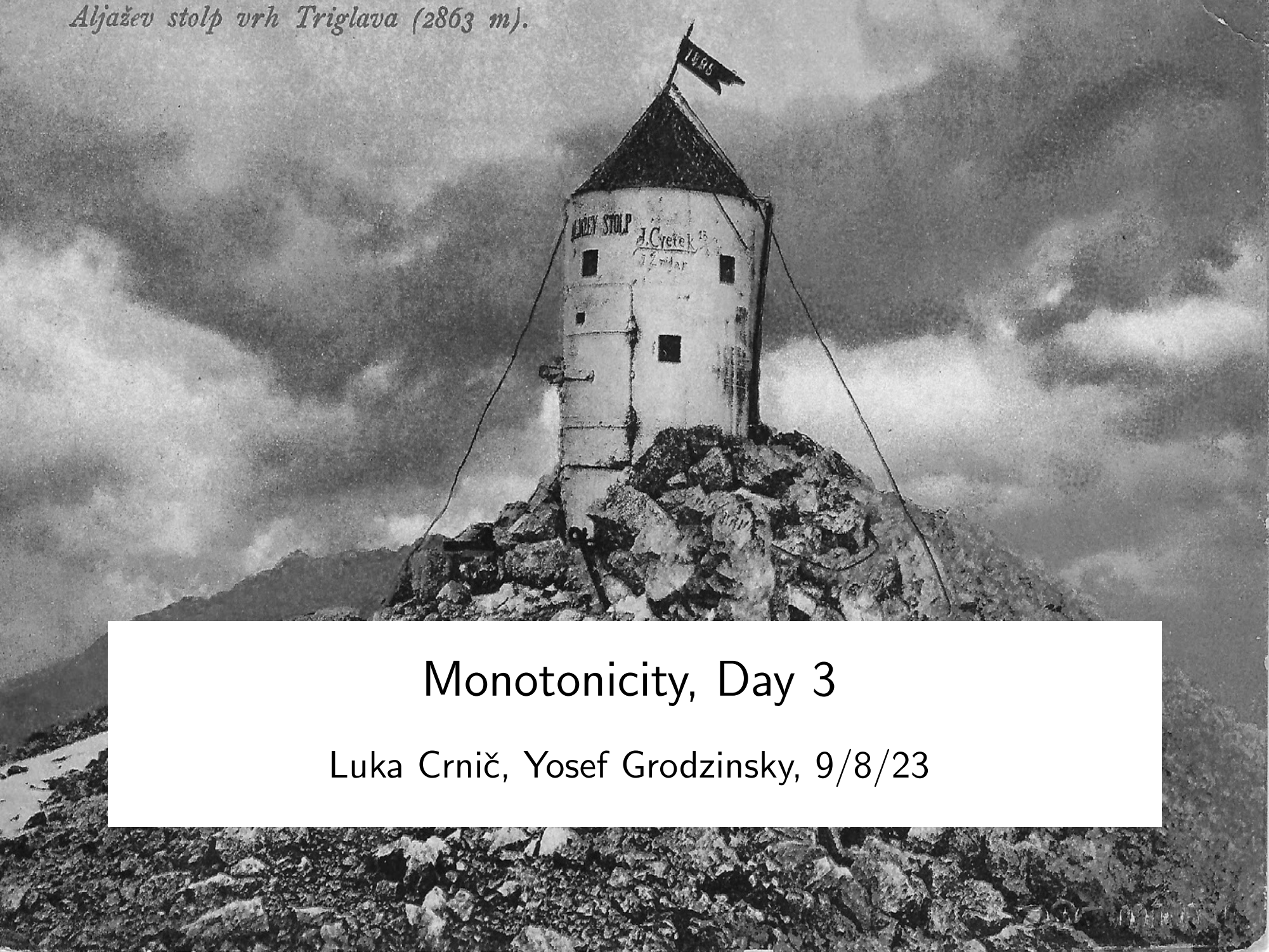


Monotonicity, Day 3

Luka Crnič, Yosef Grodzinsky, 9/8/23

the free choice challenges, part 1

the acceptability and variation challenge

(1) Tina is allowed to attend any class.

(2) *Tina is allowed to ever attend a class.

operators and environments

(3) $[\![\text{allowed}]\!]$ is not a DM function.

(4) $\lambda X.\ [\![\text{T is allowed to attend any class}]\!]^{[\text{any class} \rightarrow X]}$ is not a DM function.

illustration of non-DMness

(5) Tina is allowed to attend a(ny) class
$\not\Rightarrow$ Tina is allowed to attend two classes/every class/most classes

the free choice challenges, parts 2 and 3

the strength challenge

(6) Tina is allowed to attend any class. *(also: imperatives, generics)*

(7) *Tina is required to attend any class.

the plural/mass challenge

(8) Tina is allowed to attend any class.

