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Polarity and Arbitrariness in French

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The problem

Recent work on polarity and free choice items has promoted several (different) theoretical notions pertaining to the domains of polarity and quantification.

- Non-existentiality for *any* (Dayal 1995, Zwarts 1995, Giannakidou 1996) and for *tout* (Kleiber & Martin 1977),
- modal character or non-individuation for *any* and *tout* (Eisner 1994, Tovenà 1996, Tovenà & Jayez 1997a,b and 1998, Dayal 1998, foreshadowed in Dayal 1995), and for FC items (Giannakidou 1996, 1997),
- scalar relevance for *any* (Y.-S. Lee 1993, Kadmon & Landman 1993, Y.-S. Lee & Horn 1994, Horn 1996, C. Lee 1996, C. Lee 1997),
- arbitrariness (Tovenà & Jayez 1997b, 1998).

Is it possible to assemble these different perspectives into a coherent picture?

Basic distinction: Free Choice (FC) and Polarity Sensitive (PS) behaviours, a familiar distinction in the literature on *any*.

To be examined: *tout* ($\approx$ FC *any*), *le moindre* ($\approx$ the least).

Three basic ideas

• Non-veridicality

The idea that some constructions require that the truth of a certain proposition be not entailed by the sentence.

(1) Mary read any book which was on the topic

(1) is felicitous because there is perhaps no book on the topic. Veridicality for FC *any* and *tout* has been attacked in (T&J97a,b) and abandoned in (Dayal 1998). However, it proves useful for NPI (Giannakidou 1996).

• Non-individuation or variation

The idea is that some judgments have a modal/generic/dispositional flavour.

As such, they are not *about* particular individuals but rather about possible individuals. So, (1) is not about particular books on the topic but rather about a stable behaviour of Mary.

• Arbitrariness

The idea is that some judgments are about *dependencies* between properties. That's why those judgments:

- are about possible individuals in cases where dependencies between properties do not depend on individuation,
- are independent from individual existence.

Arbitrariness leads to non-veridicality and non-individuation. Moreover, it provides a plausible connection between PS and FC behaviour.

Arbitrary objects (Fine 1985, 1988) reminiscent of Plato's *εἶδος*, akin to the notion of informational type (description in TFS, object in OOL, concept in DL, etc.).

Connected with (i) non constant domain semantics (variation): intuitionistic logic, S4.2, relevance logic, etc. (ii) ϵ -calculus and instancial logics (Meyer Viol 1995).

Basic idea: types survive, individuals are expendable.

(1) associated with $\forall m : M, c : C b : \text{book on the topic in } c \Rightarrow m \text{ read } b \text{ in } c$. 'For every arbitrary object m of type M (Mary), c of type C (situation context of (1)) and b of type 'book on the topic in c ', m read b in c .'

More compact presentation: every object b of type 'book on the topic in c of type C ' is an object of type 'being read by m of type M in c '.

Distinction between reference and felicity condition. (1) refers to a particular situation, but it is felicitous only if this situation is perceived as a local consequence of the dependency between arbitrary objects.¹

Modes of non-individuation

Roughly, (simple) variation = the possibility to imagine possible individuals, in addition to the actual ones, arbitrariness = the informational side of the notion of variation: a is a possible variant of b iff a and b are indiscernible w.r.t. some (set of) property (properties). Variation is the symptom of arbitrariness.

• Variation

Eisner (1994), Dayal (1995, 1998), Giannakidou (1996, 1997)² and T&J (1997a,b) resort of a principle of variation (*Non-Individuation*, *Contextual*

Vagueness). Roughly, an *any* phrase must not refer to a determinate set of individuals. This takes care of things like:

- (2) a. ??Tout étudiant de ce groupe a réussi l'examen
 ??any student from this group passed the test
 b. Jean a parlé à ??toute femme qui était sur le mur
 John talked to ??any woman who was on the wall

• Towards arbitrariness

T&J (1997b, 1998) suggest that the relevant notion here is not that of variation but that of *arbitrariness* (Fine 1985). Three problems for variation-based analysis.

1. How to deal with (3)?

- (3) l'ensemble $\{1, 2, 3\}$ contient tout nombre qui en est membre
 The set $\{1, 2, 3\}$ contains any number which of it is member
 The set $\{1, 2, 3\}$ contains any number which is a member of it

(3) is analytic and is about particular individuals.

