocabulary items for past tense (T[past])*
- a. T[past] \leftrightarrow -t/{ \surd Leave, \surd Bend, ...}_____
 - b. T[past] \leftrightarrow -Ø/{ \surd Hit, \surd Quit, ...}_____
 - c. T[past] \leftrightarrow -ed
- (Embick and Marantz, 2008, 5)

Vocabulary Insertion (VI) follows Halle’s (1997) Subset Principle, which specifies that the phonological exponent of a vocabulary item can be inserted if the item contains all or a subset of the features present at the terminal node. At the same time, the Vocabulary Item must have no feature that is absent from the node. In the case where several items compete for insertion, the one that matches the most features of the terminal node will be inserted. A single morpheme can have different alternative realizations depending on the phonological or morphological context

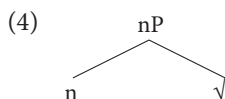
in which it appears, or even on the presence of another morpheme. A number of operations, Impoverishment, Fission, Morphological Merger, Local Dislocation are proposed to account for a number of mismatches between the minimal units of grammatical combination and the minimal units of sound (Bobajlik, 2017).

As Kramer (2015) points out (p. 7), these assumptions form the core of DM. But a more recent feature of DM that has had a significant impact in the field is the distinction between category-neutral roots and category-determining heads. A root combines with *n* to become a noun, with *v* to become a verb, etc. (on lexical decomposition see: Marantz, 1997, 2001; Arad, 2003, 2005; Embick and Noyer, 2007; Harley, 2014), creating lexical categories in the syntax. Although, there is traditionally in DM no distinction between derivational morphology and inflectional morphology,⁵ many scholars have assumed, following Marantz (2007) (see also Embick, 2010), that so-called derivational morphology corresponds to the first phase (the category-determining phase: *a*, *n*, *v*, etc.), while inflectional morphology corresponds to what is outside of that first phase. This is perhaps a more controversial feature of DM, but diachronic research provides ample support for the distinction between inflectional morphology and derivational morphology. It is therefore a feature of DM that we will also assume in this book. In fact, if correct, our analysis of the development of *-a* in early Semitic in Chapter 7 provides direct support for the syntactic representation of the distinction between inflectional and derivational morphology.

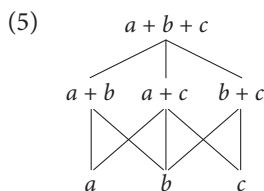
Another important notion that will be discussed in this volume is contextual allomorphy. Allomorphy is the LF counterpart of allomorphy. Allomorphy is a widespread notion of DM, whereby a single morpheme can correspond to multiple phonological realizations, depending on its immediate phonological context. In allomorphy, a single morpheme, can give rise to multiple semantic realizations, depending on the context. Allomorphy is most often discussed in the literature as a parallel of allomorphy in the LF domain. Allomorphy can take place in the root (Harley, 2014) and in functional heads (Marantz, 2013; Wood, 2012). This notion will prove relevant to the discussion about the semantic realizations associated with the feminine morpheme (see also Dali, 2020).

Focusing now on the noun phrase and the extended projection of *n*, we make the following series of assumptions. First, we assume, following many researchers (Acquaviva, 2008; Lowenstamm, 2008; Kramer, 2009; Kihm, 2005; Harbour, 2011, 2014, etc.) that classificatory features occupy their own projection, namely *n* and that *n* takes a root as a complement, as in (4). Furthermore, *n* labels the root as a noun and makes it visible to the computational system.

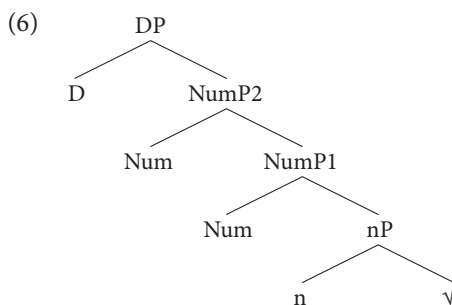
5. Derivational morphology derives new lexemes while inflectional morphology generates different word-forms. But DM does not assume a categorical distinction of “word”; “words” are epiphenomenal (Siddiqi 2018).



Second, we assume that n defines a nominal predicate P and structures the root as a join semi-lattice (Link, 1983; Harbour, 2011, 2014; Zabbal, 2002; Martí, 2020) giving us the representation in (5) for the semi-lattice. As pointed out by Harbour (2011), n underdetermines whether the lattice has an atomic stratum or whether its sub-parts have even smaller sub-parts, i.e. whether it is count or mass. Like Borer (2005), we assume it is Num (or Div for Borer) that actually introduces the distinction. When Num is projected, the noun is count, when Num is not projected, the noun is mass. The semi-lattice introduced by n and the root is the input to the singular and plural operations.

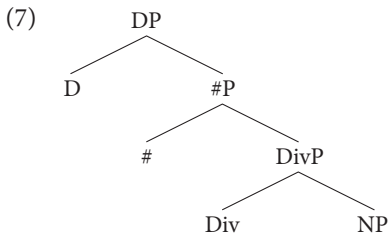


The extended projection of n looks like (6) (Grimshaw, 2005). NumP1 takes nP as complement, NumP2 takes NumP1 as complement, and DP takes NumP2 as complement.



NumP1 can be said to be equivalent to DivP as proposed by Borer and Ouwayda (2010) – or ClP as in Borer (2005) and NumP2 equivalent to #P (Borer 2005; Borer and Ouwayda 2010). Compare (6) with (7) (note NP instead of nP in (7)).⁶

6. It might be argued that Div is not technically equivalent to Num, but for our purposes Div and Num are close enough. Harbour (2011, 2014), like Borer (2005), assumes the introduction versus absence of Num/Div in the structure accounts for the mass/count distinction. Num, like Div, partitions NPs that are indeterminate with regard to number. Finally, Harbour (2011, 2014), like Borer (2005), assumes that the singular and the plural are in complementary distribution in



Next, we will be assuming functional heads associated with number come with different semantic features (Noyer, 1992; Harbour, 2011, 2014; Nevins, 2011). When relevant, such semantic features will be discussed and added to our syntactic trees. They are useful in distinguishing differences in interpretation (paucal vs. plural, for example). In particular, we will follow Harbour’s (2011, 2014) theory and set of features introduced in (8).

(8) a. [+atomic]

b. [−atomic]

(9) a. [+minimal]

b. [−minimal]

(10) a. [+additive]

b. [−additive]

Only the features on Num are interpretable. The features on *n* are lexical, but not part of the semantic calculus. The features on D are syntactic and uninterpretable (they only encode number agreement). In sum, Num is determined by cardinality (singular, dual, plural) and *n*, by lexical properties of the noun.⁷

As summarized by Martí (2020: 44): “[±Atomic] is sensitive to atoms/non-pluralities ([+atomic]) vs. non-atoms/pluralities ([−atomic]. [±Minimal] is sensitive to elements with parts ([−minimal]) vs. elements without parts ([+minimal]). [±Additive] is concerned with whether the output set contains, for any two of its members, their join ([+additive]) (a property also known as cumulativity; see Krifka 1989) or not ([−additive])”⁸

Num/Div. A major difference between Harbour’s account and Borer’s is that the former has, but the latter doesn’t have, *n*. Division, in the sense of Borer (2005), is done by *n* for Harbour (2011, 2014).

7. We mention these three sets of features because Arabic is said to have singulars, plurals, duals, and paucals, although as we shall see Tunisian Arabic barely uses the dual. Its use is disappearing and everything points to the view that the Tunisian Arabic grammar does not make use of the [±minimal] feature. Note that, on the other hand, Standard Arabic (SA) has a productive dual.

8. As a reviewer points out, technically speaking, even atoms have one part: themselves (i.e. parthood is reflexive), which means [±Atomic] is less about not having parts or more about not having parts of a certain kind. As we shall below, individuals in the extension of duals are non-atomic individuals without non-atomic parts.

As proposed by Harbour (2014), a feature bundle applies successively to a lattice L . So for example, the combination [–atomic; +minimal] for the dual will give (+minimal(–atomic(L))). [–atomic] applies first, then [+minimal]. The vertical order of features in our syntactic structures reflects the order of composition. On Harbour’s (2014) view, [\pm atomic] produces an object of type $\langle e, t \rangle$, that is functions from individuals to truth values. [\pm additive] and [\pm minimal] are of type $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$, functions from ordered pairs to ordered pairs. But we will follow Martí (2020), in viewing [\pm atomic] as of type $\langle \langle e, t \rangle, \langle e, t \rangle \rangle$ ⁹ and assume the following semantics for the number features.¹⁰

- (11) a. [[+atomic]] = $\lambda P.\lambda x. P(x) \ \& \ \text{atom}(x)$
 b. [[–atomic]] = $\lambda P.\lambda x. P(x) \ \& \ \neg \text{atom}(x)$
- (12) a. [[+minimal]] = $\lambda P.\lambda x. P(x) \ \& \ \neg \exists y P(y) \ \& \ y \sqsubset x$
 b. [[–minimal]] = $\lambda P.\lambda x. P(x) \ \& \ \exists y P(y) \ \& \ y \sqsubset x$
- (13) a. [[+additive]] = $\lambda P.\lambda x. Q(x) \ \& \ Q \sqsubset P \ \& \ \forall y Q(y) \rightarrow Q(x \sqcup y)$
 b. [[–additive]] = $\lambda P.\lambda x. Q(x) \ \& \ Q \sqsubset P \ \& \ \neg \forall y Q(y) \rightarrow Q(x \sqcup y)$

Harbour’s (2014) featural and compositional account of number has the advantage of accounting for many of the implicational parameters/universals described in the literature and captures many of Corbett’s (2000) generalizations (14) (see Greenberg, 1963, 1966; Croft, 2003). The proposal dispenses with [dual] or [paucal] as primitive features, a welcome result.¹¹

- (14) (1) Trial requires dual; (2) Dual requires singular; (3) Singular requires plural; (4) Plural requires singular or minimal; (5) Unit augmented requires augmented; (6) Minimal requires augmented or plural; (7) Augmented requires minimal; (8) Greater paucal requires (lesser) paucal; (9) Paucal requires plural; (10) Greater (and global) plural requires plural or augmented.

It must be noted that not all features are available in all languages. For example, not all languages have a paucal, a dual, a greater plural, etc. Variation is expressed by (15).

9. Martí (2020, 7) treats “the contribution of the number features to be entirely made up of entailments, whereas for [Harbour] some of their content is presupposed.” (i.e. $Q(x), Q \sqsubset P$, Harbour 2014, p. 195).

10. Note that, like Martí (2020), we take \sqsubset to be the proper subpart relation, \sqcup to be the join operation and Q to be a free variable. As noted by a reviewer and as pointed out by Martí (2020), it is not entirely clear in Harbour (2014) why there is a need to use a free variable Q in the denotation of [\pm additive]. It could, instead, be existentially quantified, as in ‘there is some Q that is a subset of P ’.

11. As pointed by a reviewer, Harbour’s model derives the Greenbergian universals but assumes a distinct ontology.

(15) *Activation parameter*

[±additive]/[±minimal]/[±atomic] is (not) a feature of Number.

(Harbour 2014, p. 203)

For example, “in order for a language to have an approximate number, the [±additive] parameter, namely, whether [±additive] is present in Num must be active (languages, like English, in which it is inactive, have no approximate numbers.)” (Harbour 2014, p. 198). Note also that one variant of a language can have a feature that is lacking in another variant. We already mentioned the case of the dual, which is a feature of Standard Arabic, but not of Tunisian Arabic. This means that, unlike Standard Arabic, Tunisian Arabic makes little use of the feature [±Minimal].

It must also be noted that social convention intervenes in the interpretation of [±additive] and that this constitutes further variation between languages. For example, Tunisian Arabic has ten as an upper-bound cutoff while Bayo (Cushitic) has six (Corbett, 2000).

(16) *Sociosemantic convention*

The semantic range of the cut defined by [±additive] is subject to social convention.

(Harbour 2014, p. 198)

Finally, it is possible (or impossible, depending on the language) for features to be recursive, as expressed by (17).

(17) *Feature recursion parameter*

Both values of [±F] may (not) cooccur on Number⁰.

(Features so parametrized are starred, [±]*.) (Harbour 2014, p. 203)

We shall see that Tunisian Arabic manifests interesting variation when compared with other languages reviewed by Harbour (2011, 2014) and that quite a few facts we describe, including those related to the singulative and its plural as well as contrasting plurals, remain unaccounted for in such a theory of number, unless we make some adjustments or propose some innovations, as we do in this book.

In the next section, we zoom in on paucity, an important concept, much needed to describe the data examined in this book. In particular, paucity is relevant for the higher number phrase we propose and background information on the concept must thus be given. In the section after next, we spell out an important component of our theory of number in Tunisian Arabic: the distinction between inclusive plurals and exclusive plurals. It must be noted that Harbour (2011, 2014) does not distinguish between inclusive versus exclusive plurals, thus his plural on Num is only exclusive and that Harbour (2016) has a few pages (p. 149–152) dedicated to the idea that the inclusive reading should *not* be encoded in the morphosemantics of number. We believe, however, like Martí (2020) before us, that the inclusive/exclusive contrast is an important distinction and we will show

received a formal treatment in the literature (but see Ojeda, 1992; Lahrouchi and Ridouane, 2016).

We show that the phenomenon manifests itself in plurals of singulatives and in sound plurals that are in competition with broken plurals and that it is a productive feature of Arabic grammar.¹² This goes against many claims found in the literature including Ferrando (2006). For example, Ojeda (1992, p. 318) says that: “In the modern vernaculars, few sound plurals alternate with a broken plural.” Mitchell (1956, p. 94) says that broken alternatives to sound plurals are “comparatively rare” in Cairene Arabic, and Cowell (1964, p. 369) states that a contrast between a sound plural holds “only sometimes”.¹³

However, when consulting native speakers, it is clear that it is productive; to quote Ratcliffe (1998, p. 79): “The plural of paucity/plural of multiplicity distinction has not generally been taken seriously by Western linguists. However, statistical evidence does offer some support for it. Based on distribution, forms traditionally labeled plurals of paucity appear in more or less free variation with forms traditionally labeled plurals of multiplicity.”

In the next section, we turn to the inclusive versus exclusive distinction, since like paucity, it is directly relevant to Arabic number.

1.4 Clusivity

The folk view about plurals matches that of the traditional linguistic approach, namely that singulars refer to ‘one’ while plurals refer to ‘more than one’ (Link, 1983). In (22), the English bare plural is interpreted exclusively: it refers to multiple children, excluding the singular. (22) cannot refer to ‘one’.

(22) I have children.

If a speaker A utters (22), then we understand the speaker has more than one child. The sentence would be false if speaker A had in fact only one child (under Gricean inference, speaker A had the option of saying ‘I have a child’, but did not).

12. Note that, for Classical Arabic, it is sometimes said that broken plurals are paucal while sound plurals refer to abundance (Howell, 1900; Ojeda, 1992). In Tunisian Arabic and other dialects (e.g. Syrian Arabic, 1964, p. 369), it is definitely the reverse.

13. Another way the paucal/multal distinction manifests itself in Arabic is via numerals with nouns below and above ten: under ten, nouns carry a plural morpheme, but above ten, the singular form is used Ojeda (1992). This is beyond the scope of this book. For now, we simply assume, like Harbour (2014), that in Arabic [\pm additive] can also be a selectional feature on numerals.

However, it has been noticed that, in certain contexts bare plurals in English are interpreted inclusively, i.e. referring to ‘more than one’, but also to ‘one’ (Krifka, 1989; Farkas and de Swart, 2010; Hoeksema, 1983; Schwarzschild, 1996; Sauerland, 2003; Sauerland et al., 2005; Spector, 2007; Zweig, 2009; Bale et al., 2011; Grimm, 2012a; Martí, 2020). Consider the examples in (23). (23-a) is a question, (23-b) is a negative statement, and (23-c) is a conditional.

- (23) a. How many children do you have?
 b. I don’t have children.
 c. If you have children, raise your hand.

(23-a) can be answered by ‘three’ but also by ‘one’. (23-b) is false if I have two children or more, but also if I have only one child. (23-c) is true if parents with two children or more raise their hands, but also if parents with only one child raise their hands. Such inclusive plurals are typical in form headings (McCawley, 1968) as in (24). These are felicitous even if the person filling the form has attended one school (24-a), has only one child (24-b) or has only one sibling (24-c).¹⁴

- (24) a. schools attended: _____
 b. children: _____
 c. siblings: _____

It has been argued that the relevant grammatical context for an inclusive reading is that of downward entailment (Sauerland, 2003; Farkas and de Swart, 2010; Zweig, 2009). The concept of entailment is generally applicable to any expression whose denotation is partially ordered. For example, *Taylor lives in Toronto* and *Toronto is in Ontario* are upward entailing. They entail: *Taylor lives in Ontario*. Upward entailing expressions are thus expressions that license inferences from subsets to supersets (Ladusaw, 1980). If the first sentence (or the first set of sentences) is true, then so is the second one. On the other hand, downward entailing expressions license inferences from supersets to subsets. If we negate the first sentence above as in: *Taylor doesn’t live in Toronto*, then it does not follow that *Taylor doesn’t live in Canada*. If the first sentence is true, it doesn’t mean the second one is also true (Taylor could be living in Vancouver). It only follows, for example, that Taylor doesn’t live in Alexandra Park, a neighbourhood of Toronto (superset to subset). Negation, in other words, reverses the polarity.

The interesting observation is that plural nominals in upward entailing environments tend to receive exclusive interpretations while plural nominals in

14. It is tempting to analyze such examples as disguised questions of the type ‘How many schools did you attend?’, or ‘How many children/siblings do you have?’.

downward entailing environments tend to receive inclusive interpretations.¹⁵ In (23-b) above, we have a clear downward entailing context: a negative statement, but note that (23-a) is not strictly a downward entailing context, since it does not involve polarity like a negative statement.

World knowledge also plays a role in the calculation of inclusive readings. For example, while it is natural to utter (25-a) in a supermarket even if we are looking for only one melon, it is odd to ask someone (25-b) at a party. Instead, one would ask ‘Do you have a car?’. The version with the plural is asking whether the addressee has more than one car (see Farkas and de Swart 2010 and Harbour 2016 for discussion of similar examples). On the other hand, asking ‘Do you have a melon?’ in a supermarket would imply that one is looking for a specific melon, an odd request in such a context.

- (25) a. Do you have melons?
 b. ??Do you have cars?

There are three main approaches to the inclusive/exclusive contrast. Sauerland et al. (2005) argue that the exclusive reading of plurals arises as an implicature, i.e. a pragmatic inference. They provide one of the first studies comparing adults’ and children’s performance on multiplicity inferences, with the aim of testing whether the latter can be analyzed as a form of implicature (see also Tieu et al. 2014). If the listener hears the utterance ‘I have children’, then this is in competition with the singular and the listener reasons that the speaker would have used the singular if there were exactly one object in the context being discussed. For inclusive readings, this pragmatic inference is cancelled since a stronger statement is being made, namely one that includes atoms.

There exist many variants of this approach (Zweig, 2009; Spector, 2007; Ivlevia, 2013). The basic insight is that plurality involves scalar implicatures of the kind we find elsewhere in language use. For example, a disjunctive sentence like (26-a) means that John didn’t buy both a shirt and a jacket, but in (26-b), this meaning disappears under negation. (26-b) means that John didn’t buy both.

15. Anand et al. (2011) tested this observation experimentally. Using the lexical item ‘each’, they found that the exclusive rate in the restrictor of this quantifier (a downward entailing environment) was lower than in the nuclear scope (an upward entailing context). But the authors showed that the difference in rates was quite modest and that there was in fact a greater difference between the upward entailing context constituted by the nuclear scope of ‘each’ and upward entailing unquantified assertions. This is an interesting result that shows one must control for all environments. But other quantifiers should be tested, since it seems it is not easy to obtain an inclusive reading when in the scope of ‘each’ (*Each student who bought books was happy* where ‘books’ = multiple books).

- (26) a. John bought a shirt or a jacket.
 b. John didn't buy a shirt or a jacket.

A problem for the implicature approach is that multiplicity inferences are harder to suspend than regular scalar implicatures. Compare (27-a) with (27-b). (27-a) is perfectly fine, but (27-b) is odd. An experimental study by Pearson et al. (2011) confirmed this.

- (27) a. Some of the professors left. In fact, all of them did.
 b. Mary bought books. # In fact, she bought exactly one.

Grimm (2012a) proposes an account of inclusive versus exclusive plurals free of the concept of logical entailment and of implicatures. His experimental data reveal that participants disfavour inclusive readings of the plural when considering object-referring uses of plural nouns, but prefer inclusive readings in contexts that encourage general reference. Building on Krifka (1995), nominal denotation can involve objects and concepts/kinds. When an inclusive plural is used, the concept-level reference is number neutral. When an exclusive plural is used, quantity matters: we are referring to objects.

However, as pointed out by Martí (2020: 63), kind interpretations cannot be the (only) source of inclusive plurals, since in English, bare plurals like *parts of this machine* that never denote kinds and as such cannot be the subject of a kind predicate, as shown in (28-a) (Carlson, 1977), allow inclusive interpretations (Chierchia, 1998; Van Geenhoven, 2000), as shown in (28-b).

- (28) a. ??Parts of this machine are widespread.
 b. John didn't see parts of this machine.

Finally, Farkas and de Swart (2010) propose that the plural morpheme is polysemous between an inclusive and an exclusive interpretation. Their theory contains three ingredients: (1) an inclusive, number-neutral semantics for common count plural forms; (2) an additional, exclusive, strictly plural semantics for the same forms; and (3) a post-compositional mechanism that chooses between (1) and (2), namely (29) (Dalrymple et al., 1998; Winter, 2001; Zwarts, 2004).

- (29) *The Strongest Meaning Hypothesis:*

When an expression is assigned a set of interpretations ordered by entailment, choose the strongest element of this set that is compatible with the context.

Because (29) is a pragmatic principle, it can be overridden by contextual pressure. According to Farkas and de Swart (2010), the utterances in (30) are felicitous with an inclusive interpretation in situations in which the speaker finds positive indirect evidence for the presence of mice and children, but has no way of telling how many there are.

- (30) a. [Speaker walks into basement, and notices mouse droppings]:
 Arghh, we have mice!
 b. [Speaker walks into unknown house, and notices toys littering the floor]:
 There are children in this house.

According to Farkas and de Swart (2010), however, the inclusive reading is possible because the situation involves a speaker with positive indirect evidence for the presence of mice and children, but with no way of telling how many there are.

There are, it seems to us, cases however where the evidence is direct. Consider (31). Here the speaker has direct evidence of (at least) one Nobel prize winner, and the inclusive plural is possible.¹⁶

- (31) [Speaker has just met a professor who recently received a Nobel prize (a framed certificate is on the wall) and speaker says to her friend]: Biochemistry at the University of Southern North Dakota must be great, the department has Nobel prize winners.

Let us add in closing this section that many of the examples mentioned by Corbett (2000) in Chapter 7 of his book show that inclusive readings are possible in upward entailing environments. For example, the Russian equivalent of ‘Robbers attack collectors without even checking if they have any money’ found in a newspaper headline was used when in fact it was clear from the article that only one robber tried to rob one guard (Corbett 2000: 236). This is called the ‘sensational plural’. Consider also the following example from Chapter 4 of *Alice in Wonderland* mentioned in Corbett (2000, p. 235) who calls this the exaggerative plural.

- (32) ‘It was much pleasanter at home,’ thought Alice, ‘when one wasn’t always growing larger and smaller, and being ordered about by mice and rabbits.’

At this point in the story, Alice has come across only one mouse (‘The Mouse’) and one rabbit (‘The White Rabbit’).¹⁷

Finally, it is possible in Alambalak (a Sepik Hill language of Papua New Guinea) to use the plural when the speaker is unable or unwilling to indicate the gender of an object giving ‘She will bear children in another month’ instead of the expected ‘She will bear a child in another month’ (Corbett 2000, p. 240).

16. We thank Daniel Harbour for this example.

17. As pointed out by Daniel Harbour, it is possible that part of what is going with the plural here is that Alice recognizes that she is now in a world where mice and rabbits generally can order one about. Daniel Harbour asks whether Geppetto can truly say “Having talking puppets makes such a difference to my life” when all he has is Pinocchio? The answer is probably not. There is thus something in the Alice example that provides the right context for inclusive plurals to be used, e.g. some presupposition about the world and the concepts/kinds that one finds in this world.

In sum, according to Farkas and de Swart (2010) the plural is polysemous: it is either inclusive or exclusive. Their proposal allows us to keep the feature [–atomic] in our system. As argued by Martí (2020), it is important to keep the feature [–atomic] in our grammatical system, because it allows us to derive the dual (and trial, etc.) and, following Harbour (2011, 2014), not assume it is a primitive. We will see that, in Tunisian Arabic, there is good evidence that plurals are ambiguous and that the [–atomic] feature is crucial for the number system of that language.

In the next section, we introduce a set of research questions and hypotheses. By doing so, we begin our survey of number in Arabic. The basic facts are introduced and a sketch of the various solutions to our puzzles is given, foreshadowing the full-fledged accounts of each chapter.

1.5 Research questions and hypotheses

Cross-linguistically, the plural is often morphologically marked while the singular is morphologically unmarked (Greenberg, 1972). This can be seen in (33) for English. The singular form is the basic form and surfaces with no added suffix (33-a). In order to yield a plural, the suffix *-s* is added to the word *book* as shown in (33-b).

- (33) a. one book
b. two book-s

This situation arises in Arabic too. Consider first the singular cases in (34): *fannen* ‘artist’ is the masculine form while *fannena* ‘artist’ is the feminine form, exhibiting the feminine suffix *-a*.

- (34) a. *fannen* [Tunisian Arabic]
artist.MASC.SG
‘a male artist’
b. *fannen-a*
artist-FEM.SG
‘a female artist’

The plural forms of these singulars appear in (35). The suffix *-i:n* marks the plural of masculine nouns (35-a), while *-at* marks the plural on feminine nouns (35-b). In Arabic, these are called sound plurals: they are similar to English plurals in that they are formed by suffixation of a plural marker on a stem.

- (35) a. *fannen* → *fannen-i:n* [Tunisian Arabic]
artist.MASC.SG artist-MASC.PL
‘artist, artists’

- b. fannen-a → fannena-at
 artist-FEM.SG artist-FEM.PL
 ‘(female) artist, (female) artists’

Now consider a second pair of singulars (36): *kalb* is a male dog while *kalba* is a female dog.

- (36) a. kalb [Tunisian Arabic]
 dog.MASC.SG
 ‘a male dog’
 b. kalb-a
 dog-FEM.SG
 ‘a female dog’

The plural form of (36) is different from the one given above for *fannen/fannena*. The plural of the nouns in (36) is called the broken plural and is formed by stem change (37). No specific suffixal morpheme in the broken plural is associated with the plural meaning and note that there is only one form for males/females.

- (37) kalb → kleb [Tunisian Arabic]
 dog.SG dog.PL
 ‘dog, dogs’

One question that arises is this:

- (38) What is the status of broken plurals?

Are they like sound plurals or are they different, i.e., more lexical? It has been argued that they have certain lexical properties (Acquaviva, 2008; Lahrouchi and Lampitelli, 2015; Lahrouchi and Ridouane, 2016). Kramer (2012, 2016) argues for a split analysis of plurality in Amharic. On her view, there are two positions for plurality: the regular (sound) plural suffix in Amharic is a realization of Num, whereas the many possible irregular plural affixes/broken plurals are realizations of *n*. Under a Borer (2005) account, this is simply not possible because there is no *n* and no possibility for plurals to be anything other than regular plurals (except for agreement in #P).

We shall propose a split analysis, like Kramer (2012, 2016), except that the division of labour for plurals is, on our view, between Num1 and Num2 and we hypothesize that both sound and broken plurals in Arabic are associated with Num1, never with *n* (Chapter 3).¹⁸ Both kinds of plurals (sound and broken) are interpreted inclusively in the relevant contexts (Mathieu, 2014). From this perspective,

18. As we shall see, sound plurals can also be associated with Num2.

they therefore resemble English plurals (see Section 1.3). Recall that when a plural is interpreted inclusively, it means that it refers to both atomic and non-atomic individuals, as in ‘How many books did you buy?’: this can be answered by ‘three’ or simply ‘one’.

Alongside the singular/plural system described above, Arabic also has a system that appears to be the mirror image of this: the unmarked form is a form used to refer to sums (despite the absence of plural morphology) and the marked form is a singular form, traditionally called the singulative.¹⁹ The Tunisian Arabic examples in (39) illustrate a morphologically realized singulative. In (39-a), the base noun from which the singulative is derived (the input noun) is *bordgen* ‘orange’, a collective noun, singular in number and masculine in gender, that semantically refers to the kind ‘orange’ (the latter typically being used with kind and generic predicates). The singulative, realized as the feminine suffix in Arabic (39-b), creates an individual or a unit. In (40-a), the input noun is a mass noun, *xobz* ‘bread’, and the singulative (40-b) creates a portion reading.

- (39) a. *bordgen* [Tunisian Arabic]
orange.MASC.COLL
‘oranges’
b. *bordgen-a*
orange-FEM.SING
‘one orange’
- (40) a. *xobz*
bread.MASC.COLL
‘bread’
b. *xobz-a*
bread-FEM.SING
‘a loaf of bread’

While in a number of languages, the singulative is expressed by gender shift, as seen for Arabic (the feminine suffix *-a* is used to create a singular), in others the singulative is marked by a dedicated suffix that involves no gender shift (Dimmendaal, 1983, 2003; Hieda, 2006, for Nilotic languages).

Interestingly, the singulative examples in (40) can be pluralized as seen in (41). Note that the plural form being used here is the sound plural of feminine nouns (as

19. According to a number of authors (e.g., Greenberg 1972), the term ‘singulative’ was first employed by Johann Caspar Zeuss (1806–1856) in his *Grammatica Celtica* (1853, p. 299) in relation to the Brittonic branch of Celtic. In Arabic, the term *ism wahda* (*nomen unitatis* or noun of unity) is traditionally used.

in (35-b)). As we shall see below in more detail, the plural form is also interpreted as a paucal.

- (41) a. bordgen-a ~ bordgen-a-at [Tunisian Arabic]
orange-FEM.SING orange-FEM-PL
‘one orange, oranges’
- b. xobz-a ~ xobz-a-at
bread-FEM.SING bread-FEM-PL
‘one loaf of bread, loaves of bread’

The plural of the singulative in Arabic, as it turns out, is interpreted exclusively, and contrasts semantically with the collective noun in that, for example, it is interpreted as a paucal (in all contexts). These observations, to which we come back in more detail in this book, are an important feature of our proposal.²⁰

This collective/singulative system raises interesting questions. First, with regard to collective nouns:

- (42) a. What is the structure of collective nouns? (which functional head is it associated with?)
b. What is the semantics of collective nouns?

Our hypothesis is that collective nouns bear a different class feature on *n* and that collective nouns simply denote semi-lattices.

Turning now to singulatives, the second set of questions is as follows:

- (43) a. Why is the singulative a feminine form morphologically?
b. What functional head is it associated with?
c. What is the interpretation of a singulative?

20. It is important to note that the singulative operation differs from coercion of mass and collective nouns to a count denotation. As is well-known, although mass nouns cannot normally be pluralized in English, exceptions to that generalization are possible provided that the interpretation of mass nouns is coerced to that of kinds – via the Universal Sorter –, as in (i-a), or standard servings – via the Universal Packer, as in (i-b) (Bunt, 1985).²¹

- (i) a. There are only two waters available (still, sparkling).
b. Bill ordered two waters (glasses, bottles).

21. Singulativization is different from coercion. Coercion in languages such as in English is quite productive and the pluralized noun refers to kinds (kinds of water, kinds of oil, etc.) or units. Singulativization, on the other hand, is a morpho-syntactic operation that targets a set of collective and mass nouns that usually refer to groups of animals, botanical species, artifacts or natural kinds, and results in sets of individuals that need not be standardized units and in many cases these individuals cannot be kinds (see Mathieu, 2012; Deal, 2017).

We argue that the singulative in Arabic constitutes a polarity system of sorts and that the feminine form is the exponent of a singulative feature. We also propose that the singulative is associated with Num1. Finally, we show that the singulative is interpreted just like a singular (expect that it involves, as we shall see, renominization, whereas regular singulars do not).

