Any as a Finian quantifier

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1 Facts

In this abstract, we are going to account for the following facts in the distribution of *any*: (a) *any* N is possible in generic sentences, (1), (b) *any* N is odd in descriptive sentences, unless N is characterised by a non–accidental property, (2) and (3), (c) *any* N is odd with *must*–obligations, (4), (d) *any* N is possible with *may*–permissions and with imperatives, (5) and (6), (e) *any* N can behave in many ways like a Negative Polarity Item (NPI), (7), (8) and (9).

(1) Any owl hunts mice
(2) *Mary read any book
(3) Mary read any book (which was on the reading list)/??(which happened to be on her desk)
(4) *Mary must read any book
(5) Mary may read any book
(6) Pick any book
(7) Mary did not read any book
(8) (At most)/*(At least) two students read any book
(9) I am surprised/*glad that you read any book

In spite of the existence of a substantial body of literature on *any*, no general agreement has emerged over the years.[2] Intuitively, the main difficulty is the tension between the appeal of uniformity and the weight of the empirical evidence in favour of two distinct behaviours of *any*, as a P(olarity) S(ensitive) I(tem), which prefers negative or downward monotone contexts and has the logical flavour of $\exists$, and as a F(ree) C(hoice) I(tem) with the flavour of a $\forall$ (Ladusaw 1979, Davison 1980, Carlson 1981). Recent literature offers two main ways of overcoming this problem.

2 The double life of *any*

Recently, the *any*–as–indefinite thesis has regained some vividness. Kadmon and Landman (1993) have proposed that *any* is an indefinite obeying two semantico-pragmatic constraints which are responsible for its distribution. The constraint of *widening* requires that, in *any* N, *any* widens the interpretation of N along (at least) one contextual dimension. So, (1) might be understood as applying to every owl, even the less apt, healthy, etc. The constraint of *strengthening* requires that the *any* N statement entail the corresponding statement without the widening effect. Examples like (2) are bad because this entailment does not hold. The widening paraphrase of (2) is 'Mary read a book of some kind (easy/not easy, pleasant/not pleasant, etc.)' and this paraphrase does not entail 'Mary read a book (a standard one)'. If Mary read a non–standard book (along some semantic dimension), she did not necessarily read a standard book along the same dimension, so the entailment is not necessarily satisfied. Israel (1996) and Lee and Horn (1994) have proposed very similar treatments.

Unfortunately, such approaches are much less convincing when it comes to FC *any*.[3] First, non–accidental modification (cf. (3)) improves definitely examples like (2). The reading of *any* is then clearly the FC one, since, as noted by Dayal (1995), it is possible to insert *almost* or *practically* (*Mary read practically any book which*

[1]This abstract has benefited from comments by Anastasia Giannakidou, Hans Kamp and Ruth Kempson on a previous presentation. Special thanks are due to Ruth Kempson who frequently took the pain to discuss and comment English data. Unfortunately, remaining weaknesses are entirely ours.

[2]See (Tovena 1996) and (Horn 1996) for recent reviews.

[3]Israel seems to point indirectly to this problem in the cryptic footnote (18) of his 1996 paper.

...). A similar remark applies to *must*–obligations. Second, how are we to explain the difference between *must*–obligations and imperatives? If (4) is offending because it means 'Mary must read a book (standard or not)', which may not entail 'Mary must read a standard book' (Kadmon & Landman's account), or not convey an emphatic value (Israel's account), with respect to variants such as *Mary must read a book*, why does the same reasoning not apply to imperatives?

Other recent proposals have attempted to give a unified semantic account without necessarily taking a firm stance towards the issue of the classification of the item. These proposals make extensive use of notions like *veridicality* or *existentiality* (Dayal 1995, Zwarts 1995, Giannakidou 1997). They assume that *any* is basically an existence-repellent determiner: *any* N is semantically licensed precisely in those contexts where one need not suppose that the N-predicate has a non-empty domain. Admissible contexts are those where the existence can be explicitly negated without contradiction (Dayal 1995).[4] Although the veridicality approach seems natural for questions and downward monotone contexts (including negation), we observe that it runs into problems in other cases. It leads to cases of underlicensing, i.e. *any* is wrongly predicted to be impossible (6), overlicensing, i.e. it is wrongly predicted to be possible (10), and indiscrimination, i.e. observations support two competing hypotheses (11).

(10) A psychologist instructing a subject:
That is the room, cards with various shapes are scattered on the floor. You must pick up every/??any square and then push the green button. If there are no squares, push the red one

(11) In that period any foreigner was considered as responsible for the war, ??
but there were no foreigners

According to Dayal's analysis of commands, (6) must be rejected: there will be some card which is picked if the command is executed. Next, (10) does not entail the existence of squares, hence *any* should be acceptable with a universal reading whereas it is not. Last, if (11) is interpreted as ranging over a set of situations (Giannakidou 1997), one cannot discriminate between non-existence and variation. In *some* of these situations the domain of the N-predicate may be empty (non-existence), and/or vary across situations (variation).