2. How to deal with (4)

- (4) Il y a 200 étudiants dans le département et tout étudiant
 There are 200 students in the department and student
 a reçu une convocation officielle
 received a summon

Again, (4) refers to individual students.³

3. Variation does not say much about the possible connection between PS and FC *any*.⁴

• What is arbitrariness? As noted by different authors (Ladusaw, Eisner, Dayal, T&J, etc.), $\phi(\text{any } N)$ with FC *any* conveys the impression that there is some sort of necessary link between the property denoted by N and the other properties mentioned in ϕ . Compare (3) and (2-a) or (2-b). The relevant notion here is that of *indiscernibility*. Two individuals a and b are indiscernible with respect to a set of properties $\mathcal{P}$ whenever a and b satisfy all the properties of $\mathcal{P}$. In (3), any number which would be indiscernible of 1, 2 or 3 w.r.t. the property of being a member of $\{1, 2, 3\}$ would satisfy the

property of being a member of the set. In (2-b), suppose that in the actual world w , John spoke to Sally, Mary and Sue. Let w' be a world accessible from w in which Judy is also on the wall. Judy is indiscernible from Sally, Mary and Sue w.r.t. the property of being on the wall in w' . However, we have no guarantee that John spoke also to Judy in this world.

In (2-a), there is no obvious link between being a student of the mentioned group and passing the test. So, the sentence is really about particular students: one may not arbitrarily imagine other students and assume that they would have passed the test as well. In contrast, in (4), while the sentence is about the students of the department, the fact that is about them is not relevant to the link between the property of being a student of the department and the property of having received a summon. Arbitrariness holds when the aboutness of a sentence does not block or weaken the link between properties.

Fine (1995) distinguishes between necessity and variation ('non-rigidity' in his terms). A predicate is *rigid* whenever it is equivalent to a disjunction of identities.

(5) **Fine's rigidity**

P is rigid if it is equivalent to $\lambda x. x = a_1 \vee \dots \vee x = a_\alpha$ for some ordinal α .

What (3) shows is that we may have necessity even in the case of rigid predicates. So, variation is not absolutely obligatory for *tout* and FC *any* sentences. A sentence $\phi(\text{tout } N)$ says that ϕ is true of an arbitrary object (Fine 1985) of type N . An entity is of type $\mathcal{P}$ ($\mathcal{P}$ a set of properties) whenever it satisfies all the properties of $\mathcal{P}$. An arbitrary object a of type $\mathcal{P}$ ($\mathcal{P}$ a set of properties) is an object such that, for any ϕ , if ϕ is true of a , it is also true of any individual of type $\mathcal{P}$.

(6) **Arbitrary object**

a is an arbitrary object of type $\mathcal{P}$ iff for every ϕ , if $\phi(a)$, then $\phi(a)$ for every a of type $\mathcal{P}$. We write $a^{\mathcal{P}} \leftrightarrow a^{\mathcal{Q}}$ when every arbitrary object of type $\mathcal{P}$ is an arbitrary object of type $\mathcal{Q}$.

In (3) $\mathcal{P}$ is just the property of being 1, 2 or 3, noted $\in \{1, 2, 3\}$. Assume that the things which satisfy this property remain the same through all worlds. If $a^{\in \{1, 2, 3\}}$ is the arbitrary object of type $\in \{1, 2, 3\}$, it satisfies $\in \{1, 2, 3\}$ by definition.

1 satisfies $\in \{1, 2, 3\}$, so 1 satisfies $\in \{1, 2, 3\}$ in virtue of being of type $\{\in \{1, 2, 3\}\}$. 1 satisfies also the property of being the ‘first’ member of $\{1, 2, 3\}$ in the natural ordering of ordinals. However, 1 is not the first on the list in virtue of being on the list. 3 is on the list and is greater than 2. However 3 is not on the list in virtue of being greater than 2 (4 is greater than 2 but is not on the list).

What counts is *dependency* between (sets of) properties.

(7) **Arbitrariness of *tout***

$\phi(\text{tout } N)$ is felicitous only if we can construct an interpretation in which the situation it describes appears as a consequence of a dependency $\mathcal{A}^{\{N\}} \hookrightarrow \mathcal{A}^{\{\phi\}}$

• The subtriggering effect.

Subtriggering = the fact that a marginal sentence is redeemed by modifying the N in *any* N, generally with a relative clause or a postnominal modifier. For an interpretation as in (7) to be constructed, we must access properties. This gives the intuitive flavour noted in the literature for *any*: $\phi(\text{any } N)$ or $\phi(\text{tout } N) \approx$ ‘every x which is an N satisfies ϕ in virtue of being an N’, which gives rise to the variation-based reading in most cases: since it is in virtue of being an N that ϕ , it does not matter which instance of N we consider.

