

Quantifiers in Malayalam

A tribute to Dany and *Operators in the Lexicon*

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1 Introduction

With this short paper I want to pay tribute to Dany and his extremely inspiring dissertation *Operators in the lexicon* (henceforth OiL). In my own dissertation I did not refer to his work explicitly but the impact his work had on my thinking cannot be underestimated. In 2011, I started exploring the idea that Dany's OiL is actually morphologically reflected in how quantifiers are built in Malayalam, a Dravidian language spoken in India. Moreover, I realized how Jaspers' decomposition of the lexicon in terms of operators meshes well with a nanosyntactic approach, a framework that I learned about in the course of that same year. At the time, I wrote a 2-page abstract on this, but never submitted it to any conference, because I considered the ideas immature. The present paper takes a stab at developing these ideas from years ago a bit further and most importantly, wants to show that the abstract formal operators presented in Jaspers (2005) are a morphological reality in some languages spoken on this planet and are hence presumably to be taken seriously when we think about the structure of the functional sequence.

2 Jaspers (2005): Operators in the lexicon

Jaspers (2005) sets out to explain why *NAND and *NALL are cross-linguistically not lexicalisable. Instead of the pragmatic Gricean approach to the *NALL problem developed by Horn (1989), Jaspers explores the lexical gap from a mentalist perspective and treats the problem as hard-wired in our cognition, as such shaping the structure and form of the lexicon. Jaspers argues extensively that

the original Boethian square of opposition in which the O-corner cannot be lexicalized can be reduced to a 2D Cartesian Coordinate system. The pivot of that system is the I-corner (*or/some*) and the two basic relations, Entailment and Contradiction, provide us with - the lexicalisable A (ALL/AND) and E corner (NOR/NO) respectively, thus isolating the non-lexicalisable O corner. Those two basic relations are the result of two abstract operations ET and NON, which work on the pivot I at a prelexical level. Jaspers goes one step further and claims that the operations ET and NON can actually be reduced to the negative disjunctive primitive NEC. Ultimately, all operators of the propositional and predicational calculus are derived from this negative-disjunctive operator NEC. When NEC applies twice to the universe of possible situations (SIT), the pivot OR (SOME in the predicate calculus) is formed. To derive AND (or ALL) from the pivot, NEC applies once more, but now by means of a NEC-compatible conjunction, called ET. AND/ALL thus structurally entails the nonlexicalized pivot OR/SOME. To derive NOR, NEC applies to the lexicalisation of the pivot. Jaspers calls this operation NON.

Whereas this summary cannot do justice to the richness and complexity of Jaspers' dissertation, I hope it suffices to illustrate the main ideas in Jaspers' rich work. In what follows I will illustrate how Malayalam morphologically incorporates some of the prelexical operators discussed in Jaspers' work, and I will take a stab at showing how nanosyntax and the ideas present in OiL can be made to work together to get a picture of the internal structure of quantifiers.

3 The data from Malayalam

Having just summarized Jaspers' dissertation and the role of the prelexical operators NEC, NON and ET in giving rise to the pivot OR/SOME, the entailer AND/ALL and the contradictory NOR/NO, the fact that the morphology of indefinites like *somebody*, *anybody* and quantifiers like *all* in Malayalam contains the overt conjunction maker *-um* or the disjunction marker *-oo*, respectively (Jayaseelan 2011), cannot be ignored.¹ As can be noticed in the examples in (1), some quantifiers, the indefinites, consist of a *wh*-word. This is a pattern that is well-known from the typology of indefinites (Haspelmath 1997). Quantifiers like *all*, however, do not contain an indefinite, although they do contain conjunctive morphology.

¹The entire indefinite series and even Q-words like *many* or quantifiers like *each* consist of the conjunctive/disjunctive morphology. Needless to say, it is beyond the scope of this squib to discuss the entire set of quantifiers.

