Chapter 18
Overview

Edward L. Keenan and Denis Paperno

18.1 Preliminary Generalizations

Here we take a first pass at generalizing over the 17 preceding articles. We count English, Chapter 1, in our sample and also include Finnish, drawing on Suihkonen (2007) whose quantifier inventory is built on the same semantic classification as ours. At certain points we also draw on Matthewson (2008) and Bach et al. (1995).

In what follows we call an expression 'lexical' if its meaning is understood as a unit rather than computed as a function of the denotations of subconstituents. This is close to 'monomorphemic' but the notions diverge when the morphological analysis is fine enough. For example we treat *always* as lexical though it consists of *all*+*ways* (the *s* on *ways* is historically the genitive *s* not the plural *s*). Also a lexical item is not necessarily a phonological word (a notion Nikolaeva regards as unclear in Adyghe).

Gen 1 All 18 languages (Ls) in our sample present both D- and A-quantifiers which are intersective (Generalized Existential), in fact cardinal.

All the Ls in our sample present monomorphemic low numerals: *one*, *two*, ... And A-quantifiers are commonly derived from D-quantifiers: Malagasy *dimy* 'five' ⇒ *indimy* 'five times'. Often (Hebrew, Russian, Japanese, Mandarin) the format [D + *times*] builds A-quantifiers: *some* / *a few* / *ten times*. Also common are lexical interrogatives *which* and *how many*. (Both are intersective, the latter cardinal: *Which students are bilingual?* just asks us to identify the members of the intersection of the set of students with the set of bilinguals. And *How many?* queries the cardinality of that intersection.)

Gen 1 supports **Gil's Generalization** (Gil 1993): *verbal quantification is morpho-syntactically more complex than nominal quantification*. We return to this topic at the end of this chapter.

E.L. Keenan (✉)
Department of Linguistics, University of California, Los Angeles, CA, USA
e-mail: keenan@humnet.ucla.edu

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Gen 2 All 18 Ls in our sample allow modification of D-cardinal quantifiers: *more than* / *less than* / *exactly n*, *nearly* / *approximately* / *about n*. By Gen 1 we expect, and find, A-quantifiers like *more than five times*, etc.

Gen 3 All 18 Ls present *value judgment* D-cardinals (*many*, *few*). They may be modified: *very many, too few*, *not enough, surprisingly many*. These modifiers extend to the A-quantifiers as well: *very many times, very often, too seldom*.

Such quantifiers carry, more or less strongly, a value judgment that the number of elements in the intersection is more (or less) than expected.

Gen 4 All 18 Ls in our sample present both D- and A-quantifiers which are *co-intersective* (Generalized Universal).

a. All have one (often several) lexical D-quantifiers meaning ALL.
b. All have at least one lexical A-quantifier meaning ALWAYS.

Gen 5 All 18 Ls in our sample distinguish phonologically between a *collective* universal and a *distributive* one.

The collective builds expressions that bind arguments of collective predicates like *gather – All the students gathered in the square*. Distributives, such as *each*, do not: **Each student gathered in the square*.

Gen 6 All 18 Ls in our sample present both D- and A-*proportionality* quantifiers

Proportionality D-quantifiers: *half* is the most common lexical one. English, Hebrew, Finnish, W. Armenian, Russian, Pima, Japanese and Malagasy have (a delicately) lexical HALF. *Most* is rarely monomorphemic; it is lexical in English, Russian, Hebrew and Finnish, and nearly so in Hungarian and German where it requires a definite article. In Finnish and German it is a superlative form and so bimorphemic. Commonly *most* = 'the majority of' or 'the greater part of'.

Proportionality A-quantifiers: Seven of our Ls appear not to present lexical proportional A-quantifiers at all: Adyghe, Basque, Garifuna, Hebrew, Pima, Telugu, and W. Armenian. The other Ls all have at least a lexical *often* and sometimes a lexical *rarely, seldom,* or *usually*. And all have productively derived A-quantifiers such as *two times out of three* or *most* / *two thirds of the time*, formed with a proportional D-quantifier and a weak noun. In fact 11 of our Ls have A-quantifiers of the form n (out) of m. Case marking Ls (Adyghe, Basque) may use adverbial cases to derive A-quantifiers.

Gen 7 All 18 Ls allow Noun ellipsis following some cardinal D-quantifiers.

(1) The ties were on sale, so I bought some, several, a dozen, ten, between five and ten, more than ten, *no, *a, *all, *almost all, *most, *?half, *?seven out of ten, *30%, *that flashy red

But English (and Hebrew) universal, proportional and definite Dets do not enjoy ellipsis in this context though many are fine with an appropriate complement: *all/most of them*, *that flashy red one*, *all that I could find*. Mandarin and Hungarian allow such ellipsis with some co-intersective and proportional Dets.

