

Exemplification and Quantification

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1. Introduction

- Exemplificational phrases (ExPs) with *such as* (e.g. “N’s such as X and Y”) and their variants exhibit interesting interpretational behavior, which has largely been overlooked in the literature.
- In cases like (1a), a phrase of the form “N’s such as A and Y” can be roughly paraphrased as “X and Y and (possibly) some other N’s”
 - (1b,c) thus are reasonable paraphrases of (1a):

- (1)
- a. **Billionaires such as Buffett and Gates** came to the fund-raising party.
 - b. **Buffett and Gates, and possibly some other billionaires**, came to the fund-raising party.
 - c. Buffett and Gates are among the billionaires who came to the party.

- In cases like (2), a paraphrase with *or* appears to be more appropriate.

- (2)
- a. The president will be happy if **billionaires such as Buffett and Gates** come to the fund-raising party.
 - b. The president will be happy if **Buffett, Gates, or some other (comparable) billionaire**, comes to the party.

- The tentative/approximate logical representations:

- (3) (1a):
 $\exists P_{\langle e,t \rangle} [P(\text{buffett}) \wedge P(\text{gates}) \wedge \forall x [P(x) \rightarrow [\text{billionaire}(x) \wedge \text{come-to-the-party}(x)]]]$
(i.e., There is some set of billionaires P such that (i) Buffett and Gates are members of P, and (ii) all members of P came to the party.)

- (2a):
 $\exists P_{\langle e,t \rangle} [P(\text{buffett}) \wedge P(\text{gates}) \wedge \forall x [P(x) \rightarrow [\text{billionaire}(x) \wedge [\text{come-to-the-party}(x) \rightarrow \text{happy}(\text{the-president})]]]$
(i.e., There is some set of billionaires P such that (i) Buffett and Gates are members of P, and (ii) if a member of P comes to the party, then the president will be happy.)

- How do we derive truth conditions like the above?
- Hayashishita & Bekki (2012) make a similar observation on Japanese conjoined nominals of the form “X-ya Y”, “X-toka Y”, etc.

- (4)
- a. **Ken-ya Hiroshi-ga** kita.
K.-ya H.-Nom come.Pst
‘People such as Ken and Hiroshi came.’
(It is implied that both Ken and Hiroshi came.)
 - b. Mari-wa [**Ken-ya Hiroshi-ga** kitara] ocha-o dasu.
M.-Top K.-ya H.-Nom come.Cond tea-Acc offer.Prs
‘Mari offers tea if people such as Ken and Hiroshi come.’
(Ken’s coming is a sufficient condition for Mari’s offering tea, and so is Hiroshi’s coming.)

2. What exemplificational phrases are not like

- Exemplificational phrases of the form “N’s such as X and Y” are not like:

- o generalized quantifiers
- o specific indefinites
- o (kind-denoting) bare plurals
- Exemplificational phrases are similar to *wh*-phrases in their scopal behavior.

2.1 *Exemplificational phrases are not like generalized quantifiers*

- One might be tempted treat the *such as* phrase in (5a) as a generalized quantifier and give it a logical translation like (5b):

- (5) a. Billionaires such as Buffett and Gates (came to the fund-raising party.)
 b. $\lambda P[\exists Q[Q(\text{buffett}) \wedge Q(\text{gates}) \wedge \forall x[Q(x) \rightarrow [\text{billionaire}(x) \wedge P(x)]]]]$

- But this leaves unexplained why it can escape scope islands (for GQs), such as an *if*-clause:
 - o (6a) allows the wide-scope interpretation of the NP modified by *such as Buffett and Gates*. (It seems that the narrow-scope interpretation is not available: see (7))
 - o (6b) does not allow the wide-scope interpretation: “All billionaires are such that the president will be happy if (s)he (i.e., any one of the billionaires) comes to the party”.

- (6) a. The president will be happy if **billionaires such as Buffett and Gates** come to the fund-raising party.
 b. The president will be happy if {**all billionaires/every billionaire**} come(s) to the party.