(9) *Tina is allowed to attend any classes.

(10) *Tina is allowed to donate any blood.

the guiding intuition

approaching the acceptability, variation, and strength challenge

(11) Gali is allowed to attend any class
$\not\Rightarrow$ Gali is allowed to attend two classes/every class/most classes

(12) Gali is allowed to attend any class
$\Rightarrow$ Gali is allowed to attend any difficult class/any logic class/etc

(13) Gali is required to attend a class
$\not\Rightarrow$ Gali is required to attend a difficult class/any logic class/etc.

the guiding intuition

potential revisions (cf Kadmon & Landman on *any*)

(14) **Env-Condition (old):** An NPI is acceptable iff it occurs at LF in a constituent that is DM* with respect to its position.

(15) **Env-Condition-any:** An *any*-DP is acceptable iff it occurs at LF in a constituent that is DM* with respect to the position of its complement.

(16) **Env-Condition-ever:** An *ever*-AdvP is acceptable iff it occurs at LF in a constituent that is DM* with respect to its position.

(all but) impossible revision

(17) **Op-Condition:** An NPI is acceptable iff it is c-commanded at LF by a constituent that denotes a DM* function.

* (and not UM)

existential vs. universal modal, episodic environments

(18) Gali is allowed to attend syntax or semantics.
$\Rightarrow$ Gali is allowed to attend syn $\wedge$ Gali is allowed to attend sem

(19) Gali is required to attend syntax or semantics.
$\not\Rightarrow$ Gali is required to attend syn $\wedge$ Gali is required to attend sem

(20) Gali attended syntax or semantics.
$\not\Rightarrow$ Gali attended syntax $\wedge$ Gali attended semantics

(cf Kamp 1973, Zimmermann 2000, Aloni 2007, Fox 2007, ia)

(21) Gali is allowed to attend syntax or semantics

alternatives

(22) a. Gali is allowed to attend syntax
b. Gali is allowed to attend semantics
c. Gali is allowed to attend syntax and semantics

(innocently) excludable alternatives

(23) $\text{excl}(S) = \bigcap\{M \mid M \text{ is a maximal subset of } ALT(S)$
$\text{such that } \{\neg p \mid p \in M\} \cup \{[\![S]\!]\} \text{ is consistent}\}$

(24) Gali is allowed to attend syntax and semantics

(innocently) includable alternatives

(25) $\text{incl}(S) = \bigcap\{M \mid M \text{ is a maximal subset of ALT}(S)$ such that $\{p \mid p \in M\} \cup \{\neg q \mid q \in \text{excl}(S)\}$ is consistent$\}$

(26) a. Gali is allowed to attend syntax
b. Gali is allowed to attend semantics

exhaustification

(27) $\text{exh}_C(S) = [\![S]\!] \wedge \forall S' \in \text{incl}(S)\text{: } [\![S']\!] \wedge \forall S' \in \text{excl}(S) \cap C\text{: } \neg[\![S']\!]$

(28) exh_C (Gali is allowed to attend syntax or semantics) =

$\Diamond$(Gali attends syntax or semantics) $\wedge$
$\Diamond$(Gali attends syntax) $\wedge$
$\Diamond$(Gali attends syntax) $\wedge$
$\neg\Box$(Gali attends syntax and semantics) (if in C)

(Bar-Lev and Fox 2020)

exhaustification and disjunction (simplified)

(29) exh_C (Gali is required to attend syntax or semantics) =

$\Box$(Gali attends syntax or semantics) $\wedge$
$\neg\Box$(Gali attends syntax) $\wedge$ (if in C)
$\neg\Box$(Gali attends semantics)

$\Rightarrow \Diamond$(Gali attends syntax) $\wedge \Diamond$(Gali attends semantics)

(30) exh_C (Gali attended syntax or semantics) =

Gali attended syntax or semantics $\wedge$
$\neg$(Gali attended syntax and semantics) (if in C)

Culprit for missing conjunctive inferences: the conjunctive inference is equivalent to the conjunctive alternative to the sentence (it is incompatible with the exclusion of excludable alternatives, prior to the pruning of alternatives)

(31) Gali is allowed to attend any class

alternatives

(32) a. Gali is allowed to attend a(ny) Dom
b. Gali is allowed to attend every Dom

for brevity, we assume $[\![\text{Dom}]\!] \Rightarrow [\![\text{class}]\!]$ *throughout*