- (1) a. aar-oo
 who-DISJ
 'Somebody'
 b. aar-um
 who-CONJ
 'Anyone'
 c. ellaa-war-um
 all-human.PL-CONJ
 'All (people)'

The case of *all* in (2) nicely illustrates Jaspers' conjunctive ET operator, giving rise to the entailer ALL.²

- (2) a. ellaa-war-um wann-illa
 all-AGR-CONJ came-NEG
 'All people didn't come.'
 b. ellaa kuTTikaL-um
 all children-CONJ
 'all (the) children' (Jayaseelan 2011, 270)

Those indefinites that take the disjunctive marker *-oo* are in accordance with OIL pivots, realizing SOME. Indefinites with *-oo* are not polar sensitive. This is illustrated in (3), i.e. they can occur in negative, modal and affirmative contexts.

- (3) a. aar-oo wannu
 who-DISJ came
 'Somebody came.'
 b. aar-oo wann-illa
 who-DISJ come-NEG
 'Somebody did not come.'
 c. aar-oo war-aam
 who-DISJ come-may
 'Somebody may come.' (Jayaseelan 2011, 271)

In line with work by Zimmerman (2000) and Geurts (2005), Jayaseelan (2011, 276)

²According to Jayaseelan (2011) *-um* is not in any clear way an operator in this case, since there is no variable available (i.e. no question word) which can be bound. Jayaseelan argues that *-um* functions like an emphatic marker in this case. However, this raises the question why — from a crosslinguistic perspective — emphasis is never marked with a disjunctive operator, but quite commonly with a conjunctive operator.

accounts for the absence of polarity sensitivity of disjunctively marked quantifiers in Malayalam by arguing that disjunction functions as a modal. This modal can satisfy the requirements of the question word, *aar-*, which is also part of the quantifier. The question word functions as a variable in need of a nonveridical context, which can be provided by the disjunctive operator. This idea squares well with the ideas in Jaspers. If the pivot is indeed the consequence of the application of two times NEC, then we do not expect the lexicalised item to be negative, since the application of two negations yields affirmation.

Indefinites that take the conjunctive marker *-um* are polarity sensitive, as illustrated in (4). They cannot appear in a veridical environment, i.e. they need to be licensed by negation or by a modal, a so-called non-veridical context (Gianakidou 1997).³

- (4) a. **aar-um* *wannu*
 who-CONJ came
 'Anybody came.'
- b. *aar-um* *wann-illa*
 who-CONJ came-NEG
 'Nobody came.'
- c. *aar-um* *war-aam*
 who-CONJ come-may
 'Anybody may come.' (Jayaseelan 2011, 271)

At first sight these indefinites seem problematic with respect to Jaspers' system, since we do not expect to see conjunctive morphology on what Jaspers classifies as pivots. However, Jaspers notes that pivots often drift from the I corner (pivot-corner) to the A corner (AND-corner), a tendency that has clearly become morphologically realized in Malayalam. However, this does not explain why these elements require a non-veridical licensing context. For Jayaseelan (2011), the explanation lies in the fact that the variable in these NPIs, which is morphologically realized by the *wh*-word, remains unbound in the presence of a conjunctive marker (as opposed to the disjunctive operator), and hence still requires to be bound by a non-veridical operator.

In the next section we will not only get back to NPIs and the problem we face

³For reasons of space I cannot discuss the relation with and difference from the group of indefinites that take - in addition to *-um* a conditional marker *-enkil-*. These items give rise to a Free Choice reading, whilst behaving distributionally in a different way from most Free Choice Items. See Jayaseelan (2011) for discussion.

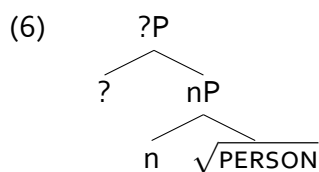
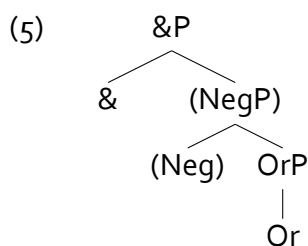
with them, but we will more generally attempt a nanosyntactic approach to the Malayalam data, exemplifying how Jaspers' logico-semantic system can find a syntactic realisation in a framework that cares about the underlying structure of morphemes. In nanosyntax not only operators are active at a submorphemic 'pre-lexical' level, but many other features, all contributing to the eventual shape and meaning of words and morphemes.