- (7) The teacher will be upset if studious students such as John and Mary do not show up to class. (John’s absence alone and Mary’s absence alone guarantee the teacher’s being upset.)

2.2 *Exemplificational phrases are not like specific indefinites*

- It is widely acknowledged that specific indefinites occurring in a scope-island may take the matrix scope.

- (8) a. The president will be happy if **a billionaire** comes to the fund-raising party. His name is Buffett.
 b. The president will be happy if **three billionaires** come to the fund-raising party. The three billionaires are Buffett, Gates, and Walton.

- Specific (plural) indefinites may take a wide “existential scope”, but not a wide “distributive” scope (Ruis 1992; Reinhart 1997; Szabolcsi 2010:92-93).

- (9) The president will be happy if **three billionaires** come to the fund-raising party.
 a. OK: “Three billionaires are such that the president will be happy if they all come to the party.”
 b. #: “Three billionaires are such that the president will be happy if any one of them comes to the party.”

- (10) The president will be happy if **billionaires such as Buffett and Gates** come to the fund-raising party.
 OK: “Buffett and Gates (and possibly some other billionaires) are such that the president will be happy if one of them comes to the party.”

2.3 *Exemplificational phrases are not like bare plurals*

- It is not clear if *such as* in {*billionaires such/such billionaires*} as *Buffett and Gates* counts as a determiner.
- If not, exemplificational NPs may grammatically be treated as bare plural nominals.
 - o A bare plural is often considered to denote a kind (e.g., *billionaires* denotes the kind BILLIONAIRE).
- If an exemplificational NP denotes a kind, what kind of kind would it denote?
 - o Perhaps, *billionaires such as Buffett and Gates* denote a subkind of BILLIONAIRE whose instances include and are somehow comparable to Buffett and Gates (“Buffett-Gates-class billionaires”; BILLIONAIRE_{B,G}).

- The interpretation of exemplificational NPs is rather different from that of bare plurals.
 - (11b) is a reasonable logical representation of (11a).
 - The analogous logical form (12b) wrongly predicts that (12a) is true when Buffett and Gates but not Walton came to the party.

- (11) a. **Billionaires** came to the fund-raising party.
 b. $\exists_{>1}x [\text{Instance-of}(x, \text{BILLIONAIRE}) \wedge \text{come-to-the-party}(x)]$
 (There is more than one instance of BILLIONAIRE such that he/she came to the party; i.e., there is more than one billionaire who came to the party)
- (12) a. **Billionaires such as Buffett, Gates, and Walton** came to the fund-raising party.
 b. $\exists_{>1}x [\text{Instance-of}(x, \text{BILLIONAIRE}_{B,G,W}) \wedge \text{come-to-the-party}(x)]$
 (There is more than one instance of BILLIONAIRE_{B,G,W} such that he/she came to the party; i.e., there is more than one Buffett-Gates-Walton-class billionaire who came to the party)

3. Exemplification and quantification

3.1 Assertions, questions, and exemplificational assertions

- Exemplificational phrases are similar to *wh*-phrases in that they can take the matrix distributive scope even when occurring in a scope island for GQs.

- (13) a. At least one student claimed that the president invited **all billionaires**.
 (*all billionaires* cannot take the matrix distributive scope.)
 b. **Which billionaires** did at least one student claim that the president invited _?
 (*which billionaires* takes the matrix distributive scope.)

- (14) (exam questions)
 a. The president will be happy if **which billionaires** come to the fund-raising party? (Name two.)
 b. John hired writers who admire **which athletes**? (Tell me the names of all such athletes.)

- Two-part semantics of utterances (root sentences): (i) illocutionary operator + (ii) propositional content.

- (15) a. Buffett came to the fund-raising party.
 b. $\text{ASSERT}(\lambda i[\text{come-to-the-party}_i(\text{buffett})])$
 c. I hereby assert that $\text{come-to-the-party}_{i_0}(\text{buffett}) = \text{Truth}$, where i_0 is the world of evaluation.