3 (yet) Another solution

The solution we propose comes into two parts. First, we assume that, in the current state of knowledge, the choice of an existential or universal value for *any* is a 'hard fact' which may not receive any convincing explanation. Second, within the bounds of these conventionalised restrictions, *any* resists individuation (rather than existence). Intuitively, *any* N is acceptable in a sentence S only when S does not entail that a fixed set of N–objects possesses the property described by the rest of S.

3.1 The restricted ambiguity of *any*

It is of course not sufficient that an interpretation does not emerge to be radically impossible. It could exist at some level of representation and be blocked at some other level by a (set of) constraint(s). We consider an existential or universal interpretation for *any* to be 'impossible' when it does not emerge, although no constraint seems to block it. A more ambitious treatment would probably consider that *any* is systematically ambiguous and the violation of hidden constraints explains the non–emergence of certain readings, but it is beyond the scope of this paper. The only impossibility we assume here is that *any* N may not be universally interpreted whenever (i) it occurs in a context which is usually taken to license PSIs, (ii) N is

[4] A very similar proposal can be found in Carlson (1981). Dayal adds the idea that *any* N may not refer to a fixed set of individuals, but she does not make it the central property.

not modified. In contrast, sentences like *At most two students read any book which was on the reading list* are ambiguous (at least for some speakers) between the $\exists$ and $\forall$ readings. As we will see, other cases (positive descriptive sentences, modals, imperatives) are compatible with the existence of an $\exists$ vs $\forall$ ambiguity.

3.2 The constraint of Non Individuation

For clarity, we decompose our proposal into 3 facets.

1. We follow Kempson (1985) in assuming that the central explanatory factor is that of *dependency*. Specifically, in a quantification of form $\mathcal{Q}_{any}$ N P, the objects which satisfy P do it *in virtue of being* N–objects. This is reminiscent of Fine's work (Fine 1985, 1995) on dependency. Borrowing the notation of Fine (1995), we have in such cases: $\Box_{\mathrm{N} \vee P} \forall x(\mathrm{N}(x) \Rightarrow P(x))$, or, 'every N-object is a P object in virtue of the nature of the objects which are N or P'.

2. We acknowledge the 'modal' (Dayal 1995) character of *any*, by requiring that the dependency between P and N be *non–rigid* (Fine 1995). A property $\lambda x.P(x)$ is *rigid* iff it abbreviates a conjunction of identities $x = a_1 \vee \ldots \vee x = a_\alpha$, where α is some ordinal. Fine (1995) shows that some dependencies can exploit rigid properties. For instance, suppose that only Jane and Mary are on the wall and define $\lambda x.$on the wall$(x) = \lambda x.\, x =$ Jane$\vee\, x =$ Mary. Suppose also that John spoke to Jane and Mary when they were on the wall and that the connection is strictly accidental: the fact that the girls were on the wall has nothing to do with the fact that John spoke to them. Observe then that we have the following dependency in Fine's (1995) system:

$\Box_{\lambda x.\text{on the wall}(x) \vee \lambda x.\text{John spoke to}(x)} \forall x(\text{on the wall}(x) \Rightarrow \text{John spoke to}(x))$.

While John spoke to Jane and Mary when they were on the wall, there is no substantial connection between the speaking event and the localisation of the girls. *Any* is odd in such cases.

(12) John spoke to *any/every person who was on the wall

Generally speaking, *any* is odd when the N–property is rigid (in Fine's sense). Conversely, for *any* to be admissible, the N–domain must be allowed to vary. This is not possible for descriptive sentences like (2), which are predictably odd.

Rigidity can be avoided in two ways. First, the N domain can be variable: this simulates the (much stronger) property of obligatory variation in relevance logics (Fine 1988). By and large, having variation on a property forbids any situation in which its dependency profile comes, not from the property itself, but from the identity of the individuals which (happen to) satisfy it. Second, there might be simply no P–event associated to any member of N in a dependency of form $\Box_{\mathrm{N} \vee P}\phi$. This accounts for the PS behaviour of *any*: *any* fits naturally into negative or downward monotone contexts because it can make them appear as dependency carriers. Consider (7). This sentence says that, in virtue of the nature of Mary's reading(s) and of books, Mary read no book. Since individuals as such do not 'percolate' through an *any*-phrase, a negative clause with *any* does not refer to a definite set of negative events or situations, but rather to the absence of events or situations of a certain type. Non–rigidity is warranted by the fact that the individual books which have not been read do not matter (they cannot be singled out by enumerating particular negative events).