Turning now to plurals, recall that, while regular sound and broken plurals are interpreted inclusively, plurals of singulatives are interpreted exclusively and as a paucal. This constitutes our next set of questions:

- (44) a. Why is the plural of the singulative interpreted exclusively?
 b. Why is the plural of the singulative interpreted as a paucal?

We argue that the plural of the singulative is associated with a higher Number functional head, namely NumP2 and this particular functional head in Arabic carries features that make the plural exclusive. We also claim that NumP2 in Arabic is associated with features that denote paucity. As we shall see, this is not necessarily the case in all singulative languages: the plural of the singulative is not necessarily exclusive or paucal. In the following Welsh triplet *caws ~ cosyn ~ cosynnu* ‘cheese(s)’, *cosynnu* is not paucal or exclusive (David Willis, pc.).²² This means that Num2 can be associated with the features [–atomic] and [+additive] rather than [–atomic] and [–additive].

This is an important observation because it shows Borer and Ouwayda’s (2010) idea according to which the plural of the singulative in Arabic is just an agreement marker is, at least, not correct for all Arabic dialects (Levantine Arabic vs. Tunisian Arabic). Recall that, on their view, the singulative is responsible for division, therefore the added plural cannot be a real plural (i.e., cannot perform division). On our view, the plural of the singulative in Tunisian Arabic is a real plural, but exclusive and paucal, and in other singulative languages it may be inclusive and non-paucal (e.g., Welsh).

Exclusivity and paucity are important features of our generalizations and analysis. They appear to be pervasive features of Arabic grammar. They turn up again in the interesting case of contrasting plurals. As pointed out earlier, Tunisian Arabic has a broken plural, involving a change in the stem and a sound plural, which is

22. A reviewer asks whether in Arabic the paucal interpretation of plural singulatives holds of those derived from mass nouns too, such that for example *xobzat* means ‘a few loaves of bread’. The answer is yes. We focus on count rather than mass nouns, but the observations we have noticed for count nouns hold for mass nouns as well. This reviewer also asks whether in Welsh pluralized singulatives built out of collectives also yield a paucal interpretation. We do not have much data for Welsh. But we assume that the answer to this question is positive. We leave this for further research when more is known about Welsh. In this book, we concentrate on Arabic.

marked by a suffix that varies according to the gender of the base noun. The distinction between sound and broken plurals is traditionally said to be lexically-based; each noun is assigned one plural shape or the other. However, it is possible for some nouns in Tunisian Arabic to take both plural shapes, as illustrated in (45).²³

- (45) meʕza → mʕi:z / meʕz-et [Tunisian Arabic]
 goat.SG goat.PL goat-FEM.PL
 ‘one goat, goats, a few goats’

These facts lead us to the following set of research questions:

- (46) a. Why are two plurals for the same noun allowed and what functional head(s) are they associated with?
 b. Is there a semantic difference between the two kinds of plurals?

Our hypothesis is that one plural is associated with NumP1 while the other is associated with NumP2. We show that the first plural is interpreted inclusively while the second one is interpreted exclusively and as a paucal.

The next puzzle has to do with broken plurals: in Tunisian Arabic the Φ -features of broken plural subjects normally agree with the verb in gender and number, as in (47-a) (masculine plural), but as (47-b) shows, agreement can also fail to match. Here, *rjel* ‘men’ is inflected masculine plural while the verb is unexpectedly inflected in the feminine singular form (on this type of optional agreement in dialects of Arabic other than Tunisian Arabic, see descriptive work by Wright, 1967; Holes, 1990; Belnap 1991; Brustad, 2000; and formal work by Zabbal, 2002).

- (47) a. El rʒe:l xerʒ-u. [Tunisian Arabic]
 the man.MASC.PL went.out-3.MASC.PL
 ‘The men went out.’
 b. El rʒe:l xerʒ-et.
 the man.MASC.PL went.out-3.FEM.SG
 ‘The men went out.’

This leads us to two research questions:

- (48) a. What is the mechanism behind the singular agreement pattern and the plural agreement plural pattern?
 b. Is there a semantic difference between the two options?

We propose that broken plurals are hybrid nouns: when they agree in the singular they agree syntactically but when they agree in the plural they agree semantically

23. *-at* is sometimes pronounced *-et* in Tunisian Arabic. This is phonologically-conditioned and has no effect on the meaning.

with the verb. Another proposed hypothesis is that plural/masculine agreement correlates with a distributive interpretation whereas singular/feminine agreement correlates with a collective reading. (47-a) receives a distributive interpretation whereas (47-b) receives a collective interpretation. In the right contexts, (47-a) means that the men went out separately, one by one, but in (47-b), that they went out together (Wright, 1967; Brustad, 2000; Zabbal, 2002, and several others).

The penultimate puzzle concerns the case of indeterminate nouns in languages such as Western Armenian, Persian, and Turkish: they can express singularity and plurality, depending on the context (often called general or transnumeral number Corbett, 2000). Consider the example in (49) from Western Armenian and (50) from Turkish (on general number in these language, see Bliss, 2004; Görgülü, 2012; Bale et al., 2010, 2011).

- (49) Kirk kənetsi. [Western Armenian]
 book buy.1SG.PERF.PAST
 ‘I bought a book/books.’
- (50) Ali kitap al-di. [Turkish]
 Ali book buy-PAST.3SG
 ‘Ali bought a book/books.’

It is customary in the literature to treat such nouns as being equivalent to mass terms (Chierchia, 1998) with a denotation of a kind or alternatively as bare NPs with no number projection (Borer, 2005, and many others). For others, such nouns refer to semi-lattices, the denotation being number neutral, thus referring to sums and atoms (Rullmann and You, 2006; Bale et al., 2010, 2011; Bale and Khanjian, 2014).

The problem is that the nouns in question can be pluralized (Sigler, 1996; Donabédian, 1993; Bale et al., 2010, 2011; Bale and Khanjian, 2014; Sağ, 2016; Görgülü, 2012).²⁴

- (51) Kirker kəetsi. [Western Armenian]
 book.PL buy.1SG.PERF.PAST
 ‘I bought books.’
- (52) Ali kitap-lar al-di. [Turkish]
 Ali book-PL buy-PAST.3SG
 ‘I bought books.’

24. According to Chierchia (1998), languages with general number are not supposed, typologically, to have plural markers as part of their grammars. But there are, of course, many exceptions, suggesting plurals are not necessarily in complementary distribution with classifiers (it is possible for classifier languages to have optional plurals, as pointed out by Greenberg 1972, 1974, see also Aikhenvald 1991, Gebhardt 2009, Doetjes 2012).

The research questions are thus as follows:

- (53) a. Since the languages in question already have a way to express plurality via general number, what functional head is the extra plural associated with?
 b. What is the interpretation of this extra plural?

We argue that the extra plural is associated with NumP2 and that it is interpreted exclusively.

The last puzzle introduced in this book is related to use of the feminine marker *-a*. It is used as we have seen already, not only as a gender marker as in (54) and as a singulative marker as in (55), but also to produce nouns from adjectives (56) and collectives from singulars as in (57).

- (54) a. ami:r [Tunisian Arabic]
 prince.MASC.SG
 'prince'
 b. ami:r-a
 prince-FEM.SG
 'princess'
- (55) a. bi:ð
 egg.COLL
 'eggs'
 b. bi:ð-a
 egg-SING
 'an egg'
- (56) a. safi:d
 happy
 'happy'
 b. safa:d-a
 hapiness
 'happiness'
- (57) a. zazza:r
 butcher.MASC.SG
 'butcher'
 b. zazza:r-a
 butcher-PL
 'butchers'

The research question is thus:

- (58) Why are such nouns all marked feminine?

We will argue that diachrony provides us with clues for this state of affairs: there is evidence from reconstruction studies (Hasselbach, 2014a; b) that *-a* was originally a derivational morpheme and that it was only secondarily associated with feminine gender. On this view, the original function of the suffix was to mark derivatives of adjectives, specifically abstract nouns (56) and other usages of *-a* derived from this basic function. Our hypothesis is therefore that the feminine marker was originally a nominalizer, but became, through time, an exponent of various syntactic functions.

Synchronically, the features expounded by *-a* are conditioned by the base of attachment. This can be justified by a weak allosemy scenario, where the exponent is interpreted according to the following rules:

- (59) Semantic realizations of [+FEM]
- a. [+FEM] ↔ singulative / _____ $n_{[+COLL]}$
 - b. [+FEM] ↔ nominalizer / _____ $n_{[-COLL]}$

In addition to the rules in (59), we add that the broken plurals are also endowed with a group feature, translated into a feminine exponent. All these synchronic parallel uses of the feminine exponents reflect the different uses of the feminine throughout the historical changes.

In the next section, we summarize every chapter of the book, giving further details for our various proposals.

1.6 Overview of the book

The book is organized as follows.

Chapter 2 focuses on the *nP* layer and gives a rationale for collectives and lexical roots in Tunisian Arabic. In addition, we review the literature on bare nouns (general number) and lexical plurals, since these two kinds of nouns are associated with *nP*. We clearly define the contribution of the root and of *n* from a syntactic perspective as well as a semantic perspective. An interesting property of nouns in this domain is that they are interpreted inclusively.

Chapter 3 moves on to the lower NumP domain, providing derivations for Tunisian Arabic singulars, singulatives, plurals as well as duals. All these, we argue, are in complementary distribution under the lowest Num phrase. The non-atomic forms are all interpreted inclusively. We argue that broken plurals are not under *n* and that they are in complementary distribution with sound plurals.

Chapter 4 focuses on the higher NumP domain and discusses plurals of singulatives and contrasting plurals while showing that contrasting sound and broken

plurals for a given noun can lead to variation in meaning. The plurals associated with the higher Num phrase are shown to be interpreted exclusively and as paucals. We provide a detailed list of features involved and show how this is interpreted compositionally.

Chapter 5 aims to explain an unusual agreement pattern that arises with Tunisian Arabic broken plurals. A verb may agree with a plural subject in all Φ -features or, rather oddly, in singular/feminine, even when the subject is masculine. Developing an idea first briefly sketched – but ultimately not adopted – by Zabbal (2002), we argue that broken plurals are hybrid nouns. Either their syntactic or semantic features can be the target of agreement, creating the possibility of an agreement mismatch. We propose that the feminine agreement seen with broken plurals is the spell out of a number feature [+group] and that all gender features are visible at LF (Hammerly, 2018).

Chapter 6 concentrates on the pluralization of bare nouns in Western Armenian and Turkish. We argue that this pluralization is a two-step process. First, there is atomization of the noun (via a null head in Num) together with renominalization (the singular form is a word). This is a reflection of the fact that the plural in Western Armenian and Turkish is not in complementary distribution with the singular. Second, the plural operates on the new semi-lattice and refers to sums only.

Chapter 7 identifies a new case of historical variation involving Sub-word formation. Most, if not all, research on diachronic changes in Generative grammar involve changes in the status of linguistic terminals from M-words to Sub-words or vice-versa, but seldom discuss historical changes within M-words (the topic has garnered more interest in linguistic typology research). Using insights from Diertani (2011) and the operation Affix migration, we give a formal account of the various changes that the suffix *-a* went through in Arabic. We argue that changes in the function of *-a* arose in circumstances of analytical ambiguity. We also discuss the development of the external (sound, suffixal) plural as well as the case of internal (broken) plurals.

Chapter 8 concludes and provides questions for further research.

The *n*P domain

2.1 Introduction

This chapter focuses on the lower portion of the syntactic tree that denotes the basic interpretation of the nouns with which this book is concerned. The assumptions we make about collective nouns in Arabic and the arguments we give in favour of the view that they are associated with *n* and denote semi-lattices will ensure that the reader is better equipped to understand and fully appreciate the arguments given in later chapters when we start discussing NumP1 and NumP2.

This is how this chapter is organized. We begin with the *n*P domain and give a rationale for the structure of collectives in Tunisian Arabic (Section 2.2), then we turn to bare nouns (Section 2.3), since they have much in common with collectives semantically and as such belong to the *n*P domain and ‘lexical’ plurals (Section 2.4), since these have been argued to be generated lower in the syntactic nominal structure. We conclude in Section 2.5.

2.2 Collectives

A considerable number of definitions of the Arabic collective have been proposed in the literature. In Wright’s (1967) grammar, the collective is designated as a whole that consists of very similar parts. Ojeda (1992) defines Arabic collectives as basic lexical items which indicate either “a substance or material in the mass” or “a collection of objects viewed as a totality without reference to the individual members” (referring to Erwin 2004, p. 166). Greenberg (1972) refers to languages with a collective system as “three term systems”, where a collective which cannot be used with numerals as opposed to a singulative with its own singular and plural. Greenberg stresses the parallel between collective and mass nouns, based on their similar syntactic distributions. He also notes that in languages with a collective system, the collective tends to be used in some instances for nouns designating materials and even liquids, in which case the singulative designates quasi-units (“quasi” in the sense that they require an intermediate unit of measure).

In Arabic, the distribution of collective nouns is similar to that of mass nouns. they are syntactically singular but cannot be pluralized (1-b) ((1-a) is a count noun,

for purposes of comparison), they do not combine directly with numerals (2-b), and they combine with cumulative quantifiers (3).

- (1) a. kalb → kleb [Tunisian Arabic]
 dog.MASC.SG dog.PL
 ‘a dog, dogs’
 b. lu:z → *alwaz
 almond.MASC.COLL almond.PL
 ‘almonds, (intended) almonds’
- (2) a. xamsa kleb [Tunisian Arabic]
 five dog.PL
 ‘five dogs’
 b. *xamsa lu:z
 five almond.MASC.COLL
 ‘(intended) five almonds’
- (3) a. *barfa kalb [Tunisian Arabic]
 lot dog.MASC.SG
 ‘(intended) many dogs’
 b. barfa lu:z
 lot almond.MASC.COLL
 ‘a lot of almonds’

Let us now turn to two properties that are relevant in discussing the nature of mass nouns: cumulativity (Quine, 1960) and divisiveness (Cheng, 1973; Krifka, 1989). Cumulativity is the property concerned with sums. A noun is cumulative iff it denotes a cumulative predicate. A predicate P is cumulative iff any sum of parts that are P are also P (Deal, 2017). Mass nouns are cumulative and this explains why they can combine with cumulative predicates and cannot be pluralized. *Water*, for instance, is cumulative, because if a is water and b is water, then $a + b$ is also water.

According to Chierchia’s (1998) analysis, collective nouns are not different from mass nouns, since they both pattern like plurals (they are both cumulative). Chierchia makes no difference between collective and object-mass nouns, such as *furniture* and *jewelry*, arguing that both types of nouns display the same syntactic behaviour due to their inherent plurality. This is illustrated in (4), where object-mass nouns are combined with cumulative quantifiers.

- (4) a lot of furniture/jewelry/footwear.

In the same vein, Zabbal (2002) also argues that Arabic collectives, like object-mass nouns, are cumulative, but adds that they share another common property: individuation. This is the second countability distinction (also dubbed “divisiveness”),

which is concerned with parts (Cheng, 1973; Krifka, 1989). A noun is divisive iff it denotes a divisive predicate. A predicate *P* is divisive iff any part of something that is *P* is also *P* (Deal, 2017). A noun is *individuated* (or non-divisive) when it does not refer to a homogeneous whole, or it refers to a number of distinct entities that the semantics can tell apart. According to Zabbal (2002), individuated nouns are defined by their possibility of being combined with individuating predicates like *counted*, *listed*, etc. The examples in (5) shows that, while both collective and object-mass nouns do combine with such predicates, nouns denoting substances do not.

- (5) a. *ħsebt en-nemme:l.* [Tunisian Arabic]
 counted.1SG the-ant.COLL
 ‘I counted the ants.’
 b. I counted the furniture/jewelry.
 c. *#ħsebt el me/lu:ħ.*
 counted.1SG the water/wood.COLL
 ‘(intended) I counted the water/wood.’

It appears, based on the observations in (5), that in terms of cumulativity, object-mass nouns, substance-denoting nouns, and Arabic collectives all have the same behaviour. They can all be identified as ‘mass nouns’, assuming that the mass-count distinction is a syntactic one and is determined by the distribution of nouns. However, when it comes to individuation, substance denoting nouns fall within one group (non-individuated), while Arabic collectives and object-mass nouns fall within another (individuated).

Other morphosyntactic patterns associated with parts-based countability distinctions include combination with “count adjectives” (e.g., *small*) (Quine, 1960; McCawley, 1975; Rothstein, 2010; Schwarzschild, 2011). Arabic collective nouns felicitously combine with count adjectives (6), corroborating the findings above, that collective nouns are individuated.

- (6) a. *kalb Sħi:r* [Tunisian Arabic]
 dog.MASC.SG small.MASC.SG
 ‘a small dog’
 b. *ħut Sħi:r*
 fish.MASC.COLL small.MASC.SG
 ‘small (individual) fish’

Despite these similarities between Arabic collectives and object-mass nouns, these two types of nouns differ in some of their properties. First, object-mass nouns unambiguously refer to collections of individuated entities. This is not the case for Arabic collectives. While we showed in (5) and (6) that they pass the individuation test, this is only true for a fraction of these nouns. For instance, Ojeda (1992) notes

that some collective nouns like *djaaj* ‘chicken’ can be viewed as a kind of food or as a species. In such cases, only the collectives referring to species (or a collection of individuals thereof) can combine with count adjectives.

Let us illustrate with the noun *ħut* ‘fish’, from our previous example. When *ħut* ‘fish’ combines with a count adjective such as *small*, it refers to a collection of individual fish. However, we can also use *ħut* ‘fish’ to refer to a kind of food, in which case combination with count adjectives and predicates is not possible, as shown in (7). Let us consider a situation where a person has a piece of salmon on their plate. They can felicitously utter (7-a). However, in this context, they cannot combine this noun with a count adjective (7-b) or a count predicate (7-c). The adjective *small* cannot combine with a portion reading of *ħut* ‘fish’ even if we are referring to a small portion (7-b). It is also not possible to count a portion of fish (7-c).

- (7) a. ftu:r-i ħut. [Tunisian Arabic]
 lunch-MY fish.MASC.COLL
 ‘My lunch is fish. (I am having fish for lunch.)’
 b. *ftu:r-i ħut Sbi:r.
 lunch-MY fish.MASC.COLL small.MASC.SG
 ‘My lunch is small fish. (I am having small fish for lunch.)’
 c. *ħsebt el ħut.
 counted.1SG the fish.MASC.COLL
 ‘I counted the fish.’

The examples in (7) show that unlike object-mass nouns, Arabic collective nouns are not always individuated in their denotation.

Another aspect that distinguishes Arabic collectives from other types of nouns is that the former seem to form a special morphological class: they are always masculine and their singulative counterparts are marked by the suffix used to mark feminine gender in count nouns. This is not the case for object-mass nouns. Let us consider the example of the object-mass nouns *sieħa* ‘jewelry’ and *mobi:lia* ‘furniture’ in Tunisian Arabic. These nouns have the same sums-based and parts-based properties as their English equivalents. They are cumulative (8-a), they cannot be pluralized (8-b), they cannot combine with numerals (8-c), and they are individuated (8-d).

- (8) a. barfa sieħa/mobi:lia [Tunisian Arabic]
 lot jewelry/furniture
 ‘a lot of jewelry/furniture’
 b. *es-sieħa-at/mobi:lia-at
 the-jewelry-PL/furniture-PL
 ‘(intended) the jewelries/furnitures’

- c. *xamsa sieʕa/mobi:lia
 five jewelry/furniture
 ‘(intended) five jewelries/furnitures’
- d. hsebt es-sieʕa/mobi:lia.
 counted.1.SG the-jewelry/furniture.
 ‘I counted (out) the jewelry/furniture.’

Despite the characteristics they share with collectives, Tunisian Arabic object-mass nouns do not belong to the same morphological class. First, the collective counterparts of the nouns presented in (8) are feminine (9), and not masculine, like all nouns of the collective class. Note that the feminine in (9) does *not* refer to the singulative (i.e., ‘a piece of jewelry’), but to a collection of objects.

- (9) lqi:t sieʕa masru:q-a. [Tunisian Arabic]
 found.1SG jewelry stolen-FEM.SG
 ‘I found stolen jewelry.’
 ✓I found a bag with a necklace, earrings and a ring.
 ? I found a bag with a ring.

Furthermore, and this follows naturally from the fact that they are not always masculine, Tunisian Arabic object-mass nouns do not derive singulatives via gender shift (10-a). The only way to obtain an individual reading out of an object-mass noun is by combining the noun with a ‘portion of’ predicate (10-b) as in English, e.g., *blade of grass*, *head of cattle*, *sheet of paper*. This type of predicate is not considered as part of an inverse system or as a classifier since individuation is not associated with a specific morpheme as it is the case for the singulative in Arabic Greenberg (1972).

- (10) a. sieʕa/mobi:lia → *sieʕa-a/mobi:lia-a [Tunisian Arabic]
 jewelry/furniture jewelry-FEM.SING/furniture-FEM.SING
 ‘jewelry, (intended) a piece of jewelry/furniture’
- b. qatʕa sieʕa/mobi:lia
 piece.SG jewelry/furniture
 ‘a piece of jewelry/furniture’

These observations suggest that having cumulative and individuated denotations is not enough for a noun to qualify as a collective (in the sense of being part of the collective class). With the morphologically marked singulative being the hallmark of the collective system, it follows that mass-count objects are of a different kind. They rather seem to be accidental nouns referring to a collection of objects with similar use.

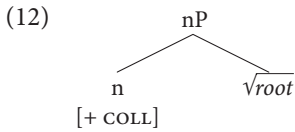
Wrapping up this section that aims to define the nouns of the Arabic collective class, it is crucial for the purposes of the analyses presented in this volume to address the question related to the syntactic structure of collective nouns. More specifically, is the count/collective classification encoded in the root part of the lexicon, or is it associated with a functional head? All definitions of the Arabic collective noun in the literature outline the common idea of inherent plurality and objects viewed as substances. The general idea is that the morphological marking of collective systems is aligned with the fact that singularity is semantically marked in these nouns; therefore, the singulative is also morphologically marked. For instance, Grimm (2012a) investigates the correlation between number markedness and the semantic level of individuation of a noun in the inverse system of Dagaare (Gur, Niger-Congo). He shows that the suffix *-ri* in this language does not strictly mark the singulative of the plural, but is rather a marker of contrast: it always signals the marked number in a noun. In nouns referring to individuated entities, *-ri* marks the plural. In nouns that refer to substances or inherently plural entities, the same suffix marks the singulative. In this kind of system, morphological markedness is aligned with semantic markedness.

This view of things is in line with the definitions of collective nouns provided above, where it is a question of “things viewed as a totality” and collections of things regarded as “a whole or unit”. There is undoubtedly a tendency for collective nouns to denote substances or small things that are not individually distinguishable (e.g., vegetation, small animals, insects), however, this property is not the sole criterion for a noun to belong to the collective class. For instance, different dialects have different ways of classifying nouns. One and the same entity or concept can have a count noun in one dialect and a collective noun in another. For example, the word for ‘mud’ is *tabʕa* in Tunisian Arabic and *teen* in Saudi Arabic. While *tabʕa* is a substance-referring noun without a singulative counterpart (11-a), *teen* has a singulative, *ti:n-a*, which refers to a chunk of mud’ (11-b).

- (11) a. *tabʕa* → **tabʕa-a* [Tunisian Arabic]
 mud mud-FEM.SING
 ‘mud, (intended) a chunk of mud’
- b. *ti:n* → *ti:n-a* [Saudi Arabic]
 mud.MASC.COLL mud-FEM.SING
 ‘mud, a chunk of mud’

Although there is a consensus that substance and inherently plural nouns tend to be part of the collective system, the contrast shown in (11) suggests that the count/collective classification is not encoded in the root denotation of a noun, but is rather part of its grammatical information. Therefore, we propose that whether a noun belongs to the count or collective class is encoded in *n* (see Dali 2020). This yields

the nominal representation in (12), where the root combines with a *n* marked with a [+COLL] feature.



This feature determines the interpretation of the noun, including the gender exponent. The feminine exponent, for instance, is only interpreted as a singulative if *n* is marked [+COLL]. This can be justified by a weak contextual alloosemy rule (Dali, 2020), where the exponent is interpreted according to the following scenario:

- (13) Semantic realizations of [+FEM]
- a. [+FEM] ↔ Num_[+atomic; -additive]/ _____ *n*_[+COLL]
 - b. [+FEM] ↔ *n*_[+fem]/ _____ *n*_[-COLL]

According to the rules in (13), the feminine exponent expresses a nominalizer (endowed or not with a feminine semantic interpretation) or a singulative. This depends on whether *n* is marked [+/-COLL]. Note that in (13-a), the singulative is expressed on Num. This is further discussed in Chapter 3 (Section 3.3), where the relevant semantic features are also provided.

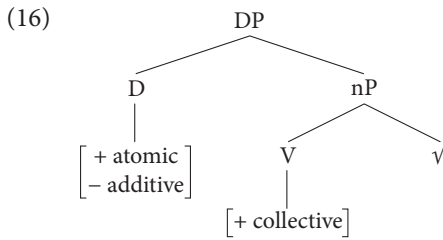
We have now established that the defining properties of collective nouns is that they are cumulative and belong to a specific grammatical class. It follows that collective nouns have the denotation of a semi-lattice, given their cumulativity. We now turn to showing that collectives are interpreted as inclusive in the right contexts (downward entailing). Consider the example in (14).

- (14) *ʃandkom bordgen?* [Tunisian Arabic]
 have.2SG orange.MASC.COLL
 ‘Do you have oranges?’

The question in (14) can be answered with ‘yes, we have five’, but also with ‘yes we have one’. In upward entailing contexts, however, the collective refers to ‘more than one’. The example in (15) cannot refer to ‘one’. If someone utters (15), then we understand that the speaker ate more than one orange.

- (15) *kli:t bordgen.* [Tunisian Arabic]
 ate.1SG bordgen.COLL
 ‘I ate oranges.’

For collectives, we propose the structure in (16), based on their grammatical classification and their inclusive interpretation in downward-entailing contexts.



Note that Num is not projected for collective nouns. Semantically, all we have is a root, i.e., a semi-lattice as in (4) in Chapter 1. This explains why, in this case, the collective can be interpreted inclusively.¹

2.3 Bare nouns

In this section, we introduce the structure for bare nouns. This will serve as background for Chapter 6 where we discuss bare plurals. In a number of languages with bare nouns (nouns without articles), it is possible to pluralize them, which is itself a puzzle, since traditionally, bare nouns are considered number neutral or both singular and plural.

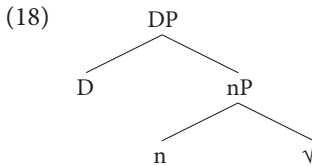
A large number of the world's languages have general number, or, as it is sometimes called, transnumeral number, (Greenberg, 1972, 1974; Corbett, 2000). In these languages, a singular noun devoid of a determiner or inflection denotes both sums and atoms. An example from Western Armenian appears in (17).²

- (17) Kirk kənet̩si. [Western Armenian]
 book buy.1SG.PERF.PAST
 'I bought a book, books.'

We propose, like Rullmann and You (2006); Bale et al. (2010, 2011); Bale and Khanjian (2014) that they refer to (atomic) semi-lattices, hence their indeterminate number. Our structure in (18) is identical to the one proposed by Borer (2005) (see also Pereltsvaig, 2014; Martí, 2020).

1. A mass noun has the same semantics as a collective noun giving us the same representation as for a collective, except that n does not carry a [+collective], but a [-group] feature (as in Harbour 2011).

2. Thanks to George Balabanian for this example.



In this structure, NumP is not projected. We will see in Chapter 6, however, that it is possible in some cases to pluralize such bare nouns, in which case it is possible after all for NumP to be projected. We will argue that both NumP1 and NumP2 need to be projected in the case of bare plurals.

2.4 Lexical plurals

It has been popular in the literature to categorize a number of plurals as being non-inflectional and associated with *n* (Acquaviva, 2008; Kramer, 2015). A prototypical case is the case of *pluralia tantum*. In English, for example, *pluralia tantum* are words that denote objects that occur or function as pairs or sets, and they are found in the plural with no corresponding singulars, such as *trousers*, *pants*, *scissors* or *clothes* (**trouser*, **pant*, **scissor*, **clothe*).

The notion of ‘lexical’ plural, however, is not limited to these cases, as Acquaviva (2008) points out. He reviews cases like the Italian double plurals (see also Ojeda, 1995): for example, the singular *braccio* ‘arm’ has two plurals, one that denotes the arms of a person *braccia* ‘arms’ and the other that denotes the arms of an object *bracci* ‘arms’. This is not extremely productive and is somehow idiosyncratic and this is why such plurals are not associated with NumP but with *nP*.

Acquaviva (2008) enlarges his domain of inquiry by considering Irish unit nouns. In Irish, regular nouns surface in the singular when used with a numeral otherwise they surface as plural. On the other hand, unit nouns, i.e. those denoting measures, units of time, etc., take either the standard plural or a special plural when used with a numeral greater than 10. The following examples are from the Christian Brothers grammar by ÓhAnluain (1999, p. 70), cited in Acquaviva (2008, p. 34–35). As pointed out by Acquaviva (2008, p. 34–35), these special plurals resemble what Stankiewicz (1962) calls quantifying plurals in several Slavonic languages. These are special plural forms that occur after numerals (or after some numerals) and contrast with regular plurals.

- (19) a. Nouns taking the plural after 3–10:
- | | | |
|-------------------------------------|--|------------------------|
| Singular | | Plural |
| ceann ‘head (as a unit), one’ | | cinn |
| cloigeann ‘head (counting persons)’ | | cloigne |
| troigh ‘foot (measure)’ | | troighthe/troigheannaí |
| slat ‘rod (measure), yard’ | | slata |
- b. Nouns taking a special plural form after 3–10:
- | | | |
|-----------------------|------------|-------------------|
| Singular | Plural | Plural after 3–10 |
| bliain ‘year’ | blianta | bliana |
| fiche ‘twenty’ | fichidí | fichid |
| pingin ‘penny’ | pinginí | pingine |
| seachtain ‘week’ | seachtainí | seachtaine |
| scilling ‘shilling’ | scillingí | scillinge |
| uair ‘time, occasion’ | uaireanta | uaire |

It is these plurals that Acquaviva (2008) calls counting plurals. On his view, while unit numerals 3–10 and nouns more generally require an empty classifier as in (20), counting plurals are noun stems that raise from their NP positions to the head of the Classifier Phrase (Classifier = Division), as in (21).

- (20) trí chat [Irish]
 three cat.SG
 ‘three cats’
- (21) [DP Ø ... [#P trí [ClassifierP Ø [NP chat]]]] (Acquaviva 2008: 190)
- (22) trí bliana
 three year.PL
 ‘three years’
- (23) [D Ø... [#P trí [ClassifierP bliana [NP t]]]] (Acquaviva 2008: 192)

Next, Acquaviva (2000) considers the case of broken plurals. As seen in the introduction, Arabic has two kinds of plurals.

The sound plural in Tunisian Arabic is like the English plural: (24) is formed by suffixation of a plural marker on a stem. The suffix *-i:n* marks the plural of masculine nouns (24-a), while *-at* marks the plural on feminine nouns (24-b)).

- (24) a. fannen → fannen-i:n [Tunisian Arabic]
 artist.MASC.SG artist-MASC.PL
 ‘artist, artists’
- b. fannen-a → fannena-at
 artist-FEM.SG artist-FEM.PL
 ‘(female) artist, (female) artists’

The broken plural, on the other hand, is formed by stem change (25). No specific suffixal morpheme in the broken plural is associated with the plural meaning.

- (25) kalb → kleb [Tunisian Arabic]
 dog.SG dog.PL
 ‘dog, dogs’

According to Acquaviva (2008), broken plurals are lexical in that they are stem forms (produced via Level 1 morphology), but inflectional in that they express number information (via Level 2 morphology). On his view, the broken plurals are in *n* and a morphologically null Number head appears above to express the broken plural’s inflectional properties. This higher dividing operator is necessary for syntax, but not for morphology (Acquaviva 2008, p. 271). As we shall see in Chapter 3, broken plurals are, on our view, not in *n*, but only in Num. They are in no way lexical, idiosyncratic or rare: they can be created from borrowings and follow very limited patterns when analyzed closely.