- Under the functional (categorial) treatment of interrogatives (Krifka 2011:1753-1757), a question can be construed as a combination of an illocutionary operator (QUEST) and an open proposition.

- (16) a. Which billionaires came to the fund-raising party?
 b. $\text{QUEST}(\lambda i[\lambda x \in \text{billionaire}_i[\text{come-to-the-party}_i(x)]])$
 c. I hereby ask you to specify for which arguments the function $\lambda x \in \text{billionaire}_{i_0}[\text{come-to-the-party}_{i_0}(x)]$ yields Truth, where i_0 is the world of evaluation.

- Three-part semantics of “exemplificational assertions (statements)”: (i) an illocutionary operator (ASSERT_{EX}), (ii) an open proposition, and (iii) a set of examples.

- (17) a. Billionaires such as Buffett and Gates came to the fund-raising party.
 b. $\text{ASSERT}_{\text{EX}}(\lambda i[\lambda x \in \text{billionaire}_i[\text{come-to-the-party}_i(x)]])(\{\text{buffett, gates}\})$
 c. I hereby provide examples of arguments for which the function $\lambda x \in \text{billionaire}_{i_0}[\text{come-to-the-party}_{i_0}(x)]$ yields Truth, where i_0 is the world of evaluation; Buffett, Gates.

- A different formulation based on the proposition-set approach to interrogatives (Krifka 2011:1757-1761).

- (18) a. Which billionaires came to the fund-raising party?
 b. **QUEST**($\{\lambda i[\text{come-to-the-party}_i(x)] \mid x \in \text{billionaire}_i\}$)
 c. I hereby ask you to specify which members of the set $\{\lambda i[\text{come-to-the-party}_i(x)] \mid x \in \text{billionaire}_i\}$ are such that they yield Truth when applied of the world of evaluation.
- (19) a. Billionaires such as Buffett and Gates came to the fund-raising party.
 b. **ASSERT_{EX}**($\{\lambda i[\text{come-to-the-party}_i(x)] \mid x \in \text{billionaire}_i\}$)
 ($\{\lambda i[\text{come-to-the-party}_i(\text{buffett})], \lambda i[\text{come-to-the-party}_i(\text{gates})]\}$)
 c. I hereby provide a subset of $\{\lambda i[\text{come-to-the-party}_i(x)] \mid x \in \text{billionaire}_i\}$ whose members yield Truth when applied of the world of evaluation; $\{\lambda i[\text{come-to-the-party}_i(\text{buffett})], \lambda i[\text{come-to-the-party}_i(\text{gates})]\}$.

3.2 Exemplification as pseudo-distribution

- The illocutionary meaning of **ASSERT_{EX}** does the job of the “global distributive operator”.
 - The “usual” distributive operator D : ${}^DP = \lambda X[\forall x[\text{Member-of}(x, X) \rightarrow P(x)]]$ (e.g. Link 1998).
 - Distributive scope is generally clause-bounded.
- (20) a. Buffett and Gates came to the fund-raising party.
 b. **ASSERT**($\lambda i[{}^D\text{come-to-the-party}_i(\{\text{buffett}, \text{gates}\})]$)
- (21) a. The president will be happy if Buffett and Gates come to the fund-raising party.
 b. **ASSERT**($\lambda i[{}^D\text{come-to-the-party}_i(\{\text{buffett}, \text{gates}\}) \rightarrow \text{happy}_i(\text{the-president}_i)]$)
 c. NOT: **ASSERT**($\lambda i[{}^D\lambda x[\text{come-to-the-party}_i(x) \rightarrow \text{happy}_i(\text{the-president}_i)](\{\text{buffett}, \text{gates}\})]$)
- (22) a. The president will be happy if billionaires such as Buffett and Gates come to the fund-raising party.
 b. **ASSERT_{EX}**($\lambda i[\lambda x \in \text{billionaire}_i[\text{come-to-the-party}_i(x) \rightarrow \text{happy}_i(\text{the-president}_i)]](\{\text{buffett}, \text{gates}\})$)