Subtriggering = a property emerges (in DRT, a special discourse reference would be introduced).⁵

- (8) a. J’ ai reçu les étudiants_{*i*}. ??C’_{*i*} est assez fréquent
I received the students. This is pretty frequent
- b. J’ ai reçu les étudiants qui étaient intéressés_{*i*}. C’_{*i*} est assez fréquent
I received the students who were interested. This is pretty frequent
- c. Tout étudiant qui a raté le premier examen (ce qui est malheureux) a une seconde chance
Any student who missed the first exam (which is unfortunate) gets a second chance
- d. Tout chômeur (??ce qui est malheureux) a une
Any unemployed person (??which is unfortunate) gets a

second chance

second chance

Polarity sensitivity

• Negative Polarity Items (NPIs) emerge empirically as items which fit only in certain ‘negative’ environments (standard negation, downward entailing environments and questions). More recent approaches (Krifka 1995, Israel 1996) focus on information. Israel views PSI as conveying an informative value (*i-value*), corresponding to the distinction between understatements and emphatic statements, and a quantitative value (*q-value*), corresponding to degrees on a scale. The NPS or PPS status of an item depends on the combination of values it exhibits. E.g. an [emphatic,low] item demands that the environment be negative.

- (9) a. Asserting that a low value on some scale is reached is not very informative $\Rightarrow$ the corresponding statement cannot be emphatic
 $\Rightarrow$ the [emphatic,low] combination is not licensed by assertions
- b. Mary made ??the least effort
- (10) a. Denying that a low value on some scale is reached is informative, because it implicates that many values on the scale are not reached (scalar entailment à la Fauconnier)
- b. Mary didn’t make the least effort

• Some items behave externally as NPIs *and* as PPIs. E.g. *le moindre* (lit. ‘the least’) which is strikingly parallel to *any*.

- (11) PPI behaviour
- a. Marie a lu le moindre livre sur la question
Mary read the least book on the topic
- b. Tu dois lire le moindre livre sur la question
You must read the least book on the topic
- c. Lis le moindre livre sur la question
Read the least book on the topic
- (12) NPI behaviour
- a. Marie n’a pas lu le moindre livre
Mary did not read the least book

- b. Marie a-t-elle lu le moindre livre?
Did Mary read the least book?
- c. Seule Marie a élevé la moindre objection
Only Mary raised the least objection
- d. Je suis ?content/étonné que Marie ait lu le moindre livre
I am glad/surprised that Mary read the least book

• Moreover, subtriggering effects are similar.

- (13) a. Marie a lu ?le moindre livre
Mary read the least book
- b. Lis ?le moindre livre
Read the least book

• We have a very strong intuition that *le moindre* is scalar. So, an ideal solution would (i) capture the parallelism between *le moindre* and *any* in scalar terms, (ii) explain the subtriggering effect and (iii) take into account some differences between the two items. We can start from the idea that *any* has a sort of *concessive* value (Y.-S. Lee 1993, Y.-S. Lee & Horn 1994, Horn 1996, C. Lee 1996, 1997). *Mary read any book on the topic* can be paraphrased as ‘Mary read all the books on the topic, even the least interesting, relevant, etc. We rephrase the affinity between *any* and *even* in an information-based terminology.

(14) **Expectation ordering**

Let S be a scale, that is, a total order $(\Delta_S, \leq_S)$, where Δ_S is a set of degrees δ_i . An expectation ordering (e.o.) on S with respect to some monadic predicate P is a scale S' $(\{\langle P, \delta_i \rangle\}, \leq_{S'})$.

Intuitively, expectation ordering (e.o.) on a scale S = an ordering of the degrees of S w.r.t. some predicate. If $\delta_i \leq \delta_j$ on this e.o., objects of degree δ_i are not likelier to satisfy P than objects of degree δ_j . For instance, given a scale S of interest for books in a given domain, and a *read*-predicate *read*, one of the possible e.o. on S w.r.t. *read* is defined by the isomorphism:

$$\langle read, \delta_i \rangle \leq_{S'} \langle read, \delta_j \rangle \text{ iff } \delta_i \leq_S \delta_j$$

A more interesting book is more likely to be read than a less interesting one.

(15) **Informational relevance**

Let S be a scale and S' an e.o. on S w.r.t. some predicate P . The informational relevance in S' of a proposition $P(\delta_i)$, where δ_i is a degree of S , is the set $\{\delta_j : \langle P, \delta_j \rangle \geq_{S'} \langle P, \delta_i \rangle\}$.