Finally, Acquaviva (2008) examines double plurals in Breton. This language, like Arabic, has a singulative marker and it can act on a plural. The noun *ster* ‘a star’ can be pluralized to give *stered* ‘stars’ and this, in turn, can be turned into a singulative to give *steredenn* ‘a star’. This can be pluralized to give *steredennou* ‘stars’. Acquaviva (2008) argues that *stered* and *steredennou* do not have the same meaning: while *stered* refers to the stars in the sky, *stered-enn-ou* can refer to a few individual stars, or to the brass stars on military epaulettes, or to the stars printed on a bottle label. The fact that the two plurals do not have the same meaning is a sign, for Acquaviva (2008), that the plurals in question are associated with *n*. In the next chapter, we will argue that singulatives are not associated with *n*, but with Num (it is a highly productive process that is also available with borrowings) and in Chapter 4, we will argue that contrasting plurals in Arabic do not have the same meaning, but that this is not derived lexically, but syntactically.

2.5 Conclusion

In this chapter, we reviewed a few cases of nouns that are basically *n*Ps. In particular, we studied the interpretation and semantics of collective nouns in Arabic. Before we discuss number in Arabic, it was important to establish what the meaning and the structure of collective nouns are in this language.

Now that we have reviewed the structure for the *n*P domain, we are ready to move up the structure and examine the lower NumP domain. The next chapter is dedicated to this field. The higher NumP domain will be the focus of Chapter 4.

The lower NumP domain

3.1 Introduction

In this chapter, we show that alongside a singular (Section 3.2), Arabic grammar has a mechanism that allows the creation of atoms called the singulative (Section 3.3). We argue that the singulative is, just like the singular, an inflectional operation associated with the lower NumP domain, but that it involves renominalization whereas simple singulars do not. It is crucial to understand the mechanism behind the singulative in Arabic if we want to understand its plural form, which as we shall see in Chapter 4, has a special structure and a special semantics. We then turn to plurals (Section 3.4), discussing both broken and sound plurals while giving the semantic features they are associated with. We will see that broken and sound plurals are interpreted inclusively and are associated with the lower number phrase. One issue that will arise is whether broken plurals should be considered lexical plurals or whether they should be assimilated with other plurals, i.e. sound plurals, under the same number functional head. Finally, we discuss duals (Section 3.5) and show that the dual operation is not a productive process in Tunisian Arabic.

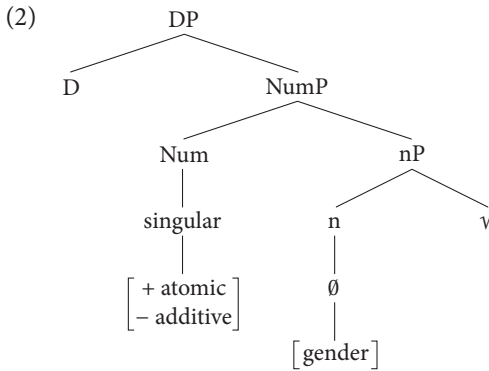
3.2 Singulars

We begin with singular nouns: *kalb* ‘dog’ (1-a) or *fannen/fannena* ‘artist’ as in (1-b). Note that *fannen-fannena* is a contrasting pair, and thus the morpheme *-a* obligatorily marks the feminine gender of the noun. We assume that gender features are associated with *n* (Kramer, 2009, 2015; Kihm, 2003; Lowenstamm, 2008).

- (1) a. *kalb* [Tunisian Arabic]
 dog.SG
 ‘a dog’
 b. *fannen* *fannen-a*
 artist.MASC.SG artist-FEM.SG
 ‘a (male) artist, a (female) artist’

(2) is the structure for the Tunisian Arabic singular. *n* is unmarked for number (Harbour, 2011, 2014). This is indicated by \emptyset (in contrast, collective nouns are

marked [+collective] – see Chapter 3). Num, since it is here singular, is associated with the features [+atomic; –additive] and they compose as in (3). We do not make use of the feature [+minimal], since the use of the dual is sparse (see Section 3.5). In Standard Arabic, Num would have an extra feature, namely [+minimal], since the dual is a feature of the grammar. We do not show the matching uninterpretable agreement features on D (they are simply the same as the semantic features under Num).



(3) $[[[-\text{additive}]]([[+\text{atomic}]]([[nP]]))]=$
 $=\lambda x. Q(x) \ \& \ Q \sqsubset ([[+\text{atomic}]]([[nP]])) \ \& \ \neg \sqsubset y Q(y) \rightarrow Q(x \sqcup y)$

The reader might find it cumbersome for n to carry multiple features and have multiple semantics (on our view, n is classificatory (gender, etc.) and semantic (as predicate with join semi-lattice)), and a quick perusal of the literature suggests another possibility, namely that DivP (our Num) is split (as in De Belder, 2008, 2011; Zhang, 2012; Acquaviva, 2016, 2019). For example, Acquaviva (2019) proposes that a root is about purely differential content, i.e. a label, n names an entity type, $P\Sigma$ introduces a variable and creates a lattice, Div partitions the set of sums, and Num restricts *P (closure under sum formation) to feature defined parts.

This is an interesting proposal (although it is not clear how it can be made compositional semantically), but in this book we follow Harbour’s (2011, 2014) system and assume “roots name concepts and n^0 makes concepts ‘nouny’, structuring them as lattices.” (Harbour 2014: 191). This is, we believe, sufficient for semantic purposes. That gender features are associated with n is now a common idea in the literature (Kramer, 2009, 2015; Acquaviva, 2008). Finally, let us point out that it is not uncommon for heads to have various roles, both syntactic and semantic. For example, v introduces an Agent, but also carry features associated with the object.

3.3 Singulatives

In addition to the singular, dual and plural systems mentioned above, most Semitic languages also have a singulative system, where the collective is the default number from which the singulative is derived (see Chapter 2 on the structure and semantics of Arabic collectives). For Semitic languages, the collective-singulative distinction is most productive in Arabic, Maltese, and Ethiopic – with Hebrew having retained only residues of the system (Doron and Müller, 2013). The following examples illustrate the singulative system of Arabic (4). The left column features collective nouns while the right column exemplifies singulative forms.

- (4) a. nemmel ~ nemmel-a [Tunisian Arabic]
 ant-MASC.COLL ant-FEM.SING
 ‘ants, an ant’
- b. du:d ~ du:d-a
 worm-MASC.COLL worm-FEM.SING-FEM
 ‘worm, a worm’
- c. bordgen ~ bordgen-a
 orange.MASC.COLL orange-FEM.SING
 ‘oranges, an orange’

The singulative is akin to a classifier (Zabbal, 2002; Mathieu, 2012). Following Greenberg (1974), a classifier is an overt expression that provides the option to count out the denotation of a noun by units, for nouns whose individuals cannot be counted out directly, i.e. for nouns that cannot be combined with numerals. Singulatives are unit-counters (Ojeda 1992, Zabbal 2002, Fassi Fehri 2003). The singulative picks out the units (i.e. atoms) in the denotation of a non-count noun.

Sometimes, the input to the singulative operation can be a mass noun, creating a unit that resembles a measure, as in (5). But the exact nature of this measure can vary: depending on the input noun, it refers to ‘a chunk of’, ‘a blade of’, etc., and this, we propose is simply a result of how speakers conventionalize the interpretation of the singulative. The measure reading, and the type of measure involved, is not determined by the feature [+atomic].

- (5) a. ḍahb ~ ḍahb-a [Tunisian Arabic]
 gold.MASC gold-FEM.SING
 ‘gold, a bit/nugget of gold’
- b. xobz ~ xobz-a
 bread.MASC bread-FEM.SING
 ‘bread, a loaf of bread’

The input nouns to the singulative (the collectives on the left in (4) and (5)) are always masculine in Arabic, and although they refer semantically to pluralities, they trigger singular agreement on verbs and other dependent categories. Consider (6). The plural subject *nemel* ‘ants’ agree with the verb in third person masculine singular.

- (6) *nemmel* *dxal* *l-el* *kuji:na.* [Tunisian Arabic]
 ant.MASC.COLL entered.3.MASC.SG to-the kitchen
 ‘Ants entered the kitchen.’

The singulative is derived from the collective through suffixation of the marker *-a* (on the singulative in Arabic, see Acquaviva 2008; Ouwayda 2014; Ojeda 1992; Zabbal 2002; Fassi Fehri 2003, 2018, 1993; Borer and Ouwayda 2010; Mathieu 2012, 2009, 2014). Unlike collectives, singulative nouns are feminine. This shows both morphologically and syntactically.

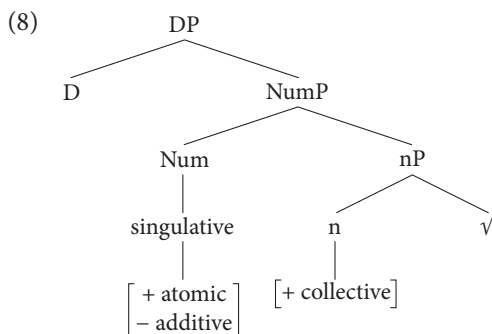
First, the ending, *-a*, is a typical feminine ending in Arabic and Maltese, and can be found in morphological feminine nouns such as those in Section 3.2 above.

Second, singulative nouns in Tunisian Arabic consistently trigger feminine agreement on the lexical items they control. Consider (7) and compare this example with (6). While in (6) the collective noun *nemel* ‘ants’, a morpho-syntactically masculine singular form, triggers masculine singular agreement on the verb, its singulative counterpart *nemmela* ‘an ant’, in (7), triggers feminine singular agreement.

- (7) *nemmel-a* *daxl-et* *l-el* *kuji:na.* [Tunisian Arabic]
 ant-FEM.SING entered.3-FEM.SG to-the kitchen
 ‘An ant entered the kitchen.’

Since the singulative behaves very much like a singular in picking out an atom from the lattice region (see Chapter 2 for the idea that collectives in Tunisian Arabic refer to semi-lattices), we propose that it is associated with the feature [+atomic] in Num, as in (8). (9) gives the order of composition and the semantic interpretation, which are the same as the singular.¹ This structure differs from that of the singular (Section 3.2), since the base of the singulative has an *n* with a [+collective] feature. This simply means that we are in a morphologically inverse system, where the unmarked base is semantically plural and the morphologically marked form is individual-denoting.

1. This is essentially what is proposed in Mathieu (2012, 2009, 2014) and Borer and Ouwayda (2010) as well as Ouwayda (2014), except that there, Num = Div. Other proposals involve different functional heads. Zabbal (2002) proposes that the singulative is associated with ClassP (between *n*P and NumP. Fassi Ferhi (2018) proposes that the singulative is associated with UnitP (between *n*P and NumP.)



- (9) $[[[-\text{additive}]]([[+\text{atomic}]]([[nP]]))]=$
 $=\lambda x. Q(x) \ \& \ Q \sqsubset ([[+\text{atomic}]]([[nP]])) \ \& \ \neg \sqsupset y Q(y) \rightarrow Q(x \sqcup y)$

Our proposal is different from derivational/lexical or *n* approaches of the singulative. For example, Acquaviva (2008) proposes an analysis, according to which the singulative is not on a syntactic head, but rather lower under *n* (Acquaviva 2008, p. 270).

Evidence for the derivational view is as follows: according to Acquaviva, the fact that gender shift occurs in singulativization in Arabic shows that it is a derivational process (see also Kramer 2015).² Also, for Acquaviva, “the derived singulative and the base it is suffixed to are distinct nouns and not inflectional forms of the same noun” (2008, p. 243). It is argued, for example, that Breton *-enn* is indifferent to the number of a nominal base (it can apply to singulars and plurals) and it does not even need a nominal base at all, since it can nominalize adjectives and verbs: *koant* ‘beautiful’ *koant-enn* ‘a belle’; *prezeg* ‘to preach’ *prezeg-enn* ‘a sermon’ (Acquaviva 2008, p. 246).

For Arabic, Acquaviva (2008), argues that *-a* serves to derive a new noun with a count reading, and it is therefore not the spell out of the singular of the base form. On his view, “[this] is reinforced by the observation that it has the same packaging function with verbal nouns, which are not their plurals in any sense.”

- (10) a. $\text{\textcircled{S}atas}$ ‘to sneeze’ → $\text{\textcircled{S}at\textcircled{S}}$ ‘sneezing’ → $\text{\textcircled{S}atsa}$ ‘a sneeze’
 b. $\text{\textcircled{B}aas}$ ‘to kiss’ → $\text{\textcircled{B}oos}$ ‘kissing’ → $\text{\textcircled{B}oose}$ ‘a kiss’
 c. $\text{\textcircled{S}aafar}$ ‘to travel’ → $\text{\textcircled{S}afar}$ ‘travelling’ → $\text{\textcircled{S}afra}$ ‘a trip’

(from Cowell 1964: 302 and Acquaviva 2008: 223)

It is true even that the morpheme *-a* can operate on items that are not nouns, e.g. on adjectives, as seen in (11).

2. Singulativization does not correlate with gender shift in all languages. For example, Western Nilotic languages do not have gender and yet a singulative morpheme is available in these languages (Hieda, 2006).

- (11) safi:d → safa:d-a [Tunisian Arabic]
 happy happiness
 ‘happy, happiness’

But this is a different case from the singulative, and so are the cases mentioned by Acquaviva (2008). The morpheme *-a* is ubiquitous in Arabic grammar: it even produces collectives from singulars (12).

- (12) zazza:r → zazza:r-a [Tunisian Arabic]
 butcher.MASC.SG butcher-PL
 ‘butcher, butchers’

In the cases mentioned by Acquaviva (2008), *-a* is a nominalizer with no individuating properties. There is evidence from reconstruction studies (Hasselbach, 2014a; b) that *-a* was originally a nominalizer that was only secondarily associated with the singulative, groups and feminine gender. The original function of the suffix was to mark derivatives of adjectives, specifically abstract nouns (11) and other usages of *-a* derived from this basic function, giving us the historical sequence in (13).

- (13) nominalization > singulative > group > gender

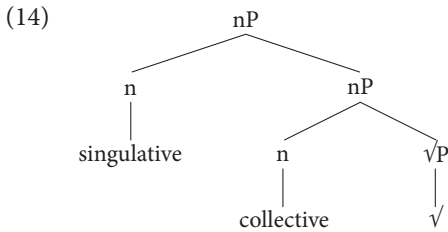
The nominalization use of *-a* never disappeared and is used concurrently with its singulative, group and gender use (see Chapter 7 for more details and historical insights). Only the singulative entails an individuating process. When used as a pure nominalizer, the morpheme *-a* is not a singulative.

Another argument put forward by Acquaviva (2008: 247) – see also Kramer (2015) – is that the distribution and function of the singulative are, to a great extent, lexical. It is determined by the semantics of the collective noun and the set of collective nouns is often small (Acquaviva, 2015). Also, the meaning of singulatives is claimed to vary enormously: “it refers to members of collections, atomic parts of granular masses, detached pieces of matter, but also to objects made up of material, or bounded extensions of a mass,” giving for example ‘a beach’ from the mass term ‘sand’. The shifting meaning of the singulative is, for Acquaviva (2008), a sign that it involves a derivational process.

While there is indeed variation as to the meaning of the input noun to the collective, this is not so different from count nouns that are inputs to the singular operation: they too can denote all sorts of objects (see Rothstein, 2010). In addition, the set of collectives is not small. For example, in Stolz (2001) more than seventy are listed for Welsh and this does not appear to be exhaustive.

Kramer (2015) proposes an analysis of the singulative similar to that of Acquaviva’s (2008). On Kramer’s view, the singulative is not completely productive,

it is a derivational process.³ The singulative is formed via an *n* attaching to an *nP* as in (14) – Kramer (2015, p. 203).



The general problem with derivational approaches is that it underplays the individuating function of the singulative and relegates it to a node not normally associated with number, i.e. *n*. On the proposed accounts, two nodes are now responsible for the creation of individuals: Num (or its equivalent, e.g. Div) and *n* (thus, two nodes with exactly the same semantic features). The singulative has a clear association with number (and it is thus no surprise that it appears in Corbett’s 2002 well-known volume on number). The singulative in Tunisian Arabic also has a clear syntactic effect: verbs and nouns must agree in gender with the singulativized noun. In the literature, one strong reason for the view that ‘singular’ and ‘plural’ are realizations of inflectional features is the phenomenon of agreement. The same can be said about the singulative. If the singulative was a derivational process, we would not expect agreement with verbs and adjectives.⁴

Another major problem is that, on the derivational view, many things are lumped together under *n*: for example, exceptional plurals (as described, for example, by Corbett 2000), collectives, mass nouns, etc. However, there is a big difference in terms of productivity between, say, Italian plurals that change gender (*braccia* ‘arms’ vs. *bracci* ‘arms (of objects)’ as plurals of singular *braccio* ‘arm’, see Acquaviva 2008 for discussion and Chapter 2) and singulatives. On the derivational view,

3. Technically, the Distributed Morphology framework makes no distinction between inflection and derivation, and between syntactic and lexical processes. However, there are lower (first Merge) and higher (second Merge) operations (Marantz, 2001, 2007). On Kramer’s (2012) view, the singulative is a lower (first Merge) operation.

4. For Acquaviva (2008) and Kramer (2015), the noun’s highest gender feature can be said to serve as the controller for agreement, but this does not really explain why there should be gender shift with renominalization in the first place, and especially why the feminine exponent in Arabic encodes number.

Italian irregular plurals, Somali plurals, singulatives, etc. are all generated under n with no possibility of distinguishing their degree of productivity.⁵

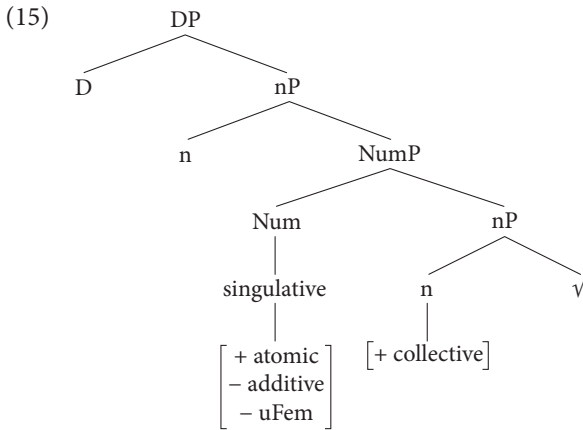
In Arabic, the singulative is clearly a productive process, as it can be applied even to neologisms and borrowings, with unvarying interpretations. Take for example the pair *ananas-ananasa* ‘pineapples, a pineapple’. *Ananas*, a borrowing from *ananas* in French is made singulative by adding *-a*. Productivity is typical of stable inflectional classes and there is thus no reason to group singulatives with derivational processes.⁶

Having said all this, we believe that the two approaches can be reconciled. *-a* has (at least) two uses: it creates a unit out of a collective (an inflectional process) and it creates a noun (a derivational process). The historical facts are enlightening: as mentioned above, the morpheme *-a* was originally a nominalizer, then it was used as a singulative, then as a group marker, and then as a gender marker (see Chapter 7 for a diachronic analysis). This means that the singulative is both an inflectional and a derivational process. We cannot simply propose that the singulative is just a case of renominalization, because if we did, we would lose its individuating semantic contribution that has clear connection with number.

This means that, even though a singulative is like just a singular (it acts on a semi-lattice and is associated with the same features, namely [+atomic] and [–additive]), there is a crucial difference between the two operations. A singulative, unlike a singular, creates a new noun, adding another n on top of Num, as in (15). The exponent of the singulative in Num is the feminine marker *-a* (marked in bold in (15)). The noun becomes feminine as marked on the higher n and then D carries the uninterpretable feminine feature to interact with agreement. The structure in (15) is similar to a denominal noun (e.g. English *village* → *villager* or French *boucher* ‘butcher’ → *boucherie* ‘butcher’s shop’, with a change of gender, except that the singulative case involves an embedded number phrase that creates a partition from a collective noun to a unit of that collection).

5. In a neo-constructivist model, it might be quite natural to generate odd plurals under Num and do away with n as a carrier of number features. This is exactly what Tsoulas (2009) and Harbour (2008) do for plurals of mass nouns.

6. The singulative is far from obsolete in Arabic. The same goes for Welsh. Stolz (2001, p. 69) discusses Welsh and states that “massive language contact did not accelerate the expected disintegration of marked singulative-collective distinctions. On the contrary, the integration of English loan-words has even contributed to strengthening the system-internal role of singulative-collective distinctions.” Singulatives apply naturally to borrowed plurals from English where the latter is treated as the base, providing innovations: *ceirios* ‘cherries’ → *ceirios-en* ‘cherry’, *gwsberys* ‘gooseberries’ → *gwsberys-en* ‘one gooseberry’, *pys* ‘peas’ → *pys-en* ‘one pea’ (Stolz 2001: 68).



Note that Num is associated with a [uFem] feature. This feature is the feature responsible for agreement with verbs or adjectives. It is the closest gender feature to the relevant Probe, which means that the masculine feature associated with the collective is inactive. This [uFem] feature is expounded by *-a* and surfaces in all cases where *-a* is associated with Num.

In the next chapter, this structure will turn out to be important. It will help derive the correct semantics for the features associated with the higher number projection.

Now that we have reviewed the singular and the singulative in Arabic, we turn to plurals in the next section.

3.4 Plurals

The plural in Arabic comes in two shapes. The sound plural in (16) is formed by suffixation of a plural marker on a stem. The suffix *-i:n* marks the plural of masculine nouns (16-a), while *-at* marks the plural on feminine nouns (16-b).⁷

- (16) a. fannen → fannen-i:n [Tunisian Arabic]
 artist.MASC.SG artist-MASC.PL
 ‘artist, artists’
- b. fannen-a → fannena-at
 artist-FEM.SG artist-FEM.PL
 ‘(female) artist, (female) artists’

7. Note that sometimes *-at* in Tunisian Arabic is pronounced/written *-et*.

The broken plural is formed by stem change (17). No specific suffixal morpheme in the broken plural is associated with the plural meaning.

- (17) kalb → kleb [Tunisian Arabic]
 dog.SG dog.PL
 ‘dog, dogs’

While the sound plural is a straight forward inflectional shape, where plural meaning can be associated with a suffix, the case of the broken plural is more complex. In the following section, we discuss the status of each Arabic plural in terms of their conditioning as well as their morphological and semantic nature.

3.4.1 The sound plural

We can uncontroversially say that the sound plural is an inflectional operation. First, the sound plural suffix unequivocally corresponds to plural meaning. Consider, for instance, the example in (18), where we show that the singular base strictly corresponds to a singular reading. It is only when the sound plural marker *-i:n/at* is affixed that the plural reading arises.

- (18) a. muḡallam → muḡalm-i:n [Tunisian Arabic]
 teacher.MASC.SG teacher-MASC.PL
 ‘a teacher, teachers’
 b. muḡallam → muḡallm-at
 teacher.FEM.SG teacher-FEM.PL
 ‘a female teacher, female teachers’

We conclude from (18) that the sound plural suffix corresponds to plural meaning, just like it is the case for *-s* in English. Since number carries inflectional information, we propose a straightforward inflectional analysis of the sound plural. The base stem is hosted on *n* and is devoid of any number inflection at this stage, including the singular. The sound plural suffix is hosted on Num, the syntactic head that encodes all information about number. The shape of the sound plural suffix is conditioned by the gender on *n*. If *n* is marked *-FEM* for gender, *-i:n* will surface as a plural suffix. If *n* is marked *+FEM*, then the corresponding suffix will be *-at*. The corresponding syntactic structure is presented in Section 3.4.3.

Note that the singular is also hosted on Num, as we show in Section 3.2. The singular is also an expression of number; it is simply morphologically unmarked, as opposed to the sound plural. In the case of the broken plural, it is unclear whether or not the plural shape is morphologically marked. This observation leads to different analyses of the status of the broken plural. This is discussed in the next section.

3.4.2 The broken plural

Some accounts of broken plural formation (e.g., Wright 1967) present it as a chaotic process, where 11 singular patterns can result in as many as 31 different plural types. Other accounts, such as McCarthy and Prince (1990a), claim that there is a systematic connection between broken plurals and their respective singulars, reducing Wright's list of patterns to four shape-defined categories. These two opposing views of broken plural formation bring out an important dimension of their analysis. On the one hand, broken plural formation can be viewed as a derivational process, hosted on *n*. On the other hand, it can be analyzed as an inflectional operation on Num, similar to the sound plural. In what follows, we provide arguments and evidence supporting the latter view.

Arabic is a root and pattern language, whereby the root consists of a set of consonants arranged in a specific sequence. This consonantal root identifies the general concept of the word's meaning. Additional information (typically grammatical, such as syntactic category or tense) is represented in the stem's vocalic and syllabic features, the "pattern". One and the same root can appear in different syntactic contexts, defined by the pattern. This suggests that the pattern assigns a category to the root, as assumed in the DM framework (Halle and Marantz, 1993; Marantz, 1997). For instance, the famous Arabic root /*k t b*/ carries the concept of "writing" in its meaning, but as a root, it is devoid of category. It is only in combination with a pattern that the root is assigned a category, a semantic denotation, and a phonological realization. This is illustrated in (19).

- (19) a. kataba [Standard Arabic]
 wrote.3.MASC.SG
 'He wrote'
 b. kita:b
 book
 'a book'

The examples in (19) illustrate the fact that each pattern gives rise to a different category. One and the same root can yield a verb (19-a) or a noun (19-b). In line with the DM approach (Halle and Marantz, 1993; Marantz, 1997), we can safely assume that the vocalic pattern is associated to a category head. In the case of a noun, the pattern is associated to *n*. With this in mind, it has been proposed that broken plurals are formed using the root and pattern mechanisms: by combining a root directly with a vocalic pattern corresponding to the plural (Ratcliffe, 1998; Kihm, 2003; Acquaviva, 2008; Lahrouchi and Lampitelli, 2015). According to this view, the broken plural pattern is not derived from a singular base, but rather directly from

the root. The opposing view is that the broken plural is an inflectional shape derived from a singular (Hammond, 1988; McCarthy and Prince, 1990a; b). We adopt the latter view, based on the morphological and semantic arguments presented below.

3.4.2.1 *Singular stem qualities are transferred to the broken plural*

Several studies have established the form of the singular as the principal factor determining the form of the broken plural in Arabic (Murtonen, 1964; Levy, 1971). Hammond (1988) argues that melodic transfer is also appropriate for the description of root and pattern morphology and shows, in particular, that a broken plural is better analyzed in terms of melodic transfer from the singular shape than by insertion of a vocalic pattern directly to the root. His claims are based on the following arguments. First, the final vowel length of a broken plural depends on vowel length in the singular. For instance, consider the examples in (20), where the vowel length in the final syllable of the plural corresponds to that of the final syllable of the singular.

- (20) a. maktab ~ maka:tb 'office, offices' [Standard Arabic]
 b. mifta:h ~ mafa:ti:h 'key, keys'
 c. xa:tm ~ xawa:tm 'ring, rings'
 d. qa:nu:n ~ qawa:ni:n 'law, laws'

Second, the spreading of consonants in the plural is based on consonantal spreading in the singular. If a consonant is spread in the singular, it is also spread in the plural. This can be observed in (21). The noun *nuwwa:r* 'flower' has the consonantal root base /nwr/, and spreads *w* in the plural, based on the spreading of the same consonant in the singular.

- (21) nuwwa:r ~ nawa:wi:r 'flower, flowers' [Standard Arabic]

A third problem with treating broken plural formation in terms of a standard template is the insertion of the semi-consonant [w] in the broken plural shape when there is a long vowel in the first syllable of the singular. This is illustrated in (22).

- (22) a. xa:tm ~ xawa:tm 'ring, rings' [Standard Arabic]
 b. qa:nu:n ~ qawa:ni:n 'law, laws'

In sum, vowel length and consonantal spreading are not qualities of the root and should not be visible to mechanisms that directly associate melodic material to the plural template. Hammond (1988) attributes these three phenomena to melodic transfer from the singular stem rather than vocalic insertion to a consonantal root pattern. This approach accounts for the issues listed above, since transfer allows plural formation to see the singular template where vowel length and consonantal spreading are represented.

In the same vein, McCarthy and Prince (1990b) claim that all the properties of a canonical stem are carried over from singular to broken plural, despite the fact that the root itself contains no information about the canonical form. McCarthy and Prince (1990a) have independently defined the canonical stem for Arabic, based on the Prosodic Morphology Hypothesis. The canonical stem has a minimum of two moras, and a maximum of two syllables. These constraints include notions like vowel quantity, number of syllables, and consonant spreading. The latter notions define exactly the kind of information that the consonantal root abstracts away from. In a true root and pattern derivational morphology setting, only the root consonantism is carried over from one form to another in a prosodically diverse set (e.g., *kita:b* ‘book’, *ka:teb* ‘writer’, *kataba* ‘he wrote’). The broken plural, then, cannot be obtained with the ordinary resources of root and template morphology.

McCarthy and Prince (1990b) also add more supporting evidence for a melodic transfer treatment of the broken plural (from the singular shape) based on two arguments. First, they observe that some derivational affixes that are not part of the consonantal root, are not ignored in the broken plural form. For example, the noun *mifṭaaḥ* ‘key’ is derived from the consonantal root /*ft ḥ*/, which carries the concept of ‘opening’. Its broken plural includes the derivational affix, as shown in (23). This indicates that the root alone is not the appropriate base for broken plural formation.

(23) *mifṭa:ḥ* ~ *mafa:ti:ḥ* ‘key, keys’ [Standard Arabic]

Moreover, they discuss the case of the “plural of the plural”, whereby a broken plural is formed from a stem that is itself a broken plural. In the second plural form, the final syllable vowel length is transferred from the (already plural) base – and this vowel length comes from the prior pluralization process, not from the singular, and much less from the consonantal root. Consider the example of *buldaan* ‘countries’, derived from the broken plural *bilaad* ‘towns’, reanalyzed as ‘country’. First, the intermediate form itself has been reanalyzed as a new singular (‘country’), thus feeding pluralization. Second, note that the long vowel in the third form is inherited from the intermediate form and is not found in the first singular stem.

(24) *balad* ~ *bila:d* ~ *bulda:n* ‘town, country, countries’ [Standard Arabic]

In sum, it appears that broken plurals include qualities of the singular stem, which are not present on the consonantal root. This indicates that broken plurals do not result from the combination of a consonantal root and a pattern specific to plurals.

3.4.2.2 *Broken plural formation is not limited to nouns*

An important argument against hosting the broken plural pattern on *n* is the fact that broken plural formation is not limited to nouns. For instance, as put forth by

Acquaviva (2008, 216), adjectives can have broken plurals. An illustration from Tunisian Arabic is provided in (25).

(25) mri:ð morða [Tunisian Arabic]
 sick.SG sick.PL
 ‘sick, sick (pl)’

(26) a. řabd mri:ð [Tunisian Arabic]
 person.SG sick.SG
 ‘a sick person’
 b. řbe:d morða
 person.PL sick.PL
 ‘sick people’

As shown in (26), Arabic broken plural formation extends to adjectives and follows the same principle as noun pluralization. Broken plural patterns modify the adjectival stem, by transferring some of the phonological qualities of the singular stem. Since adjectives are agreement targets, not controllers, this observation indicates that broken plural formation is an inflectional process rather than a derivational one. Considering how broken plural patterns apply to adjectives, a stem-forming process analysis of this plural shape would be very unlikely. Adjectives do not typically get number information as part of their derivational formation (which is attributed to the inflectional head ‘a(djective)’ in the DM framework), but rather acquire this inflectional information through agreement.

To sum up, broken plural formation is not limited to nouns, but also extends to adjectives. This indicates that broken plural patterns are not hosted on a derivational head like *n*.

3.4.2.3 *Broken plurals are productive*

Considering that broken plurals are often portrayed as resulting from a chaotic process (Wright, 1967), it is natural to consider them as lexical shapes. However, based on McCarthy and Prince’s view that there is a prosodic connection between broken plurals and their respective singulars, we can consider the possibility of a more systematic and productive pluralization process.

McCarthy and Prince adopt the “Prosodic Morphology Hypothesis” (McCarthy and Prince, 1990b), where morphological categories are expressed by morphemes whose only constant is a fixed canonical pattern and independently from the consonants or vowels that fill this shape. Based on the Prosodic Morphology Hypothesis, McCarthy and Prince assume a canonical shape for Arabic nouns that is defined by prosodic constraints: the Minimal Stem Constraint and the Maximal Stem Constraint. The first constraint sets a lower limit of two moras on the stem size. The second constraint sets the maximum number of syllables to two. In sum, the Arabic

canonical stem has a minimum of two moras and a maximum of two syllables. All stems that go beyond these limits are considered noncanonical.

