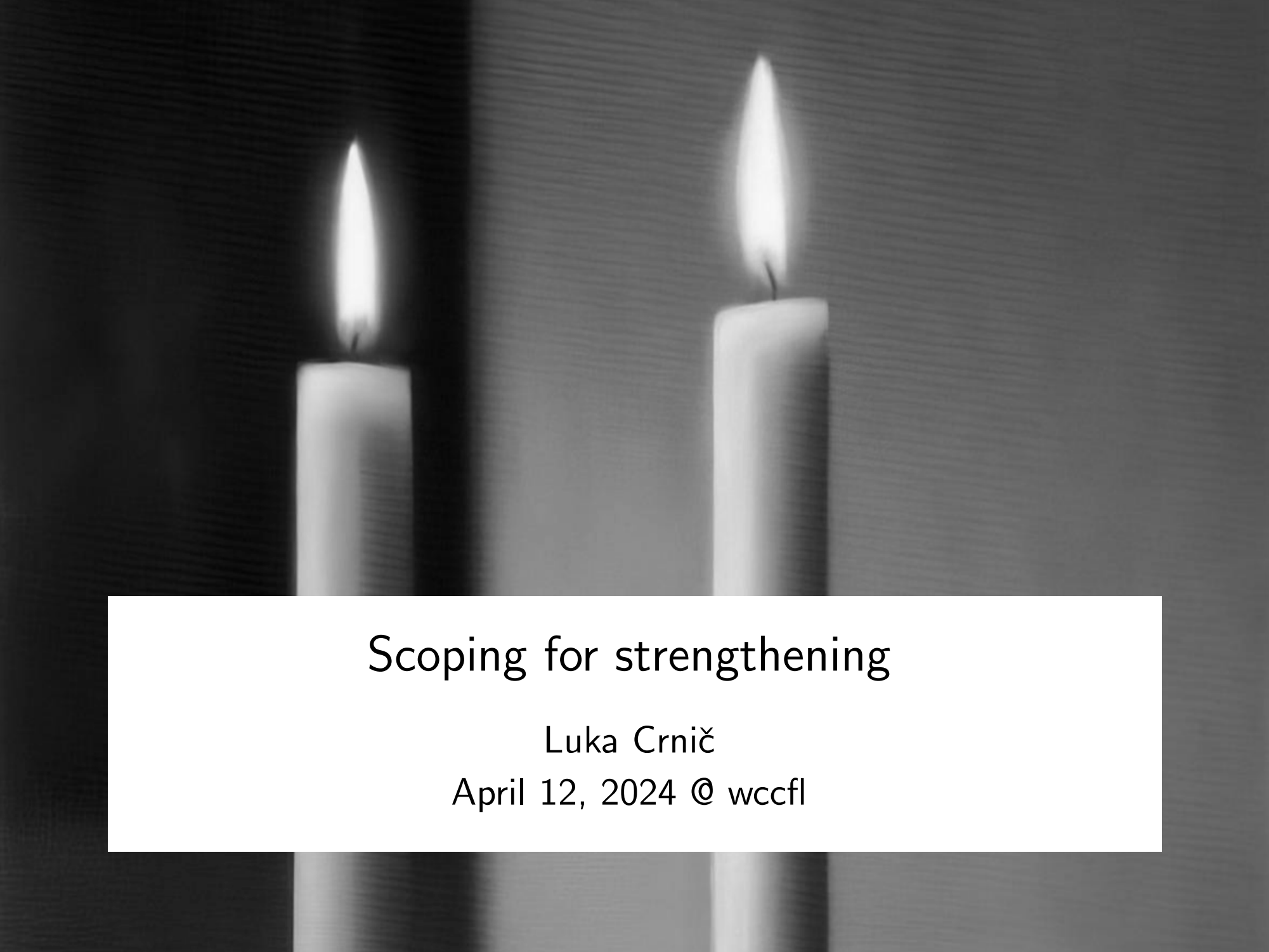

Scoping for strengthening

Luka Crnič

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The lottery has 100 tickets (1-100). Sally bought tickets 31-70 (= 40 tickets):