4. Other issues

4.1 Collective interpretation of exemplificational phrases

- An exemplificational phrase may receive a collective interpretation too.
- (23) a. Artists such as Nelson and Sosa painted this picture together.
 b. **ASSERT_{EX}**($\lambda i[\lambda x \in \text{artist}_i[\exists X[\text{artists}_i(X) \wedge \text{Member-of}_i(x, X) \wedge \text{paint-this-picture}_i(X)]]](\{\text{nelson}, \text{sosa}\})$)
 c. I hereby provide examples of arguments for which the function $\lambda x \in \text{artist}_i[\exists X[\text{artists}_{io}(X) \wedge \text{Member-of}_{io}(x, X) \wedge \text{paint-this-picture}_{io}(X)]]$ yields Truth, where io is the world of evaluation; Nelson, Sosa.

- (24) Who, along with Nelson, painted this picture?

4.2 A variety of exemplificational phrase: {a N/N's} such as X or Y.

- A variety of exemplificational phrase with *or* appears to be licensed only in non-veridical environments.
 - In a case like (25), the difference between the *and*-version and *or*-version seems subtle.
 - The *or*-version is possible only in non-veridical contexts?
- (25) a. The president will be happy if **billionaires such as Buffett and Gates** come to the fund-raising party.
 b. The president will be happy if {i. **a billionaire**/ii. **billionaires**} **such as Buffett or Gates** come to the fund-raising party.
- (26) a. **Billionaires such as Buffett and Gates** came to the fund-raising party.

- b. *{**A billionaire/billionaires**} such as **Buffett or Gates** came to the fund-raising party.

4.3 Exemplificational questions and orders

- Exemplificational phrases may occur in non-assertions.
- (27) a. Did the president invite billionaires, such as Buffett, Gates, and Walton?
b. Has John ever been to Southeast Asian countries, such as Thailand and Indonesia?
- (28) a. Invite billionaires, such as Buffett, Gates, and Walton!
b. Eat more foods high in vitamin C, such as cabbage and spinach!
- Any difference between the *and*- and *or*-versions?
- (29) a. Has John ever been to Southeast Asian countries, such as Thailand and Indonesia?
b. Has John ever been to Southeast Asian countries, such as Thailand or Indonesia?
- (30) a. Eat more foods high in vitamin C, such as cabbage and spinach!
b. Eat more foods high in vitamin C, such as cabbage or spinach!
- Tentative generalizations
 - o Exemplificational phrases with *and*: no constraints
 - o Exemplificational phrases with *or*: in non-veridical environments (including non-assertions) only
- (31) (assertion, veridical)
a. **Billionaires such as Buffett and Gates** came to the fund-raising party.
b. ***A billionaire such as Buffett or Gates** came to the fund-raising party.
- (32) (assertion, non-veridical)
a. The president will be happy if **billionaires such as Buffett and Gates** come to the fund-raising party.
b. The president will be happy if **a billionaire such as Buffett or Gates** comes to the fund-raising party.
- (33) (non-assertion, non-veridical)
a. Did the president invite **billionaires, such as Buffett and Gates**?
b. Did the president invite **a billionaire, such as Buffett or Gates**?
- (34) (non-assertion, non-veridical)
a. Invite **billionaires, such as Buffett and Gates**!
b. Invite **a billionaire, such as Buffett or Gates**!
- Exemplificational phrases in questions and orders, as well as generic statements, tend to be set off by “comma intonation”? Do commaless and comma-separated exemplificational phrases have any semantic difference?
- (35) (generic statement)
a. Food high in vitamin E, such as sardine and almonds, helps prevent heart disease.
b. Food high in vitamin E, such as sardine or almonds, helps prevent heart disease.

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