

Homogeneity and non-maximality in default plural predication

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Capturing homogeneity and non-maximality

Homogeneity 1: Truth-value gap

Both, (1) and (2), have non-complementary truth- and falsity-conditions.

Homogeneity 2: No excluded middle

There are contexts in which neither (1) nor (2) applies.

⇒ The plural definite has a **quasi-universal** interpretation in (1) and a **quasi-existential** interpretation under negation as in (2).

- (1) The books are written in Dutch.
- (2) The books aren't written in Dutch.

Scenario	Truth-value: positive (1)	Truth-value: negative (2)
<i>homogeneous:</i> $\forall x.(book(x) \rightarrow Dutch(x))$	clearly true	clearly false
<i>mixed context:</i> $\exists x.(b(x) \wedge D(x)) \ \& \ \neg \forall x.(b(x) \rightarrow D(x))$?	?
<i>homogeneous:</i> $\neg \exists x.(book(x) \wedge Dutch(x))$	clearly false	clearly true

- Plural definites are known to allow for **pragmatic slack**.

(3) The townspeople are asleep.

- **Non-maximal reading:** (3) is **true** even if '*a few insomniacs are pattering around their houses.*'

Non-maximality doesn't cancel out homogeneity

- (3) The townspeople are asleep.
- (4) The townspeople aren't asleep.

- **Non-maximal readings:**

- (3) is **true** even if someone is awake.

- (4) is **true** even if someone is asleep.

- **Homogeneity:**

- In a **mixed context** neither (3) nor (4) are completely true or false.

- Some contexts give rise to 'quasi-universal' readings.

Context: *Sleep study. It is crucial that all participants are sleeping in order to move on with the experiment. One experimenter says to the other:*

(5) The participants are asleep.

- (5) is only true if, and only if, actually all participants are sleeping.
- The context **does not allow** for nonmaximal readings.

- Non-maximal readings occur even if the exceptions are still referenced by the plural definite.

Context a): *Professors at a PhD defense. Smith is known to be grumpy. All the professors except Smith smiled, and then all the professors, including Smith, left.*

(6) The professors smiled and then all left the room.

Context b): *All the professors except Smith smiled and then left, leaving Smith behind.*

(7) #The professors smiled and then all left the room.

- Homogeneity and nonmaximality **appear** and **disappear together**.

All has a **slack regulating** effect and removes homogeneity:

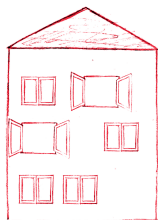
(3) The townspeople are asleep.

(8) **All** of the townspeople are asleep.

No homogeneity effect: (8) is clearly false if anyone is awake.

No non-maximal readings: (8) does not allow for exceptions.

Context: *Mary is leaving her house for a car trip with a friend. A few minutes after leaving, they see a storm coming in the direction of her house. She believes that she left at least some windows open and she knows that if at least one window is open, the house is not safe from the storm. Mary says:*



(9) Oh my, we have to go back home, **the windows** are open!

- (9) is true, even if **only a few - or even just one?** - windows are open.

Accounts that integrate homogeneity and non-maximality

- **Proposal 1: Exhaustification**

[Bar-Lev, 2021]

Plural definite predication introduces an **existential quantifier** that is oftentimes pragmatically strengthened.

(10) The windows are open. \rightsquigarrow *Some windows are open.*

- **Proposal 2: Three-valued logic**

[Križ, 2015, Križ, 2016]

QUD gives rise to an **existential reading**.

(11) ‘*Some windows are open.*’ \equiv ‘*All the windows are open.*’
under current issue.

- **Proposal 3: Underspecification**

[Križ and Spector, 2021]

(12) The windows are open. \rightsquigarrow *Some or certain relevant windows are open.*

The underspecification account of plural definites

Breaking down complex objects

- Homogeneity occurs in natural language constructions that involve some kind of complex objects.
- We can break down these objects into their (mereological) parts.

Let $x := a \oplus b \oplus c$ be the plurality referenced by the plural definite.

$$\mathcal{Part}(x) = \{y \mid y \sqsubseteq x\} = \left\{ \begin{array}{c} a, b, c, \\ a \oplus b, a \oplus c, b \oplus c, \\ a \oplus b \oplus c \end{array} \right\}$$

- where x represents the Montagovian individual $\lambda P.P(x)$.
- Applying x to a predicate yields a set of propositions.

What are we trying to capture?