(1) If the winning ticket is between 1-70 or between 31-100,
Sally probably won

A simple disjunctive interpretation is false:

#(if the winning ticket is between 1-100, sally probably won)

A wide conjunctive interpretation is correct:

(if the winning ticket is between 1-70, sally probably won) and
(if the winning ticket is between 31-100, sally probably won)

(Santorio 2018)

The lottery has 100 tickets (1-100). Sally bought tickets 1-40 (= 40 tickets):

(1) #If the winning ticket is between 1-70 or between 31-100,
Sally probably won

A wide disjunctive interpretation is too weak:

(if the winning ticket is between 1-70, sally probably won) or
(if the winning ticket is between 31-100, sally probably won)

The puzzle

Disjunction can have a conjunctive interpretation construed exceptionally wide

The story

A consequence of an interaction of two properties of disjunction: it can be strengthened to a conjunctive interpretation (free choice), and it can take exceptional scope. Many predictions emerge once we consider this interaction

Some lessons

The distribution of free choice is broader than is often assumed - it is not tied to specific constructions - and its computation is sensitive to alternatives that can be generated by grammar. This is explained on certain approaches to strengthening, in particular, on exhaustification based on recursive exclusions

Strengthening

Sentences introduce alternatives. They are strengthened by excluding those alternatives that are excludable and relevant. Strengthening applies recursively.

(cf., e.g., Kratzer & Shimoyama 2002, Fox 2007)

Conjunctive strengthening

Strengthening a disjunctive sentence to convey a conjunctive meaning is possible only if the conjunctive meaning does not entail any excludable alternative to it

$$\text{STR}(S_{[p \text{ or } q]}) \Rightarrow (S_p \text{ and } S_q) \text{ only if}$$
$$\text{for no excludable alternative S' to S: } (S_p \text{ and } S_q) \Rightarrow S'$$

(cf., e.g., Fox 2007, Chemla 2009, Franke 2011)

(2) Sally may eat peas or quinoa — conjunctive strengthening

$\Rightarrow \Diamond$(sally eats peas) and $\Diamond$(sally eats quinoa)

Excludable alternative: $\Diamond$(sally eats peas and sally eats quinoa)

Fact: $\Diamond$(sally eats peas) and $\Diamond$(sally eats quinoa) $\not\Rightarrow$ $\Diamond$(sally eats peas and sally eats quinoa) — ✓ conj.str.

(3) Sally must eat peas or quinoa — ~~conjunctive strengthening~~

$\not\Rightarrow \Box$(sally eats peas) and $\Box$(sally eats quinoa)

Excludable alternative: $\Box$(sally eats peas and sally eats quinoa)

Fact: $\Box$(sally eats peas) and $\Box$(sally eats quinoa) $\Rightarrow$ $\Box$(sally eats peas and sally eats quinoa) — ✗ conj.str.

Exceptional scope

Disjunction allows for exceptional scope construals that are not available to conjunction (i.e., disjunction can take semantic scope outside of their host islands)

(4) If Sally or Steve are smiling, the Clippers won

possible LF: [sally or steve]$_x$ [if x be smiling, the clippers won]

= (if sally smiles, the clips won) or (if steve smiles, the clips won)

(5) If Sally and Steve are smiling, the Clippers won

impossible LF: #[sally and steve]$_x$ [if x be smiling, the clips won]

$\neq$ (if sally smiles, the clips won) and (if steve smiles, the clips won)

(e.g., Partee & Rooth 1982, Schlenker 2006)

A consequence of exceptional scope: missing alternatives

A sentence with an exceptional scope disjuntion lacks an exceptional scope conjunction alternative (but it does have normal scope conjunction alternatives)

Surface form: [OP ... (p or q) ...]

Exceptional scope LF: $[\text{p or q}]_x$ [OP ... x ...]
(OP ... p ...) or (OP ... q ...)

