

1. WHAT IS A QUANTIFIER?

This lemma surveys quantifiers in Arabic and classifies them according to their morphosyntactic behavior. Quantifiers are terms that express quantificational relations between sets, where sets are expressed by predicates, e.g. noun phrases and verb phrases. For example, the quantifier *most* in (1) expresses a relation between *Egyptians* (a noun phrase (NP) denoting the set of Egyptians) and *love Umm Kulthoum* (a verb phrase (VP) denoting the set of individuals who love Umm Kulthoum).

(1) Most Egyptians love Umm Kulthoum.

The relation that *most* expresses is true if and only if the intersection of the two sets (the individuals who are both Egyptian and who love Umm Kulthoum) accounts for more than half of the first set (the Egyptians). The two set-denoting phrases *Egyptians* and *love Umm Kulthoum* are arguments of *most*. Similarly, *Every Egyptian loves Umm Kulthoum* is true if the Egyptians are a subset of the individuals who love Umm Kulthoum (i.e., if there is no individual in the *Egyptian* set who is not also in the *loves Umm Kulthoum* set). *Some Egyptian loves Umm Kulthoum* is true if the intersection of *Egyptians* and *loves Umm Kulthoum* is not empty (i.e., if there is at least one individual in both the *Egyptian* set and the *loves Umm Kulthoum* set).

Keenan (1996) formalizes such relations as conditions on the truth of sentences that contain them, as in (2). Here, A and B are any sets, $|\alpha|$ stands for ‘the cardinality of α ’, $I(\alpha)$ stands for ‘the interpretation of α ’, and T stands for the truth-value ‘true’. (2a), then, which defines *most*, says for any sets A and B , the interpretation of $most(A, B)$ (read ‘most A’s are B’s’) is ‘true’ if

and only if the cardinality of the intersection of A and B is greater than the cardinality of the set of things that are in A but not B (the set $A-B$), that is, in the example at hand, if the Egyptians who love Umm Kulthoum outnumber the Egyptians who don't.

- (2) a. For any sets A and B , $I(\text{most}(A, B)) = T$ if and only if $|A \cap B| > |A - B|$.
- b. For any sets A and B , $I(\text{every}(A, B)) = T$ if and only if $A \subseteq B$.
- c. For any sets A and B , $I(\text{some}(A, B)) = T$ if and only if $A \cap B \neq \emptyset$

The definitions in (2) follow the model of the generalization of the logical quantifiers *all* and *some* devised by Mostowski (1957). Such 'generalized quantifiers' have played an important role in the development of modern logic; see Lindström (1966), Montague (1970), Barwise and Cooper (1981), Higginbotham and May (1981) and Keenan and Stavi (1986).

A quantifier's first argument is its *restriction* (R in (3)); it restricts the universe to that portion that needs to be considered in order to evaluate whether the quantificational relation is true or not (non-Egyptians have no bearing on the truth of *Most Egyptians love Umm Kulthoum*).

A quantifier's second argument is its *nuclear scope* (NS in (3)); it constitutes that portion of the scope of the quantifier not included in the restriction (Heim 1982).

- (3) [_Q Most] [_R Egyptians] [_{NS} love Umm Kulthoum]

Note, though, that quantifiers may be more-than-two-place, as in *More students than teachers came to the party* (and section 4 below), which describes a relation between the set of students, the set of teachers, and the set of individuals who came to the party (Keenan 1996).

Morphological and syntactic criteria distinguish three classes of quantifiers in Arabic: (1) nominal quantifiers (e.g. *ḡamī^c* (*all*)), (2) numerals (e.g. *talāt* (*three*)), and (3) phrasal quantifiers (quantificational relationships expressed periphrastically). These are surveyed below.

2. NOMINAL QUANTIFIERS

A defining characteristic of the nominal quantifiers is a parallelism to the syntactic expression of possession in Arabic. Possession is expressed through the ‘construct state’, in which the NP denoting the possessee is the first term and the NP denoting the possessor the second. The first term of a construct state bears the case morphology corresponding to the grammatical function of the construct as a whole, while the second term bears genitive case. The first term may bear neither the definite article nor the *tanwiin* (-n ending; glossed *TWN* below) that typically occurs on nouns in the absence of the article, and the two terms must be adjacent. See Ritter (1987) (building on Abney 1987), Ritter (1988), Ouhalla (1988), Benmamoun (1992), Mohammad (1988), Mohammad (1989), Fassi Fehri (1999) and Shlonsky (2004).