Context: *There are 10 books on the reading list for exam preparations. We want to know whether Mary read enough books to be properly prepared for the exam.*

(13) Mary read the books (on the reading list).

- The current issue is given by $I = \{i_1, i_2, i_3\}$.

i_1 : Mary read 8 or more of the books.

→ Mary is properly prepared.

i_2 : Mary read between 3 and 7 of the books.

→ We don't know.

i_3 : Mary read 2 or fewer of the books.

→ Mary isn't well prepared.

- Plural definites are **generalized quantifiers over individuals** associated with a set of **candidate denotations**.
- As a consequence, sentences with plural definites yield a **set of propositions**, the **candidate interpretations**.

Let $x := a \oplus b \oplus c$ be the plural individual referenced by the plural definite.

$$\mathcal{Part}(x) = \{y \mid y \sqsubseteq x\} = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$$

Naively,

$$\text{Cand}_x := \{\bigvee S \mid S \subseteq \mathcal{Part}(x)\} \text{ where } x \vee y := \lambda P. P(x) \vee P(y)$$

- Plural definites are **generalized quantifiers over individuals** associated with a set of **candidate denotations**.
- As a consequence, sentences with plural definites yield a **set of propositions**, the **candidate interpretations**.

The sentence is always true if the predicate applies to the maximal element:

$$\text{Cand}_x := \left\{ \bigvee \text{Conv}_{\sqsubseteq}(S \cup \{x\}) \mid S \subseteq \text{Part}(x) \right\}$$

- We want to filter out some candidate propositions by relevance considerations.

Strong relevance

A proposition p is **strongly relevant** to a partition I iff $\exists X \subset I : p = \bigcup X$

A sentence is judged true
iff

all the strongly relevant candidate propositions are true.

Nonmaximality and the notion of contextual relevance

$$\text{Cand}_x := \left\{ \bigvee \text{Conv}_{\sqsubseteq}(S \cup \{x\}) \mid S \subseteq \text{Part}(x) \right\}$$

Strong relevance

A proposition p is **strongly relevant** to a partition I iff $\exists X \subset I : p = \bigcup X$

- The current issue is given by $I = \{i_1, i_2, i_3\}$.

DOES SUCH AN ISSUE EXIST IRL?

i_1 : Mary read 8 or more of the books.

→ Mary is properly prepared.

i_2 : Mary read between 3 and 7 of the books.

→ We don't know.

i_3 : Mary read 2 or fewer of the books.

→ Mary isn't well prepared.

- i_1 and $i_1 \cup i_2$ are the only strongly relevant candidate interpretations.
⇒ The overall meaning we obtain is the conjunctions of i_1 and i_2 .

Homogeneity and non-maximality with generics

Some facts about generics

- Generics express generalizations.

(14) Tigers have stripes.

(15) Mosquitoes carry malaria. → *existential*

(16) Humans erect monuments. → *collective predicate*

(17) '*Bees collect pollen.*' vs. '*?Bees are workers.*'

- Other than quantified statements (*all, some*), generics do not provide information about quantity.

- **Note:**

We are (for now) not talking about *habituals* such as (18).

(18) John smokes after work.

Episodic vs. global predication

- In English, sentences with PDs display **episodic predication** over a restricted domain.

- PDs can appear with **stage level predicates**, e.g. *be happy*.

(19) The students are happy.

(20) #Students are happy.

- Generics appear with **individual level predicates**, e.g. *written in Dutch*.

(21) Books are written in Dutch.

(22) The books are written in Dutch.

(23) Dogs are intelligent.

(24) Dogs aren't intelligent.

- (23) is **true** if dogs are, *in general*, intelligent.
- (24) is **true** if dogs are, *in general*, not intelligent.
- **Neither** (23) not (24) is completely true or false in a *mixed context*.

Exception tolerance in generics

- **Plural definites:**

(3) The townspeople are asleep.

- **Generics:**

(25) Tigers have stripes.

Non-maximal reading:

(25) is true even if some unusual tigers, e.g. albino tigers, don't have stripes.

- **Plural definites:**

(5) The participants are asleep.

- **Generics:**

(26) The inner angles of triangles sum up to 180 degrees.

- (26) is only true if, and only if, actually all triangles satisfy the property.
- The context **does not allow** for non-maximal readings.

Nonmaximality \neq domain restriction in generics

- **Plural definites:**

(6) The professors smiled and **then all** left the room.

- **Generics:**

(27) Birds lay eggs and can fly.