By (15), we have that a proposition $P(\delta_i)$ is maximally relevant iff for all δ_j , $\langle P, \delta_j \rangle \geq_{S'} \langle P, \delta_i \rangle$. The characterization of minimal relevance is similar.

• For *any* and *le moindre*, we require that informational relevance be maximal with respect to some scale–expectation pair. A sentence like (11-a) would then mean that Mary read the book that was the least likely to be read (expectation) with respect to some criterion (scale). In contrast, (12-a) would mean that Mary did not read the book that was the likeliest to be read.

(16) **Informational relevance for *any* and *le moindre***

$\phi(\text{any } N)$ and $\phi(\text{le moindre } N)$ are felicitous only if we can construct an interpretation under which the corresponding propositions are maximally relevant, in the sense of (15).

Any and *le moindre* do not specify the orientation of the scale(s) with respect to which information relevance is evaluated. So, they show as NPIs or as PPIs indifferently.

• How to interpret subtriggering in this new scalar framework? This is particularly important since existing approaches to *any* either recognize its scalar nature but fail to explain subtriggering or explain subtriggering at the cost of distinguishing PS and FC *any* too sharply. If subtriggering is a particular symptom of arbitrariness, linking scalarity and arbitrariness provides a solution. Maximal relevance according to (15) entails that (even) the most (least) significant degree does not satisfy (satisfies) a certain predicate. This implies that the trigger of non-satisfaction or satisfaction is not an individual object but rather the category which subsumes the object. For instance, in (11-a), the fact that Mary read even the less interesting or relevant books implies that she read such books in virtue of their property of being on the topic.

However, this doesn’t work for NPI uses of *any* or *le moindre*. Some of these uses *are* definitely accidental in flavour.

- (17) a. Marie n’a pas touché au moindre objet sur ce bureau
Mary didn’t touch the least object on this desk
- b. Mary didn’t touch any object on this desk

If uttered in detective story context, neither (17-a) nor (17-b) imply that there was a disposition of Mary or a conceptual profile of objects on the desk such that the proposition conveyed by the sentences is true. Mary just *happened* not to have touched any object on the desk.

- Still, there is a sense in which arbitrariness is applicable to (17-a) and (17-b). As noted by Fine (1985, 1988): arbitrariness prevents the use of enumeration. If $\mathfrak{a}$ is an arbitrary object, $\phi(\mathfrak{a})$ may not be proved by enumerating all individual instances of $\mathfrak{a}$ and by proving that each instance satisfies ϕ .⁶ The arbitrary flavour of negation and, more generally, of negative contexts consists in the fact that they assert propositions which cannot be proved by enumeration. When we say that Mary didn't touch any object, we might have spied Mary and observed that she didn't touch the objects. Since there is (presumably) a finite number of objects, we could enumerate them and check that Mary didn't touch any of them. However, we cannot enumerate all the *events* of Mary touching one of the objects and dismiss them as non-existing. Alternatively, we cannot observe events of non-touching. So, the event-type of Mary touching one of the objects on the desk provides the arbitrary entity we need. Unifying the PS and FC cases requires that we extend the notion of arbitrariness to events.

(18) **Arbitrary events**

$\mathfrak{E}$ is an arbitrary event iff every possible instance of $\mathfrak{E}$ is realized or every possible instance of $\mathfrak{E}$ is not realized.

We tie up the PS and FC behaviours by requiring that *some* form of arbitrariness (on objects or events) be used in an appropriate interpretation.⁷

(19) **PS/FC marriage**

$\phi(\text{any } N)$ and $\phi(\text{le moindre})$ are felicitous only if we can construct an interpretation in which it means either $\mathfrak{a}^{\{N\}} \hookrightarrow \mathfrak{a}^{\{\phi\}}$ or the event $\mathfrak{e}^{\phi(\text{any } N)}$ (or $\mathfrak{e}^{\phi(\text{le moindre } N)}$) is arbitrary.

Negative sentences like (12-a) use an arbitrary event of Mary reading a book because no possible instance of this event is realized. Positive sentences allude to particular events $\Rightarrow$ no arbitrary event $\Rightarrow$ object-based reading

Imperatives

In Vendlerian imperatives *any* emerges as an ‘indefinite’.

(20) Pick any card ($\approx$ ‘Pick a card, no matter which one’)

Yet, if the ‘indefinite’ value for *any* is associated with PS *any*, interpreting *any* in (20) as an indefinite forces us to assume either that (i) the imperative environment hosts PSI or (ii) that the association of the ‘indefinite’ *any* with polarity sensitivity is not robust.