- (4) bāb-u l-ḥadīqat-i
 gate-NOM the-garden-GEN
 ‘The gate of the garden; the garden’s gate’

Nominal quantifiers occur as the first term of a construct state construction of which the second term is the NP denoting the quantifier’s restriction. Here again, the first term, the quantifier, may bear neither the definite article nor the *tanwiin*.

- (5) a. ḡamī^c-u l-kutub-i
 all-NOM the-books-GEN
 ‘all the books’
 b. mu^cḡdam-u l-kutub-i
 most-NOM the-books-GEN
 ‘most of the books’

- c. ba[°]ḏ-u l-kutub-i
 some-NOM the-books-GEN
 ‘some of the books’

In addition to the morphosyntactic parallels between (4) and (5), quantificational and possessive constructions are parallel in the replaceability of the second term by a pronominal suffix.

- (6) a. bāb-u-hā
 gate-NOM-3PL
 ‘their gates’
- b. žamī[°]-u-hā
 all-NOM-3PL
 ‘all of them; their entirety’
- c. mu[°]ḏam-u-hā
 most-NOM-3PL
 ‘most of them’
- d. ba[°]ḏ-u-hā
 some-NOM-3PL
 ‘some of them’

The parallel between (4) and (5) and (6a) and (6b-d) in light of the fact that the first term of the construct state is a noun suggests that there is something nominal about these quantifiers. Their nominal character is also evident in morphological parallels between the quantifiers in (5) and other nouns. The quantifiers bear case morphology as nouns do, and when the restriction is

unexpressed, bear either the definite article or the *tanwiin* that occurs on nouns in the absence of the article.

- (7) a. qara³-tu al-žamī^c-a
 read-1SG the-all-ACC
 ‘I read all of it/them.’ (i.e. ‘I read it/their entirety’)
- b. qara³-tu ba^cḏ-a-n
 read-1SG some-ACC-TWN
 ‘I read some/several.’

Arabic differs in this respect from English, in which quantificational relationships are typically expressed by determiners (*every, most, some, etc.*). In Arabic they are typically expressed by nouns.

Also like in possessive constructions, the second term of a construct state headed by a quantifier may be definite or indefinite, singular or plural. Interpretations for the quantifiers in (5) for the four possible definiteness/number combinations in the restriction are paraphrased in English as follows. Note that when the restriction of a nominal quantifier is indefinite, its interpretation typically must be restricted in some other way, as by an adjectival modifier (the *b*- and *d*-examples below).

- (8) a. qara³-tu žamī^c-a l-kitāb-i
 read-1SG all-ACC the-book-GEN
 ‘I read all of the book.’
- b. qara³-tu žamī^c-a kitāb-i-n mamnū^c-i-n
 read-1SG all-ACC book-GEN-TWN banned-GEN-TWN
 ‘I read all of a banned book.’

- c. qara³-tu žamī^c-a l-kutub-i
 read-1SG all-ACC the-books-GEN
 ‘I read all of the books.’
- d. qara³-tu žamī^c-a kutub-i-n mamnū^c-at-i-n
 read-1SG all-ACC books-GEN-TWN banned-PL-GEN-TWN
 ‘I read all banned books.’
- (9) a. qara³-tu mu^cḍam-a l-kitāb-i
 read-1SG most-ACC the-book-GEN
 ‘I read most of the book.’
- b. qara³-tu mu^cḍam-a kitāb-i-n mamnū^c-i-n
 read-1SG most-ACC book-GEN-TWN banned-GEN-TWN
 ‘I read most of a banned book.’
- c. qara³-tu mu^cḍam-a l-kutub-i
 read-1SG most-ACC the-books-GEN
 ‘I read most of the books.’
- d. qara³-tu mu^cḍam-a kutub-i-n mamnū^c-at-i-n
 read-1SG most-ACC books-GEN-TWN banned-PL-GEN-TWN
 ‘I read most banned books.’
- (10) a. qara³-tu ba^cḍ-a l-kitāb-i
 read-1SG some-ACC the-book-GEN
 ‘I read part of the book.’
- b. qara³-tu ba^cḍ-a kitāb-i-n mamnū^c-i-n
 read-1SG some-ACC book-GEN-TWN banned-GEN-TWN

‘I read part of a banned book.’

- c. qara³-tu ba^cḏ-a l-kutub-i
read-1SG some-ACC the-books-GEN

‘I read some of the books.’