Based on the Prosodic Morphology Hypothesis and assuming the existence of a canonical stem shape, McCarthy and Prince argue that all canonically-shaped nouns take one of the four broken plural types, and that the various prosodic properties are “transferred” from singular to plural. Considering the fact that the broken plural is the result of a phonological rule applying to the singular form, it is clear that it differs from irregular English plurals and should not be considered as a lexical plural. Consider, for instance, the pairs *foot-feet* and *child-children*. One cannot predict the irregular plural shapes *feet* and *children* simply based on the singular. These shapes are learned and memorized, as this pluralization process is not a productive one like the templatic Arabic patterns. Arabic broken plurals, on the other hand, are highly predictable based on the singular shapes, and hence do not need to be learned or memorized. In fact, the broken plural process is so productive that it easily applies to loanwords and neologisms, as long as they have a canonical stem.

Consider the loanword *bank* ‘bank’. This loanword has a canonically-shaped stem that falls within the limits of the Minimal and Maximal Stem Constraints and therefore takes the broken plural *bunuuk* ‘banks’. The high predictability of the broken plural stem provides a strong argument against a lexical treatment thereof.

Stems with noncanonical shapes are pluralized by suffixation, using the sound plural. Noncanonical nouns usually originate from borrowings and are not created by the root-based templatic morphology that is typically used in Semitic languages. McCarthy and Prince (1990b) claim that noncanonical stems do not normally contribute their root to further derivational processes (e.g., denominal verbs are almost never created from noncanonical forms.⁸). Consider, for instance, the trisyllabic noun *muṣallam* ‘teacher’. Since this stem is trisyllabic, it cannot take the broken plural. Therefore, it can only be pluralized by suffixation, to give *muṣallameen* ‘teachers’. Furthermore, noncanonical loans also do not participate in broken plural formation. It is the noncanonicity of these words that prevents them from forming broken plurals, not their status as loans. For example, the trisyllabic loan *tilifun* ‘telephone’ can only take a sound plural to give *tilifunat* ‘telephones’. Based on how they are assigned, it appears that broken plurals are the default plural shapes, rather than mere irregularities.

Finally, according to (Wurzel, 1987, 87), one of the characteristics of a stable inflectional class is productivity. The integration of borrowings into morphological process is a token of productivity (see also Stolz 2001). This fact, along with the previous observations about broken plural shape predictability and canonicity,

8. See also Arad (2005), Chapter 2, for a discussion about the internal modification of syllabic roots in Hebrew verbs that originated from borrowings.

provide strong arguments to the claim that broken plurals are inflectional rather than lexical.

3.4.2.4 *Broken plurals are not associated with special meaning*

Most accounts that treat broken plurals as lexical forms are based on morphological information. For instance, Acquaviva (2008, 216) mentions that no principles of Arabic grammar prevents a given singular noun to have several corresponding broken plural shapes. Moreover, several studies (Kihm, 2003; Acquaviva, 2008; Lahrouchi and Lampitelli, 2015) discuss the fact that, unlike sound plurals, broken plural formation is more restrictive in terms of the root it applies to. This was also observed by Lecarme (2002) in Somali. She observes that the broken plural patterns are very ‘choosy’ of their roots, which is very characteristic of derivational processes.

Let us now consider the semantic properties of the broken plural. Lahrouchi and Lampitelli (2015) claim that the different plural shapes of Arabic are each associated with a specific function. In their view, the broken plural is used as a collective, in more general contexts, as in (27-a), while the sound plural is used in contexts with a definite number, as in (27-b) (see also Lahrouchi and Ridouane 2016 for similar arguments).

- (27) a. mmul l-kwast [Moroccan Arabic]
 owner DEF-tape.PL
 ‘tape seller, record store’
 b. zuʒ kaset-at
 two tape.FEM-PL
 ‘two tapes’

Based on the observation that Arabic sound and broken plurals are different in both morphological and semantic perspectives, Lahrouchi and Ridouane (2016) argue that these plurals are not hosted on the same syntactic head; the broken plural is on *n*, and the sound plural, as a true number exponent, as suggested in (27-b), is on Num.

In contrast, Acquaviva observes that broken plurals have no special meaning and are unambiguously the equivalents of sound plurals when it comes to their distribution. We echo this view, based on data from Tunisian Arabic (28).

- (28) a. mula l-kleb [Tunisian Arabic]
 owner DEF-dog.PL
 ‘the dogs’ owner’
 b. zuz kleb
 two dog.PL
 ‘two dogs’

The examples in (28) show that the broken plural can also be used with numbers, contrary to the examples in (27), where it is suggested that the broken plural is reserved to collective contexts. We address the case of (27) in Chapter 4 (Section 3), where we argue that the different meanings associated to the plural shapes are not systematic, but only occur when the plural forms are used contrastively. Importantly, this means there is no *inherent* special meaning attached to broken plurals.

Finally, let us review the meaning of Arabic broken plurals in terms of inclusive/exclusive readings. We show that both broken and sound plurals are exclusive in standard environments, and inclusive in questions and downward entailing contexts. We conclude from this observation that the broken plural is not special in this regard.

First, consider (29). For (29-a), with a broken plural, the sentence can only be true if there is more than one dog in the garden. Similarly, with regard to the sound plural in (29-b), the sentence can only be true if I met more than one engineer.

- (29) a. *famma kleb f-ez-zarda.* [Tunisian Arabic]
 there dog.PL in-the-garden
 ‘There are dogs in the garden.’
 b. *qabelt muhands-i:n.*
 met-1SG engineer-MASC.PL
 ‘I met engineers.’

However, in the right environments (negative, interrogative, conditionals), both sound and broken plurals in Tunisian Arabic are inclusive (Mathieu, 2013, for Standard Arabic and other dialects). (30-a) refers to any number of dogs, one or more. (31-a) also refers to any number of engineers. (30-b) is false if there are three dogs around, but also if there is one. (31-b) is false if I met three engineers, but also if I met one. Finally, (30-c) and (31-c) are referring to one or more dogs or engineers, respectively. We see that, from this perspective, broken plurals are not different from sound plurals.

- (30) a. *famma kleb?* [Tunisian Arabic]
 there dog.PL
 ‘Are there any dogs?’
 b. *ma fammeġ kleb.*
 NEG there.NEG dog.PL
 ‘There are no dogs.’
 c. *ken famma kleb ji:b-hom.*
 if there dog.PL bring.2SG-THEM
 ‘If there are any dogs, bring them.’

- (31) a. qabelt muhands-i:n? [Tunisian Arabic]
 met.2SG engineer-MASC.PL
 ‘Did you meet any engineers?’
 b. ma qabelt-ef muhands-i:n.
 NEG met.1SG-NEG engineer-MASC.PL
 ‘I did not meet any engineers.’
 c. ken qabelt muhands-i:n qol-li.
 if met.YOU engineer-MASC.PL tell.2SG-ME
 ‘If you meet any engineers, tell me.’

As pointed out in the introductory chapter, the inclusive plural is sometimes possible not only in downward entailing environments, but also in situations where the speaker has positive indirect evidence of the presence or existence of something without further information about its number, as shown in (32), repeated from (30) in Chapter 1.

- (32) a. [Speaker walks into basement, and notices mouse droppings]:
 Arghh, we have mice!
 b. [Speaker walks into unknown house, and notices toys littering the floor]:
 There are children in this house.

In Tunisian Arabic, both broken (33) and sound plurals (34) are used in such contexts.

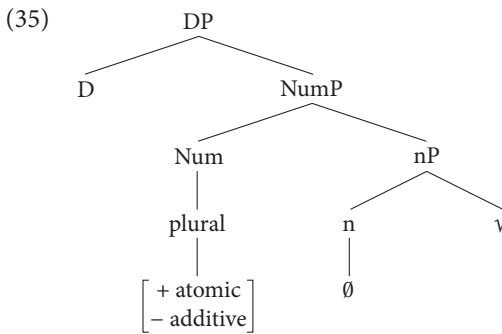
- (33) ŷand-hom s̄a:r. [Tunisian Arabic]
 have.3PL small.PL
 ‘They have kids.’
 (Source of indirect evidence: The speaker walks into someone’s backyard and sees a swing and a small pool.)
 (34) famma saḥafi-ji:n. [Tunisian Arabic]
 there journalist-MASC.PL
 ‘There are journalists.’
 (Source of indirect evidence: A celebrity is leaving her house and sees a flash through the window.)

In sum, since broken plurals have no semantic distinctiveness as a morphological class, they cannot be considered as lexical plurals in the sense of having a morphology that expresses a special reading.

3.4.3 Sound plurals and broken plurals are on Num

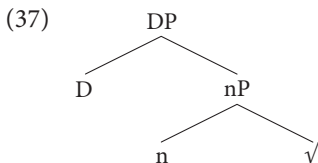
On the basis of the above discussion about broken plural formation, we conclude that both sound plurals and broken plurals are inflectional and thus associated with Num (the lowest number phrase). We thus obtain the structure in (35). In (35), the interpretation of the plural is exclusive. This is represented by $[-\text{atomic}]$. This corresponds to the normal cases where plurals appear in upward entailing environments. The plural is in complementary distribution with the singular under Num. (36) provides the semantic interpretation of NumP. Note that, since in Tunisian Arabic, the plural starts at two rather than three, as one would expect in a system with a strict dual, we are not using the $[\pm\text{minimal}]$ feature for Tunisian Arabic plurals.

In Standard Arabic, Num would have an extra feature, namely $[-\text{minimal}]$ (See next section for the dual).



(36) $[[+\text{additive}]]([[-\text{atomic}]][[n\text{P}]]) =$
 $= \lambda x. Q(x) \ \& \ Q \sqsubset ([[-\text{atomic}]][[n\text{P}]]) \ \& \ \sqsupset y Q(y) \rightarrow Q(x \sqcup y)$

Following Martí (2020), we propose that inclusive plurals have a different structure from that of exclusive plurals. Plurals are thus ambiguous: they can be inclusive or exclusive, and this corresponds to two different structures. On her view, inclusive plurals have the structure in (37) (see also Pereltsvaig, 2014).⁹



9. The structure proposed by Martí (2018), as she points out, “is in fact one possibility considered in Harbour (2014) for languages that make no grammatical number distinctions at all, such as Pirahã or Dëne Suliné.” (Martí 2020: 60) Whether Pirahã or Dëne Suliné truly have no grammatical number, however, is an open question.

(37) is a reduced structure: NumP is not projected and the feature [–atomic] does not appear. Semantically, all we have is the semi-lattice, thus both sums and atoms are available. Inclusive plurals end up with the same minimal structure as general number (see Chapter 2).

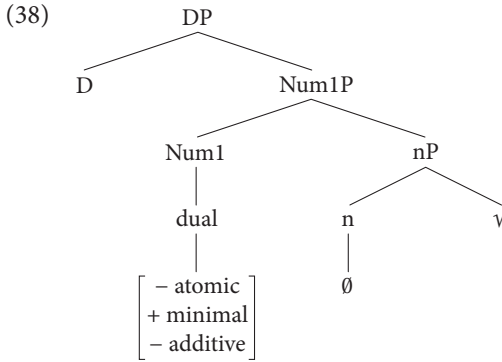
The difference between such nouns and Tunisian Arabic collectives of the kind we are interested in in this book is that while the former can refer to sums and atoms, collectives in upward entailing environments can only refer to sums (see (14) in Chapter 2). Tunisian Arabic collectives are thus truly ambiguous between a structure where Num is projected and one where it is not.

A potential problem with the structure in (36) is that inclusive plurals, like exclusive plurals, agree in number with verbs and adjectives, so it is not clear how this is achieved with a structure that lacks Num and is devoid of syntactic features. Martí (2018) proposes that the agreement is achieved semantically, applying plural by default, but default verbal agreement is usually singular rather than plural cross-linguistically. The fact that adjectives are possible with inclusive plurals is also problematic, since there are no projections (Num or #) that can host them. Despite its shortcoming, we will simply adopt for the purposes of this chapter Martí's (2018) proposal that inclusive plurals denote a reduced structure (the agreement could be semantic without being by default, as we shall see in Chapter 5, broken plurals are hybrid nouns).

However, an elegant solution to this problem is to adopt an idea sketched by Harbour (2016: 149–152) according to which, in the context of inclusive plurals, a choice function operates on the set of non-atoms provided by NumP, accessing the atoms that constitute them and making them available for interpretation. As pointed out by Martí (2020) herself, this is another possible version of the ambiguity account. It would allow Num to be projected even for inclusive plurals and for the features on Num to be passed on to D and for the inclusive plural to agree with the verb or adjective just like the exclusive plural. This proposal has its own problems, since it is not clear why a choice function cannot be introduced in the case of higher plurals when these are strictly exclusive (see Chapter 4). But it might, in the end, be superior to the reduced structure account. Our proposal in this book is not dependent on either proposal and whichever turns out to be the most sound (or popular) is the one we will adopt.

3.5 Duals

In Harbour (2011), the dual has the structure in (38) with the features $[-\text{atomic}; +\text{minimal}; -\text{additive}]$ associated with Num. Note that, on this view, the dual, like the singular or the plural, is an operation on a semi-lattice. (39) gives the order of composition and the semantic interpretation.



(39) $[[[-\text{additive}]]([[+\text{minimal}]]([[[-\text{atomic}]]([[nP]])))]]=$
 $=\lambda x. Q(x) \ \& \ Q \sqsubset [[+\text{minimal}]]([[[-\text{atomic}]]([[nP]])) \ \& \ \neg \sqsubset y Q(y) \rightarrow Q(x \sqcup y)$

In Tunisian Arabic, the dual is formed by the suffixation of the marker *-i:n* to a noun, as shown in (40).

(40) *nhar* → *nhar-i:n* [Tunisian Arabic]
 day.SG day-DU
 ‘one day, two days’

The dual in Tunisian Arabic can receive the structure in (38). But it must be noted that the function of the dual is weakening in many dialects of Arabic, where it is often used simply as a plural allomorph on nouns referring to things that usually occur in pairs. The use of the dual as an exponent bearing the meaning of the quantifier “two” is limited to nouns belonging to specific categories, e.g. units of measure, units of weight, units of time, commonly used foods, currencies. As illustrated in (41), this is the case for nouns such as *se:q* ‘foot’, where suffixation of the marker *-i:n* results in a plural meaning instead of a dual one. These cases involve the structure for plurals we introduced in Section 3.4. the dual mark is simply an allomorph of the plural morpheme.

(41) *se:q* → *seqq-i:n* [Tunisian Arabic]
 foot foot-PL
 ‘foot, feet (not necessarily two)’

In addition, plural marking in Tunisian Arabic has more often than not replaced the function of the dual. As noted by Blanc (1970), any reference to two items or persons is obligatorily marked by the dual morpheme in Standard Arabic (42-a), while modern dialects make use of a free numeral (e.g. *itnen* ‘two’), followed by the noun in its plural form.

- (42) a. *kunna* *sadiq-ayn*. [Standard Arabic]
 were.1.PL friend-DU
 ‘We (both of us) were friends.’
 b. *kunna* *asdiqa*.
 were.1.PL friend.PL
 ‘We (two or more of us) were friends.’

Evidence from the interpretation of plurals (they include items referring to two) indicates that the dual is not a strict feature of Tunisian Arabic grammar. This is why our Tunisian Arabic plural did not contain the feature [\pm minimal].

This brings Section 3.5 to an end. In the next section, we summarize the present chapter and conclude.

3.6 Conclusion

In this chapter, we gave structures for Tunisian Arabic singulars, singulatives, plurals, and duals, using a feature-based representation of number. We proposed that singulatives are like singulars except that they involve renominalization, and we established that both sound and broken plurals are associated with the lower number phrase and that inclusive plurals have a different structure from that of exclusive plurals (or alternatively that they lack a choice function). Finally, we briefly considered the case of the dual.

The higher NumP domain

4.1 Introduction

This chapter is concerned with the following two puzzles. First, recall from Chapter 1, that it is possible for singulatives in Tunisian Arabic to be pluralized. The relevant examples are repeated here in (1).

- (1) a. bordgen-a ~ bordgen-at [Tunisian Arabic]
 orange.FEM.SING orange-FEM.PL
 ‘one orange, oranges’
 b. xobz-a ~ xobz-at
 bread.FEM.SING bread-FEM.PL
 ‘one loaf of bread, loaves of bread’

On the view that the singulative performs division (Borer and Ouwayda, 2010; Mathieu, 2012), this is surprising. What is the role of the plural if number and division can be expressed by the singulative?

Second, it is possible for some nouns in Tunisian Arabic to take both plural shapes, as illustrated in (2).¹

- (2) meʕza → mfi:z / meʕz-et [Tunisian Arabic]
 goat.SG goat.PL goat-FEM.PL
 ‘one goat, goats, a few goats’

Why is this possible? In other words:

- (3) a. Why are two plurals for the same noun allowed and what functional head(s) are they associated with?
 b. Is there a semantic difference between the two kinds of plurals?

In this chapter, we propose that both plurals of singulatives and sound plurals in contrasting environments are associated with a higher number head.

1. As already pointed out, *-at* is sometimes pronounced *-et* in Tunisian Arabic. This is phonologically conditioned and has no effect on the meaning.

First, we give a comprehensive account for the observation that plurals of singulatives in Tunisian Arabic allow only an exclusive interpretation and no inclusive reading. We also show that when a given noun in Tunisian Arabic yields two plurals, one broken and one sound, this duality gives rise to differences in meaning. In contrasting contexts, a broken plural yields an inclusive interpretation (in downward entailing environments) while a sound plural yields an exclusive interpretation (Dali, 2020). This shows that the distinction between sound (suffixational) and broken (non-suffixational) plurals is not always a simple phonological contrast and has semantic significance. Our proposal is compatible with the idea that exclusive readings arise through polysemy as in Farkas and de Swart (2010) (see Chapter 1 for details), but it is also compatible with an implicature-based account (Sauerland, 2003; Sauerland et al., 2005; Spector, 2007; Zweig, 2009) if we assume that plurals on the lower Num are inclusive, and may compete with the singular pragmatically, while plurals on the higher Num are exclusive, and by virtue of not containing atomic individuals do not compete with the singular.² Table 4.1 summarizes and foreshadows the results we obtained for the various Tunisian Arabic plurals with regard to clusivity.

Table 4.1 Inclusive vs. exclusive readings of Tunisian Arabic plural forms

	SOUND	BROKEN	CONT. SOUND	CONT. BROKEN	PL. OF SING
INCLUSIVE	✓	✓	✗	✓	✗
EXCLUSIVE	✓	✓	✓	✗	✓

Second, we give an account for the observation that the plural of the singulative and the sound plural when contrasting with a broken plural are plurals of paucity (Wright, 1967, p. 233–234 and Fischer, 2002, p. 53–54 for Classical Arabic and Cowell, 1964, p. 369 for Levantine Arabic).

On our view, the strict exclusive reading and paucal interpretation of Tunisian Arabic plurals are the result of a set of features associated with a higher Number projection. This means that the same plural morpheme can be associated with two different meanings while realizing different features. The plural morpheme in Tunisian Arabic is thus not tied to a single functional head, but surfaces on at least two, a lower Num and a higher Num. This state of affairs arises because the plural morpheme in Tunisian Arabic can refer to a plural or a paucal, as summarized in Table 2, making sound plurals ambiguous.

2. As pointed out by a reviewer, the latter would be in line with the general approach we have developed.

Table 4.2 Functions of the Tunisian Arabic plural suffix

	PLURAL	PAUCAL
FEM	-at	-at
MASC	-i:n	-at

In the course of the discussion, we will demonstrate that, although the plural in the lower Num position operates on a simple n (a semi-lattice), the paucal in the higher Num position operates on a complex n (another semi-lattice), i.e. a derived noun. Each n defines a new nominal predicate. This allows to account for morphological compositionality, a prevalent phenomenon in Arabic where one number can serve as the base of another, including, we argue, the plural of the singulative and the contrasting sound plural (both sharing the same structure).

4.2 Plural of the singulative

In this section, we show that the singulative can be pluralized, creating a plural that, as we shall see for Tunisian Arabic, contrasts semantically with the collective noun. In Tunisian Arabic, pluralization of the singulative is realized by suffixation (via *-at*), as seen in (4).

- (4) dud-a ~ dud-a-at [Tunisian Arabic]
 worm-FEM.SING worm-FEM.SING-FEM.PL
 ‘a worm, worms’

This phenomenon is also prevalent in Standard Arabic. Consider the example in (5).

- (5) tamr-a ~ tamr-a-at [Standard Arabic]
 date-FEM.SING date-FEM.SING-FEM.PL
 ‘a date, dates’

In Tunisian and Standard Arabic, the feminine rather than the masculine (or default) plural marker is used in this case. This suggests that the result is truly a plural of the singulative and not of the collective, which is always masculine in the language. For instance, the form in (6), where the masculine plural marker is directly added to the collective base is not possible. We thus see that the plural morpheme of the singulative acts on a singular rather than a collective base.

- (6) *tamr-i:n [Standard Arabic]
 date.MAS.COLL-MASC.PL
 ‘dates’

Although the concept of the plural of a unit created out of a collective can seem redundant for speakers of non-singulative languages (since the collective can already express plurality), judging from Arabic, we note that the resulting form has a different denotation from the collective. While Tunisian Arabic collective nouns refer to both sums and atoms (for some, it refers to genus, as formulated in Wright, 1967: 147) and are unrestricted in terms of number, in Tunisian Arabic the plural of the singulative can only refer to exclusivity. Compare (7-a) with (7-b). (7-a) is appropriate in a context where we are referring to kinds (for example, upon entering shop, a collective is the appropriate form to use). In this case, we are not presupposing the existence of a certain quantity of apples – it could be one or more. On the other hand, (7-b) is odd in such a context, since (7-b) is referring to specific objects and presupposing the existence of more than one apple.

- (7) a. $\text{\textcircled{S}and-ek toffeh?}$ [Tunisian Arabic]
 have-2SG apple.COLL
 ‘Do you have apples?’
 (yes, I have one/yes, I have three)
- b. $\text{\textcircled{S}and-ek toffeh-a-at?}$
 have-2SG apple-FEM.SING-PL
 ‘Do you have apples?’
 (yes, I have three/#yes, I have one)

The same holds in negative contexts. In (8-a), the speaker is implying they did not eat any apple, not even one. In (8-b), the speaker is saying that they did not eat more than one apple, but it is possible that they ate one. For instance, the speaker can say “I did not eat apples; I only ate one.”

- (8) a. $\text{ma klit-ef toffeh.}$ [Tunisian Arabic]
 NEG ate.1SG-NOT apple.COLL
 ‘I did not eat any apples’
- b. $\text{?ma klit-ef toffeh-a-at.}$
 NEG ate.1SG-NOT apple-FEM.SING-PL
 ‘I did not eat apples.’

Finally, let us compare the use of the collective and the plural of the singulative in conditionals. In (9-a), where the collective form is used, the speaker is implying that it takes an unspecified quantity of apples to make a cake. It is possible that one single apple, or even half an apple is enough for the cake recipe. However, with the use of the plural of the singulative form, in (9-b), The speaker is specifying that they need a few apples for the cake. If the interlocutor has one apple, they would most probably answer “I only have one, unfortunately (so we cannot make a cake)”.

- (9) a. ken ʃand-ek toffeh n-aʃml-u gattu. [Tunisian Arabic]
 if have-2SG apple.MASC.COLL 1-make-PL cake
 ‘If you have apples, we can make a cake.’
 b. ken ʃand-ek toffeh-a-at n-aʃml-u gattu.
 if have-2SG apple-FEM.SING-PL 1-make-PL cake
 ‘If you have apples, we can make a cake.’

In addition, the plural of the singulative in Tunisian Arabic can only refer to a few entities, generally below ten. In other words, the plural of the singulative in Tunisian Arabic is a *plural of paucity*, as defined by Ojeda (1992). Paucals in other languages with a dual usually refer to numbers from three and above, but in Tunisian Arabic the cut is different: it is from two rather than three.³ Evidence for the idea that the plural of the singulative is a paucal comes from examples such as (10-a), where *tamraat* ‘a few dates’ is not an appropriate complement for the adjective *meljen* ‘full’. When referring to more than ten entities, Tunisian Arabic speakers use the collective form, as in (10-b).

- (10) a. #sanduq meljen b-et-tamr-a-at [Tunisian Arabic]
 box full with-the-date-FEM.SING-PL
 ‘A box full of (a few) dates’
 b. sanduq meljen b-et-tmar
 box full with-the-date.MASC.COLL
 ‘A box full of dates’

Consider the example in (11), illustrating the use of the plural of the singulative in a context where we expect to find a large quantity of fish.

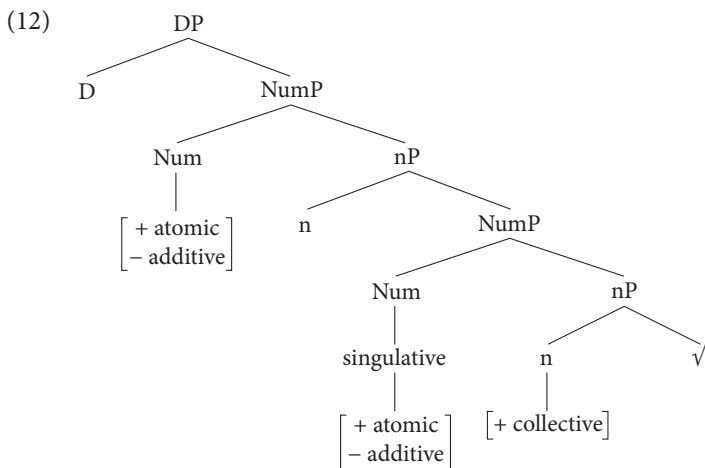
- (11) a. el marʃi i-biʃ-u fi:h hut/#hut-a-at. [Tunisian Arabic]
 the market 3-sell-PL in.3SG fish.MASC.COLL/fish-FEM.SING-PL
 ‘In this market, they sell fish.’
 b. ʃand-ek hut/#hut-a-at?
 have-2SG fish.MASC.COLL/fish-FEM.SING-PL
 ‘Do you have fish?’

While the collective form is suitable in a context referring to a large quantity of fish, the plural of the singulative is not. We propose that this is because the plural

3. Languages with a paucal, but without a dual, such as Bayso (Cushitic) or Walapai (Yuman) (Corbett, 2000, p. 22) have a paucal starting at two (up to six). The fact that the Tunisian Arabic paucal starts at two is perhaps connected to the fact that the dual is no longer very productive (other dialects of Arabic might be different).

of the singulative is a paucal and its use is limited to contexts referring to small quantities. One would not go to the market to find a few fish. Given the fact that the plural of the singulative is restricted in its number reference, it is not expected to fit in questions and downward entailing environments where no specific number of entities is presupposed. This prediction is borne out, as shown in (11-b). In the context where a client is asking the merchant if they sell fish, the use of the collective form would be more suitable. If the client used the plural of the singulative, it would mean that the client is asking to know if they have a small quantity of fish in the store. This is very unlikely, since in general, the question would be about fish in general, as a kind/species, and not about a specific quantity.

We propose that the plural of the singulative is a higher plural as in (12). It belongs to a second NumP projection different from the one we discussed in Chapter 3. Here, we have the plural acting on the singulative. The higher Num is associated with the features $[-\text{atomic}]$ and $[-\text{additive}]$. This accounts for the paucal and exclusive interpretation of the plural in question. Note that a paucal in a language with a dual would normally include the feature $[\text{minimal}]$ to give, $[-\text{atomic}]$, $[-\text{minimal}]$, $[-\text{additive}]$. But this does not correspond to what happens in Tunisian Arabic, as already established, since the paucal in Tunisian Arabic starts at two rather than three. The lower NumP has the interpretation in (13). Semantic interpretation starts afresh with the second nP .

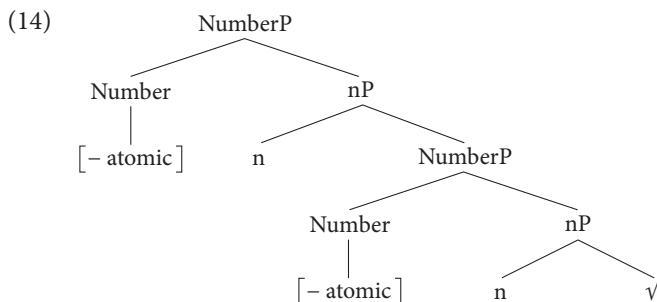


$$(13) \quad [[-\text{additive}]][[+\text{atomic}]][[nP]] = \\ = \lambda x. Q(x) \ \& \ Q \sqsubset ([+\text{atomic}])[nP] \ \& \ \neg \forall y Q(y) \rightarrow Q(x \sqcup y)$$

Without the extra nP layer, the structure would be problematic semantically, since all NumP gives us is a set of atoms. If the higher Num instructs the semantics to look for the nonatomic, nonminimal, nonadditive part of that set of atoms, it will return nothing. We need a new lattice. Since the higher n defines a new nominal

predicate, the higher Num is able to operate on a semi-lattice, as expected semantically. In other words, semantic interpretation starts afresh.⁴

The structure in (12) is inspired by Harbour's (2014, p. 221) structure for plurals of plurals, as represented in (14). The difference between (12) and (14) is that in (12), the higher plural in Tunisian Arabic is not a plural, but a paucal, whereas in (14) it is a plural. The other difference is that the lower Num in (12) is associated with plurality [-atomic] whereas in the case of the plural of the singulative in Tunisian Arabic is of course associated with non-plurality [+atomic].⁵



It must be noted that the higher number functional head is not necessarily associated with paucity. In singulative languages other than Tunisian Arabic, e.g. Welsh, the plural of the singulative is just a plural; it does not denote paucity. In the following triplet, *cosynmau* is not paucal (David Willis, pc.). The same goes for (16).

- (15) a. caws [Welsh]
cheese
'cheese'
- b. cos-yn
cheese-SING
'cheeses'
- c. cos-yn-nau
cheese-SING-PL
'cheeses'

4. As pointed out by Harbour (2014, p. 102), this is "the only way of having multiple occurrences of Number⁰ within the syntax [...]"

5. Our account predicts that it is possible to have a dual of a singulative. This is certainly possible in Standard Arabic and in Tunisian Arabic. The same reviewer also notes that our approach predicts that plural of a plural is possible. This is certainly possible in formal Arabic (Ojeda, 1992), but in Tunisian Arabic (and possibly in other dialects) the plural of the plural is lexically restricted and is not greatly productive. Yet, the semantics and the syntax allow it.

- (16) a. glo [Welsh]
 coal
 ‘coal’
 b. glö-yn
 coal-SING
 ‘piece of coal’
 c. gloo-yn-nau
 coal-SING-PL
 ‘pieces of coal’

It appears then that, depending on the language, the plural of the sigulative is associated with [–atomic]/[–additive] features (yielding a paucal) or with [–atomic]/[+additive] (yielding a plural). In both cases, however, it is clear that a higher Num head is activated, since the lower head has already performed a counting (or dividing, in the sense of Borer 2005) operation.

Our proposal is not unlike other accounts that have proposed two number projections in the nominal domain (see Vásquez-Rojas 2012 for Purépecha and Watanabe 2010 for Japanese), but contrasts with that of Borer (2005) and that of Borer and Ouwayda (2010). This is because Borer (2005) views the plural as unique (and also because on her view, a syntactic operation can target either the head of the functional projection or the specifier and not both), the plural of the singulative cannot be a real plural. The only plural that is relevant is the one under Div. In order to account for the plural of the singulative, Borer and Ouwayda (2010) nevertheless propose that it is not a real plural, but mere agreement. The counting function is realized by the numeral and not by the plural. Putative evidence for such a view comes from cases in Arabic where the plural of the singulative comes with a numeral as seen in (17).⁶

- (17) ʃtar-o sabʃ dje:j-e-et. [Lebanese Arabic]
 bought-3PL seven chicken-FEM.SING-PL
 ‘They bought seven chickens.’ (Borer and Ouwayda, 2010)

Borer and Ouwayda (2010) claim that in this case the numeral is obligatory. On their view, this follows from the fact that the numeral agrees with the noun in the plural. However, this idea is problematic, because numerals are in no way obligatory in the dialects that we surveyed. Two examples appear below, one from Saudi Arabic (18-a), and one from Tunisian Arabic (18-b).