Alternatives:

(OP ... p ...) or (OP ... q ...),
~~(OP ... p ...) and (OP ... q ...),~~
(OP ... p ...), (OP ... q ...),
(OP ... (p or q) ...),
(OP ... (p and q) ...)

$\in$ ALT((OP ... p ...) or (OP ... q ...))

(but see Charlow 2019 for an alternative take)

Exceptional scope and alternatives

(4) If Sally or Steve are smiling, the Clippers won
[sally or steve]$_x$ [if x be smiling, the clippers won]

(if sally smiles, the clips won) or (if steve smiles, the clips won),
~~(if sally smiles, the clips won) and (if steve smiles, the clips won),~~
(if sally/steve smiles smiles, the clips won),
(if sally smiles or steve smiles, the clips won),
(if sally smiles and steve smiles, the clips won)

$\in$ ALT((if sally smiles, the clips won) or (if steve smiles, the clips won))

Still, no conjunctive strengthening under exceptional scope

Excludable alternatives: (if sally smiles or steve smiles, the clips won),
(if sally smiles and steve smiles, the clips won)

Fact: (if sally smiles, the clips won) and (if steve smiles, the clips won)
$\Rightarrow$ (if sally smiles or steve smiles, the clips won) ✗ conj.str.

Thus, simple strengthening is all that obtains here

STR((if sally smiles, the clips won) or (if steve smiles, the clips won)) =

(if sally smiles, the clips won) or (if steve smiles, the clips won) and ¬(if sally smiles or steve smiles, the clips won) =

(if sally smiles, the clips won) xor (if steve smiles, the clips won)

The observed inference is derived without having to adopt alternatives not generated by grammar (every exceptional scope theory restricts it to specific elements)

(see Charlow 2019 for discussion, alternative derivation)

(1) If the winning ticket is between 1-70 or between 31-100,
Sally probably won

Exceptional scope

[between 1-70 or between 31-100]$_P$
[if the winning ticket is P sally probably won]

= (if w is between 1-70, sally probably won) or
(if w is between 31-100, sally probably won)

Conjunctive strengthening

Excludable alternatives: (if w is between 1-100, sally probably won),
(if w is between 31-70, sally probably won)

Fact: (if w is between 1-70, sally probably won) and
(if w is between 31-100, sally probably won) $\not\Rightarrow$
(if w is between 1-100, sally probably won),
(if w is between 31-70, sally probably won)

✓ conj.str.

STR((if w is between 1-70, sally probably won) or
(if w is between 31-100, sally probably won)) =
(if w is between 1-70, sally probably won) and
(if w is between 31-100, sally probably won)

There are two teams, team A and team B, each with 5 kids as members, and with 3 kids on both teams (thus, 4/7 kids are on a single team):

(6) Most kids who are on team A or team B are on both teams

(Bar-Lev & Fox 2020)

A simple disjunctive interpretation is false:

#(most of all the kids are on both teams)

A wide conjunctive interpretation is correct:

(most kids on team a are on both teams) and

(most kids team b are on both teams)

Exceptional scope

[team A or team B]$_x$ [most kids who are on x are on both teams]

= (most kids on team a are on both teams) or

(most kids on team b are on both teams)

Conjunctive strengthening

Excludable alternative: (most of all the kids are on both teams)

Fact: (most kids on team a are on both teams) and
(most kids on team b are on both teams)

$\not\Rightarrow$ (most of all the kids are on both teams)

✓ conj.str.

STR((most kids on team a are on both teams) or
(most kids on team b are on both teams)) =

(most kids on team a are on both teams) and

(most kids on team b are on both teams)

Jointly, many students get into Ivy League schools each year, of which there are eight, though each Ivy League school accepts only few students (let's say):

(7) Few students got into Harvard or Yale or Dartmouth or ...

A simple disjunctive interpretation is false:

#(few students got into ivy league schools)

A wide conjunctive interpretation is correct:

(few students got into harvard) and

(few students got into yale) ...

Importantly, while no island is present here, wide scope of conjunction is impossible (Parte 1970; also universal quantifiers, Mayr & Spector 2012, Fleisher 2016)

impossible LF: [harvard and yale ...]$_x$ [few students got into x]

~~(few students got into harvard) and (few students got into yale) ...~~
$\in$ ALT((few students got into harvard) or ...)