Gen 8 In all 18 Ls, quantified noun phrases (QNPs) built from a D-quantifier (DNPs) occur in all major argument positions (subject, object, object of adpositions, possessor) subject to subclass restrictions and lexical constraints (*all/each cat).

Gen 8 is surprising as many constraints on the distribution of DNPs are cited in the literature. In our Questionnaire (Chapter 1) we noted that San Lucas Quiavini Zapotec, normally VSO, fronts quantified subjects (Lee 2008). VSO Chamorro (Chung 2008) must front a QNP subject from a basic transitive sentence. And Garifuna (VSO) frequently but not obligatorily fronts quantified subjects. Languages regularly impose distributional constraints on subclasses of DNPs: In the partitive *two of DNP*, the DNP must be definite plural: **two of no cats*. Interrogative and downward entailing DNPs may be required to occupy a focus position if there is one. In Russian many QNPs with modified numeral quantifiers must occur in nominative or accusative positions. Definite DNPs may be excluded as pivots in Existential Ss: **Aren't there the older boys in your class?*.

Gen 9 All the Ls in our sample exhibit some type of quantifier scope ambiguity.

We count classical scope ambiguities between QNPs, as in *Some editor read every manuscript*, as well as Quantifier-Negation ambiguities: *Everyone doesn't know that* (which might be used to mean 'everyone is ignorant of that' or 'Not everyone knows that'). The presence of scope ambiguities is likely a language universal (Keenan 1988 suggests an explanation). Languages do seem to differ with regard to how easy it is to induce scope ambiguities. Languages with productive scrambling (Hungarian, Japanese, Basque) are likely to front a QNP forcing wide scope. There is also a cross-family tendency (a universal?) for the choice of quantifier expression to limit or force the choice of scope reading (Russian, Malagasy, Wolof). (The Malagasy chapter here eschews discussion of scope preferences due to unreliable speaker judgments. But this accepts that speakers exhibit different scope judgments).

Gen 10 All Ls in our sample have at least one demonstrative (*that*, *those*) which combines with a property denoting expression to form a **definite** DNP, one that may or may not (Straights Salish, Jelinek 1995) occur in argument position.

In our sample, Finnish, Russian, Telugu, and Mandarin lack a definite article or affix distinct from a demonstrative. Only English (and marginally Telugu) have an indefinite article segmentally distinct from the numeral *one* (WALS 2005:158–162). In German, Italian, Basque and Hungarian the numeral *one* is

used both as a numeral and as an indefinite article, whereas this is not the case in Russian, Malagasy or Japanese. In both English and Telugu the indefinite article is a phonologically reduced form of 'one' and one might argue that unstressed *egy* 'one' (Hungarian), *ein* (German) and *bat* (Basque) are indefinite articles, but, as in Italian, in careful speech they do not differ segmentally from the numeral.

Gen 11 All Ls in our sample have **partitive QNPs**: *two of those boys* (structurally indistinguishable from proportional QNPs in Telugu).

Gen 12 All 18 Ls in our sample have lexical expressions for ONE, ALL, ALWAYS, and MANY.

Not common is a lexical NO, present here only in English *no*, German *kein*, and Mandarin *mei*. (The two Germanic cases, like Danish *ingens*, are historically derived from [*ne* + (def) + *one*]. The Mandarin case seems derived from *mei* + the existential verb *you*).

Gen 13 All 18 Ls in our sample have at least one lexical ONLY.

The quantifier status of bare *only* is debatable, but it clearly builds complex quantifiers (inter alia) in English (*How many boys showed up*? *Only six*) and so is of interest here. Languages may have several synonyms of ONLY. English, Adyghe, Basque and Italian have three: *He was the sole/lone/only survivor*. Malagasy has five (*tokana*, + two in this volume, + two others in Keenan 2008).

Gen 14 All 18 Ls in our sample express equivalents of multiply-headed QNPs of the sort *more men than women*, as in *More men than women get drafted*.

This is surprising as such expressions seem complex and their syntax has not been well studied typologically. Notice that in English they do occur in various argument positions: *Sue has argued with fewer linguists than philosophers*, *Fewer girls than boys' bikes were stolen*, *More students than teachers were believed to have signed the petition, More boys than girls read as many plays as poems over the vacation,* (Keenan 1987). We have not specifically elicited constituency checks in languages other than English, but did observe some diversity. For example, the Greek counterpart of the comparative *more women than men* shows rather clear non-constituent behavior.

Gen 15 All Ls in our sample allow some logical equivalents of Boolean compounding (AND/BUT, OR, NOT, NEITHER . . .NOR . . .) at the level of QNP: *most students but not all teachers* and often at the level of the quantifier: *most but not all poets* (English, German, Hungarian, Malagasy, Greek, W. Armenian, Russian, Basque, Adyghe, Japanese, Mandarin).