6. Traditional grammars for Classical Arabic often forbid numerals with plurals of singulatives.

noun conditions the interpretation and syntactic level of attachment of the suffix *-at* (Dali, 2020). The interpretation of *-at* is, thus contextual allosemy, just like the exponent *-a*, and can be described by the following rules:

- (20) Semantic realizations of [+FEM,+PL]
- a. [+FEM, + PL] \leftrightarrow Num1[+atomic;-additive]/_____ $n_{[-\text{COLL},+\text{FEM}]}$
 - b. [+FEM, + PL] \leftrightarrow Num2[-atomic;-additive]/_____ Num1 [+atomic;-additive]

To sum-up, we saw in Section 4.2 that the plural of the singulative is interpreted as paucal and exclusively in Tunisian Arabic while in other languages, it is interpreted as plural rather than paucal. We proposed that the plural of the singulative is associated with a higher number phrase, and depending on the language, with [-atomic]/[-additive] features (yielding a paucal) or with [-atomic]/[+additive] (yielding a plural).

4.3 Contrasting plurals

In this section, we show that the exclusive/paucal versus inclusive/non-paucal distinction discussed earlier in this book is not restricted to the collective/singulative system and it can apply in other systems as well. As pointed out earlier, Tunisian Arabic has a broken plural, involving a change in the stem and a sound plural, which is marked by a suffix that varies according to the gender of the base noun. The distinction between sound and broken plurals is traditionally said to be lexically based; each noun is assigned one plural shape or the other.

However, it is possible for some nouns in Tunisian Arabic to take both plural shapes, as illustrated in (21).⁸

- (21) meʃza → mʃi:z / meʃz-et [Tunisian Arabic]
 goat.SG goat.PL goat-FEM.PL
 ‘one goat, goats, a few goats’

Maltese (22-a) and Breton (22-b), both languages with a singulative system, also show this alternation between two plural forms in the count system.

- (22) a. carruta → craret / carrut-iet [Maltese]
 rag rag.PL rag-FEM.PL
 ‘rag, rags, a few rags’

8. As pointed out elsewhere in this book, *-at* is sometimes pronounced *-et* in Tunisian Arabic. This is phonologically conditioned and has no incidence on the meaning.

- b. maneg → maneg-eier / maneg-ou [Breton]
 glove glove-PL glove-FEM.PL
 'glove, pairs of gloves, a pair of gloves'

This phenomenon is quite productive in Tunisian Arabic. The table below gives a list of contrasting plurals in Tunisian Arabic (extracted from the Tunisian Arabic online corpus <http://www.tunisiya.org/>)

Table 4.3 Contrasting plurals in Tunisian Arabic

SINGULAR	BROKEN PLURAL	SOUND PLURAL
ʃarka 'fight'	ʃra:k	ʃarke:t
ʃezla 'wheel'	ʃze:li	ʃezla:t
ħabba 'grain'	ħbu:b	ħabbe:t
ħafla 'party'	ħfe:li	ħafle:t
ħa:ja 'thing'	ħwe:yej	ħa:je:t
bagra 'cow'	bgarr	bagra:t
fi:lem 'movie'	afla:m	fi:lme:t
beskle:t 'bike'	bse:kel	beskle:te:t
kaʃba 'a unit'	kʃebb	kaʃbe:t
kamju:na 'truck'	kme:jen	kamju:ne:t
kelma 'word'	kle:m	kelme:t
korra:sa 'notebook'	kra:ras	korasa:t
meʃza 'goat'	mʃi:z	meʃza:t
mese:k 'pin'	mse:sek	messe:ke:t
moʃkla 'problem'	meʃe:kel	moʃkle:t
qlam 'pencil'	aqle:m	qloma:t
saff 'row'	sfu:f	saffe:t
se:ʃa 'hour'	swe:jaʃ	se:ʃa:t
sahfa 'bowl'	ʃha:f	sahfe:t
sozra 'tree'	sʒar	sozra:t
ʃafra 'blade'	ʃwa:far	ʃafra:t
ʃamʃa 'candle'	ʃmaʃ	ʃamʃa:t
talfza 'television'	tle:fez	talze:t
ta:wla 'table'	twe:wel	ta:wle:t
warqa 'sheet'	wraqq	warqa:t

In Tunisian Arabic, these two plural shapes are used in a contrastive way to express differences in meaning, and based on this observation, we propose in this section that they are each associated with distinct syntactic functions and come with different semantic features.

First, note that not all phonological environments allow the alternation between two plural shapes. In fact, the described phenomenon is only observed on nouns

that can be pluralized by stem change (broken plural). We adopt the proposal made by McCarthy and Prince (1990a), whereby the Arabic broken plural only applies to canonically-shaped stems. The notion of canonical stem is based on prosodic constraints: a stem is considered canonical if it has a minimum of two moras and a maximum of two syllables. Any stem that goes beyond these limits is uncanonical and cannot be internally manipulated into forming a broken plural. This is when the sound plural comes to play; according to this view, the suffixational plural is for uncanonical stems. That Arabic noun pluralization primarily involves stem changes is also echoed by Ratcliffe (1998), with a few differences. Ratcliffe (1998) argues that the sound plural is always used for derived forms like the singulative, adjectives, diminutives, participles, and for recent loanwords that cannot take a broken plural pattern. Defining the exact morphophonological conditioning of the sound plural is beyond the scope of this chapter – see McCarthy and Prince 1990a; Hammond 1988; Ratcliffe 1998; Boudelaa and Gaskell 2002; Kihm 2003, among others for more details about plural formation in Arabic. What matters is the observation that sound plurals are linked to specific morphological environments.

Simply put, when sound plurals appear, there is a morphological reason. Broken plurals are thus not restricted as one would expect of an internal plural (e.g., *foot-feet* in English); they are the primary pluralization strategy in Arabic (see discussion in Chapter 3, Section 3.3.2). What we want to show here is that broken plurals require a certain morphological environment in order to appear, and that suffixation is only used when the necessary conditions are not met for the broken plural to apply. Alternation between two plural shapes is therefore only observed in environments that allow broken plural formation. However, we want to show that in Tunisian Arabic, sound plurals can also be used with stems that are fit for internal pluralization. This brings us to the question of nouns that take both plural shapes. If a noun can take the broken plural template, then why use the sound plural? It seems like this variation between the two shapes is not only conditioned by phonological matters, but also by semantics. We explore this idea in what follows.

As discussed in Chapter 3, phonological contexts seem to motivate variation in the plurals of Arabic. However, as we will show here, sometimes Tunisian Arabic speakers alternate between the sound and the broken plural forms regardless of phonological patterns (Dali, 2020). This is evidenced by cases like the ones in (23), where one and the same noun take both plural shapes.⁹

9. In Standard Arabic, the plural of a singulative can be paucal in relation to the broken plural of a collective, which is interpreted as multal, since direct plurals of collectives are possible (in Tunisian Arabic, they are not). *šağarāt* ‘trees’ (pl. of sing.) vs. *?ašğār* ‘trees’ (broken pl.) from *šağar* ‘trees’ (coll.) (Ojeda, 1992, p. 317).

- (23) a. meʕza → mfi:z / meʕz-e:t [Tunisian Arabic]
 goat.SG goat.PL goat-FEM.PL
 ‘one goat, goats, goats’
- b. korra:sa → kra:ras / korra:sa-at
 notebook.SG notebook.PL notebook-FEM.PL
 ‘notebook, notebooks, notebooks’
- c. saħfa → ša:f / saħf-e:t
 bowl.SG bowl.PL bowl-FEM.PL
 ‘bowl, bowls, bowls’

Although the examples in (23) suggest that there is free variation between the sound and the broken plural in the Tunisian dialect, we use attested examples to show that the use of each form is motivated by semantic factors (see also Dali 2020). More specifically, we show that the variation between the broken and the sound plurals in the count domain parallels that of the collective and the plural of the singulative discussed in Section 4.2. In other words, when plural shapes are used in a contrastive way, the broken plural is inclusive, while the sound plural is exclusive and paucal (when the broken plural is used non-contrastively, it is inclusive, but neutral with regard to paucity).

First, we need to establish the phonological context of this variation. Note that alternation between the two variants is not always possible. As discussed above, the broken plural is a stem-sensitive operation that only applies to canonically-shaped nouns. Therefore, noncanonically-shaped nouns can only take sound plurals and are *not* subject to variation, as they cannot form broken plurals. When the sound plural is assigned by default to a noncanonical noun, no special meaning arises. The resulting plural is inclusive in the right contexts, just like regular plurals. This is illustrated in (24). *Kaskrut* ‘sandwich’ is a French borrowing with a non-canonical shape, thus taking a sound plural. Consider the use of this sound plural in an interrogative context. The person who walks into a restaurant or butcher shop, asking if they make sandwiches, using the sound plural shape as in (24-a) is referring to sandwiches as a kind, and is not necessarily looking to buy more than one sandwich. In the same way, the use of the sound plural in the conditional context in (24-b) would still apply if there was only one sandwich. Finally, the negation in (24-c) implies that there are no sandwiches at all, not even one. These uses of the sound plural in default (non-contrastive) contexts show that the latter shape is inclusive in questions and downward-entailing environments, just like the broken plural and the collective in Arabic.

- (24) a. taʕml-u kaskrut-et? [Tunisian Arabic]
 make-2PL sandwich-PL
 ‘Do you make sandwiches?’

- b. ken famma kaskrut-et ji:bl-i we:hed.
 if there sandwich-PL bring-1SG one
 ‘If there are sandwiches, bring me one.’
- c. ma famm-ej kaskrut-et.
 NEG there-NOT sandwich-FEM.PL
 ‘There are no sandwiches.’

Again, the data in (24) supports the idea that when not used in contrast with the broken plural, the sound plural does not carry any special meaning. Therefore, we will use the term “contrasting sound plural” to talk about the sound plural with a special meaning.

Let us now turn to contexts where the sound plural alternates with the broken plural. This is the case for most canonically-shaped nouns in Tunisian Arabic. Consider the attested examples in (25).

- (25) a. ken falla:h ʃand-u arð w ʃwajja meʃz-et. [Tunisian Arabic]
 was farmer have-3SG land and few goat-FEM.PL
 ‘He was a father who had a land and a few goats.’
- b. kes-sahf-et mahle:h-om.
 these-bowl-FEM.PL beautiful-they
 ‘These bowls, they are pretty.’
- c. tfarr-ejt fi film-et.
 watched-1SG in movie-FEM.PL
 ‘I watched a few movies.’

All examples in (25) involve the sound plurals of canonical nouns. All these instances of the sound plural have a special meaning: they are paucal. Upon asking our informants why they did not use the prescribed broken plural form, they always responded: “because there are only a few/two/some x (x referring to the pluralized entity).” When placed in contexts where reference is clearly being made to more than a few entities, sound plurals of canonical nouns yield odd, infelicitous, even ungrammatical sentences. This is demonstrated in (26).¹⁰

- (26) a. tfoll i-rabbi f-el mfi:z/*meʃz-et. [Tunisian Arabic]
 boy 3SG-breed in-the goat.PL/goat-FEM.PL
 ‘A boy who breeds goats’

10. A reviewer asks the following question: if the paucal interpretation is required for contrasting sound plurals, is the corresponding broken plural only felicitous when the context requires a multiplicity of objects (more than 10)? The answer is no. The contrasting plural is more general; it applies to all relevant contexts.

- b. *ħall-et ħanu:t ma t-bi:ħ ken es-ħa:f/*saħf-et.*
 opened-3SG store neg 3SG-sell only the-bowl.PL/bowl-FEM.PL
 ‘A new store opened that only sells bowls.’
- c. *l-ħa:m ħe:k-a kol jemħa n-emħi l-sinema tfarr-eħt fi barħa*
 the-year that-3SG each week 1SG-go to-movies watch-1SG in many
*aħe:m/*fiħm-et.*
 movie.PL/movie-FEM.PL
 ‘That year I went to the movies every week. I watched a lot of movies.’

As seen in (26), when referring to more than a few entities, only the broken plurals of canonical nouns can be used. The sound plurals are not fit for such contexts since they are paucal.

Contrasting sound plurals also have an exclusive meaning, as evidenced by their use in questions and downward-entailing environments (27).

- (27) a. *ħandkom bse:kel/#besħe:t-et?* [Tunisian Arabic]
 have-2PL bike.PL/bike-FEM.PL
 ‘Do you have bikes?’
- b. *ma lqi:t-eħ krares/#korrasa-at.*
 NEG found.1SG-NEG notebook.PL/notebook-FEM.PL
 ‘I did not find any notebooks.’

In Tunisian Arabic, only the broken plural of canonical nouns can be felicitously used in contexts that favour inclusive readings, e.g., in sentences involving a question or negation. Let us consider the example in (27-a) and imagine a situation where the speaker is at a bike rental place. If she asks the question in (27-a) using the sound plural form, it would imply that she is looking to rent specifically more than one bike, or more specifically a few, which would be odd in this context. If this form was used and only one bike was left at the rental, the employee would reply “no, we only have one left, unfortunately”. The suitable form would be the broken plural, which would be inclusive of the singular – the employee at the bike rental place can answer “yes, I have one left”. In (27-b), if the speaker was looking for notebooks in stores and she found one, then she cannot use the negation with the broken plural form, which is inclusive of the singular. However, the use of the negation with the contrasting sound plural *korrasat* would result in a true statement that can be understood as “I did not find notebooks, but I found *one*”. This corroborates the idea that the inclusive reading is not available with the sound plurals of canonical nouns.

A clear parallel can now be established between the contrasting sound plural and the plural of the singulative. Both have paucal and exclusive readings. In addition, note that the contrasting plural suffix is always feminine, even when the base noun is masculine. The noun *fi:ħem* ‘movie’, for example, is a masculine noun in

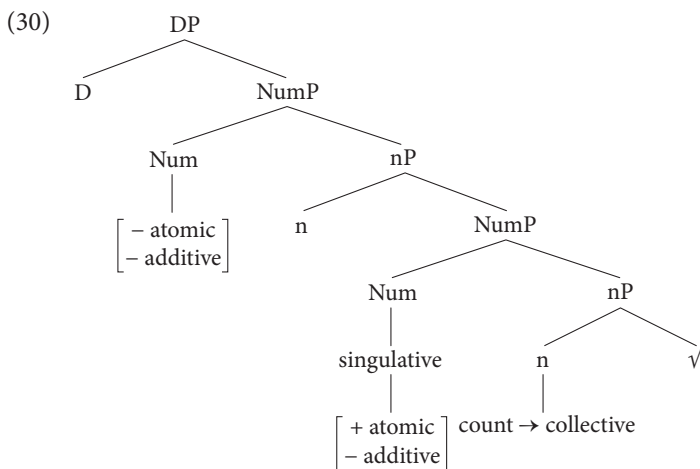
Tunisian Arabic (28-a), and its sound plural *fi:lmēt* uses that feminine plural suffix *-et*, as shown in (28-b).

- (28) a. *fi:lem be:hi* [Tunisian Arabic]
 movie good.MASC.SG
 'a good movie'
 b. *fi:lem* → *aflem* / *fi:lm-et*
 movie.SG movie.PL movie-FEM.PL
 'a movie, movies, movies'

This indicates that the contrasting sound plural is an operation on an intermediate feminine form. Although there is no freestanding intermediate feminine form in count nouns, it is clear that there is a step where the noun becomes feminine morphologically, at least, at an underlying level, as suggested in (29), where we show a parallel between the structure of the contrasting sound plural of a noun of the count class (29-b) and the plural of a singulative (29-b).

- (29) a. *tu:t* [masc.] 'berries' → *tu:ta* [fem.] 'a berry' → *tu:tāt* [fem.] 'a few berries'
 b. *fi:lem* [masc.] 'movie' → *filem* [fem.] 'a movie' → *fi:lmēt* [fem.] 'a few movies'

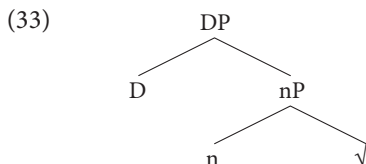
We propose that the nouns in question have been reanalysed as being part of the collective class. Evidence for such a view is the change in gender, indicating an individualizing operation on a collective is involved. We thus propose the exact same structure we had for the singulative and its plural of paucity, with a reanalysis indicated by the shift from count to collective class under *n* (30).



- (31) $[[[-\text{additive}]]([[+\text{atomic}]]([[nP]]))]=$
 $=\lambda x. Q(x) \ \& \ Q\sqsubset([[+\text{atomic}]]([[nP]])) \ \& \ \neg\forall y Q(y) \rightarrow Q(x\sqcup y)$

$$(32) \quad [[[-\text{additive}]][[[-\text{atomic}]][[nP]]]]= \\ =\lambda x. Q(x) \ \& \ Q \sqsubset ([[-\text{atomic}]][[nP]]) \ \& \ \neg \forall y Q(y) \rightarrow Q(x \sqcup y)$$

On the other hand, the contrasting broken plural has a reduced structure, as in (33) (see Chapter 3). It is interpreted inclusively (as pointed earlier in this book, it might be more sound to propose that inclusive plurals have the same structure as exclusive plurals, with just a choice function to distinguish the two).



The emergence of two plural forms for the same root has been observed by other authors, but with different interpretations and hence different implications for the analysis. Ouwayda (2014), for instance, discusses this phenomenon in Levantine Arabic (LA), that showcases interesting differences with Tunisian Arabic. The main observation is that the use of contrasting sound plurals in LA is not restrictive to paucal contexts and must be accompanied by overt numerals. Her conclusions from the LA data is that while the broken plural is associated with “low” plurality, – Div head, in Borer’s (2005) system – the sound plural emerging from the same root is analyzed as an agreement marker of the numeral and therefore associated with #P, a higher projection.

Lahrouchi and Ridouane (2016) also observed that a single noun can display both plural forms in Moroccan Arabic. For instance, the Moroccan Arabic noun *taswera* ‘photograph’ has two possible plural forms: the broken plural *tsawer* and the sound plural *taswerat*. Lahrouchi and Ridouane also noted the semantic contrast between the forms: the sound plural indicates a definite number, while the broken plural has a collective reading. They account for this contrast by positing that broken plurals and sound plurals reside in different syntactic locations, respectively the *n* projection, and the standard *Num* projection. Our account differs from Lahrouchi and Ridouane’s in that while they make a systematic distinction between the two plural shapes, we only consider the *contrastive* sound plural to be different from the broken plural. Sound plurals of noncanonical nouns show no semantic contrast with broken plurals. In addition, although we also associate the plural with a collective interpretation to a location that is lower than that of the plural with a paucal interpretation, we consider the broken plural to be the result of a productive operation and thus to be higher than the *n* projection (see Chapter 3).

4.4 Conclusion

To summarize, we showed in Chapter 4 that the plural of the singulative in Tunisian Arabic is interpreted exclusively and as a paucal. We proposed that this is due to the fact that this plural is associated with a higher Num functional head that carries features such as [-atomic] and [-additive]. Not all singulative languages are the same. In Welsh, the plural of the singulative is not interpreted as a paucal, but as a straightforward plural, which means that the features on the higher Num are [-atomic] and [+additive]. In this chapter, we also reviewed the case of contrasting plurals and saw that when two plurals are used in contrast in Tunisian Arabic, the broken plural is inclusive, while the sound plural is exclusive and paucal, just like the plural of the singulative. We proposed that sound plurals are associated in this case with the higher Num functional head and the featural combination [-atomic]/[-additive] and that a prior operator is via the lower Num functional head producing a (vacuous) singular form marked by the exponent *-a*.

Broken plurals and interpretation

5.1 Introduction

This chapter focuses on broken plurals and the different patterns of agreement they show with verbs (and adjectives). In Section 5.2, we introduce the puzzle. In Section 5.3, we summarize Zabbal's (2002) proposal(s) that tackle(s) the problem with apparent mismatches of agreement. In Section 5.4, we give an analysis of broken plurals as hybrid nouns, comparing them with collectives and sound plurals, and we explain how semantic agreement is made possible between broken plurals and verbs/adjectives. We conclude in Section 5.5.

5.2 Agreement mismatches in Arabic: A puzzle

The aim of this chapter is to account for the following puzzle: in Tunisian Arabic (TA, henceforth), the Φ -features of broken plural subjects normally agree with the verb in gender and number, as in (1-a) (masculine plural), but as (1-b) shows, agreement can also fail to match. Here, *rʒe:l* 'men' interpreted as masculine plural, unexpectedly triggers feminine singular agreement on the verb (on this type of optional agreement in dialects of Arabic other than Tunisian Arabic, see descriptive work by Wright, 1967; Holes, 1990; Belnap 1991; Brustad, 2000; and formal work by Zabbal, 2002).

- (1) a. el rʒe:l xerʒ-u. [Tunisian Arabic]
 the man.PL went.out-3.MASC.PL
 'The men went out.'
- b. el rʒel xerʒ-et.
 the man.PL went.out-3.FEM.SG
 'The men went out.'

It has been noticed in the literature on certain dialects of Arabic (Wright, 1967; Brustad, 2000; Zabbal, 2002, and several others) that, when the optional situation in (1) occurs, plural/masculine agreement correlates with a distributive interpretation whereas singular/feminine agreement correlates with a collective reading. The same facts obtain in TA. (1-a) receives a distributive interpretation whereas (1-b) receives

a collective interpretation. In the right contexts, (1-a) means that the men went out separately, one by one, but in (1-b), that they went out together.

Only broken plurals are subject to this phenomenon, as evidenced by the ungrammaticality of (2-a), where the subject is a masculine sound plural failing to trigger feminine singular agreement on the verb. As shown in (2-b), masculine sound plurals can only trigger masculine plural agreement on the verb.

- (2) a. *el muʔalm-i:n raʒʕ-et l-el-bi:ru. [Tunisian Arabic]
 the teacher-MASC.PL returned-3.FEM.SG to-the-office
 ‘The teachers went back to the office.’
 b. el muʔalm-i:n raʒʕ-u l-el-biru.
 the teacher-MASC.PL returned-3.MASC.PL to-the-office
 ‘The teachers went back to the office.’

It is important to note at the outset that the “weak” agreement (a pre-theoretical term) exhibited in (1-b) is not partial agreement, a well-known phenomenon in Standard Arabic. SVO sentences in Standard Arabic trigger all the Φ -features of the verb (e.g. 3, MASC, PL), as shown in (3-a). On the other hand, in VSO sentences, as in (3-b), the verb is inflected in the singular even though the subject noun is plural. (3-c) shows that singular marking is obligatory in VSO orders.

- (3) a. al-ʔawla:d-u za:ʔ-uu. [Standard Arabic]
 the-boys-NOM came-3.MASC.PL
 ‘The boys came.’
 b. za:ʔ-a al-ʔawla:d-u
 came-3.MASC.SG the-boys.NOM
 ‘The boys came.’
 c. *Ja:ʔ-u: al-ʔawla:d-u.
 came-3.MASC.PL the-boys.NOM
 ‘The boys came.’ (Mohammad 1990: 95)

TA is an SVO dialect.¹ This means that the “weak” agreement in (1-b) has nothing to do with the phenomenon known as “partial agreement”, seen in word order alternations of the type found in Standard Arabic. In addition, not only is (1-b) singular, but it is also feminine, showing a gender shift when comparing with (1-a)

1. Except for subject nouns in intransitive constructions in which case singular/feminine agreement is possible on the verb. Consider the following example:

- (i) wesl-et ktobb-etek. [Tunisian Arabic]
 arrived-FEM.SG book.PL-YOUR
 ‘Your books arrived.’

exhibited in (1) is an interesting case study to add to this literature. Our hypothesis is that the broken plural in (1-b) is in fact singular and feminine; the verb thus agreeing strictly with its subject. We argue that broken plurals are hybrid nouns. Hybrid nouns have mismatching syntactic/semantic Φ -features and are thus able to trigger either syntactic or semantic agreement: Landau (2015) and others; Corbett (2000, 2015), den Dikken (2001); Wechsler and Zlatić (2003); Danon (2011, 2013); Matushansky (2013); Johnson and Joseph (2014); Smith (2015). Examples exist in Icelandic, Serbo-Croatian, British and Canadian English (groups nouns, e.g. *committee*), German (*Mädchen*), Hebrew (*be'alim*), polite plurals (Comrie, 1975), pancake sentences (Enger, 2004, 2013), Russian *vrač* 'doctor' (Matushansky, 2013), etc.⁵ As proposed by Corbett (2000), controllers of agreement – typically nouns – carry two sets of Φ -features, syntactic and semantic, which often match, but need not to. Most of the time, it is impossible to tell whether agreement is syntactic or semantic, since the two types of Φ -features usually coincide. The only way to determine whether the controllee will agree with syntactic or semantic phi-features is by looking at mismatch situations. Focusing on Arabic broken plurals, we propose in a nutshell that, while the agreement is syntactic in (1-b), it is semantic in (1-a).

In an appendix, Zabbal (2002) proposes a similar idea as an alternative proposal to his main thesis according to which sound plurals denote sums and broken plurals denote sums or groups with sound plurals associated with Num and broken plurals on their group interpretation associated with a lower projection akin to *n*. The alternative proposal is that broken plurals are always associated with a projection closer to N while receiving a uniform semantics (as group plurals). This means that full agreement with the verb is viewed as semantic agreement. Such a proposal immediately raises problems. First, as pointed out by Zabbal himself, it does not explain why the verb is feminine when agreeing in the singular. Second, assuming the broken plural is associated with a feminine morphosyntactic feature, this feature would block the agreement relationship between the noun's semantic features and the verb. This problem can be solved by adopting recent analyses of gender (e.g. Kramer 2009, 2015) where some gender features are interpretable while others are uninterpretable. This would make the feminine form associated with broken plurals uninterpretable while the gender features of the controller would be semantic (natural gender).

However, there is a major problem with this. The fact that (6-a) is possible shows that semantic agreement is not necessarily tied to natural gender. The word *biben* 'door', unlike *rjel* 'men', is not associated with natural gender, and thus does

5. As we shall see, this does not mean all hybrid nouns are similar: they are subject to selectional/lexical parameters, see Landau (2015).

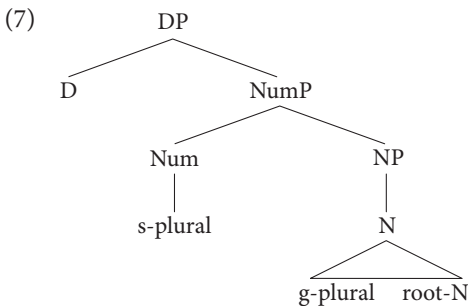
not presumably carry an interpretable feature. Yet, semantic agreement is possible between the noun *biben* ‘door’ and the verb.

In this chapter, we argue that the feminine feature [+FEM], exponed by *-a*, can be associated with a number feature [+group]. In order to explain why it is possible for the gender features of nouns such as *biben* ‘door’ to be active for semantic agreement, we will propose that all gender features are interpretable as in Hammerly (2018) or that, at least, they are visible at LF.

In sum, we propose that broken plurals, as hybrid nouns, are semantically plural but syntactically singular. When agreeing in the singular, broken plurals are interpreted as groups and the role of the feminine exponent is to signal [+group]. We will argue that the number feature [+group], spelled out as feminine agreement, is associated with Num (and ultimately D) and that it does not surface on the broken plural itself (only on agreeing associated lexical items, e.g. verbs, adjectives, that agree with the broken plural), because of the impossibility for broken plurals to have suffixes.

5.3 Zabbal (2002)

Zabbal (2002) makes a distinction between s-plurals (sum plurals) and g-plurals (group plurals). Sound plurals are s-plurals: they refer to sums or sets. Broken plurals can either be s-plurals or g-plurals. This is compatible with a view that broken plurals are ambiguous (rather than hybrid nouns): they constitute two discrete forms instead of one, the latter solution being clearly preferable in that it satisfies Occam’s razor. On Zabbal’s view, broken plurals are s-plurals when the verb carries plural agreement, but they are g-plurals when the verb carries singular/feminine agreement. Sound plurals are always s-plurals, since they always denote sums and agree with the verb in the plural. Zabbal argues that the g-plural is associated with N (making it lexical and derivational) while the s-plural is under Num (inflectional). This is represented in (7).



There is a major problem with (7). On this view, while s-plurals are inflectional (syntactic), g-plurals are derivational (lexical). An important fact to consider, however, is that broken plural forms are predictable and productive. McCarthy and Prince (1990a) note that the broken plural process is so productive that it easily assimilates neologisms and loan words. Consider, for instance, the French borrowing *bank* ‘bank’, which takes the broken plural *bunuk* ‘banks’. Therefore, we do not consider them as lexical.

In addition to productivity, many arguments support an inflectional analysis of the broken plural. First, there is a clear and systematic prosodic connection between broken plurals and their respective singulars, which makes them much less arbitrary than English irregular plurals, e.g., *book/book-s* vs. *woman/women* (see Acquaviva 2008, McCarthy and Prince 1990a, Ratcliffe 1998, Kihm 2003). Arabic has canonical stems from which broken plurals can be created, and broken plurals form 70% of plural nouns in Arabic and are often, if not always, the default plural form (contrary to general beliefs that plural suffixes are the default).

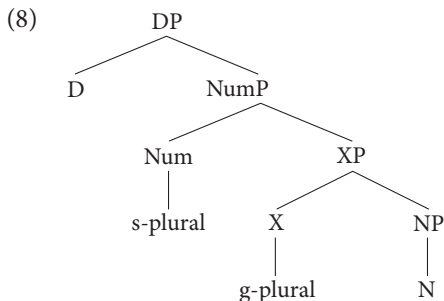
Second, some accounts of the broken plural (Ratcliffe, 1998; Kihm, 2003; Lahrouchi and Lampitelli, 2015) treat it like an operation on *n*, where the broken plural vocalic pattern is applied to the root to give a noun, as an alternative to the singular noun. However, it appears that broken plurals are operations on a stem, and not on a root. For example, the properties of the singular stem are carried over to its broken plural counterpart. These properties include vowel quantity, number of syllables, and consonant spreading (McCarthy and Prince, 1990a; Hammond, 1988). The root itself contains no such information (the Semitic root consists only of consonants). Therefore, several studies of the Arabic broken plural established the form of the singular as the principal factor determining the form of the broken plural (Murtonen, 1964; Levy, 1971).

Third, broken plural patterns also apply to adjectives (e.g., *mri:ð/morða* ‘sick’). Considering this, a stem-forming process analysis is very unlikely. Adjectives typically do not get number information as part of their derivational formation (which is attributed to the head ‘a(djective)’ in the DM framework), but rather acquire this inflectional information through agreement. Claiming that the broken plural is on *n* does not account for this fact.

Based on these arguments, there is no reason to treat g-plurals as derivational or lexical phenomena.⁶

6. According to Acquaviva (2008), broken plurals are lexical in that they are stem forms (produced via Level 1 morphology), but inflectional in that they express number information (via Level 2 morphology). On his view, the broken plurals are in *n* and a morphologically null Number head appears above to express the broken plural’s inflectional properties. This higher dividing operator is necessary for syntax, but not for morphology (Acquaviva 2008: 271). On our view, broken plurals are not in *n*, only in Num.

Aware of these problems, Zabbal (2002) proposes a brief alternative analysis towards the end of his thesis: the g-plural is in fact inflectional and thus not under N. He proposes, as before, that s-plurals are under Num, but g-plurals are under X (an undefined projection). A group operator is generated in X and it turns a plural NP into an atom. This is shown in (8).



As Zabbal (2002) himself realizes, there is still a major problem with this proposal in that, although the sum broken plural and the group broken plural have the same morphological form, they still appear on two different syntactic nodes. If we adopt the view according to which complementary distribution is the hallmark of identity and that this is reflected in the nominal structure, we should expect s-plurals and g-plurals to be generated under the same node. In addition, the difference between broken and sound plurals appears mainly morpho-phonological. Thus, why should they appear on different nodes?

Another problem is that, while sound plurals are always s-plurals, broken plurals are sometimes s-plurals (when they agree with the verb in the plural) and sometimes g-plurals (when they agree with the verb in the singular). In other words, depending on the interpretation, broken plurals have not only a different syntax (as seen above), but a different semantics, depending on whether they agree in the singular or the plural.

Not entirely happy, it seems, with these proposals, Zabbal (2002) entertains the idea, in a short appendix (Section 4.9), that broken plurals have a unified semantics. Zabbal notes a similarity between broken plurals in Arabic and committee nouns in English, and suggests that while all broken plurals are g-plurals with one semantics (group plurals), the distributive reading and the plural agreement on the verb are manifestations of purely semantic number. However, Zabbal (2002) is not sure this analysis will work because it has, according to him, difficulties in accounting for the fact that there is a difference in gender between the g-plural and the s-plural. The g-plural always has feminine gender and the s-plural has the gender of its underlying noun. The problem seems to be the following: assuming that gender features are morphosyntactic features, the feminine form associated with the broken plural intervenes with the agreement of the features of the noun with the verb.