4 OiL meets Nanosyntax

In a binary syntactic system, squares nor triangles nor Cartesian 2D systems can be easily rendered. Nevertheless, by adopting the nanosyntactic framework (cf. e.g. Starke 2009; 2014; Caha 2009; Baunaz et al. to appear), I dare think that many relations present in Jaspers' system can be captured in syntax, offering a fine-grained approach to the morphology of natural language.

Nanosyntax makes use of postsyntactic lexical insertion. After each Merge step, the lexicon is checked at the level of the phrase. Spellout is thus phrasal and cyclic. Consequently, the lexicon also contains lexical trees, which are themselves created by syntax. Whenever the lexicon has a matching lexical item, the lexical item can be inserted. If there is no identical match, the *Superset Principle* and the *Elsewhere Condition* govern lexical insertion. If no match can be found, movement is allowed in order to spellout the newly merged feature.

In order to capture the relations between quantifiers and the underlying operators Jaspers' discusses, the syntax of quantifiers and indefinites will also consist of underlying operator features. What I propose is that the operator sequence, illustrated in (5), starts from the pivot, realized by disjunction in Malayalam, and captured here by the feature *Or*. The contradictory relation, caused by the application of *NON* to the pivot, is captured by the optional feature *Neg*. Finally, the entailer tops the spine, as *&P*, formed by the application of the *NEC* compatible *ET* operator to the pivot. An advantage of this sequence is that it captures the fact that **NAND* is ruled out and that *AND* entails *OR*.



Depending on which bottom the operator sequence in (5) combines with, one gets a quantifier like *all* or an indefinite like *someone*. Indefinites have a clear nominal base, which is captured in the tree structure in (6) by the nominalizing feature *n*. In addition to a nominal base, indefinites also consist of a variable, which — according to Jayaseelan (2011) — is worked upon by the disjunctive, conjunctive and/or negative operator. Whereas the English indefinite bases like *-body, -thing, -place, -time, . . .* are insightful with respect to the ontological category of the root, Malayalam is insightful in that by making use of *wh*-words in the composition of its indefinites a variable is introduced. The variable is represented by means of a question-feature (?). In the tree in (6) the ontological category is PERSON, but depending on the nature of the indefinite this could also be THING, PLACE, TIME etc. In English *-body* will spell out the sequence in (6), whereas in Malayalam *aar-* ‘who’ will spell out this sequence.

At first sight this straightforwardly yields the lexical item for Malayalam in (7):

(7) </aar-/ , [_{NP} ? [_{NP} n [$\sqrt{\text{PERSON}}$]]]>

For quantifiers like *all* in (2), the ?-feature is absent from the nominal base. The root will be filled with whatever type of root that can be nominalized, illustrated in (8) for the nominal bottom in (2b). The plural and case morphology will be added accordingly.

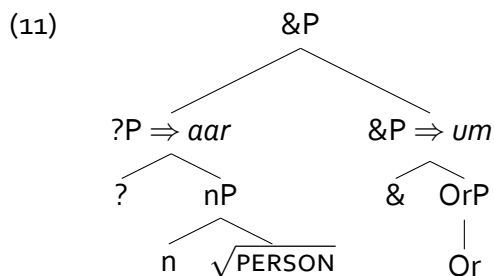
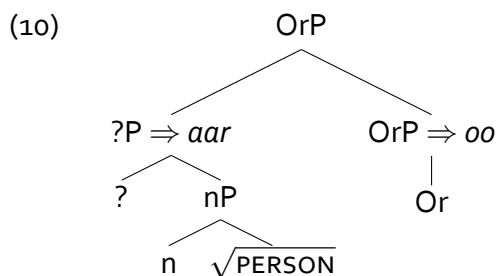
(8) </kuTTi-/ , [_{NP} n [$\sqrt{\text{CHILD}}$]]>

By now we have discussed the upper and the bottom part of the sequence of the quantifier and indefinites under discussion, and it is time to have a more detailed look at how some quantifiers can be spelled out in nanosyntax.

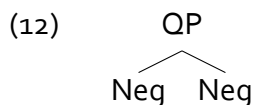
We start with *aar-oo* ‘somebody’ and NPI *aar-um* ‘anybody’. I propose that Malayalam has the following lexical items at its disposal, in addition to (7).

(9) a. </oo/ , [_{OrP} Or] >
 b. </um/ , [_{&P} & [_{OrP} Or]] >

The derivation of *aar-oo* as in (15) and *aar-um* as in (16) is quite unproblematic at first sight.