Basque, Garifuna, German, and Telugu present some systematic restrictions on Boolean compounding. Expressions equivalent to certain Boolean compounds of determiners are common in our sample: *exactly ten* denotes the same as *at*

least ten and not more than ten; *between six and ten* denotes the same as *at least six and at most ten*.

Gen 16 17 of our 18 languages present downward entailing DNPs.

Downward monotonicity may arise from the quantifier: *no*, *less than six*, *neither Jack nor Jill* or from overt negation: *not more than six*, or possessive DNPs with decreasing possessors: *no child's doctor*. Telugu lacks decreasing arguments, using predicate negation with an existential (or NPI), as in: *He something not+saw* / *He didn't see anything*.

Gen 17 17 of our 18 languages present quantifiers built from the same roots as interrogatives. In Wolof interrogatives have a dedicated root but share class prefixes with other D-quantifiers.

The derived quantifiers seem to be of two types: one, illustrated by Greek and English *whoever*, *whatever*, etc. has a universal interpretation. The other, illustrated by Japanese, builds existential QNPs: *Dare?* 'Who?', *Dare ka* 'Someone'. Telugu and Russian have both types.

Gen 18 15 of the 18 languages present type (2) quantifiers, illustrated in *Different people like different things*.

Data are lacking for Finnish, Greek, and Wolof; again, this generalization might hold for all 18 languages in our sample.

Gen 19 14 of our 18 languages present rate phrases (*twice a day*, *100 kilometers per hour*). We suspect that all Ls have such phrases, but we lack confirming data from Finnish, Japanese, Pima and Wolof.

Gen 20 In our sample the simplest partitives are usually syntactically complex.

Japanese and Finnish have a lexical *which of the two?*. English *both* and *neither* are lexical partitives, denoting the same functions as *each*/*none of the two*. Italian, German, Russian and Finnish (below: Suihkonen 2007:59) have a *both*:

(1) Molemma+t lapse+t halus+i+vat lähte+ä koti+in
both+pl.nom child+pl.nom want+past+3pl go+1inf home+sg.ill
Both children wanted to go home

We have not explicitly elicited BOTH, NEITHER or WHICH OF THE TWO so their distribution may be wider than we indicate here.

Gen 21 14 of our 18 languages allow at least one quantifier to float. Garifuna, Telugu, W. Armenian basically don't allow floating. In Basque quantifier float is limited. We lack the relevant data for Finnish.

The most common type of floating is of universals from the subject. But Russian, Japanese, Pima, Hebrew and Mandarin allow some floating of numerals, and Japanese, Pima, Mandarin and German allow some objects to host floating.

Gen 22 11 of our 18 languages allow quantifiers with exception phrases. We illustrate with Finnish (Suihkonen 2007:91):

(2) Kaikki paitsi viisi matkustaja+a
all+pl.nom except five passenger+sg.partitive
All but five of the passengers

We have not sought constituency tests for the Quantifier + Exception Phrase and in a few cases the exception phrase is not adjacent to the quantifier.

Gen 23 Quantifiers as Bare Predicates arise in Ss like **The boys who passed were five*. 11 of our Ls present such quantifier predicates: Adyghe, Basque, German, Hebrew, Hungarian, Italian, Malagasy, Mandarin, Russian, Pima and W. Armenian.

Most often only cardinal Qs (*ten*) or value judgment cardinals (*many*) are used predicatively. German and W. Armenian seem restricted to value judgment cardinals; Italian and Russian allow some proportionality quantifier predicates, and Adyghe seems to allow most D-quantifiers as predicates. Telugu and English do not generally allow predicate quantifiers. We lack the relevant data on Garifuna, Finnish, Japanese, Wolof and Greek.

Gen 24 15 of our 18 Ls have analogs of distributive numerals. In 10, distributive numerals have special morphological marking (Adyghe, Basque, Garifuna, Hungarian, Japanese, Malagasy, Pima, Telugu, and W. Armenian). At least six more have syntactic exponents of distributivity in NPs with numerals, employing either an equivalent of binominal *each* (English, Greek, Hebrew, Italian, and Russian) or a specialized distributivity marker (German *je*, Russian *po*).

Gen 25 10 of the Ls in our sample present Boolos Sentences

Boolos sentences (Boolos 1981) are ones of the form 'For every A there is a B.' (A,B disjoint one place predicates). Two of his examples are: *For every philosopher that has studied Spinoza thoroughly, there is one that hasn't even read the* Ethics; and, more cutely, *For every drop of rain that falls, a flower grows*. Boolos notes that these Ss are equivalent to the claim that there is a one to one function from the As into the Bs, that is, the set of objects with property B is at least as large as the set with A, and such comparative cardinality Ss are known not to be definable in first order logic (Boolos gives a short classical proof).