- d. qara³-tu ba^cḏ-a kutub-i-n mamnū^c-at-i-n
read-1SG some-ACC books-GEN-TWN banned-PL-GEN-TWN

‘I read some banned books.’

These interpretations are largely as expected assuming firstly that a singular noun denotes a set of subparts of a single individual (book, above), while a plural denotes a set of individuals, and secondly that the definite article in the restriction has the effect of relating the restriction to a discourse-salient set. Hence, the *a*- and *c*- examples (with a singular restriction) describe a relationship between subparts of a book and a property (here *that I read it*), while the *b*- and *d*-examples (with a plural restriction) describe a relationship between books and a property.

An exception to this very regular pattern is the quantifier *kull* (roughly, *every*). *Kull* is special in that its interpretation with definite, indefinite, singular and plural restrictions does not compose in the same manner as for the other quantifiers. In combination with a definite restriction, it is parallel in meaning to *žamī^c* (*all*) (compare (11a,c) with (8a,c)). However, in combination with a singular indefinite restriction, its restriction is interpreted not as a set of subparts of an individual but rather as a set of individuals (11b), just like a plural definite restriction (11c). And in combination with a plural indefinite restriction it is ungrammatical altogether (11d). Note lastly that *kull* is also unlike *žamī^c* in that a singular indefinite restriction for *kull* need not be further modified (compare (11b) with (8b)).

- (11) a. qara³-tu kull-a l-kitāb-i
 read-1SG every-ACC the-book-GEN
 ‘I read all of the book.’
- b. qara³-tu kull-a kitāb-i-n
 read-1SG every-ACC book-GEN-TWN
 ‘I read every book.’
- c. qara³-tu kull-a l-kutub-i
 read-1SG every-ACC the-books-GEN
 ‘I read all of the books.’
- d. *qara³-tu kull-a kutub-i-n (mamnū³-at-i-n)
 read-1SG every-ACC book-GEN-TWN banned-PL-GEN-TWN

Kull alone has the property that it forces a set-of-individuals interpretation on a singular indefinite restriction, but even this quirk vanishes when the restriction is definite (compare (11b) with (11a)). As with other quantifiers, the restriction of *kull* can be pronominalized (12a) or null (12b,c) (compare (12) with (6) and (7)). Note that the fact that (12a) is interpreted on par with (11a), not (11b), indicates that pronouns are inherently definite in Arabic.

- (12) a. qara³-tu kull-a-hu
 read-1SG every-ACC-3SG
 ‘I read all of it’ (not: ‘I read each one’)
- b. qara³-tu kull-a-n
 read-1SG every-ACC-TWN
 ‘I read each one’ (not: ‘I read all of it’)
- c. qara³-tu l-kull-a

read-1SG the-every-ACC

‘I read all of it.’ (not: ‘I read each one’)

A null restriction may ‘reappear’ in a prepositional phrase.

- (13) qara³-tu kull-a-n min al-kutub-i
read-1SG every-ACC-TWN of the-books-GEN
‘I read each one of the books.’

The possibility illustrated in (13) of separating the restriction out into a prepositional phrase avails itself generally in Arabic for most quantifiers of any type. In this respect also, the syntactic relationship between the quantifier and its restriction parallels possession. (4) may also be paraphrased as in (14), though the head in this case is interpreted as indefinite (→‘construct state’).

- (14) bāb-u-n min al-ḥadīqat-i
gate-NOM-TWNof the-garden-GEN
‘a gate of the garden’

The quantifier *kilā* (*both*) occurs with a dual restriction, which must be definite. It is the only nominal quantifier that agrees in gender with its restriction. The form *kilā* occurs with a masculine restriction (15a) and *kiltā* with a feminine (15b).

- (15) a. qara³-tu kilā l-kitāb-ayni
read-1SG both the-book-DUAL/ACC
‘I read both books.’
b. qara³-tu kiltā r-risāl-at-ayni
read-1SG both/FEM the-letter-FEM-DUAL/ACC
‘I read both letters.’

The nominal class also includes the proportional quantifiers (e.g., *one third of*). Like the other nominal quantifiers, these occur in construct with their restriction, which can be pronominalized or dropped as shown in (17), and distribute like nouns.