In the next section, we build on Zabbal's (2002) insight, providing an account that solves this problem. Our account will also solve the problem associated with (6). Nouns that carry natural gender are not the only nouns that can trigger feminine singular agreement on the verb, nouns that carry arbitrary gender can do the same. This is completely unexpected under a simple semantic agreement account.

5.4 Broken plurals are hybrid nouns

The unusual pattern of agreement of TA introduced in (1-b) is reminiscent of the behaviour of hybrid nouns. As pointed out in the introduction, hybrid nouns have mismatching syntactic/semantic Φ -features and are thus able to trigger either syntactic or semantic agreement (Landau, 2015 and others, Corbett 2000, 2015, Den Dikken, 2001; Wechsler, 2003; Danon, 2011, 2013; Matushansky 2013; Smith, 2015).

Let us take, as a way of illustration, group nouns in British and Canadian English (*committee*, *team*). These have been argued to be hybrid nouns (Corbett, 2000, 2015; Wechsler and Zlatić, 2003; Smith, 2015). Consider the relevant examples in (9). It is possible for the verb to be inflected in the singular (9-a) or in the plural (9-b).

- (9) a. The committee is meeting next week.
 b. The committee are meeting next week.

The idea is that group nouns have the feature matrix in (10) where either the syntactic features or the semantic features can be accessed. In (9-a), the syntactic features are activated whereas in (9-b), the semantic features are at play. Like others (den Dikken, 2001; Gardelle, 2019), we assume that the singular is the default agreement pattern and that the plural agreement pattern is an added/superimposed effect (possibly of the universal Animacy hierarchy, Gardelle, 2019).

$$(10) \begin{bmatrix} \text{syn: 3 SG} \\ \text{sem: 3 PL} \end{bmatrix}$$

This contrasts with plural subjects, since they have the feature grid in (11).

$$(11) \begin{bmatrix} \text{syn: 3 PL} \\ \text{sem: 3 PL} \end{bmatrix}$$

It has been noticed that the contrast in agreement observed with group nouns correlates with a distributive / collective distinction. For example, in (12-a) the predicate *is old* is predicated of the committee as a whole. It is the committee that is old and not necessarily its members. This is the collective reading. In (12-b), on

the other hand, the predicate *are old* is predicated of the members of the committee. It is the members of the committee that are old and not necessarily the committee itself. This is the distributive reading (example from Barker, 1992, p. 89).

- (12) a. The committee is old. (collective)
 b. The committee are old. (distributive)

Predicates such as *be old* are usually distributive. This can be seen in (13) where a plural subject necessarily triggers plural agreement and is thus interpreted as distributive. The collective reading is not available (the men cannot be old together, 'be old' is an individual property), and **the men is old* is not grammatical.

- (13) The men are old. (distributive)

In (12-a), the agreement is with the syntactic features of the group noun, but in (12-b), the verb agrees with the semantic features of the group noun.

In the case of collective predicates, we have similar results. Singular agreement correlates with a collective reading (14-a) while plural agreement correlates with the distributive interpretation (14-b).

- (14) a. The committee is gathering. (collective)
 b. The committee are gathering. (distributive)

With plural subjects and collective predicates, only the collective reading is available, and singular inflection is impossible **The men is gathering*.

- (15) The men are gathering soon.

Of course, ambiguous predicates such as *leave* will allow both options. This is true for committee nouns (16) and plural subjects (17).

- (16) a. The committee is leaving. (collective)
 b. The committee are leaving. (distributive)

- (17) The men are leaving. (collective, distributive)

In sum, English plural subjects and committee nouns behave differently: only plural agreement is possible with plural subjects, as summarized by the examples shown in (18), (19), and (20). Note that, since a plural subject is used, (18-a) is strictly distributive, (19-a) strictly collective, and (20-a) is, of course, ambiguous.

- (18) a. Men are coughing.
 b. *Men is coughing.

- (19) a. Men are gathering.
 b. *Men is gathering.

- (20) a. Men are leaving.
 b. *Men is leaving.

To recapitulate, group nouns are special in that they can agree with the verb in the singular (and thus yield a collective reading) or in the plural (and yield a distributive reading) no matter which kind of predicate is used while, of course, plural subjects are restricted, since they refer both syntactically and semantically to pluralities. What we see with group nouns is that verb agreement marks the collective/distributive distinction (de Vries, 2013; De Vries, 2015).

Turning now to TA, we see that broken plurals behave like British/Canadian English group nouns rather than plural subjects. Broken plural subjects in Tunisian Arabic can agree in the singular or in the plural quite freely: with distributive (21), collective (22), as well as ambiguous predicates (23).

- (21) a. rʒe:l i-koh̄-u. (distributive)
 man.PL 3.MASC-coughing-PL
 ‘(Some) men are coughing.’
 b. rʒe:l t-koh. (collective)
 man.PL 3.FEM-coughing.SG
 ‘(Some) men are coughing.’
- (22) a. el rʒe:l tɫamm-u. (distributive)
 the man.PL gathered-3.MASC.PL
 ‘The men gathered.’
 b. el rʒe:l tɫamm-et. (collective)
 the man.PL gathered-3.FEM.SG
 ‘The men gathered.’
- (23) a. el rʒe:l xerʒ-u. (distributive)
 the man.PL went.out-3.MASC.PL
 ‘The men went out.’
 b. el rʒe:l xerʒ-et. (collective)
 the man.PL went.out-3.FEM.SG
 ‘The men went out.’

Sound plurals, on the other hand, behave like normal plural subjects. Consider the following examples. (24-a), (25-a), and (43-a) are all grammatical, but (24-b), (25-b), and (43-b) are not. As pointed out for British English plurals above, (24-a) is distributive, (25-a) is collective, and (26-a) is ambiguous (to see how ‘gather’ can be distributive, see discussion around (14) above).

- (24) a. muhands-i:n i-koh̄-u. (distributive)
 engineer-MASC.PL 3.MASC-coughing-PL
 ‘(Some) engineers are coughing.’

- b. *muhands-i:n t-koh.
 engineer-MASC.PL 3.FEM-coughing.SG
 ‘(Some) men are coughing.’
- (25) a. el muhands-i:n tlam-m-u. (distributive)
 the engineer-MASC.PL gathered-3.MASC.PL
 ‘The engineers gathered.’
- b. *el muhands-i:n tlam-m-et.
 the engineer-MASC.PL gathered-3.FEM.SG
 ‘The engineers gathered.’
- (26) a. el muhands-i:n xerj-u. (distributive)
 the engineer-MASC.PL went.out-3.MASC.PL
 ‘The men went out.’
- b. *el muhands-i:n xerj-et.
 the engineer-MASC.PL went.out-3.FEM.SG
 ‘The engineers went out.’

These are the sorts of facts that lead us to propose that broken plurals in TA are hybrid nouns. The idea is that broken plurals are syntactically singular, and so they strictly agree with the verb or the adjective in the singular. As in the case of group nouns described above, this is the default agreement pattern. When the agreement on the verb or the adjective is plural, it is the semantics features on Num that are accessed. This is an superimposed interpretive effect that overrules the default agreement setting. (27) is the feature grid for broken plurals.

- (27) $\begin{bmatrix} \text{syn: 3 SG} \\ \text{sem: 3 PL} \end{bmatrix}$

This is interpreted as a group. Let us assume that a group operator is generated in Num and that it turns a plural NP into an atom. We propose further that *-a* expones a feature [+FEM] and that this morphosyntactic feature can express [+group], as in (28).

- (28) [+FEM] = [+group]

This is not unlike what happens with the singulative feminine, except that the interpretation is the reverse and that the exponent is not spelled out on the broken plural itself. This is because broken plurals are formed by a change in the stem, and gender can generally only be expressed through suffixation in Arabic (Caubet, Simeone-Senelle, Vanhove 1989, Wright 1967: 183). However, the [+group] feature expressed by *-a* surfaces on D and as such agrees with verbs and adjectives. Below, we will provide arguments in favour of the view that *-a* can express groups.

(29), on the other hand, gives the feature grid for sound plurals. Such plurals are syntactically plural and as such agree with the verb only in the plural.

$$(29) \begin{bmatrix} \text{syn: 3 PL} \\ \text{sem: 3 PL} \end{bmatrix}$$

Turning now to gender features of such plurals, we adopt the recent analyses of gender (e.g. Kramer 2015) that have proposed some gender features are interpretable while others are uninterpretable and that both types are generated in *n*. This distinction is equivalent to the more traditional distinction between natural and arbitrary gender (Corbett, 1991). (30) is Kramer's (2015) feature structure.

- (30) Kramer (2015) feature structure
- a. Arbitrary masculine: $n []^7$
 - b. Arbitrary feminine: $n [u +\text{fem}]$
 - c. Natural masculine: $n [i -\text{fem}]$
 - d. Natural feminine: $n [i +\text{fem}]$

The syn(tactic) features in the feature grids above are equivalent to uninterpretable features and the sem(antic) features are equivalent to interpretable features.

The question that now arises is the following: How do we account for semantic agreement in a theory with AGREE? We follow Smith (2015, 2017) – see also Arregi and Nevins (2012) – in assuming a modified version of AGREE where the operation proceeds in two steps, as follows (31) (Smith 2017, p 18).

- (31) Agreement by Probe with Goal proceeds in two steps:
- a. AGREE-LINK: a probe has unvalued Φ -features that trigger Agree with a goal (possibly more than one). The result is a link between probe and goal.
 - b. AGREE-COPY: After the syntactic derivation, the values of the Φ -features of the goal are copied onto probe linked to it by AGREE-LINK.
 - i. if AGREE-COPY happens at the point of transfer, this requires that goal to c-command the probe.

Once the second step (COPY) has occurred, the valued features are no longer active. Semantically motivated agreement involves AGREE-LINK, but requires AGREE-COPY to copy feature values from a valued feature. This is made possible because AGREE-COPY happens at the point of Transfer, when both unvalued and valued features are present, leaving the valued features accessible for (semantic) agreement.

7. Masculine noun-sex differentiable nouns lack gender features in this system.

So far, so good. There nevertheless remains an additional problem to be solved. To see the problem, compare (1-a), repeated here as (32), and (6-a), repeated here as (33).

- (32) *el rze:l xerʒ-u.* [Tunisian Arabic]
 the man.MASC.PL went.out-3.MASC.PL
 ‘The men went out.’
- (33) *el bibe:n tsakkr-u.*
 the door.PL closed-MASC.PL
 ‘The doors closed.’

(32) is unproblematic: assuming semantic features are accessed in this case, the gender features associated with ‘men’ are interpretable. On the other hand, (33) is a priori problematic: this is because the gender associated with ‘doors’ are normally uninterpretable, and it is not clear how these would be accessed, since they are not semantic features. The word *bibe:n* ‘doors’, unlike *rze:l* ‘men’, is not associated with natural gender, and should technically not carry an interpretable feature. Yet, semantic agreement is possible between the noun *bibe:n* ‘doors’ and the verb.

To solve this problem, we adopt the view that *all* gender features are interpretable (Hammerly, 2018) or that, at least, they are all visible at LF. Hammerly (2018) builds his theory on examples such as the following.

- (34) a. *bassin* (MASC) [French]
 ‘basin (geographical)’
 b. *bassine* (FEM)
 ‘washing basin’
- (35) a. *chapelet* (MASC)
 ‘prayer beads’
 b. *chapelle* (FEM)
 ‘prayer room’
- (36) a. *rouet* (MASC)
 ‘spinning wheel’
 b. *roue* (FEM)
 ‘wheel’
- (37) a. *cache* (MASC)
 ‘mask’
 b. *cache* (FEM)
 ‘hiding place’

The idea is that even inanimate/non-natural items can involve gender differences with semantic import. Assuming the pairs above all involve nouns that stem from

the same respective roots, we see that a change of gender signals a difference in meaning. There is often an associated change in morphophonological form (examples (34)–(36)), but this is not always the case (example (37)). As pointed out by Hammerly (2018), alternations in gender within nouns that denote inanimate objects are far less discussed in the literature, although there are many examples of this process. For the sake of simplicity, we will continue using the terms interpretable/uninterpretable, but we will view both types as visible at LF.

In sum, while hybrid agreement for English collective nouns “is common for pluralities of humans (e.g. *committee*), rarer for animals (e.g. *herd*), and impossible for inanimates (e.g. *the forest are...)” (Gardelle, 2019, p. 33), hybrid agreement in Arabic is different: it permits agreement with inanimates, i.e. nouns that are basically low on the Animacy Hierarchy (Corbett, 2000; Croft, 2003).

(38) The Animacy Hierarchy

human > animates > inanimates

(Croft, 2003, p. 130)

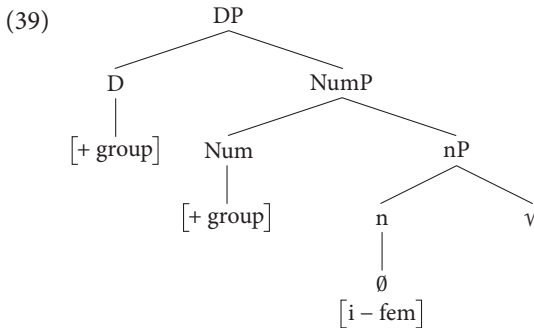
This situation is unique to Arabic broken plurals. In other languages and/or for other nouns, the semantic override agreement superimposed on the basic agreement pattern is usually, if not always, correlated with items in the higher domain of the Animacy Hierarchy. For example, the German word *Mädchen* ‘girl’ is grammatically neuter, and as such, it triggers neutral agreement in all its targets, while the semantic override may trigger the feminine in the personal pronoun (*sie*). In Russian, *vrač* ‘doctor’ is morphosyntactically masculine, but can be used with a feminine pronoun if referring to a female doctor. Again, we see here a case where the semantic override has to do with animates and not the other way around. However, it must be noted that, since hybrid agreement is dependent on the Animacy Hierarchy, it does not rule out semantic override with inanimates, since the latter are part of, and not excluded by, the hierarchy.

In other words, hybrid nouns are not created equals cross-linguistically, their internal features might not be the same (see footnote 13 below) and not necessarily accessible in the same way. Semantic override works differently for different languages and different constructions/hybrid nouns. Hybrid agreement for both gender and number is governed by two universal hierarchies: a semantic one, the Animacy Hierarchy, and a formal one, the Agreement hierarchy, but how these are manifested depends on the language and the noun in question. A formal account of this is needed, for sure, but this is beyond the scope of this chapter.

Let us now give full structures for broken plurals and their associated features (we ignore Person features). First, we assume that sound plurals always denote sums in Arabic and that broken plurals basically denote groups (Zabbal, 2002) (when plural agreement is triggered the interpretation is via semantic agreement).

(39) is the structure for a broken plural referring to “men” interpreted as a group.

The features on Num are semantic while the features on D are syntactic (\emptyset on n indicates the noun class; in this case, a regular count noun, not a collective noun). The [+group] feature is spelled out as *-a* (although not pronounced because gender in Arabic can only be expressed through suffixes in Arabic and not through stem change, as already discussed) and this is picked up in Num. The [+group] feature is similar to [+atomic] in that it can be both a semantic feature (on Num) and a syntactic feature (on D).



Our account differs from that of Fassi Fehri's (2018) who refers to the feminine broken plurals with a group interpretation as "pluratives". Fassi Fehri claims that the plurative is a special kind of plural that differs in many aspects from the regular broken plural, and hence should receive a distinct syntactic treatment. Because pluratives are both numbered and gendered Fassi Fehri proposes a hybrid structure to express the dual nature of the (Gen/group) head involved. On his view, the plurative is hosted on a Gen(der) head that is dominated by the Num head. The plurative is not just Gen, since it cannot be interpreted as "female", and it is also not just any Num, because although it is a plurality, it cannot be distributive (nor exclusive or inclusive), and it does not control "regular" plural agreement. Taking these two observations into account, Fassi Fehri thus integrates the plurative into a hybrid structure comprising both projections.

On our view, broken plurals are not ambiguous, but only have the structure in (39). The [+group] feature on Num indicates that we are dealing with a group. As a group, a broken plural agrees syntactically with the verb or adjective in the singular, but since a group contains members and the sum of its members is a plurality, it is possible for semantic agreement to occur. Assume that n defines a nominal predicate P and structures the root as a join semilattice (Harbour, 2011, 2014; Zabbal, 2002; Martí, 2020), the group selects for example a group of men from the sums in the semi-lattice.⁸

8. The group feature can be thought of as an operator and made to correspond to Zabbal's (2002: 64) definition: $[GP(P)] = x \in At \mid$ there is a $y \in [PL(P)]$ such that $f(x) = y$.

In short, we have formalized Wright's (1933) original insights, summarized in this quote.

- (40) As regards their meaning the plurales fracti [broken plurals] differ entirely from the sound plurals; for the latter denote several *distinct* individuals of a genus the former a number of individuals viewed *collectively*, the idea of individuality being wholly suppressed. [...] The plurales fracti are consequently, strictly speaking, *singulars* with a *collective* signification, and often approach in their nature to *abstract nouns*. Hence, too, they are all of the *feminine* gender, and can be used as masculine only by a constructio ad sensum. (Wright, 1933: 233)

Collectives and broken plurals are not associated with the same gender (collectives are masculines, broken plurals are feminine). This difference resides in the fact that they do not belong to the same class. While broken plurals are part of the count class, collectives are part of the collective/singulative class. The latter is similar to mass nouns in its distribution: collective nouns, unlike count, cannot be pluralized directly (that is, prior to the singulative operation) (42-a) and cannot combine with numerals (42-b). In addition, unlike broken plurals, collectives can never trigger semantic (plural) agreement on dependent categories. The only agreement option for collective nouns is masculine/singular (42-c).

- (41) a. qattu:s → qta:tes [Tunisian Arabic]
 cat.MASC.SG cat.PL
 'cat, cats'
 b. xamsa qta:tes
 five cat.PL
 'five cats'
 c. qta:tes j-etfa:rk-u/t-etfar-ek
 cat.PL MASC-fighting-PL/FEM-fighting-SG
 'Cats are fighting.'
- (42) a. dʒe:ʒ → *deze:jeʒ [Tunisian Arabic]
 chicken.MASC.COLL chicken.PL
 'chickens, chickens'
 b. *xamsa dʒe:ʒ
 five chicken.MASC.COLL
 'five chickens'
 c. dʒe:ʒ j-etfa:r-ek/*j-etfark-u
 chicken.MASC.COLL MASC-fighting-SG/MASC-fighting-SG
 'Chickens are fighting.'

Despite the fact they belong to different classes, on our view, broken plurals are similar to collective nouns in that both are semantically plural, but morphosyntactically singular. There is clear evidence that broken plurals are singular.

First, Acquaviva (2008) observes that some patterns used for the plural of some nouns appear in the singular of other nouns. For instance, the plural *kilaab* ‘dogs’ has the same prosodic structure and vowel melody as the singular *kitaab* ‘book’ (plural *kutub*). Therefore, nothing in the morphology of broken plurals indicates that they are *plurals*. Sound plurals, on the other hand, are associated with true plural morphology, namely a plural suffix that is added to the singular shape. This is why sound plurals are never subject to the agreement pattern alternation: they are true plurals.

Second, it is possible to pluralize broken plurals in TA, as seen in (43) and (44).

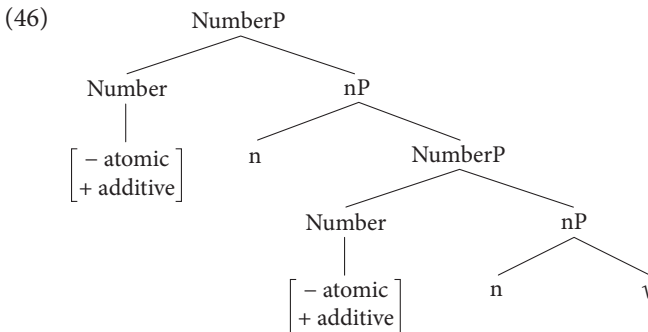
(43) *ħsa:n ħsonna ħsonn-et* [Tunisian Arabic]
 horse.SG horse.PL horse.PL-FEM.PL
 ‘horse, horses, horses’

(44) *kte:b ktobb ktobb-et*
 book.SG book.PL book.PL-FEM.PL
 ‘book, books, books’

The fact that broken plurals can be pluralized shows that they are singular to begin with. (45) is a pluralized broken plural in a sentence. The plural of the broken plural is interpreted as a pile of books in this context, this shows that we have a plural of a group (a pile can be seen as a group).

(45) *l-bi:t l-kolli ktobb-et ktobb-et.* [Tunisian Arabic]
 the-room the-all book.PL-FEM.PL book.PL-FEM.PL
 ‘There were piles of books everywhere in the room.’

We propose that this kind of pluralization is made possible in Arabic, because renominalization applies. The NumP is turned into another *n*, and NumP applies again. The structure we propose is inspired by Harbour’s (2014, p. 221) structure for plurals of plurals, as represented in (46).

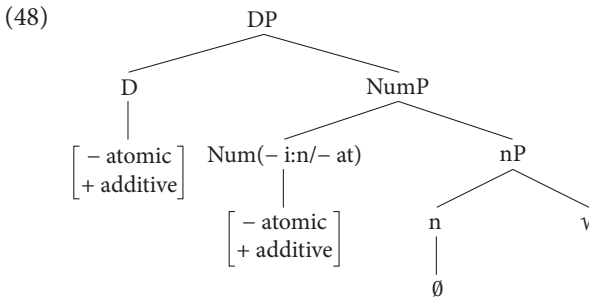


The second *n* introduces a new semi-lattice on which the plural can operate. This proposal explains the residual derivational nature of broken plurals. Derivational accounts might simply argue that broken plurals are in *n* and thus pluralization is achieved via Num. But we reviewed above many arguments in favour of the view that broken plurals are not derivational.

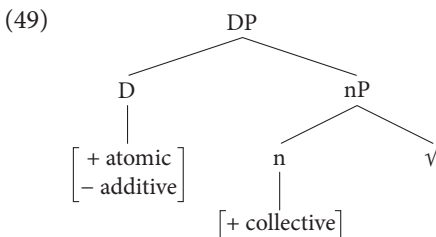
Sound plurals, on the other hand, cannot be pluralized (47). This is because they are plurals syntactically and their featural grid is different from that from broken plurals.

- (47) *mrej-et-et [Tunisian Arabic]
 mirror-FEM.PL-FEM.PL
 'mirrors'

(48) is the structure for sound plurals. These are interpreted as sums and unlike broken plurals are not marked [+ group].



For collectives, we propose the structure in (49), where the [+collective] class feature appears on *n*. This structure has no Num projection, since it cannot combine with numerals. Essentially, following what is proposed in Mathieu (2012, 2009, 2014) and Borer and Ouwayda (2010) as well as Ouwayda (2014), we assume that the role of the Num functional projection (the equivalent of Div in Borer's 2005 proposal) is to divide nouns prior to their combination with the numeral. NumP is not projected in mass noun structures, and that is reflected in their distribution (no pluralization, no direct combination with numerals).



Finally, we should mention diachronic evidence in favour of the view that broken plurals are singular. Historically, the singular was the only number in Semitic languages (Lipiński 2001: 242, Haelewyck 2016: 153). Plural reference was expressed by the singular collective, namely, the broken plural shape and this agreed in the singular only, just like collective nouns do in Arabic. The suffixal (sound) plural is the result of later developments in the history of Semitic languages (Hasselbach, 2014a; b). This means that the broken plural was not syntactically plural in the old number system of Arabic and the plural is thus an innovation.

Next, we turn to the question as to why broken plurals, when interpreted as groups, correlate with feminine agreement on the verb (or the adjective). Feminine agreement appears not only on the verb when the verb is inflected singular, but also on adjectives and other such categories. In (50), the agreement on the quantifier *kolli* ‘all’ and the adverbial expression *mša bšaḏ-ha* ‘together’ are inflected in the feminine singular. This indicates that agreement is controlled by the subject noun, which is, as we argue in view of this and other evidence, syntactically feminine.

- (50) el wled el kolli xerz-et mša bšaḏ-ha. [TA]
 the boy.MASC.PL the all.FEM.SG left-3.FEM.SG with other-3.FEM.SG
 ‘The boys all left together.’

The following two examples provide further evidence that feminine/singular agreement is continuous in the cases at hand.

- (51) šand-ek mefe:kel nafsij-ja. [Tunisian Arabic]
 have-2SG problem.PL personal-FEM.SG
 ‘You have personal problems.’
- (52) xlašt el beb bej tašmel el fweh heḏ-i lkol?
 forced.2SG the door will do.2SG the scandal.PL this-FEM.SG all
 ‘You forced the door to make all these scandals?’

Unlike sound plural suffixes, gender does not surface on broken plural forms (Caubet et al. 1989; Wright 1933: 183). (53) illustrates that even when gender is visible on singular nouns such as *kalb*, ‘dog’, and *mri:ḏ*, ‘sick’, there exists only one form for the broken plural, and, without a proper context, one could not tell which gender it refers to.

- (53) a. kalb kalb-a kleb [Tunisian Arabic]
 dog.MASC.SG dog-FEM.SG dog.PL
 ‘dog (male), dogs (female), dogs’
- b. mri:ḏ mri:ḏ-a morḏa
 sick.MASC.SG sick-FEM.SG sick.PL
 ‘sick, sick, sick’

Since the feminine is not morphologically marked on broken plurals, the only way to detect gender is through the agreement on the verb and other lexical items controlled by the noun. For example, the adjective *nafsijja*, ‘personal’ in (51) is feminine singular, despite the fact that it modifies *mefekel*, ‘problems’, a feminine broken plural. In (52), the broken plural noun *fweh*, ‘scandals’ is the antecedent to a feminine singular deictic pronoun *heði*. Deflected agreement, therefore, simply reflects the feminine gender that does not surface on the broken plural subject. This observation is not surprising, since based on the standard definition of gender by Hockett (1958), gender is reflected in the behaviour of associated words, rather than on the noun itself. This view is the predominant one in the literature and many authors adopted it in their analyses (see also Corbett, 1991; Aikhenvald, 1991; Kramer, 2009, 2015)

One question that arises at this point is whether one probe (say, an adjective) can agree syntactically while another (say, a verb) agrees semantically? The answer is no. At least, for Arabic. In that language, mixed agreement inside and outside DP is not possible. This is consistent with the behaviour of group nouns. In French, group nouns are attested (54-a), but there cannot be mismatches between verbs and adjectives in relation to the hybrid noun, as seen in (54-b).

- (54) a. Le jury, ils prennent le melon. [French]
 the jury they take the melon
 ‘The jury, they are getting a big head.’ (*Le Parisien*, quote from a candidate after a reality show, 2013, cited in Gardelle, 2019, p. 34)
- b. Le nouveau/*nouveaux jury, ils prennent le melon.
 the new.SG/new.PL jury they take the melon
 ‘The new jury, they are getting a big head.’

On the other hand, hybrid nouns of the type found in Hebrew, e.g. *be’alim* ‘owner’, as discussed by Landau (2015), triggers either syntactic or semantic agreement within the DP. Although the Hebrew hybrid noun *be’alim* ‘owner’ is morphologically marked as masculine plural, it is fully compatible with both singular and plural referents, as shown in (55) and (56). (55) and (56) involve matching between the features on the verb and the adjective whereas (57) does not: here, the verb is marked singular while the adjective is marked plural. (58), where the features on the verb are plural but the features on the adjective singular, is not possible:

- (55) ha-be’al-im ha-kodem maxar et ha-makom lifney šana. [Heb.]
 the-owner-PL the-previous.SG sold.3SG ACC the-place before year
 ‘The previous owner sold the place a year ago.’
- (56) ha-be’al-im ha-kodm-im maxru et ha-makom lifney šana.
 the-owner-PL the-previous-PL sold.3PL ACC the-place before year
 ‘The previous owners sold the place a year ago.’

- (57) ha-be'al-im ha-xadavsim hexlit al picul.
 the-owner-PL the-new.PL decided.3SG on demerger
 'The new owner decided on demerger.'
- (58) *ha-be'al-im ha-xadavs hexlitu al picul.
 the-owner-PL the-new.SG decided.3PL on demerger
 'The new owner(s) decided on demerger.'

According to Landau (2015), the patterns described above for Hebrew are made possible because hybrid nouns come with two types of features: morphologically-rooted (=CONCORD) features (hosted on the noun stem) and semantically-rooted (=INDEX) features (hosted on Num, a higher functional head). We adopt his discussion of Serbian/Croatian *deca* 'children' and propose that, like Serbian/Croatian *deca*, broken plurals in Arabic only make their CONCORD features available to attributive agreement. This follows from a selectional parameter: some nouns involve complete independence of the INDEX number from the CONCORD number (Hebrew *be'alim*), standard nouns have a default CONCORD-INDEX matching constraint attached, and exceptional nouns of the *deca*-type, where the INDEX number is fixed.

Finally, (58) is not possible because verbal agreement always originates from semantic features. It is unlike attributive adjectives that can pick up the features from either syntactic or semantic agreement. In (58), the plural marking on the verb indicates that the INDEX value is plural. Therefore, if the agreement on the attributive adjective is singular, then it necessarily originates from the CONCORD value, and this is impossible, since *be'alim* is morphologically plural.

As already hinted, we propose that the feminine in the cases at hand is the phonological spell out (the exponent) of a group feature. That the group interpretation correlates with a feminine exponent can be seen independently in contexts such as professional (59) or ethnic/regional groups (60). In each case, a gender shift from masculine to feminine yields a group interpretation.

- (59) a. ḥazzem [Tunisian Arabic]
 hairdresser.MASC.SG
 'hairdresser'
- b. ḥazzem-a
 hairdresser-FEM.SG
 'female hairdresser or a group of hairdressers'
- (60) a. bedwi
 bedouin.MASC.SG
 'Bedouin'
- b. bedwij-a
 bedouin-FEM.SG
 'Female bedouin or a group of bedouins'

The *-a* morpheme appears on the noun. In this case, agreement on the verb is masculine (61). This is either because marking on the noun is sufficient for marking of the group denotation or because the agreement is automatically done semantically to avoid ambiguity, since feminine marking on the verb, adjective, etc. would express a different semantics, namely that a female bedouin travelled.

- (61) el bedwīj-a sefr-u. [Tunisian Arabic]
 the bedouin-FEM.SG travelled-MASC.PL
 ‘The (group of) bedouins travelled.’

We can think of the feminine exponent as denoting a number rather than a gender feature, since it is correlated with the meaning of a group.

There is evidence that *-a* was not originally associated with gender. In particular, there is an argument from reconstruction, that Proto-Semitic did not have gender (Hasselbach, 2014b) and that it developed from the *-a* morpheme associated with nominalization. (62) summarizes what came first and next.

- (62) nominalization > singulative/group > gender

We provide arguments for this in Chapter 7.

Synchronically, we have a feature [+FEM] (a morpheme) and the features associated with [+FEM] are conditioned by the base of attachment. This can be justified by a weak alloosemy scenario, where [+FEM], expounded by *-a*, is interpreted according to the following rules:

- (63) LF instructions: semantic realizations of [+FEM]
 a. [+FEM] ↔ “singulative” / _____ *n*_[+COLL]
 b. [+FEM] ↔ “nominalizer” / _____ *n*_{INANIMATE}
 c. [+FEM] ↔ “nominalizer” and “female” / _____ *n*_{ANIMATE}

In addition to the rules in (63), we add that the broken plurals are also endowed with a group feature, translated into a feminine exponent. All these synchronic parallel uses of the feminine exponents reflect the different uses of the feminine throughout the historical changes. Although figuring out the meaning of a feminine exponent may seem like a daunting task for learners of the language, one must keep in mind that it simply depends on the basis to which it is attached, as suggested above.⁹

9. A reviewer suggested that the forms seen in feminine, group and singulative nouns are a case of metasyncretism, since it holds across all agreement targets. We instead use the term weak conditioned alloosemy, since it accounts for the fact that the meaning associated with the exponent depends on certain characteristics of the base.