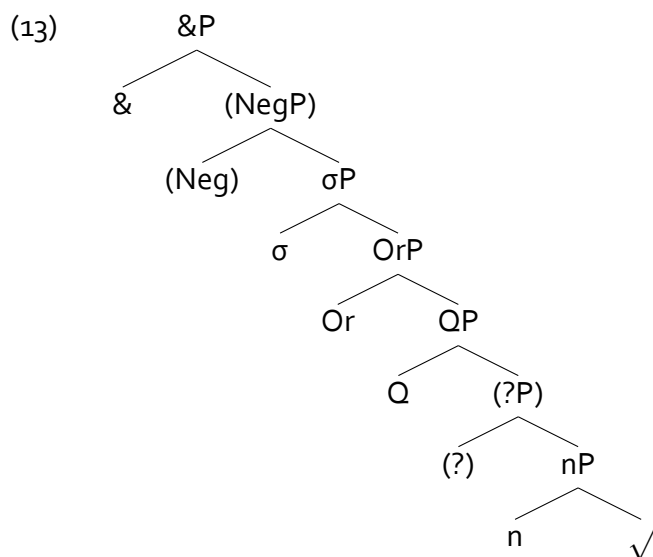


However, when it comes to derivation of *ellaa-X-um* 'all X' (see (2) above), it turns out that featural picture as developed up until now does not suffice. If we spell out the operator spine by means of *-um* and the nominal X by means of (6) without a question-feature, then it still remains a mystery which features are spelled out by *ellaa*. Jayaseelan (2011) observes that *ellaa* is diachronically derived from *ell-*, which means *limit* — and is clearly a negative word — and *aa*, which is an old negative marker, one cannot but think of the two NEC operations which lead to the pivot in Jaspers' system. Consequently, what I would like to propose is that *ell-aa* are the pivot-creating NEC operators in disguise of Jaspers (2005). When two negative operators work on each other the result is something, i.e. a quantity, which is why I propose — in line with work by De Clercq (2017) on the Q-words *many*, *much*, *few*, *little* — that *ellaa* is the spellout of a QP. The syntax of *ellaa* and hence also of English *much* could from this perspective be looked at as the consequence of two negative features cancelling each other out, yielding a quantity, QP, as in (12).



Before we update what we had for the indefinites in (10) and (11) and briefly illustrate the derivation of *ellaa-X-um*, we need to consider that at present the derivation of the determiners *all* and *any* in English cannot be distinguished. Given that

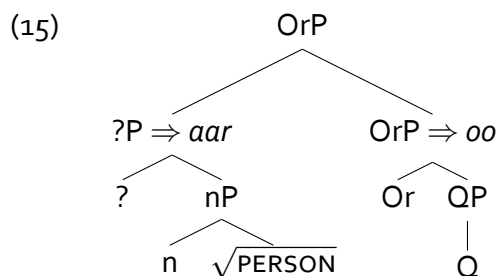
there is a morphological distinction between *some*, *any* and *all*, it makes sense to distinguish all three of them featurally. What I propose is that below the optional NegP in the operator spine, there is a domain widening feature σ (Chierchia 2006), which gives rise to NPIs like *any*. Taking into account these changes, the updated fseq for quantifiers and indefinites is now as in (13), with optional features in between brackets:

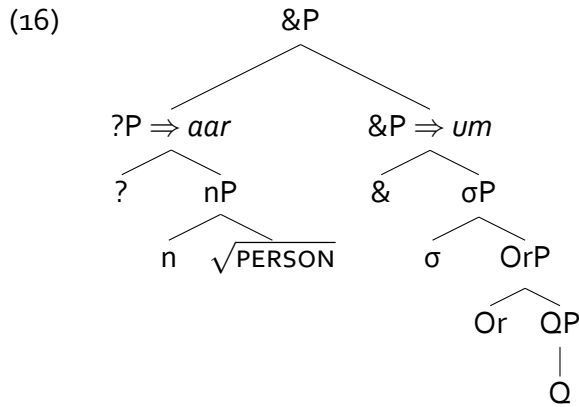


The updated lexical items for Malayalam are in (14).