- (16) a. qara³-tu tult-a l-kitāb-i
 read-1SG third-ACC the-book-GEN
 ‘I read a third of the book.’
- b. qara³-tu tult-a kitāb-i-n mamnū^c-i-n
 read-1SG third-ACC book-GEN-TWN banned-GEN-TWN
 ‘I read a third of a banned book.’
- c. qara³-tu tult-a l-kutub-i
 read-1SG third-ACC the-books-GEN
 ‘I read a third of the books.’
- d. qara³-tu tult-a kutub-i-n mamnū^c-at-i-n
 read-1SG third-ACC books-GEN-TWN banned-F-GEN-TWN
 ‘I read a third of banned books.’
- (17) a. qara³-tu tult-a-hu
 read-1SG third-ACC-3S
 ‘I read a third of it’
- b. qara³-tu t-tult-a
 read-1SG the-third-ACC
 ‘I read the third.’
- c. qara³-tu tult-a-n (min-hu)
 read-1SG third-ACC-TWN (of-it)

‘I read a third (of it).’

3. NUMERIC QUANTIFIERS

Like other quantifiers, the cardinal numbers denote relations between sets. (18) asserts that the intersection of the set of students and the set of individuals who passed the exam has cardinality three.

- (18) naḏaḥ-a ṭalāṭ-at-u ṭullāb-i-n fii l-ʾimtiḥān-i
succeed-3SG three-FEM-NOM students-GEN-TWN in the-exam-GEN
‘Three students passed the test.’

That is, *ṭalāṭ* has the truth conditions in (19).

- (19) For any sets A and B, $I(\underline{\tau}al\underline{\tau}at(A, B)) = T$ if and only if $|A \cap B| \geq 3$.

Like the nominal quantifiers, quantifiers formed from numerals may have any grammatical function. The numerals from 1-10 as well as 100, 1,000, and 1,000,000 occur in construct with their restriction, which, as usual, appears in the genitive case. Beyond these similarities, the numeric quantifiers differ from the nominal quantifiers in a number of respects that suggest they are taxonomically special.

First, the cardinal numbers mentioned above agree in gender with their restriction (except for *miʾat* (100), which is feminine and indeclinable), that is, the form of the numeral depends on the gender of the restriction, albeit in an unusual way. The numeral bears the opposite gender morphology of the noun that forms the restriction. Note that this gender ‘polarity’ effect, typical of the Semitic languages (Hetzron 1967, 1972), does not apply to the one agreeing nominal quantifier *kilā* (*both*).

- (20) a. talāt-at-u tullāb-i-n
 three-FEM-NOM students-GEN-TWN
 ‘three (male) students’
- b. talāt-u tālib-āt-i-n
 three-NOM student-FEM/PL-GEN-TWN
 ‘three (female) students’

Second, unlike the nominal quantifiers, the numerals may occur as adjectival modifiers of their restriction, whether definite or indefinite (Wright 1981:part 2 §321).

- (21) a. naḏaḥ-a tullāb-u-n talāt-at-u-n fii l-^oimtiḥān-i
 succeed-3SG students-NOM-TWN three-FEM-NOM-TWN in the-exam-GEN
 ‘Three students passed the test.’
- b. naḏaḥ-a t-tullāb-u t-talāt-at-u fii l-^oimtiḥān-i
 succeed-3SG the-students-NOM the-three-FEM-NOM in the-exam-GEN
 ‘The three students passed the test.’

Here, the numeral functions as an adjective modifying (*aṭ*)-*tullābu*-(n), agreeing with it in case, definiteness and gender, as required of adjectival modifiers (though the gender polarity principle still applies here, and not to adjectival modification in general).

Third, although a numeral may occur in construct with a definite restriction or bear a pronominal suffix (Wright 1981:part 3 §107), the interpretation is not the expected one given the pattern established by the contrast in (5) and (6).

- (22) a. naḏaḥ-a talāt-at-u t-tullāb-i fii l-^oimtiḥān-i
 succeed-3SG three-FEM-NOM the-students-GEN in the-exam-GEN
 ‘The three students passed the test.’ (≠ ‘Three of the students passed the test.’)

b. naḏaḥ-a ṭalāt-at-u-hum fii l-°imtiḥān-i
 succeed-3SG three-FEM-NOM-3PL in the-exam-GEN

‘The three of them passed the test.’ (≠ ‘Three of them passed the test.’)

The usual partitivity associated with the construct state does not carry over to numerals in construct with a definite noun. Semantically, *ṭalāt* has the function in (22) of an adnominal modifier (as in *they three...*), indeed, the same function as its adjectival counterpart in (21b). The partitive interpretation with a definite restriction is expressed with the restriction in a prepositional phrase dependent of the numeral.