In Section 5.4, we gave an analysis for the alternative ways broken plurals agree with the verb or adjective in Tunisian Arabic. We argued that broken plurals are hybrid nouns: either their syntactic features enter into an Agree relation with the verb or adjective or their semantic features are accessed and the agreement is not syntactic, but semantic. For this to work in Tunisian Arabic, it was argued that gender features are visible at LF. We know this is possible independently (Hammerly, 2018) and this feature is therefore not an ad hoc feature of our analysis.

5.5 Conclusion

The aim of this chapter was to account for an apparent agreement mismatch in Tunisian Arabic: the Φ -features of broken plural subjects do not always seem to agree with the verb in gender and number. We argued that broken plurals in TA are hybrid nouns: either agreement is with the syntactic or the semantic features. We argued that broken plurals denote groups and that the feminine marker *-a* is the spell out of a group feature. It was also shown that broken plurals have a very similar structure to that of collectives. Finally, it was argued that all gender features are visible at LF.

Bare plurals

6.1 Introduction

In the preceding chapters, we saw that the plural can occupy not just one (Borer, 2005), but several functional positions depending on its semantics (see also Alexiadou, 2011; Acquaviva, 2008; Wiltschko, 2008, 2012; Butler, 2012; Mathieu, 2014; Mathieu and Zareikar, 2015; Dali and Mathieu, 2016; Gillon, 2015; Kramer, 2016). The aim of this chapter is to provide further evidence for this view, focusing on Western Armenian and Turkish. We return to the case of indeterminate nouns in these languages already discussed in Chapter 2. Such nouns can express singularity and plurality, depending on the context (often called general or transnumeral number Corbett, 2000). Consider the example in (1) from Western Armenian and (2) from Turkish (on general number in these language, see Bliss, 2004; Görgülü, 2012; Bale et al., 2010, 2011).

- (1) Kirk kənetsi. [Western Armenian]
 book buy.1SG.PERF.PAST
 ‘I bought a book, books.’
- (2) Ali kitap al-dı. [Turkish]
 Ali book buy-PAST.3SG
 ‘Ali bought a book/books.’

It is customary in the literature to treat such nouns as being equivalent to mass terms (Chierchia, 1998) with a denotation of a kind or alternatively as bare NPs with no number projection (Borer, 2005, and many others). For others, such nouns refer to semi-lattices, the denotation being number neutral, thus referring to sums and atoms (Rullmann and You, 2006; Bale et al., 2010, 2011; Bale and Khanjian, 2014).

6.2 General number and plurality: A puzzle

The puzzle with which the present chapter is concerned is that, as shown in (3) and (4), the nouns in question can be pluralized (Sigler, 1996; Donabédian, 1993; Bale et al., 2010, 2011; Bale and Khanjian, 2014; Sağ, 2016; Görgülü, 2012).¹

- (3) Kirker kəetsi. [Western Armenian]
 book.PL buy.1SG.PERF.PAST
 ‘I bought books.’
- (4) Ali kitap-lar al-dı. [Turkish]
 Ali book-PL buy-PAST.3SG
 ‘I bought books.’

This plural is surprising, since the languages in question already have a way to express plurality via general number.² Since it is supposed to refer to sums already, it is impossible for the plural to operate on a semi-lattice directly. It must therefore be the case that such bare nouns are in fact individuated via the Number head first before they are pluralized (see also Mathieu and Zareikar, 2017; Zareikar, 2019, for Persian). We thus propose that pluralization of bare nouns in Western Armenian and Turkish is a two-step process.

First, the noun is atomized giving a singular form (this is achieved via a null exponent of number under Num) and a new noun is created providing a brand new semi-lattice. This is shown in (5). There are two NumP projections. The lower NumP operates on the semi-lattice and returns a set of atoms.

- (5) [_{DP} [_{NumP} Num [_{nP} n [_{NumP} Num Ø [_{nP} book]]]]]

Second, the higher NumP operates morphosyntactically on the singular, and returns a set of atoms from the semi-lattice introduced by the higher *n*. This is shown in (6). This is a case of morphological compositionality where one number is built

1. According to Chierchia (1998), languages with general number are not supposed, typologically, to have plural markers as part of their grammars. But there are, of course, many exceptions, suggesting plurals are not necessarily in complementary distribution with classifiers (it is possible for classifier languages to have optional plurals, as pointed out by Greenberg 1972, 1974, see also Aikhenvald 1991, Gebhardt 2009, Doetjes 2012).

2. This plural is not a plural of abundance and therefore cannot be claimed to be associated with *nP* (Acquaviva, 2008; Lowenstamm, 2008; Tsoulas, 2009; Alexiadou, 2011; Ghaniabadi, 2012). As pointed out by a reviewer, there is a way that this could make sense: while bare nouns are number-neutral, the plural marker makes it clear that we are not dealing with atoms. But, as pointed out by the same reviewer, there are some theoretical reasons to find this surprising.

out of another. Each n defines a new nominal predicate and semantic interpretation starts afresh with each n .

- (6) [_{DP} [_{NumP} Num PL [_{NP} n [_{NumP} Num \emptyset [_{NP} book]]]]]

Evidence for such a view comes from three main observations. First, it turns out to be possible in some cases for bare nouns in WA-type languages to refer exclusively to singulars. This has been shown by Sağ (2016) for Turkish (see also Zareikar, 2019) for Persian.

- (7) Jerexa-n ir kirkə gartats. [Western Armenian]
 child-DEF.DET EMPH.3SG.POSS book.DEF.DET read-PAST.3SG
 ‘The child read his book.’
 not ‘The children/children read their book.’
- (8) Çocuk kitab-ı-nı oku-du. [Turkish]
 child book-POSS-ACC read-PAST
 ‘The child read his book.’
 not ‘The children/children read their book.’ (Sağ, 2016, p. 5)

The generalization seems to be that bare nouns in WA-type languages are ambiguous (Sağ, 2016): they either refer to general number or are singular. The facts in (7) and (8) show that it is not possible to propose an analysis à la Borer (2005) according to which the plural in (3) and (4) might simply be in Div (or Num for us) taking as input the bare NP that general number nouns refer to. The morphological plural is acting on a singular, not a bare NP. We have independent evidence for this in Tunisian Arabic where plurals of singulatives operate on nouns that have already been individuated and where the plural is not on Num but generated in a higher number position, as was made explicit earlier in this book. In Tunisian Arabic, we see a renominalization effect, with the added n introducing a new semi-lattice.

Second, bare plurals in WA-type languages have a different semantics from bare nouns. English bare plurals, for example, are inclusive in downward entailing environments, i.e. referring to ‘one’ or ‘more than one’ (Hoeksema, 1983; Krifka, 1995; Farkas and de Swart, 2010; Schwarzschild, 1996; Sauerland, 2003; Sauerland et al., 2005; Spector, 2007; Zweig, 2009; Brustad, 2000; Bale et al., 2011; Grimm, 2012a; b; Martí, 2020), but bare plurals in WA-type languages are interpreted exclusively, referring only to ‘more than one’, thus excluding the singular. Based on our observations from Tunisian Arabic, we propose that the higher plural is always exclusive. Once division – in Borer’s (2005) sense – has applied, the plural is exclusive.

That Western Armenian and Turkish bare plurals are exclusive has been noted before (Bale et al., 2011, 2010), but these exclusive plurals turn out problematic for the generalization these authors put forward, namely that the plural is marked

morphologically, but unmarked semantically, always referring to sums as well as atoms. They leave the Western Armenian/Turkish puzzle unresolved, but clearly, in these languages, and incidentally also in Tunisian Arabic, as shall be seen in Section 6.2, it is possible for the plural to be marked semantically.

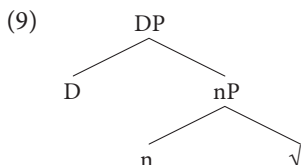
Third, our proposal is bolstered by a range of scope facts. We will show that bare nouns in Western Armenian and Turkish have low scope while, under the appropriate controlled environments, nouns with an added plural may receive wide scope.

This chapter is structured as follows. Section 6.2 provides the background theory necessary for us to proceed together with examples of lower and higher plurals in Tunisian Arabic. Section 6.3 focuses on Western Armenian and Turkish and gives an account of the puzzle presented in this introduction. Section 6.4 concludes the chapter.

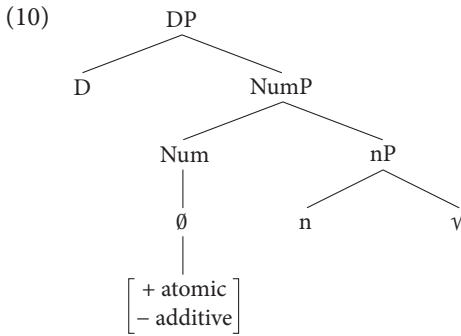
6.3 Atomization and renominalization

In Chapter 3, we saw that Tunisian Arabic plurals can either be generated in a lower NumP or in a higher NumP. Plurals of singulatives are generated in the higher NumP: they are interpreted as exclusive and paucal. In this section, we propose that the plural of WA-type bare nouns is systematically associated with the higher NumP. It does not bear paucal features (it is not interpreted as a paucal), but has true plural features. On our account, NumP can apply recursively provided renominalization is involved. Since Western Armenian and Turkish do not have a dual, we will use only two sets of features, namely [+/-atomic] and [+/-additive].

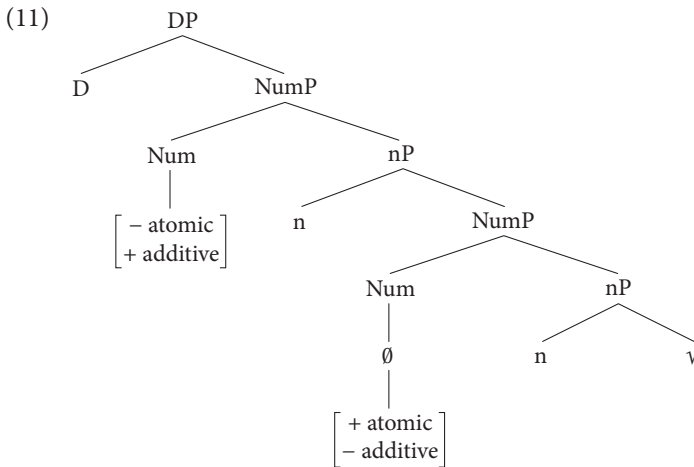
Let us begin with bare nouns in Western Armenian and Turkish. We propose, like Rullmann and You (2006); Bale et al. (2010, 2011); Bale and Khanjian (2014) that they refer to semi-lattices, hence their indeterminate number. Our structure in (9) is identical to the one proposed by Borer (2005) (see also Pereltsvaig, 2014; Martí, 2020).



When a plural is added, we propose that this is done in two steps. First, NumP is projected with a null head for singular number (10).



The next step is the introduction of the plural in a higher NumP domain, as in (12). The features associated with the lower Num are [+atomic; –additive] while those associated with the higher Num are [–atomic; +additive].



The question that immediately arises is why not follow a type of analysis à la Borer and propose that the added plural in Western Armenian and Turkish triggers a DivP projection (or Num for us) and that the plural is inserted under Div? There is evidence against this view. As already hinted in the introduction, it is possible in that some cases for bare nouns in WA and Turkish to denote, not a sum, but an atom. Consider the following examples.³

3. It is not possible either to claim that the plural is just an agreement marker, as done for the Arabic plural of singulatives by Borer and Ouwayda (2010) and Ouwayda (2014), since in Turkish at least, it is not actually possible for numerals to appear with a bare plural. Numerals must merge with a bare noun (Donabédian, 1993; Görgülü, 2012).

- (12) Jerexa-n ir kirkə gartats. [Western Armenian]
 child-DEF.DET EMPH.3SG.POSS book.DEF.DET read-PAST.3SG
 ‘The child read his book.’
 not ‘The children/children read their book.’
- (13) Çocuk kitab-ı-nı oku-du. [Turkish]
 child book-POSS-ACC read-PAST
 ‘The child read his book.’
 not ‘The children/children read their book.’ (Sağ, 2016, p. 5)

As argued by Sağ (2016) for Turkish, bare nouns appear to be ambiguous: they either refer to general number or are singular. The facts in (12) and (13) show that it must be the case that the morphological plural is acting on a singular, not a bare NP. We have independence of this in Tunisian Arabic where plurals of singulatives operate on a noun that has already been individuated and where the plural is not in the lower Num position, but generated in the higher Num position. In Tunisian Arabic, we see a renominalization effect, with the added *n* introducing a new semi-lattice. We propose that this is exactly what is happening in the case of WA-type bare plurals.

We have independent evidence that the plural is generated not in the lower, but the higher Num. The evidence comes from the inclusive/exclusive contrast and scope. First, we note that bare nouns are felicitous in interrogative contexts (14) and (15). This is expected since such nouns refer to atoms as well as sums, i.e. they are inclusive. The following questions can be answered in the singular, e.g. ‘Yes, one’, or in the plural, e.g. ‘Yes, three’. The same judgements are given by Turkish speakers (Sağ, 2016).

- (14) Bəzdig unis? [Western Armenian]
 child have.2.SG
 ‘Do you have (one or more) children?’
- (15) Azer çocuk bak-ır? [Turkish]
 Azar child care-IMP.3SG
 ‘Does Azar take care of (one or more) children?’

If we now use a bare plural in the same context, the interpretation is such that the noun is interpreted only as a plural, i.e. exclusively. As Bale et al. (2011) point out for Western Armenian, “Given a context where it is clearly relevant whether a person has one or more children versus no children and where it is not relevant whether a person has one child versus more than one, Armenian speakers find the question in [(16)] awkward. In fact they often suggest that one should use the singular form of the noun instead. However, when told that [(16)] is the intended question, speakers will answer no if they only have one child but yes if they have more than one.”

- (16) Bəzdig-ner unis? [Western Armenian]
 child-INDEF.PL have.2.SG
 ‘Do you have (two or more) children?’
- (17) Azer çocuk-lar bak-ıyor? [Turkish]
 Azar child-PL care-IMP.3SG
 ‘Does Azar take care of (two or more) children?’

Turning now to negative contexts (18) and (19), we see that, as expected, bare nouns are interpreted inclusively, they refer to sums as well as atoms.

- (18) Kirk tʃikənetsi. [Western Armenian]
 book NEG.buy.1SG.PERF.PAST
 ‘I didn’t buy (one or more) books.’
- (19) Azer çocuk bak-mı-yor. [Turkish]
 Azar child care-NEG-IMP.3SG
 ‘Azar does not take care of (one or more) children.’

When a bare plural is used as in (20) and (21), the situation is different. The bare plural is interpreted exclusively, referring to more than one systematically.

- (20) Kirker tʃikənetsi. [Western Armenian]
 book.PL NEG.buy.1SG.PERF.PAST
 ‘I didn’t buy (two or more) books.’
- (21) Azer çocuk-lar-a bak-mı-yor. [Turkish]
 Azar child-PL-DAT care-NEG-IMP.3SG
 ‘Azar does not take care of (two or more) children.’

Let us now turn to conditionals as shown in (22) and (23). As expected, number-neutral nouns are interpreted inclusively.

- (22) Jete kirk məkənes (ne), hajis əse indzi. [Western Armenian]
 if book buy.2SG (if), please say.2SG.IMP to-me.
 ‘If you buy (one or more) books, please let me know.’
- (23) Azer çocuk bakır-sa, bana haber ver. [Turkish]
 Azar child care-CONT.3SG, me.DAT news pass.2SG
 ‘If Azar is taking care of (one or more) children, let me know.’

On the other hand, a bare plural in the same context yields an exclusive reading: the noun necessarily denotes plurality. The following examples are true if Azar takes care of two children or more but false if she takes care of only one child.

- (24) Jete kirk-er məkənes (ne), hajis əse indzi.
if book-PL buy.2SG (if), please say.2SG.IMP to-me
'If you buy (two or more) books, please let me know.' [Western Armenian]
- (25) Azer çocuk-lar-a bakır-sa, bana haber ver. [Turkish]
azar child-PL-DAT care-CONT.3SG, me.DAT news pass.2SG
'If Azar is taking care of (two or more) children, let me know.'

As pointed out in the introduction, these facts have been noticed before by Bale et al. (2010), Bale et al. (2011) and Bale and Khanjian (2014), but Western Armenian is problematic for them, because it goes against the generalization they put forward, namely that the plural is marked morphologically, but unmarked semantically, always referring to sums as well as atoms. Clearly, in Western Armenian, but also in Turkish, and in fact Arabic as seen previously, it is possible for the plural to be marked semantically. This means that in a context where the children are a, b and c, the English singular 'child', but also the WA-type singular bare noun, denotes (26-a), the English plural 'children' denotes (26-b) while the Persian/Azeri/Turkish/Western Armenian bare plurals corresponding to 'children' denotes (26-c). Nouns denoting general number correspond to (26-b) and have thus the same denotation as English plurals. These facts show that the basic interpretation of the plural is not one that includes sums as well as atoms, as in Sauerland et al. (2005).

- (26) a. child= {a, b, c}
b. children= {a, b, c, ab, ac, bc, abc}
c. children= {ab, ac, bc, abc}

We now turn to our final piece of evidence. We note that the scope of WA-type bare nouns is obligatory low. The following sentences cannot be referring to specific books, only to non-specific books.

- (27) Kirk gə pəndrem gor. [Western Armenian]
book IND find.1SG CONT
'I am looking for books.'
- (28) Şapka arı-yor-muş-dum. [Turkish]
hat search-IMP-PART-PAST.3SG
'He used to look for hats.'

On the other hand, the version of these sentences with a plural marker, as in (29) and (30) allows a wide scope reading.

- (29) Kirk-er gə pəndrem gor. [Western Armenian]
book-PL IND find.1SG CONT
'I am looking for books.'

- (30) Şapka-lar arı-yor-muş-dum. [Turkish]
 hat-PL search-IMP-PARTP-PAST.3SG
 ‘He used to look for hats.’

Thus, while bare nouns in WA-type languages behave like bare plurals in English (Carlson, 1977; Chierchia, 1998) in receiving narrow scope, their plural counterparts allow a reading where more structure needs projecting than the bare NP structure for bare nouns. We assume that the wide scope is available because the plural is generated high in the structure allowing it to escape the DP to take scope over the whole sentence à la Borer (2005). The bare noun lower in the structure is not able to escape the DP to take wide scope.

If bare plurals in Western Armenian and Turkish are high plurals, then we begin to understand why they are associated with definiteness (Donabédian, 1993). For example, *tun-ə* means ‘the house’, *ə* indicating definiteness, but if we use a definite plural, then not only do we need to add an *ə*, but also need to include the plural marker to give *tun-er-ə* ‘the houses’. We saw also that when a bare noun in WA and Turkish is interpreted as a singular rather denoting both sums and atoms, the interpretation of the subject noun was definite. That some plurals are linked to specificity or definiteness has been noticed before (Ghomeshi 2003 and Hamedani 2011 for Persian and Butler 2012 for Yucatec Maya, among others). These are interesting facts, but we must now conclude.

6.4 Conclusion

In this chapter, we explained the differences that arise between bare nouns and bare plurals. Bare nouns refer to sums and atoms and receive low scope while bare plurals refer to sums only and have the possibility of being interpreted as having wide scope. Bare nouns can be interpreted as inclusive, but bare plurals cannot, and we know independently from Arabic that the higher Num position is associated with strict exclusivity. We proposed that the pluralization of bare nouns in Western Armenian and Turkish is a two-step process. First, there is atomization of the noun (via a null head in Num) together with renominalization (the singular form is a word). This is a reflection of the fact that the plural in Western Armenian and Turkish is not in complementary distribution with the singular. Second, the plural operates on the new semi-lattice and refers to sums only. It remains to be seen whether our findings can be generalized to other languages with general number that also have plurals as part of their grammars.

Number and diachrony

7.1 Introduction

In the theoretical context of Distributed Morphology, the aim of this chapter is to provide evidence for the idea that historical changes are not limited to changes in the status of linguistic terminals from M-words to Sub-words or vice versa (Roberts and Roussou, 1999, 2003; Van Gelderen, 2011), but that historical changes or innovations can occur *within* M-words (Diertani, 2011). The terms ‘M-word’ and ‘Sub-word’ are defined as follows (Diertani 2011: 20, based on Embick and Noyer 2001).

- (1) a. M-word: (potentially complex) head not dominated by further head projection.
- b. Sub-word: terminal node within an M-word (i.e., a Root or feature bundle).

The possibility of grammaticalization of a derivational formant to an inflectional one is certainly part of Kuryłowicz’s (1965) classical definition of grammaticalization (2),

- (2) Grammaticalization consists in the increase of the range of a morpheme advancing from a lexical to a grammatical or from a less grammatical to a more grammatical status, e.g., from a derivative formant to an inflectional one.
(Kuryłowicz 1965: 52)

and it has been a topic of significant discussion in typological studies (Comrie, 1985 for Chukchi; Mithun, 1988 and Langdon, 1992 for a number of North American languages; Booij, 1996 for German and Dutch; and Mithun, 2010 for Yup’ik and Cherokee). However, the possibility that a derivational morpheme (a Sub-word) can change into an inflectional one (another Sub-word) or vice versa has been seldom studied over the years in Generative grammar and little attention has been paid to it (notable exceptions include Diertani 2011, Koutsoukos and Ralli 2013, Koutsoukos 2018).

The aim of this chapter is to fill this gap. In studying changes involving inflectional and derivational morphemes, this chapter offers some support for the inflectional/derivational distinction in Distributed Morphology. While traditionally the distinction between inflection and derivation does not have clear theoretical status

in such a framework (Halle and Marantz, 1993, 1994), it has been proposed since at least Marantz (2007) (see also Embick, 2010) that derivational morphology can be made to correspond to the first phase (the category-determining phase: *a, n, v*, etc.), while inflectional morphology is everything above.

Our case study is the suffix *-a* in Arabic and in Semitic more broadly. Synchronically, *-a* constitutes an interesting puzzle because it is used, not only as a gender marker as in (3), but it is also used to produce nouns from adjectives (4), groups from singulars (5), and singulatives from collectives (6). The suffixation of *-a* turns all these nouns into syntactically feminine nouns.

- (3) a. ami:r
prince.MASC.SG
'prince'
b. ami:r-a
prince-FEM.SG
'princess'
- (4) a. safi:d
happy
'happy, happiness'
b. safa:d-a
happiness
'happiness'
- (5) a. zazza:r
butcher.MASC.SG
'butcher'
b. zazza:r-a
butcher-PL
'butchers'
- (6) a. bi:ð
egg.COLL
'eggs'
b. bi:ð-a
egg-SING
'an egg'

That the nouns in (3)–(6) are all marked feminine is somehow strange. For example, why should 'butchers' become "feminine" when viewed as a group? Or why should a singulative, which is equivalent semantically to a singular, be marked as feminine? Or why should nominalization be expressed by a feminine marker? (the latter is common cross-linguistically and has been addressed by Lecarme 2002; Kihm 2005; Lowenstamm 2008; Kramer 2015 and others, but it is not clear why the feminine

marker is used rather than something else). These questions are rarely addressed in synchronic studies of number features of Arabic and an explanation is called for.¹

Diachrony provides us with clues for this state of affairs: there is evidence from reconstruction studies (Brocklemann, 1908; Speiser, 1936; Hasselbach, 2014a; b) that *-a* was originally a derivational morpheme expressing nominalization, as in (4), and that it was only secondarily associated with number and then later with feminine gender (3), giving us the sequence in (7).

(7) nominalization > group/singulative > gender

Our goal is to formalize this series of historical changes. We propose that the gender-marking properties of *-a* developed out of the reanalysis of a pre-existing morpheme with a change in meaning and that this was achieved through Affix migration (Diertani, 2011).² The element *-a* went from exponing a derivational morpheme (expressing nominalization) to exponing an inflectional morpheme (a feature bundle expressing number), and then from exponing yet another feature bundle, now associated with gender, a derivational morpheme (on reanalysis, see Heine et al., 1991; Harris and Campbell, 1995; Hopper and Traugott, 2003).³

Our hypothesis is that this happened because of a series of erroneous parsing by language learners of the structural position of the exponent. As pointed out by Diertani (2011), affix migration or reanalysis happens when there is one (or more) phonologically null morpheme in the derivation. We propose that this is what happened in Arabic in the case of *-a* except that the exponent *-a* did not lose its original meaning(s) along the way: each time the exponent *-a* acquired new functions, but retained its original interpretation in the appropriate context. In addition, we will see that several steps in the historical changes under review involved analogy

1. Fassi Fehri (2018) gives many examples/uses of *-a* in Arabic, many of which go beyond what is described here. In particular, although very interesting and possibly connected to the use of *-a* as a nominalizer, the grammar of diminutives will not be discussed.

2. As pointed out by Hasselbach (2014b), since both East and West Semitic exhibited the possibility of gender marking via *-a*, we can assume gender was a feature of Proto-Semitic grammar. Proto-Semitic is the stage of Semitic right before the split of the language family into East and West Semitic. The present study, like many others (Féghali and Cuny, 1924; Brocklemann, 1908; Driver, 1948; Cohen, 1964; Aspesi, 1990; Kienast, 2001; Hasselbach, 2014b), aims to go back further in time and find out the origin of *-a*. Therefore, in this chapter, we will use the term ‘early Semitic’ rather than Proto-Semitic.

3. According to Hopper and Traugott (1993: 32): “Unquestionably, reanalysis is the most important mechanism for grammaticalization.” For a different view, see Haspelmath (1998) who proposes that “reanalysis is not only unable to supersede grammaticalization, but is not even necessary to explain the relevant phenomena.” (p. 318).

(extension, deductive innovation, etc., Hopper and Traugott, 2003), an important feature of language change.

All in all, we will see that Arabic was a rich terrain for linguistic change because of three main competing systems of classification and counting: collectives vs. singulatives, singulars vs. plurals, and animates vs. inanimates. We end the chapter by considering the development of plurals in Arabic using analogy with paucals (morphological plurals of singulatives).

The chapter is organized as follows. Section 7.2 explains how Distributed Morphology can help us understand historical changes not only with regard to M-words, but also in relation to Sub-words. Section 7.3 proceeds to our analysis of the development of *-a*. Section 7.4 concludes.

7.2 Distributed Morphology and diachrony

The aim of this section is to explain how linguistic change is accounted for within the framework of Distributed Morphology with a focus on Sub-word historical changes as described by Diertani (2011).

Research in DM has largely focused on synchronic phenomena, giving less attention over the years to historical changes. Diertani (2011) is a notable exception. Like other generative approaches, Diertani (2011) studies the deeper structural properties of grammaticalization (Roberts and Roussou, 1999, 2003; Roberts, 2007; Van Gelderen, 2011; Van Geenhoven, 2000), but unlike the majority of previous generative research in historical changes, Diertani's approach focuses on changes affecting Sub-words rather than M-wordhood (e.g. affix-genesis, grammaticalization, or syntactic change proper).

To give an example of changes affecting M-words, consider the case of modals in the history of English. Roberts and Roussou (1999, 2003) argue that, through a process of grammaticalization, a categorial reanalysis was carried out (see also Lightfoot, 1999; Roberts, 1985) and an M-word changed into another M-Word, i.e. the verb 'must' (*mote* in earlier English) evolved into the modal 'must'. A different example illustrates a change from an M-word to a Sub-word: the case of the 'passé composé' in French. First, a new complex perfect developed in Vulgar Latin and began to share aspectual territory with the existing preterit and imperfect. In the various Romance languages, this compound perfect – formed by combining the auxiliary *habere* with a past participle – began to be employed for many functions that were previously expressed through the simple preterit (Haspelmath, 1998, and many others). All other examples reviewed in diachronic generative approaches are of these types: an M-Word changes into an M-Word or an M-Word changes into a Sub-Word. Not much attention has been paid to changes within M-words.

Linguistic change within M-words, and in particular changes from derivational morphemes to inflectional morphemes and vice-versa, has garnered more attention in the field of linguistic typology. Comrie (1985) shows how several forms from the verb paradigm in Chukchi were created from a reanalysis of derivational morphemes: among other changes, the agreement marker for 1st person singular objects came from the antipassive *ine-/ena-* and the imperfect prefix *n-* arose from the derivation of deverbal adjectives. In addition, Mithun (1988) and Langdon (1992) describe, for a number of North American languages, how derivational distributive markers on verbs gave rise to derivational plurality markers on nouns, and finally to the creation of an inflectional plural.

As already pointed out, Diertani's (2011) dissertation is unique in that it tackles linguistic changes within M-words within Generative grammar and within DM in particular. Although Diertani's (2011) approach focuses on Sub-words, it is still consistent with the idea put forward by Roberts and Roussou (1999, 2003), namely that grammaticalization is reanalysis of (a subset of) lexical item in an upward fashion. Reanalysis, on this view, affects the upper part of the functional layer. But as we will see reanalysis can occur in a downward fashion as well and affect the lower part of the functional layer as well. As will become obvious, reanalysis works in tandem with analogy in the development of *-a* from a derivational to an inflectional morpheme and vice versa, and extension or deductive innovation are still important factors in language change.

More generally, we will be assuming, like many others in generative grammar (Lightfoot, 1999; Roberts and Roussou, 1999, 2003), that linguistic change is not a process completely independent of speakers, but that it is instead a discontinuous process very much rooted in individual speakers, particularly children acquiring their native language.⁴ Second, we will assume that morphosyntactic change is best treated as a succession of different synchronic grammars and arise in circumstances of analytical ambiguity, frequently implicating the location and/or nature of various morpheme boundaries, particularly if there are null exponents involved (Diertani, 2011, 3) (with the caveat already mentioned a few times that analogy is also part of the equation).

4. According to Diertani (2011): "each new speaker must recreate the grammar entirely on his own, and if he should fail to replicate exactly the grammar of the speakers who acquired the language ahead of him, an innovative grammar is the result. The speaker himself may remain entirely unaware that he has erred. This is why no independent diachronic mechanisms exist: there is only the conservative grammar, the innovative grammar, and the difference between them." This does not rule out completely the contribution of adult learners as well as the additional effects of use and repetition (Haspelmath, 1998; Bybee, 2006).

With this in mind, we now turn to Affix migration. As pointed out earlier, one of the common sources of morphosyntactic change is a misunderstanding by language learners of which structural position an exponent is associated with (Diertani, 2011). This happens especially when there is one (or more) phonologically null morpheme in the string of words. To illustrate, suppose X in (8) is a root or stem, Y a functional overt morpheme, and Z a functional phonologically null morpheme, the string X Y Z is potentially ambiguous, and it is common for speakers to reanalyze Y as Z.

(8) [X - Y - Z]

The above would typically describe a change from a derivational to an inflectional morpheme, involving a movement from bottom to top. (9) would involve the reverse: a change from an inflectional to a derivational morpheme, i.e., a movement from top to bottom.

(9) [X - Y - Z]

As discussed by Diertani (2011), *'not all structural changes are apparent when they occur within an M-word. When English lost V-to-T movement, there were visible consequences in word order; [...] there are often visible consequences when M-words become Sub-words. If, however, the change is happening within a Sub-word, where the position of Vocabulary Items relative to each other is much more tightly constrained, there may not be any overt signs that a structural change has occurred.'*

Several examples are given by Diertani (2011), one from Georgian and another from Swedish. We shall introduce only one for illustration: the case of Yup'ik. This is a very interesting example because it shows reanalysis of a preexisting morpheme with an effect on meaning (and with preservation of the original function), and it is exactly what we see with the case of affix migration in early Semitic.

Most morphemes in Yup'ik are able to occur in a variety of positions depending on which morphemes take higher scope. This is illustrated by the minimal pair in (10), where the adverbial 'probably' is placed to the right of the embedded tense marker when it modifies the embedded clause, as in (10-a), but to the right of the matrix tense marker when it has matrix scope, as in (10-b).⁵

- (10) Ayagciqsugnarqnillruuq.
 a. ayag ciq yugnarqe ni llru u q
 go FUT probably claim PAST IND.INTR 3.SG
 'He said he would probably go.'
 Ayagciqnillryugnarquq.

5. The first line corresponds to the way it is pronounced; the second line is the morpheme segmentation. There may be mismatches between the two.

- b. ayag ciq ni lllu yugnarqe u q
 go FUT claim PAST probably IND.INTR 3.SG
 ‘He probably said he would go.’