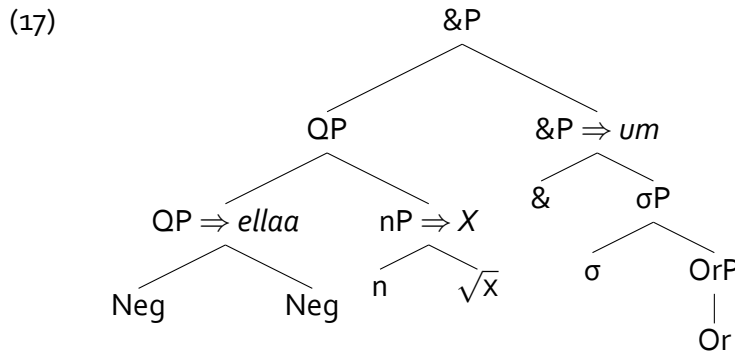
- (14)
- $\langle /aar-/ , [_{?P} ? [_{nP} n \sqrt{PERSON}]] \rangle$
 - $\langle /-oo/ , [_{OrP} Or [_{QP} Q]] \rangle$
 - $\langle /-um/ , [_{\&P} \& [_{\sigma P} \sigma [_{OrP} Or [_{QP} Q]]]] \rangle$
 - $\langle /ellaa-/ , [_{QP} Neg Neg] \rangle$

The updated tree structures for *aar-oo* 'somebody' and *aar-um* 'anybody' are in (15) and (16).





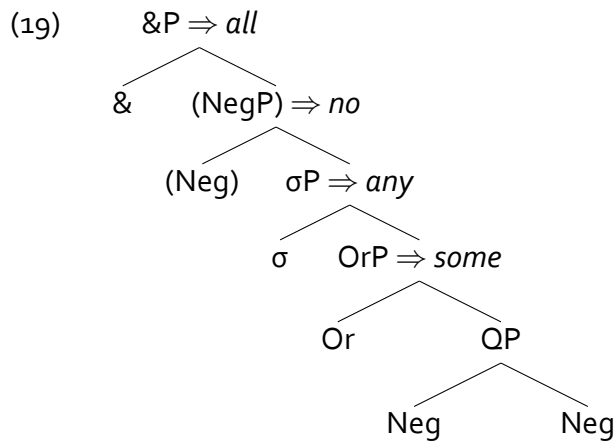
We are now in a position to derive *ella-X-um* 'all X', with X as a placeholder for any nominal or silent nominal (cf. (2a), which consists only of Agreement markers), surrounded by the quantificational morphology.⁴



Finally, I would like to illustrate how the same sequence does a fine job at capturing the English quantifiers and indefinites. Abstracting away from details, the structure of English quantifiers can be captured as in (19):

- (18)
- </-body/, [_{?P} ? [_{nP} n $\sqrt{\text{PERSON}}$]]>
 - </some/, [_{OrP} Or [_{QP} Neg Neg]] >
 - </all/, [_{&P} & [_{sigmaP} sigma [_{OrP} Or [_{QP} Neg Neg]]]]] >
 - </any/, [_{sigmaP} sigma [_{OrP} Or [_{QP} Neg Neg]]] >
 - </no/, [_{NegP} Neg [_{sigmaP} sigma [_{OrP} Or [_{QP} Neg Neg]]]]] >

⁴I refer the reader to Starke (to appear) and Caha et al. (2017) for more details on binary and unary bottoms and more in particular on how to spell out prefixal elements like *ellaa-*.



As a final note, I want to get back to the unlexicalisable nature of *NALL and *NAND. The present sequence captures this fact well and predicts that if a universal quantifier like *all* gets negated, it will be by means of a negator at another point in the derivation, i.e. at the level of vP for instance.

5 Conclusion

This paper started out by discussing Jaspers' dissertation, *Operators in the Lexicon*, and in order to pay tribute to his work, I singled out a language, Malayalam, where the operators and relations Jaspers (2005) uncovered are morphologically realized. On the basis of Malayalam the paper also made a first stab at showing how the spirit of Jaspers' logico-semantic work meshes well with the nanosyntactic framework and how they can work together to get a more fine-grained understanding of the internal structure of QPs like *some*, *all*, *any* and *no* both in English and Malayalam.

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