3. *Any* can be interpreted as an existential or universal quantifier, but the chosen interpretation must be compatible with some universally quantified dependency. If *any* is existential, there must be an associated epistemic/affective/deontic information which can be expressed by a universally quantified formula carrying the dependency between the N and another property. If *any* is universal, every universally quantified interpretation associated with the sentence it occurs in must carry a non–rigid dependency. Let us illustrate the two cases. Consider first (9).

The *surprised* version is associated with an epistemic situation, representing the beliefs of the speaker, in which no book has been read by Mary. This a standard case of absence of event/situation of a certain type. The *glad* version either carries no such expectation and is then unable to provide a dependency, if *any* corresponds to a $\exists$, or is blocked by rigidity as in (2), if *any* corresponds to a $\forall$. Consider now a variant of (8).

(13) #At least two students read any book which was on the reading list

On its existential interpretation ($\approx$ 'a book'), this sentence is odd, because it fails to convey any universally quantified information. If *any* corresponds to $\forall$, the sentence is acceptable (for some speakers). Suppose that S is a possible situation where the sentence is true. In S a certain number of students, not less than two, read all the books. The relative clause allows for variation. Even if books remain constant we can imagine that *different* subsets of books constitute the reading list. So we are never confined into a rigid interpretation.

More formally, we capture the behaviour of *any* by the constraint **NI**. We need some terminological conventions first. A *modal constraint* is a constraint on a tuple of possible worlds/situations $(w_0, w_1 \dots w_n)$, where w_0 is the actual world. A modal configuration is a pair $\langle (w_0, w1 \dots w_n), \mathcal{C} \rangle$, where $\mathcal{C}$ is a set of constraints on $(w_0, w1 \dots w_n)$. In a modal configuration, we say that $w_1 \dots w_n$ are accessible from w_0. When $n = 0$, w_0 is accessible from itself. An expression ψ *associated* with some logical form $\mathrm{LF_S}$ of a sentence S whenever it describes a state of affairs in which $\mathrm{LF_S}$ is true if S is an assertion, or in which an appropriate answer to $\mathrm{LF_S}$ is true, if S is a question, an appropriate execution w.r.t. $\mathrm{LF_S}$ is true, if S is a command, an obligation or a permission, etc.

Non individuation, **NI** Let S be a sentence of form (A) *Any* N VP or (B) NP V *any* N, and let LF(S) be the set of its logical forms, where *any* can be interpreted as $\exists$ or $\forall$. Let ϕ be a member of LF(S). We say that ϕ is an admissible interpretation only if:
a. if *any* is existential, ϕ entails some ψ of form $\forall x(\mathrm{N}(x) \Rightarrow \chi(x))$, if *any* is universal some ψ with the same universal form is associated with ϕ.
b. For every such ψ, there is a modal configuration $\langle (w_0, w1 \dots w_n), \mathcal{C} \rangle$ where ψ holds and which respects the following constraint. Let N correspond to the conjunction of properties $P_1, \dots, P_n$. For every world w_j accessible from w_0, each individual i which satisfies a subset $\mathcal{P}$ of $P_1, \dots, P_n$ in w_0 and every member k w.r.t. ψ of the witness set of VP in (A) or NP in (B), it is not possible to prove that $k(i)$ (for (A)) or $\mathrm{V}(k, i)$ (for (B)) is true in w_j from the fact that $\mathcal{P}(i)$ is true in w_0 and $\mathcal{C}$.

Partially Fixed Reference, **PFR** A noun N is *descriptively interpreted* in a sentence ϕ(N) if the reference of N is *partially fixed* with respect to ϕ, in the following sense. Let $\mathcal{P} = \{P_1 \dots P_n\}$ be a set of properties introduced by N. $\mathcal{P}$ has a partially fixed reference in the actual world w_0 if there is a subset $\mathcal{P}'$ of $\mathcal{P}$ such that, if the reference of $\mathcal{P}'$ in w_0 is a set $\mathbf{P}'$ of individuals, ϕ(N) is true in a world w' only when the reference of $\mathcal{P}'$ in w' is the same set $\mathbf{P}'$. In a descriptive sentence or clause, NPs have a partially fixed reference whenever they point to possibly existing objects (books but not unicorns). Their N lexical head has a fixed reference while the modifiers are allowed to denote different sets of individuals whenever they do not describe accidental properties, as in (12).