However, each verbal complex in Yup’ik must contain exactly one “mood” suffix (indicative, optative, interrogative, etc.), and exactly one subject agreement marker. In Yup’ik literature, these two suffixes are classified together as the “inflectional ending”, with all other verbal suffixes classified as “derivational”; according to Jacobson (1984), there are over 450 “derivational suffixes” and even more inflectional suffixes. The inflectional suffixes are syntactically more restricted than the derivational suffixes: they must occupy a fixed, clause-final position. Many of the Yup’ik mood suffixes have been traced back to Proto-Eskimo derivational suffixes. One such suffix, illustrated in (11), is the past contemporaneous *-llet-*, translated as ‘when in the past’.

- (11) Ak’a ayagyuarulleمني.
 a. Ak’a ayagyuaq u llet mni
 past teenager be PAST.CONTEMP 1.SG
 ‘Long ago when I was young...’
 Ilaka tauna kassuuteqatallrani.
 b. ila ka tauna kassuute qatar llet ani
 relative 1.SG/SG that marry FUT PAST.CONTEMP 3.SG
 ‘When one of my relatives was going to get married...’

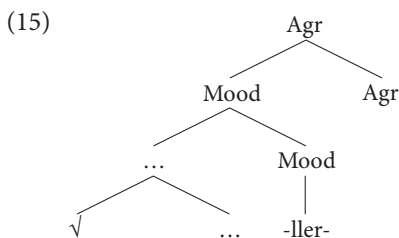
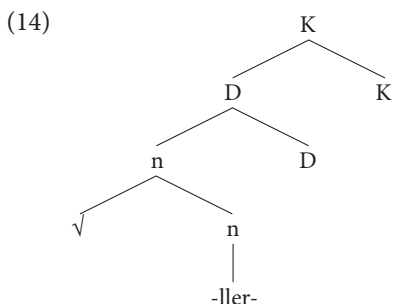
The morpheme *-llet-* is related to a nominalizing suffix still in use in modern Yup’ik, as shown in (12). When used to form nominals, *-llet-* means ‘former X’ or ‘the one who (was) Xed.’

- (12) ekualleq
 a. ekua lleq
 burn PAST.NOMIN
 ‘the one that burned’
 pagaaggun anellret
 b. pagaa ggun ane llet t
 up.above VIA go.OUT PAST.NOM ABS.PL
 ‘those who had left through the upper door’

As mentioned already, the original nominalizing function of *-llet-* is still current in Modern Yup’ik, but it does not occupy the same position as verbal *-llet-*. Nominalizing *-llet-* (13-a) occurs between the root and two other suffixes, the verbalizing morpheme *-u-* and *-yaq-* ‘indeed’. In contrast, in (13-b) the mood use of *-llet-* is restricted to the position immediately before AGR. This shows that despite their etymological connection, synchronically the two *-llet-* suffixes are distinct.

- (13) Ekuallrunritellruyaquq.
 a. ekua llru nrite ller u yaq u q
 burn PAST NEG PAST.NOMIN be indeed INTR.IND 3.SG
 ‘Indeed it is not the object that burned!’
 Qumacunguallrullerani.
 b. qumar cuk u aq llru ller ani
 worm ugly.old be indeed PAST PAST.CONTEMP 3.SG
 ‘As he was indeed a low-life worm...’

Diertani (2011) proposes the following two structures for the morpheme *-ller-*. (14) is the conservative structure while (15) is the innovative derivation. The original function is not lost. Note that the use of *-ller-* as a nominalizer does not disappear in the language.



To summarize Section 7.2: we have reviewed the basic tenets of Distributed Morphology and we have introduced the operation Affix migration as an example of diachronic change that is consistent with Distributed Morphology. In the next section, we turn to our analysis.

7.3 The analysis

We begin with the status of gender and number in earlier stages of Semitic. There is evidence from reconstruction studies (Brocklemann, 1908; Driver, 1948; Cohen, 1964; Aspesi, 1990; Kienast, 2001; Hasselbach, 2014b) that early Semitic did not mark gender by morphological affixes on substantives. For example, **bin(a)t* ‘daughter’ developed from **bin*, now meaning ‘son’, but originally more akin to ‘child’ or ‘youth’. A couple of examples appear in (16) for Classical Arabic (same facts hold for Biblical Hebrew, Akkadian, and Gé‘ez).

- (16) a. abu [Classical Arabic]
 father
 ‘father’
 b. ’ummun
 mother
 ‘mother’

In early Semitic, female human beings and certain early domesticated livestock exhibited gender but only by stem alternation, not by morphological affixes (Hasselbach, 2014b). Other animate nouns, including those denoting human beings and animals, and all other inanimate substantives were unmarked for gender.

Regardless of the morphological spell out of gender features, let us assume that *n* came with gender features *i*[+FEM] and *i*[-FEM] for animate nouns. Pronouns were marked with gender at an early stage, via *-i* for feminine pronouns in the singular⁶ (Speiser, 1936; Hasselbach, 2014b) and, presumably, were generally able to co-refer with all animate nouns (masculine/unmarked and feminine/marked).⁷

Turning now to number in early Semitic, there is also evidence from reconstruction studies that it was not expressed via suffixes (Hasselbach, 2014a; b). Early Semitic had a system with a simple opposition between collective nouns, expressing general number (number is unspecified and collective nouns can refer to both singulars and plurals semantically) and broken plurals, used for cases where plurality needed to be specified.

This means there were two major classes of nouns. Class I, which included (some) animates (those denoting female human beings and certain domesticated

6. As pointed out by Speiser (1936), because such pronouns were marked by *-i* and not *-a*, pronouns, an in particular the exponent *-i* cannot be claimed to be the source of gender in Arabic nouns.

7. As pointed out by Hasselbach (2014b), it is not uncommon cross-linguistically for languages to only distinguish gender in pronouns; they are very high on the Animacy Hierarchy (Corbett, 2000).

livestock), made a distinction between general number and (broken) plurals, and showed stem alternation for gender and number. Class II, which included inanimates and (some) animates, with no corresponding broken plurals, exhibited neither number nor gender morphological marking. The table in (17) summarizes the generalizations so far with regard to number and gender in early Semitic.

Table 7.1 Number/gender in early Semitic

	NUMBER	GENDER
Class I	general number/plurals (via stem change)	masc/fem (via stem change)
Class II	general number	no gender marking

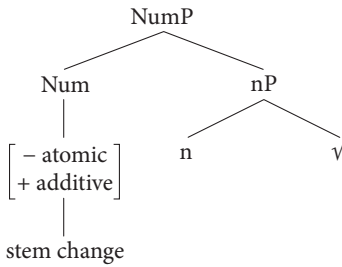
Since plurals were available, we can assume that number was projected in the syntax. Broken plurals have been claimed to be older than sound plurals, and part of early Semitic grammar (Ratcliffe, 1998). They were very likely derived from collectives. As pointed out by Corbett (2000, 119), “since collectives, like distributives, imply plurality this can pave the way for their reanalysis over time as number markers. Sound plurals are plurals that use suffixation.”

Traditionally, the terms “sound” and “broken” are often considered just morphophonological. No syntactic or semantic differences are expected between them: both types should appear in Num. Although they are sometimes (often?) considered lexical while portrayed as resulting from a chaotic process (Wright, 1933), there is in fact a prosodic connection between broken plurals and their respective singular (McCarthy and Prince, 1990a; Ratcliffe, 1998). As seen in Chapter 5, Arabic broken plurals are highly predictable based on the singular shapes, and hence do not need to be learned or memorized. In fact, the broken plural process is so productive that it easily applies to loanwords and neologisms, as long as they have a canonical stem.

To quote Ratcliffe (1998, 117): “there is nothing inherently idiosyncratic about internal plural marking.”⁸ On our view, broken plurals are not in *n*, only in Num (for a different view, where broken plurals are in *n*, see Kramer, 2015 and Kramer, 2016 for Amharic). (17) is a syntactic representation for an animate plural (Class I) in early Semitic. Since the noun is a plural, the features on Num are [−atomic; +additive].

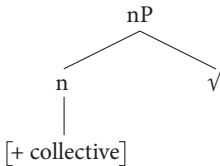
8. Even lexical approaches to Arabic plurals have an inflectional ingredient. According to Acquaviva (2008), whose book is called “Lexical plurals”, broken plurals are lexical in that they are stem forms (produced via Level 1 morphology), but inflectional in that they express number information (via Level 2 morphology). On his view, the broken plurals are in *n* and a morphologically null Number head appears above to express the broken plural’s inflectional properties. This higher dividing operator is necessary for syntax, but not for morphology (Acquaviva 2008: 271).

(17) Animate plural (Class I)



The syntactic representation for an animate or inanimate from Class II appears in (18). These correspond to general number (Corbett, 2000). In other words, these are collective nouns that can refer to both singulars and plurals (semantically, it introduces a semi-lattice, Borer 2005, Harbour 2011, 2014, etc.). Collective nouns in Modern Arabic can still be both animate (*ʒorme:n* ‘ducks’) or inanimate (*lu:z* ‘almonds’). These collectives are the input to the singulative operation (see below). They are marked with [+collective] feature; a classificatory feature (see Chapter 2 and Chapter 3). By default, *n* is interpreted as a count noun, as in (17).

(18) Animate/Inanimate (Class II)



At this stage, it is possible that, when a broken plural was in opposition with a collective, the collective was reanalyzed as a singular. This is because, although collectives denoted semantically both atoms and sums, they in fact looked like singulars on the surface and were potentially ambiguous between (19-a) and (19-b). That general number/plural systems can develop into singular/plural systems is not unheard of (see Corbett, 2000, 267).⁹

- (19) a. noun (collective)
 b. noun-Ø (count)

(20) shows the example of a collective *bi:ð*, that has the same shape and as a regular singular *fi:x*. (21) introduces the structure for these reanalysed singulars.

9. Certain collectives in Semitic languages can serve as both collectives and singulatives: B. Heb. *ādām* ‘a man, men’, *ēs* ‘tree, trees’, Ge’ez *ħarā* ‘army, soldier’. These are examples of how a collective form can be reanalyzed as a singular form without loss of original form/meaning. Also, in some dialects of Modern Arabic, some Classical Arabic collectives, e.g. *baqar* ‘cattle’ have been reanalyzed.

(20) a. bi:ð

egg.MASC.COLL

'eggs'

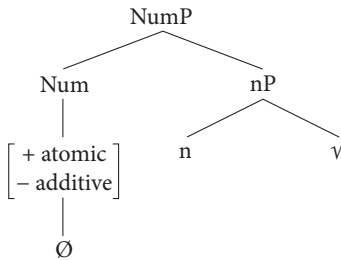
b. ʃi:x

sheikh.MASC.SG

'a sheikh'

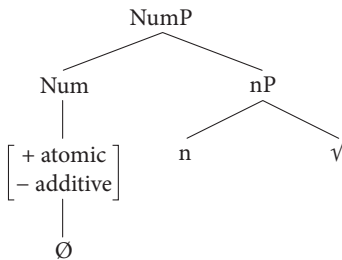
[Classical Arabic]

(21) Animate singular (Class I)

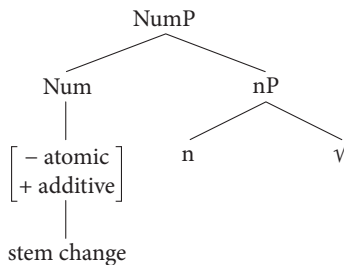


We can imagine that by analogy certain Class II indefinite collectives started to project a number phrase as well and have the noun reanalyzed as a count noun. The change affected some Class II nouns, but not all: many such nouns remain collectives to this day. The change, fuelled by competing number systems, meant that a number phrase was projected for both inanimate singulars and plurals. From (28), we went to (22) for inanimate singulars, and then to (23) for inanimate (broken) plurals.

(22) Inanimate singular



(23) Inanimate plural



This brings us to abstract nouns. Consider the following examples (from Speiser, 1936, 37–38). These nouns are formed with a root/stem and a suffix *-at*. This noun formation is special in that Semitic has very few suffixes.

- (24) a. *kull [Akkadian]
 all
 ‘all’
 b. kull-at
 all-NOM
 ‘totality’
- (25) a. ra‘ [Biblical Hebrew]
 bad
 ‘bad’
 b. *ra‘-at
 evil-NOM
 ‘evil’
- (26) a. ḥasan [Classical Arabic]
 good
 ‘good’
 b. ḥasan-at
 good-NOM
 ‘goodness’

These particular nouns have been claimed to be at the source of the development of *-at* (Speiser, 1936; Hasselbach, 2014b), and we would like to propose that like other inanimates they began projecting a number phrase.¹⁰ We shall give a syntactic representation in a moment, but first, let us review the chronological stages for the development of *-at* and why we should consider abstract nouns to be connected with the original use of *-at*. Consider the following table (from Hasselbach, 2014b, 330–331). It shows what different Semitic languages have in common with regard to the use and functions of *-at*.

10. There are other proposals: one has the ancestor of *-a*, namely *-a*, denote weak or inferior nominals, mostly because the feminine marker in early Semitic is also used for diminutives and pejoratives, see Brockleman (1908); Driver (1948); Fleisch (1961). A variant of this proposal has masculine nouns denoting a “socially active” noun class and feminine nouns denoting a “socially passive” noun class (Diakonov, 1965). See Speiser (1936) for criticism of this theory. Another proposal is that the early Semitic nominal system was based on animacy and that while animates were reinterpreted as masculine, inanimates were reinterpreted as feminine (Meillet, 1921). As pointed out by Hasselbach (2014b, 325), “[a]lthough animacy certainly plays an important role in the development of the Semitic gender and agreement system, it is unlikely that Semitic had a noun class system solely based on animacy at an early stage.”

Table 7.2 Functions of *-at* in individual Semitic languages

Akkadian	abstracts (from ADJs) diminutives (mostly PNs) singulatives (mostly inanimate)
Biblical Hebrew	abstracts (from ADJs and verbal nouns) collectives (mostly animate) singulatives (mostly inanimate)
Classical Arabic	abstracts (from verbal ADJs and verbal nouns) substantivizer (of ADJs and PTCs) collectives (not common) singulatives (independent of animacy) one time action (with verbal nouns) manner (with pattern <i>fi'l</i>)
Ge'ez	abstracts (from ADJs) collectives (independent of animacy) manner

From the table above, we see that there is only one function that is shared by all languages under consideration and that is the marking of abstracts derived from verbal adjectives. Another common property between these languages is the case of the singulative (lacking in Ge'ez only). The other functions can be derived from these two basic ones with nominalization appearing before singulativization.¹¹

(27) summarizes what came first and next. This corresponds to Speiser's (1936) proposed chronological stages for the development of *-a*.¹² Group and singulative appear together, since it is not clear what developed first. The two functions are closely related in that they provide number information depending on the base noun.

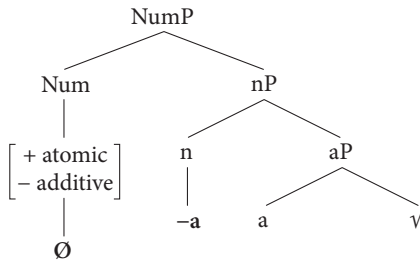
(27) nominalization > group/singulative > gender

Building on this order of events, we propose the following structure for nominalization of adjectival roots. Note that this structure is similar to the one above representing an animate singular, except that *-a* is the exponent for [+N] on *n* (on nominalization in generative grammar, see Alexiadou, 2001, 2010; Marantz, 2001; Arad, 2003, 2005; Borer, 2005, and many others).

11. From Akkadian and Biblical Hebrew, we see that the singulative is used mostly with inanimates. As pointed out by Hasselbach (2014, 338), we can thus infer that "this association with inanimacy was probably original to the morpheme and also fits its use to mark abstracts – abstracts being necessarily inanimate." The singulative was then extended to the use of animates.

12. For a different view, see Hetzron (1967). On his view, gender marking by *-a* was present from the start.

(28) Nominalization (abstract nouns)



Formation of abstracts is also possible from numerals: Arabic **hasmīs-* ‘five’: **hasmīs-at-* ‘quintet’ and verbs: **wtb* ‘dwell’: **tib-t-* ‘dwelling’; Akkadian *nb* ‘call’: *nibi-t* ‘nomination, call’: Biblical Hebrew *qny* ‘acquire’: inf. **qanay-at* (Speiser, 1936, 38). The case of the numeral can receive the same analysis as (28) (on the assumption that numerals are adjectives in Semitic) and the case of the verb is similar to (28) except that instead of *aP* we have *vP*. The nominalizer in all three cases is realized as *-a*.

Now comes the key proposal: the structure in (28) created a segmentation, we believe, that was ambiguous for language learners. The segmentation could be either (29-a) or (29-b) (Classical Arabic *ḥasanat* = goodness, see example (5)).

- (29) a. ḥasan-at-Ø [Classical Arabic]
 b. ḥasan-Ø-at

As pointed out in Section 7.2, one of the common sources of morphosyntactic change is a misunderstanding by language learners of which structural position an exponent is associated with (Diertani, 2011). We propose that this is what happened with *-a* giving us (30).

- (30) [ḥasan-at - Ø]

Suppose then that the exponent *-a*, normally corresponding to a nominalizer, was reanalysed as an exponent denoting number. The use of *-a* as a nominalizer did not disappear, but the exponent *-a* acquired a new function. If correct, the change or rather extension of use went from a derivational morpheme (a feature bundle, basically +N, corresponding to a nominalizer) expressed on *n* to an inflectional morpheme (a feature bundle including the feature [+sg], corresponding semantically to [+atomic; -additive] expressed on Num).

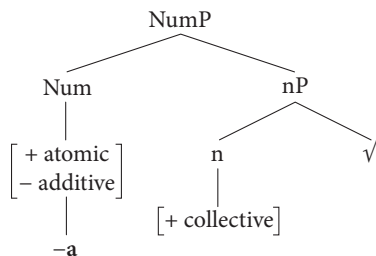
We can imagine that the innovative function of *-a* became useful for collective nouns that had not been reanalyzed as singulars. Such collectives could not be counted or they might have had a broken plural, but no singular. This might explain the emergence of a singulative system in Semitic (on the singulative in Arabic, see Ojeda 1992; Zabbal 2002; Fassi Fehri 2003, 2012, 2018; Borer and Ouwayda 2010;

Mathieu 2012, 2009, 2014; Dali 2020; for evidence that singulative markers are inflectional rather than derivational, see Mathieu 2012, and for a different view, see Acquaviva 2008; Kramer 2015). The following examples illustrate the singulative system of Biblical Hebrew and Classical Arabic (examples from Speiser, 1936, 38). The singulative is derived from the collective through suffixation of the marker *-a* (see Chapter 3).¹³

- (31) a. *šé'ār* [Biblical Hebrew]
 hair
 'hair'
 b. **šá'r-at*
 hair-SING
 'single hair'
- (32) a. *baqar* [Classical Arabic]
 cattle
 'cattle'
 b. *baqar-at*
 cattle-SING
 'one head of cattle'

We assume the following structure for singulatives. Note that the collective noun can be animate (ducks, worms) or inanimate (gold, almonds). Such nouns belonged to Class II, as described above, and belong to the set of collective nouns that were not reinterpreted as singulars.

(33) Singulative



The exponent *-a* became quite useful in early Semitic because it was able to generate contrasts (Meinhof, 1912). When the input noun was not a collective but a count noun, the meaning associated with Num was the reverse of what we found in (33). (34) is an example of a group created from a count noun (examples from Speiser, 1936, 38).

13. Hebrew also has collectives with a pleonastic plural marker that forms the base for the collective: *bēšim* 'eggs'/*bēšō* 'egg', *nəməlim* 'ants'/*nəməlō* 'ant', etc.

- (38) a. baqar-Ø-at [Classical Arabic]
 b. baqar-at-Ø

(38-a) is the conservative segmentation while (38-b) is the innovative segmentation. This means we had a change: the exponent *-a* went from being associated with an inflectional morpheme to being associated with a derivational morpheme, giving us:

- (39) [baqar-Ø-at]

The same goes for groups. In a sequence such as *ʒazzar-a* (meaning ‘butchers’ group), the segmentation is potentially ambiguous between (40-a) and (41-b).

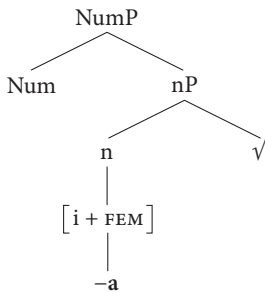
- (40) a. kafir-Ø-at [Classical Arabic]
 b. kafir-at-Ø

(40-a) is the conservative segmentation while (40-b) is the innovative segmentation and the change is the same as above:

- (41) [kafir-Ø-a]

We propose the following syntactic representation. The number marker *-a* was reanalyzed as a gender marker, giving us (42).

- (42) Gender reanalysis



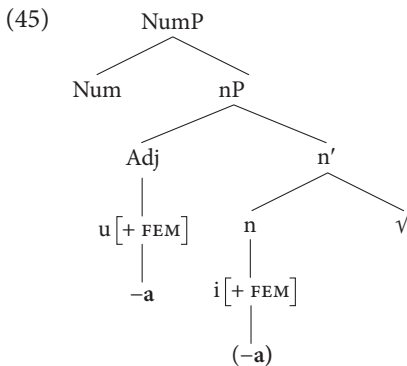
This change was not total in that not all nouns carried this feminine suffix. This is still the case in Modern Arabic. (43-a) and (43-b) are examples from Tunisian Arabic.

- (43) a. bu
 father
 ‘father’
 b. omm
 mother
 ‘mother’

Note that inanimate singulars do not take *-a* either. The feminine marker is only realized on agreeing elements, as shown in (44) for Tunisian Arabic. This means that the use of the exponent *-a* only spread in the case of animates. We come back to inanimates, because they will become relevant again when we discuss the development of the plural in Semitic.

- (44) a. *ʃams qwejj-a* [Tunisian Arabic]
 sun strong-FEM.SG
 ‘a strong sun’
 b. *ʕi:n xaḍr-a*
 eye green-FEM.SG
 ‘green eye’

From expounding the feature $i[+FEM]$, *-a* went on to expone the corresponding $u[+fem]$ feature on targets of agreement. This is how we obtain noun-adjective agreement (verb agreement not shown here). Suppose adjectives are merged in the specifier of *nP* (or adjoined to *nP*, for our purposes, this is equivalent), giving us (45). Following Carstens (2000, 2001), we assume that DP-internal concord does not require a specialized mechanism, and is the result of the same formal operations that give rise to other instances of agreement. The noun and the adjective enter into an Agree relation ($i[+FEM]/u[+FEM]$ checking relation).



Synchronically, *-a* always agrees with adjectives or verbs in the feminine. The agreement is not restricted to things like ‘young man’ or ‘strong sun’; *-a* appears on targets when the singulative, group or nominalizer is used. It appears then that, through time, *-a* was reanalyzed as a gender marker across the board. This means, for example, that although the function of *-a* in a singulative context corresponds to a singular interpretation [+atomic; additive], Num carries a gender feature, in this case a $u[+FEM]$ feature. It is this feature that enters into an agreement relationship with an adjective or a verb.

Synchronically, we have a feature [+FEM] (a morpheme) and the features associated with [+FEM] are conditioned by the base of attachment. This can be justified by a weak allosemy scenario, where [+FEM], exponed by *-a*, is interpreted according to the following rules (this is similar, of course, to rules we had in previous chapters):

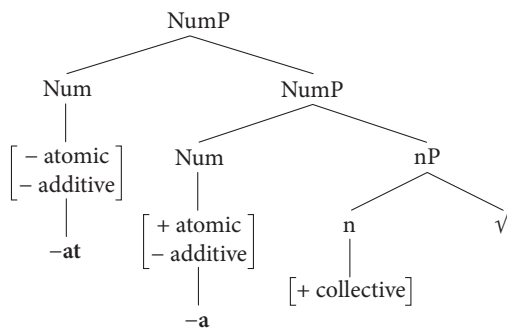
- (46) LF instructions: semantic realizations of [+FEM]
- [+FEM] ↔ “singulative” / _____ $n_{[+COLL]}$
 - [+FEM] ↔ “nominalizer” / _____ $n_{INANIMATE}$
 - [+FEM] ↔ “nominalizer” and “female” / _____ $n_{ANIMATE}$

Let us now turn to the development of the plural in Arabic. Recall that Semitic had no suffixal marking for the plural, only stem change for a subset of nouns. Plurality was of course also expressed by collectives. Let us suppose that the origin of the suffixal marking for plurals in Semitic comes from the singulative system. Once a singulative was created from a collective, it was/is possible to pluralize the singulative form to give: two eggs, three eggs, etc. Consider the example in (47). The plural marker is *-at*.

- (47) a. baqar-a [Classical Arabic]
 cattle-SING
 ‘a head of cattle’
- b. baqar-a-at
 cattle-FEM-PL
 ‘heads of cattle’

We propose (48) as the syntactic representation for the plural of the singulative. A second number phrase is projected. Note that the exponent *-at* corresponds to a feature bundle [−atomic; −additive], since *-at* was/is interpreted as a paucal (the plural of the singulative is a plural of paucity – *jamʿu l-qilla*, latin *pluralis paucitatis*, Wright, 1967, p. 233–234 and Fischer, 2002, p. 53–54 for Classical Arabic and Cowell, 1964, p. 369 for Levantine Arabic).

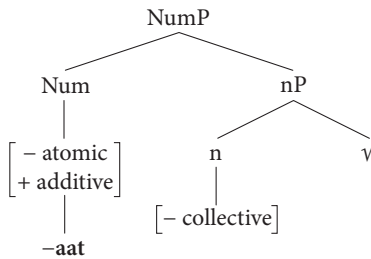
- (48) Plural of singulative



We propose that, by analogy, *-at* started to be used with count nouns. The meaning may have been paucal to start with, but eventually became plural. A single/plural pair appears in (49).

- (49) a. muslim-a [Classical Arabic]
 muslim-FEM.SG
 'female muslim'
 b. muslim-aat
 muslim.FEM.PL
 'female muslims'

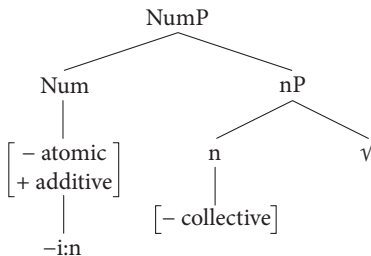
(50) Plural of animates (feminine)



From this and by further analogy, a masculine suffixal plural was created, as in (51).

- (51) a. muzarraḥ [Classical Arabic]
 farmer.MASC.SG
 'a farmer'
 b. muzarraḥ-i:n
 farmer-MASC.PL
 'farmers'

(52) Plural of animates (masculine)

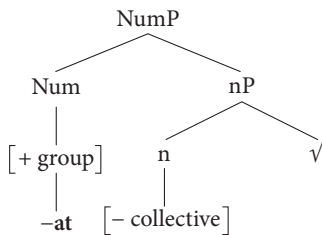


The suffixal plural of inanimates evolved differently. Recall that inanimate singular count nouns do not necessarily carry the marker *-a* (only the agreeing elements do, e.g., adjectives). In addition, the plural of inanimates is, rather oddly, always feminine regardless of whether the singular is masculine or feminine. Consider the examples in (53) and (54).

- (53) a. babur [Tunisian Arabic]
 boat.MASC.SG
 ‘boat’
 b. babur-at
 boat-FEM.PL
 ‘boats’
- (54) a. mreja [Tunisian Arabic]
 mirror.FEM.SG
 ‘mirror’
 b. mreja-at
 mirror-FEM.PL
 ‘mirror’

We propose that indefinites plurals in Classical (and Modern Standard Arabic) denote groups (rather than sums). A group operator is generated in X and it turns a plural NP into an atom (following Zabbal, 2002). The suffix *-at* in Arabic is therefore ambiguous: it can refer to a paucal, a plural, or a group, depending on the context, i.e. base noun.

(55) Plural of inanimates



Evidence that inanimate nouns denote groups comes from agreement. In Standard Arabic, plural controllers designating inanimates systematically trigger feminine singular agreement (Belnap, 1991, 1999). In dialects, e.g. Tunisian Arabic, only the plural is possible. In earlier texts, there was in fact a lot of variation (Beeston, 1975; Belnap and Shabaneh, 1992; Ratcliffe, 1998; Belnap, 1999). It is in the transition from pre-Classical to Classical Arabic that plural nouns denoting inanimate entities underwent, like all nonhuman controllers, a process of standardization that made agreement in the feminine singular nearly categorical in Standard Arabic (Belnap and Gee, 1994).

We would like to propose that when agreement matches with the noun controller, agreement is semantic. The idea is that inanimate nouns in Classical or Modern Standard Arabic are hybrid nouns (see Dali & Mathieu 2020 for broken plurals). The syntactic feature for number is singular while the semantic feature for

number is plural, as in (56) (in the case of dialects we assume grammaticalization of the plural variant, which means inanimate plurals are no longer hybrid nouns, they have been reanalyzed as syntactic plurals and semantic sums).

$$(56) \begin{bmatrix} \text{syn: 3 SG} \\ \text{sem: 3 PL} \end{bmatrix}$$

Plural nouns denoting humans, on the other hand, have the structure in (57). They are not hybrid nouns. They are syntactic plurals referring to sums semantically.

$$(57) \begin{bmatrix} \text{syn: 3 PL} \\ \text{sem: 3 PL} \end{bmatrix}$$

We argued that broken plurals denote groups and that the feminine marker *-a* is the spell out of a group feature.

To summarize Section 7.3: we have seen that, due to tensions between a set of different number and classificatory systems, i.e., collectives vs. plurals, animate vs. inanimate, etc., there have been ample ambiguous strings in the development of Arabic, and thus much reanalysis, coupled with analogy, took place. We have seen that, through Affix migration, the exponent *-a*, originally a nominalizer, was reanalyzed as a singulative as well as a group marker, then later became a gender marker.

7.4 Conclusion

In this chapter, we gave a formal account of the development of *-a* in early Semitic, with a focus on Arabic. We saw how Distributed Morphology can be used for studies on language change, focusing on changes inside M-words. Following a number of authors working with reconstruction, we proposed that reanalysis, through the operation Affix migration (Diertani 2011) and in tandem with analogy, was responsible for the development of number and gender markers in Semitic. Our diachronic account of the development of gender and number in Semitic not only provided support for the operation Affix migration (proposed by Diertani, 2011 for different phenomena), but also provided support for the relevance of the derivational/inflectional distinction in Distributed Morphology.

Conclusions

Using a feature-based theory of number categories (Noyer, 1992; Harbour, 2011, 2014; Nevins, 2011) and focusing on Tunisian Arabic, but including other languages (especially Western Armenian for general number), we proposed that there are two number projections in the noun phrase and that these differ in the features they specify (see also Vásquez-Rojas, 2012; Watanabe, 2010, for other languages). In Tunisian Arabic, the same plural morpheme, namely *-at* can be associated with (at least) two different meanings while realizing different features. This gives further support to the idea that number is distributed along the nominal spine (Lowenstamm, 2008; Acquaviva, 2008; Wiltschko, 2008, 2012; Butler, 2012; Mathieu, 2014; Gillon, 2015; Kramer, 2016).

We paid particular attention to paucity and clusivity in Tunisian Arabic, and using theoretical assumptions from Harbour (2011, 2014) and Martí (2018), coupled with our own proposals, we arrived at a simple system of Tunisian Arabic number that accounted for a very complex set of facts. Finally, we provided arguments in favour of the view that linguistic change can occur inside words. Using Arabic gender and number as examples, we showed that Affix migration (Diertani, 2011) is a productive operation in historical linguistic development.

In future work, we aim to review other languages and number systems and see whether our proposal can be generalized to other grammars. Several questions arise: (1) Can the number phrase NumP2 be associated with features other than those we have proposed?; (2) Can features apply freely to any number phrase?; (3) Is the singulative always the same process and in particular is it always associated with NumP1?; (4) Are there other types of plurals that would fit the NumP1/NumP2 distinction?; (5) And are there other languages apart from Arabic where plurals can be contrasting?

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The objective of this book is to develop a deeper understanding of the form and interpretation of number. Using insights from Generative syntax and Distributed Morphology, we develop a theory of distributed number, arguing that number can be associated with several functional heads and that these projections exist depending on the features they specify. In doing so, we make a strong claim for a close mapping between the syntactic structure and the semantics in the noun phrase, since each node corresponds to a different interpretation of number. Despite some technical implementations, the book is accessible to linguists working outside any particular syntax-semantic framework, since we propose generalizations that are applicable in many, if not all, models of grammar. The book focuses on Arabic, but also discusses a number of languages including English, French, Ojibwe, Blackfoot, Hebrew, Japanese, Korean, Chinese, Turkish, Persian, and Western Armenian.

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