Slack removal in generics

- **Plural definites:**

- (3) The townspeople are asleep.
- (8) **All** the townspeople are asleep.

- **Generics:**

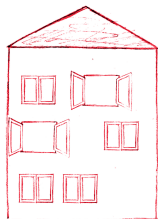
- (28) Tigers have stripes.
- (29) All tigers have stripes.

No homogeneity effect: (29) is clearly false if there's a tiger without stripes.
No non-maximal readings: (29) does not allow for exceptions.

Quasi-existential readings of generics

- **Plural definites:**

- (9) Oh my, we have to go back home,
the windows are open!



- **Generics:**

Context: *Birds lay eggs, mammals don't. But have you considered the Platypus? Turns out:*

- (30) Mammals lay eggs, too.

[Cohen, 2004a]

Plural definites and bare plurals cross-linguistically

- **PDs for episodic predication, BPs for generics:** e.g. English, German

(31) The townspeople are asleep.

(32) Tigers have stripes.

- **PDs for episodic and generic predication:** e.g. Spanish, French, Greek

(33) Los tigres tienen rayas.
the tigers have stripes

(34) Los participantes están dormidos.
the participants are asleep

- **BPs for episodic and generic predication:** e.g. Serbian, Russian, Polish

(35) Ljudi spavaju.
people sleep

(36) Pingvini su slatki.
peguins are cute

An underspecification account for generics

Adjusting candidate interpretations

- The sentence is always true if the predicate applies to the maximal element:

$$\text{Cand}_x := \left\{ \bigvee \text{Conv}_{\sqsubseteq}(S \cup \{x\}) \mid S \subseteq \text{Part}(x) \right\} \text{ [Križ and Spector, 2021]}$$

- Simplifying the set of (theoretically possible) candidates:

$$\text{Cand}_x := \left\{ \bigvee (S \cup \{x\}) \mid S \subseteq \text{Part}(x) \right\}$$

Now, for $x := a \oplus b \oplus c$ we have:

$$c \vee a \oplus b \vee a \oplus b \oplus c \in \text{Cand}_x$$

Stressing the role of the QUD and common ground

Križ & Spector:

A proposition p is **strongly relevant** to a partition I iff $\exists X \subset I : p = \cup X$

A sentence is judged true
iff

all the strongly relevant candidate propositions are true.

New proposal:

- Current issue is given by

$I = \{s_1, s_2\}$ where $s_1 \cap s_2 = \emptyset$ & $s_1 \cup s_2 = \text{CG}$

A proposition p is **strongly relevant**
iff
 $p \in I$

Default plural predication by splitting the common ground

$$\text{Cand}_x := \{\bigvee(S \cup \{x\}) \mid S \subseteq \text{Part}(x)\}$$

Strong relevance: A proposition p is **strongly relevant** iff $p \in I$.

(37) Tigers have stripes.

(38) Dogs are intelligent.

(39) Mosquitoes carry malaria. \rightarrow *existential*

(40) Mammals lay eggs, (too). \rightarrow *existential*

(41) Humans erect monuments. \rightarrow *collective predicate*

(42) 'Bees collect pollen.' vs. '?Bees are workers.' [Cohen, 2004b]

Cognitive default and neglect-zero

Generic-like predication of plural definites

- Generics pattern with **homogeneity and nonmaximality observations** in sentences with plural definites.
- Generic predication **differs** from episodic predication with respect to the referenced domain.
- Generic and episodic predication might **align** in the way the predicate distributes over the referenced plurality.
- The parallels between generic and episodic predication provide a starting point for the development of a **dynamic framework** for the **QUD-based interpretation** of plural definites.

Claims

- ➊ Homogeneity and non-maximality are features of one underlying mechanism.
- ➋ In fact, there are features of a cognitive default, just like neglect-zero.[Aloni, 2022a, Aloni, 2022b]
- ➌ Truth-value based and polarity-based definitions of homogeneity coincide, they can be used interchangeably.
- ➍ Non-maximality is symmetric, that is, non-maximal readings are as available in negative, as they are in positive contexts.
- ➎ IRL, there is never a truth-value gap. The truth-value gaps we find with PDs are caused by missing reference to/inability to accommodate a QUD.
- ➏ Generics and PDs are QUD-sensitive to the same extend.
- ➐ Neglect-zero is not in itself QUD-sensitive but also arises from a difficulty to abstract away from context.

Thank you! :)

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