- *Any* and imperatives

We might assume that (20) is licensed by covert subtrigging (*Pick any card you like*). But the manoeuvre would make every occurrence of *any* acceptable (we would appeal to a covert subtrigging whenever needed).

Imperatives describe states of affairs which are considered as desirable (or necessary) by the speaker, and which are described by the propositional content of the imperative. So, they come with (at least) two e.o. The scale of the propositional content and that of the satisfaction judgments.

(21) **Expectation orderings for imperatives**

Imperative of form $!P(a)$, where a is the addressee.

E.o. of the p.c. = e.o. of $P(a)$.

E.o. of satisfaction = e.o. on the possible situations of type $P(a)$ which satisfy the speaker.

For (20):

e.o. of the p.c. = $(\{\langle \text{pick}(a, x), \delta_i \rangle\}, \leq)$

e.o. of satisfaction = $(\{\langle \bigwedge_{i=1}^n \text{pick}(a, x_i), \{\delta_1 \dots \delta_n\} \rangle\}, \leq)$, where the x_i refer to cards.

E.o. of satisfaction = the ranking of the possible card-picking situations.

This gives two possibilities:

a. The addressee picks the card which is the least likely to be picked. A typical case of FC *any* which is only possible with subtrigging or event nouns. Information relevance (15) is satisfied by the p.c.

- (22) a. Pick any card which is marked (p.c. = the addressee will pick any card which is marked)
 b. Punish any misdemeanour (p.c. = the addressee will punish any misdemeanour which occurs)

b. The addressee picks the card which is the most likely to be picked. A plausible (maybe lexicalized) interpretation is that the addressee picks any

card she likes. There is no scalar entailment, the addressee is not expected to pick all cards, hence the ‘indefinite’ value of *any*. However, informational relevance is not satisfied by the propositional content which entails ‘the addressee will pick some card’. It is satisfied on the e.o. of satisfaction: the situation where the addressee picks the card she likes is satisfactory, so the speaker has no special requirement on the card-picking situation, so every card-picking situation would be satisfactory for the speaker.

• *Le moindre* and imperatives

Le moindre is not felicitous in a (20) environment.

- (23) Prends ??la moindre carte
Pick the least card

Explanation: *le moindre* favours ‘natural’ e.o. where the item associated with the minimal likelihood is actually small, unimportant, not substantial, boring, ugly, etc. Observe:

- (24) a. Any difficulty can be overcome
b. ??La moindre difficulté peut être surmontée
The least difficulty can be overcome

Conclusion

- Arbitrariness contributes a more principled analysis of variation phenomena,
- it provides the missing link between scalarity and quantification.
- It will probably help to discriminate between genuine arbitrary items (*any*, *tout*, *le moindre*), and items which exploit variation and are conducive to arbitrariness but are not based on it (*n’importe quel*).

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Notes

¹ A similar distinction is used by Dayal (1998) when she ascribes the oddness of certain sentences with *any* to a presupposition failure.

²Giannakidou proposes that FC items are subject to a constraint of *non-episodicity*, thereby generalizing a more local suggestion about *any*, to be found already in (Ladusaw 1979) and exploited in a systematic way in (Eisner 1994). Interestingly, she acknowledges that *any* probably tells a more complex story than just non-episodicity.

³Note that FC markers like *who/whichever* (Dayal 1997) and *quel qu'il soit* are perfectly compatible with 'standard' (= non arbitrary) universal quantifiers, as evidenced by (a) and (b).

(a) Chaque étudiant quel qu'il soit est arrivé à l'heure
($\approx$ each student, whoever he is, arrived on time)

(b) Smith's murderer, whoever he is, left ashes in the ashtray

In (b) there is no link between the property of being Smith's murderer and that of having left ashes in the ashtray. So, although these markers can convey arbitrariness, as noted in (Giannakidou 1997), they do not impose it.

⁴T&J (1997b) use variation to link PS and FC *any*, but at the cost of a rather complex analysis.

⁵See Asher's (1993) conceptual anaphora.

⁶This remains true even in the case of a property like $\in \{1,2,3\}$ mentioned above. Proving that every member of $\{1, 2, 3\}$ is a member of $\{1, 2, 3\}$ requires that we prove that a member of $\{1, 2, 3\}$ *as such* is a member of

$\{1, 2, 3\}$. We may not select, say 1, prove that it belongs to $\{1, 2, 3\}$, then select, say 2, etc. We must start from an arbitrary member of the set, that is, an object which satisfy only the property of being a member of the set.

⁷Tovenà & Jayez (1998) go further on the same way by expressing the constraint on PS and FC uses *any* and *le moindre* in terms of events. I do not discuss this point here.