Boolos Ss, not mentioned in the Quantifier Questionnaire, arose in response to the expression of *indexing* by the universal quantifier in Ss like *More people buy Toyotas every year*. *Every year* provides an index set for people who buy

Toyotas. That is, the interpretation of the S treats *people who buy Toyotas* as a function F mapping years y to the number of people who bought Toyotas in y. The S is true iff whenever a year y was prior to a year y' then F(y) < F(y'). At least eight of our Ls (Adyghe, Basque, English, Hebrew, Malagasy, Mandarin, Russian, and Telugu) present such indexing uses. And in Adyghe, Basque and English the universal quantifier cannot be sensibly replaced with a non-universal one. Is this a new use of the universal quantifier?

And the eight languages with indexing plus Garifuna, Italian and W. Armenian all presented Boolos Sentences. For the other Ls in our sample we lack the relevant data on indexing and Boolos Ss.

18.2 Remarks on Selected Topics

We conclude with a few topics of general interest but for which our data do not provide a basis for a strong generalization – not more than half of our Ls have the relevant property.

Binominal *Each* (Safir and Stowell 1988, Zimmermann 2002) as in *The TAs graded sixty exams each*. 7 of our 18 languages have a comparable item, which may fail to be a D-quantifier. It forces a distributive reading. The languages are: Adyghe, Hebrew, Italian, Mandarin, Japanese, Russian and English.

Existential There Sentences (ETSs) are ones used to assert, query or deny the existence or number of objects with a certain property and which are lexically or syntactically distinct from simple declarative sentences. Only 15 of our languages present ETSs; Adyghe, Japanese, and Russian lack dedicated existential constructions. Ls with ETSs that exhibit a 'definiteness effect' (= disallowing universals as pivots) are Wolof, English, Finnish, Malagasy, Mandarin, Basque, Greek and Hungarian. (Greek is complicated as it has three ETSs with somewhat different properties, but one of them does show a definiteness effect). Languages with ETSs but without a definiteness effect, allowing some universal DNPs as pivots, are: German, Garifuna, Hebrew (minor definiteness effect), Italian, Pima, Telugu (marginal definiteness effect), W. Armenian.

This variability supports that attempts to distinguish 'strong' from 'weak' QNPs on the basis of occurrence in ETSs are not reliable cross-linguistically.

Open Issues (1) The languages studied here do not in general present quantificational expressions properly within the verbal morphology (though the Questionnaire included such examples from Kalaallisut (Eskimo-Aleut; Bittner and Trondhjem 2008:42), Mayali (Evans 1995:209) and Passamaquoddy (Bruening 2008:97). Examples (156) from Adyghe and (23) from Russian are our best (but lone) counterexamples to this claim. (2) We did not elicit data on *ordinals – the tenth*, etc. Sometimes they show up with universals, as in *Every second dog was inoculated*. (3) A deeper topic ignored here is *anaphoric determiners*, as in: *Some*

students hold a job while in school. Such students should be awarded scholarships. And a second, elliptical, type: *Fairly many students attended the first lecture but many fewer | hardly any attended the second.* (4) We studied A-quantifiers expressing frequency but not duration: *He has been ill all week*, *He missed class three days in a row*, etc. (5) How true is it cross-linguistically that modified numerals in object position favor object narrow scope readings? Here this is asserted for Basque, English and Italian but denied for Adyghe.

Lastly, how representative of languages in general is our sample? We can not generalize from 18 languages to the 5,000–8,000 extant languages. Our hope of course is that others will check our generalizations to see how well they hold or can be modified for other languages. For example, limiting ourselves to our data we could give a somewhat more precise formulation of Gil's Generalization:

> **Gil's Generalization** reformulated**: All Ls form some A-quantifiers productively from D-quantifiers, but no L forms D-quantifiers productively from A-quantifiers.**

Much of our data cited above supports this form of Gil's Generalization, especially data on intersective and proportionality quantifiers. Our best candidate for a counterexample to the second conjunct above is an Adverb to Quantifier 'back formation': *a frequent visitor, an occasional sailor*, Russian *každodnevnyj ritual* 'everyday ritual', from *každyj den'* 'every day', etc. We note that Bittner (1995) exhibits for Greenlandic Eskimo a variety of pairs of D- and A-quantifiers where each is derived from a common stem with different suffixes. So in these cases D- and A-quantifiers seem symmetrically related, neither being derived from the other. But nothing rules out that there might be other processes, like [D- times], deriving A-quantifiers from D-ones.

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