(23) naḏaḥ-a ṭalāt-at-u-n min aṭ-ṭullāb-i fii l-°imtiḥān-i
 succeed-3SG three-FEM-NOM-TWN of the-students-GEN in the-exam-GEN

‘Three of the students passed the test.’

In these respects the numerals do not pattern together with the nominal quantifiers, nor does the one similarity between the numerals and the nominal quantifiers—their occurrence in the construct state—extend beyond the numerals mentioned previously. The numerals between 10 and 100 obligatorily precede their restriction, which is indefinite, accusative and singular.

(24) naḏaḥ-a ṭalāt-at-u-n wa °iṣrū-na ṭālib-a-n
 succeed-3SG three-FEM-NOM-TWN and twenty-TWN student-ACC-TWN

‘Twenty three students passed.’

See Ziadeh and Winder (1957) for a cogent discussion of additional properties of the Arabic numerals.

4. PHRASAL QUANTIFIERS

In English, some quantificational relations are expressed by what one might call ‘discontinuous determiners’, such as *more ... than ...* (as in *More Egyptians than Iraqis love Umm Kulthoum*), *exactly as many ... as ...* (as in *Exactly as many Egyptians as Iraqis love Umm Kulthoum*), *three more ... than ...* (as in *Three more Egyptians than Iraqis love Umm Kulthoum*), *every ... except ...* (as in *Every Egyptian except Salma loves Umm Kulthoum*), etc. Such relations are expressed periphrastically in Arabic, as illustrated below.

(25) ʿadad-u l-muḥām-īna l-laḍīna ya-qraʾ-ūna ḡarīdat-a
 number-NOM the-lawyer-PL/GEN the-which 3-read-PL newspaper-ACC

l-quds-i ʾaktar-u min ʿadad-i l-ʾaṭibbaaʾ-i
 the-Quds-GEN more-NOM than number-GEN the-doctors-GEN

‘More lawyers than doctors read Al-Quds.’ (literally: ‘The number of lawyers who read Al-Quds is more than the number of doctors.’)

(26) ʿadad-u l-ʾaṭibbaaʾ-i l-laḍīna ya-qraʾ-ūna ḡarīdat-a
 number-NOM the-doctors-GEN the-which 3-read-PL newspaper-ACC

l-quds-i yu-sāwī ʿadad-a l-muḥām-īna
 the-Quds-GEN 3-equal number-ACC the-lawyer-PL/GEN

‘As many doctors as lawyers read Al-Quds.’ (literally: ‘The number of doctors who read Al-Quds equals the number of lawyers.’)

(27) ya-zīd-u ʿadad-u l-ʾaṭibbāʾ-i l-laḍīna ya-qraʾ-ūna
 3-exceed-IND number-NOM the-doctors-GEN the-which 3-read-PL

ḡarīdat-a al-quḡs-i ṭalāṭ-at-a-n ʿan ʿadad-i l-muḡām-īna
 paper-ACC the-Quds-GEN three-FEM-ACC-TWN on number-GEN the-lawyer-PL/GEN

‘Three more doctors than lawyers read Al-Quds.’ (literally: ‘The number of doctors who read Al-Quds exceeds the number of lawyers by three.’)

(28) kull-u l-ʾaṭibbāʾ-i ya-qraʾ-ūna ḡarīdat-a
 every-NOM the-doctors-GEN 3-read-PL newspaper-ACC

l-quḡs-i ʾillā salmā
 the-Quds-GEN except Salma

‘All the doctors read Al-Quds except Salma.’

Proportions named explicitly as percents are expressed as ...*in 100* in Arabic, as in (29).

- (29) naḏaḥ-a tamānū-na fii l-mi³at-i min aṭ-ṭullāb-i
 succeed-3SG eighty-TWN in the-hundred-GEN of the-students-GEN
 ‘Eighty percent of the students passed.’

5. SUMMARY

Quantifiers denote relations between sets. Nominal quantifiers are morphosyntactically nouns and occur as first term of a construct state construction of which the second term is the restriction, which may be definite or indefinite, singular or plural. *Kull* is a unique quantifier that may combine with a definite or indefinite restriction, but with an indefinite only in the singular, and with a unique interpretation vis à vis the other quantifiers. The numeric quantifiers are quasi-adjectival. They agree with their restriction. The basic ones occur either in construct with their restriction or as adjectival modifiers of it, and when the restriction is definite, are semantically modificational, not partitive, . Other kinds of quantificational relations are expressed altogether non-lexically.

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