Excludable alternative: (few students got into harvard or yale or ...)

Fact: (few students got into harvard) and (few students got into yale) and ...
$\not\Rightarrow$ (few students got into harvard or yale or ...) ✓ conj.str.

STR((few students got into harvard) or (few students got into yale) or ...) =
(few students got into harvard) and (few students got into yale) ...

The lottery has 100 tickets (1-100). Sally bought tickets 31-70 (= 40 tickets). Two salient groupings of tickets, 1-70 and 31-100:

(8) If the winning ticket is from one of those groupings, Sally probably won

(9) If the winning ticket is from either grouping, Sally probably won

There are three teams each with 5 kids as members, and with 3 kids on all three teams (thus, 6/9 kids are on a single team):

(10) Most kids on one of those teams are on all three teams

(11) Most kids on any of those teams are on all three teams

Exceptional scope

(12) [any team]$_x$ [most kids on x are on all three teams]
= (a team t: most kids on t are on all three teams)

Universal strengthening

Excludable alternative: (most of all the kids are on all three teams)

Fact: (every team t: most kids on t are on all teams) $\not\Rightarrow$
(most of all the kids are on all teams)

STR(a team t: most kids on t are on all teams) =
(every team t: most kids on t are on all teams)

The NPI licensing condition is satisfied in these examples

An NPI like *any team* must occur in a constituent that is downward-entailing with respect to the NPIs domain (cf. Kadmon & Landman 1993)

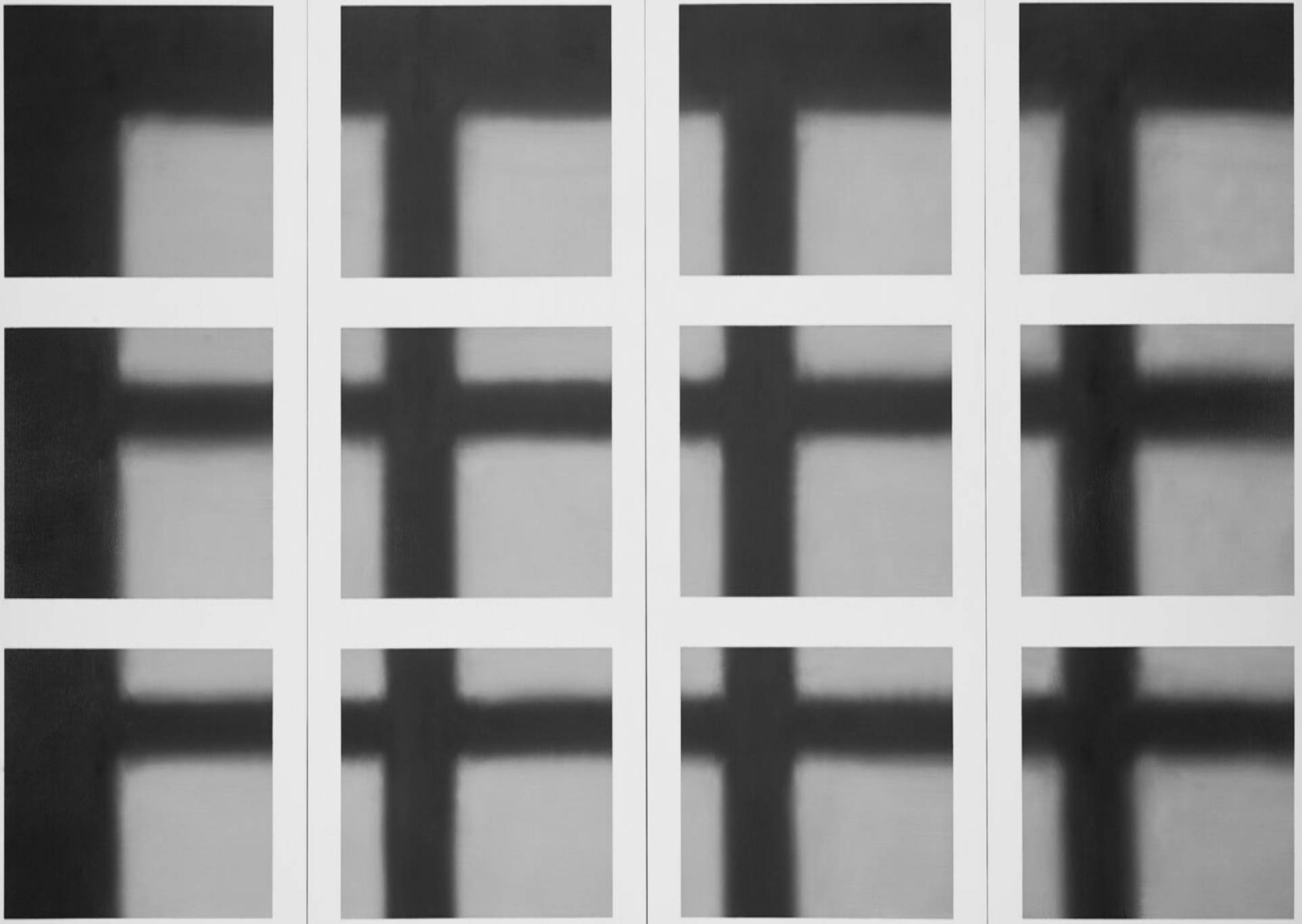
[STR [any team]$_x$ [most kids on x are on all three teams]]
is downward-entailing with respect to 'team'