This definition says that a noun has a partially fixed reference if we are not free to change the set of individuals which satisfy some given subset of the properties designated by the noun across worlds. Descriptive sentences purport to describe the world as it is. So every NP which occurs in them will have a partially fixed reference, unless it clearly designates non–existing objects. The reference of a NP in a descriptive sentence is totally fixed in two cases. When a N is not modified and

points to possibly existing objects, its reference is totally fixed, since $\mathcal{P}$ in **PFR** is a singleton. When the N is modified, but the dependency is accidental, as explained above, the reference is fixed (rigid, in Fine's sense).

3.3 Application

We are now going to review the main configurations in the distribution of *any* to demonstrate how **NI** and **PFR** work. We will leave aside examples which have already been discussed (negation).

1. Descriptive sentences like (2) can be assigned the following logical forms: (i) $\exists x(\text{book}(x) \wedge \text{Mary read}(x))$ and (ii) $\forall x(\text{book}(x) \Rightarrow \text{Mary read}(x))$. (i) may not entail any universally quantified formula, so a. of **NI** is not satisfied. (ii) satisfies a. because it is associated with itself, so ψ of **NI** is simply (ii). Since assertions are normally evaluated in the actual world, the modal configuration reduces to the actual world w_0 itself. In w_0, if b is a book we can safely conclude from (ii) that Mary read(b) is true, contrary to what i stated in **NI**,b.

2. When the N is modified, as in (3), the universal form is again the only candidate. **PFR** allows us to create variation. Since the N lexical head has a fixed reference, the sentence denotes a fixed set of books. In contrast, we may allow for different subsets of books on the reading list. Let b be a book. We cannot conclude from the logical form that b has been read, since b might not be on the reading list, whose identity is allowed to vary.

3. The psychologist example is more subtle. At the moment where the task is described to the subject, there is an indeterminacy. Assume then that we have a set of possible actual worlds, $w_0^1 \ldots w_0^m$. Suppose that s is a square shape on the floor in one of these worlds, then, we must conclude that it will be picked up (see below for *must*–obligations). This is not so for examples of type (3), even if we use several actual worlds to represent variation.

4. Questions easily host *any*. Consider *Did Mary read any book?*. It has only the existential interpretation and entails that, for every book b, the speaker does not know whether Mary read it. We can construct a modal configuration in which Mary read no book or only some books. The speakers which interpret universally *Did Mary read any book which was on the reading list*, can receive an (appropriate) answer 'yes'. In this case, Mary read every book from the reading list, but, owing to the modification of N, variation is preserved. If b is a book, we cannot prove that Mary read b.

5. For examples like (8), the existential interpretation entails that, for every book, at most two students read it. This allows us to avoid the offending situation in which every book was read by some student. For instance, if Tina is a member of the witness set of $ATMOST2students$ w. r. t. $\psi = \forall x(book(x) \Rightarrow AT\ MOST\ 2\ students$ read $x)$ and if b is a book, we cannot be sure that Tina read b. The universal interpretation (*via* a modification of the N) leaves room for variation.

6. *May* and *must* modals can also be accommodated in the present framework. *May*–permissions like (5) can host the existential reading, because it entails that every book may be read by Mary. This is of course compatible with a situation in which Mary reads no book or only some of them. The universal reading (with a modification on the N head) is 'Mary may read every book which Q'. This is associated with itself, and we can, again, construct a modal configuration in which Mary read no book or only some of them.

Must–obligations are different. The existential reading is not possible because there is no universally quantified entailment. The universal reading is associated with a situation in which Mary read all books. This is an offending configuration, so the N head has to be modified for the sentence to become acceptable.

7. Imperatives are a combination of the *may* and *must* cases. The existential interpretation entails that any book may be picked, which carries us back to the case of *may*. The universal one is associated with a situation in which the addressee picks all the books. Again, only modification of the N head can make the sentence acceptable.

8. Generics allow variation by nature, since they do not allude to fixed sets of individuals. Accordingly they may host the universal *any*, as in (1), because, from the fact that o is an owl in w_0 and that owls hunt mice, I cannot prove that o hunts mice in another world. Since we are not in a descriptive sentence, variation is allowed even on the N head (i.e. *owl*). So, o might not be an owl in a world different from w_0.

4 Conclusion

Summarising, we propose that *any* draws its homogeneity from the requirement of dependency, which is realized in English as the **NI** constraint. A similar relation with dependency exists in other languages, for instance in French for the two determiners *tout* (a sort of modal *every*, studied in (Tovena & Jayez 1997)) and *n'importe quel* (a sort of purely existential *any*). One may reasonably expect that the dependency requirement will be linguistically implemented in various ways across languages. A related, open, question is whether all free–choice items, which convey a sense of indiscriminacy or *quodlibeticity* (Horn, after Hamilton), are manifestations of a dependency requirement or whether some of them express only the existence a range of possibilities.

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