(every team t: most kids on t are on all teams)
$\Rightarrow$ (most kids on team a are on all teams)
$\Rightarrow$ (most kids on team b are on all teams)
$\Rightarrow$ (most kids on team c are on all teams)

NPIs may take exceptional scope elsewhere too

A math textbook contains 500 difficult problems. Every math grad student is required to pick a problem and study every analysis that solves it. Tali studied every analysis that solves the four-color theorem. Gali studied every analysis that solves the Poincaré conjecture. But, as always, Sally is an exception:

(13) Sally DIDN'T study every analysis that solves ANY problem mentioned
[not [[any problem]$_x$ [[every analysis that solves x]$_z$ [sally study z]]]]



Summary

- Conjunctive meanings of disjunction/indefinites through an interaction of their two properties: exceptional scope taking and strengthening abilities
- Tightly constrained, yet productive strategy (e.g., various non-upward-entailing environments, exceptional scope NPIs and other indefinites)
- Theoretically consequential (recursive exh, pruning, obligatoriness)

Outlook: donkey anaphora et al

(14) a. Every student who read book A or book B liked it
b. Every student who read a book liked it

[STR [a book]$_x$ [every student who read t$_x$ liked it$_x$]]
= (every book x: every student who read x liked x)

(see Crnič 2023 for a preliminary probe)

Selected references

[1] Bar-Lev, Moshe and Danny Fox. 2020.
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Scalar implicature and exceptional scope.

[4] Crnič, Luka. 2023.
Donkey anaphora through choice functions and strengthening.
URL: https://ling.auf.net/lingbuzz/007540

[5] Fox, Danny. 2007.
Free choice and the theory of scalar implicatures.

[6] Mayr, Clemens and Benjamin Spector. 2012
Generalized scope economy - not too strong!

[7] Santorio, Paolo. 2018.
Alternatives and Truthmakers in Conditional Semantics.

All artworks used are from Gerhard Richter.

Unpacking strengthening

Strengthening as recursive exhaustification, exclusions only

$[\text{exh}_{C'}$ $[\text{exh}_{C}$ $[[\text{between 1-70 or between 31-100}]_{P}$
[if the winning ticket is P sally probably won]]]]

(Low-scope) conjunctive alternative is excludable but can be pruned

(if w is between 31-70, sally probably won) $\notin$ C

We do all we can to get free choice, i.e., to resolve all alternatives induced by the sentence, even avoid some exclusions (which can lead to more information)