(innocently) excludable alternatives

(33) Gali is allowed to attend every Dom,
where $\text{card}([\![\text{Dom}]\!]) \geq 2$

(innocently) includable alternatives

(34) Gali is allowed to attend a(ny) Dom,
where $\text{card}([\![\text{Dom}]\!]) \geq 1$

exhaustification

(35) exh_C (Gali is allowed to attend any class) =
$\Diamond$(Gali attend a class) $\wedge$
$\forall$Dom: $\text{card}([\![\text{Dom}]\!]) \geq 1 \rightarrow \Diamond$(Gali attends a Dom) $\wedge$
$\forall$Dom: $\text{card}([\![\text{Dom}]\!]) \geq 2 \rightarrow \neg\Diamond$(Gali attends every Dom)

exhaustification and indefinites (simplified)

universal modal sentences

(36) exh_C (Gali is required to attend a class) =

$\Box$(Gali attends a class) $\wedge$

$\forall$Dom: Dom $\dot{\Rightarrow}$ $[\![\text{class}]\!]$ $\rightarrow$ $\neg\Box$(Gali attends a Dom)

episodic sentences

(37) exh_C (Gali attended a class) =

Gali attended a class $\wedge$ $\neg$(Gali attended every class)

excursus: necessity of some condition

non-trivial exhaustification in existential and universal modal environments

(38) exh_C (Gali is allowed to attend any class) =

$\Diamond$(Gali attends a class) $\wedge$
$\forall$Dom: card($[\![\text{Dom}]\!]$) $\geq 1 \rightarrow \Diamond$(Gali attends a Dom) $\wedge$
$\forall$Dom: card($[\![\text{Dom}]\!]$) $\geq 2 \rightarrow \neg\Diamond$(Gali attends every Dom)

(39) exh_C (Gali is required to attend a class) =

$\Box$(Gali attends a class) $\wedge$
$\forall$Dom: Dom $\dot{\Rightarrow}$ $[\![\text{class}]\!] \rightarrow \neg\Box$(Gali attends a Dom)

if we get rid off the env-conditions on npis, other conditions would be needed to replace it to account for their distribution in modal environments; indeed Chierchia replaces it with 'the wide-scope constraint' and 'the modal containment'.

revision: locus of the environment condition

(40) **Env-Condition-any:** An *any*-DP is acceptable iff it occurs at LF in a constituent that is DM* with respect to the position of its complement.

this seems to suffice

(41) for every $\emptyset \neq X \Rightarrow [\![\text{class}]\!]$: ✓ existential modals

$(\forall \text{Dom}: \text{Dom} \Rightarrow [\![\text{class}]\!] \wedge \text{card}(\text{Dom}) \geq 1 \rightarrow \Diamond(\text{G attends a Dom})) \wedge$
$(\forall \text{Dom}: \text{Dom} \Rightarrow [\![\text{class}]\!] \wedge \text{card}(\text{Dom}) \geq 2 \rightarrow \neg\Diamond(\text{G attends every Dom}))$

$\Rightarrow \quad (\forall \text{Dom}: \text{Dom} \Rightarrow X \wedge \text{card}(\text{Dom}) \geq 1 \rightarrow \Diamond(\text{G attends a Dom})) \wedge$
$(\forall \text{Dom}: \text{Dom} \Rightarrow X \wedge \text{card}(\text{Dom}) \geq 2 \rightarrow \neg\Diamond(\text{G attends every Dom}))$

(42) not for every $\emptyset \neq X \Rightarrow [\![\text{class}]\!]$: ✗ universal modals

$\Box(\text{G attends a class}) \wedge \forall \text{Dom}: \text{Dom} \dot{\Rightarrow} [\![\text{class}]\!] \rightarrow \neg\Box(\text{G attends a Dom})$

$\Rightarrow \quad \Box(\text{G attends a } X) \wedge \forall \text{Dom}: \text{Dom} \dot{\Rightarrow} X \rightarrow \neg\Box(\text{G attends a Dom})$

revision: locus of the environment condition

but slightly greater care is needed – domain of *exh*:

(43) exh_C (Gali is allowed to attend any class) =

$\forall$Dom: card($[\![$Dom$]\!]$) $\geq 1 \rightarrow \Diamond$(Gali attends a Dom) $\wedge$

$\forall$Dom: card($[\![$Dom$]\!]$) $\geq 2 \rightarrow \neg\Diamond$(Gali attends every Dom)

an issue for DM-ness:

(44) Let X be s.t. $\emptyset \neq X \Rightarrow [\![\text{class}]\!]$ and X' $= [\![\text{class}]\!] \backslash X$.

If [Gali is allowed to attend a X'] $\in$ C:

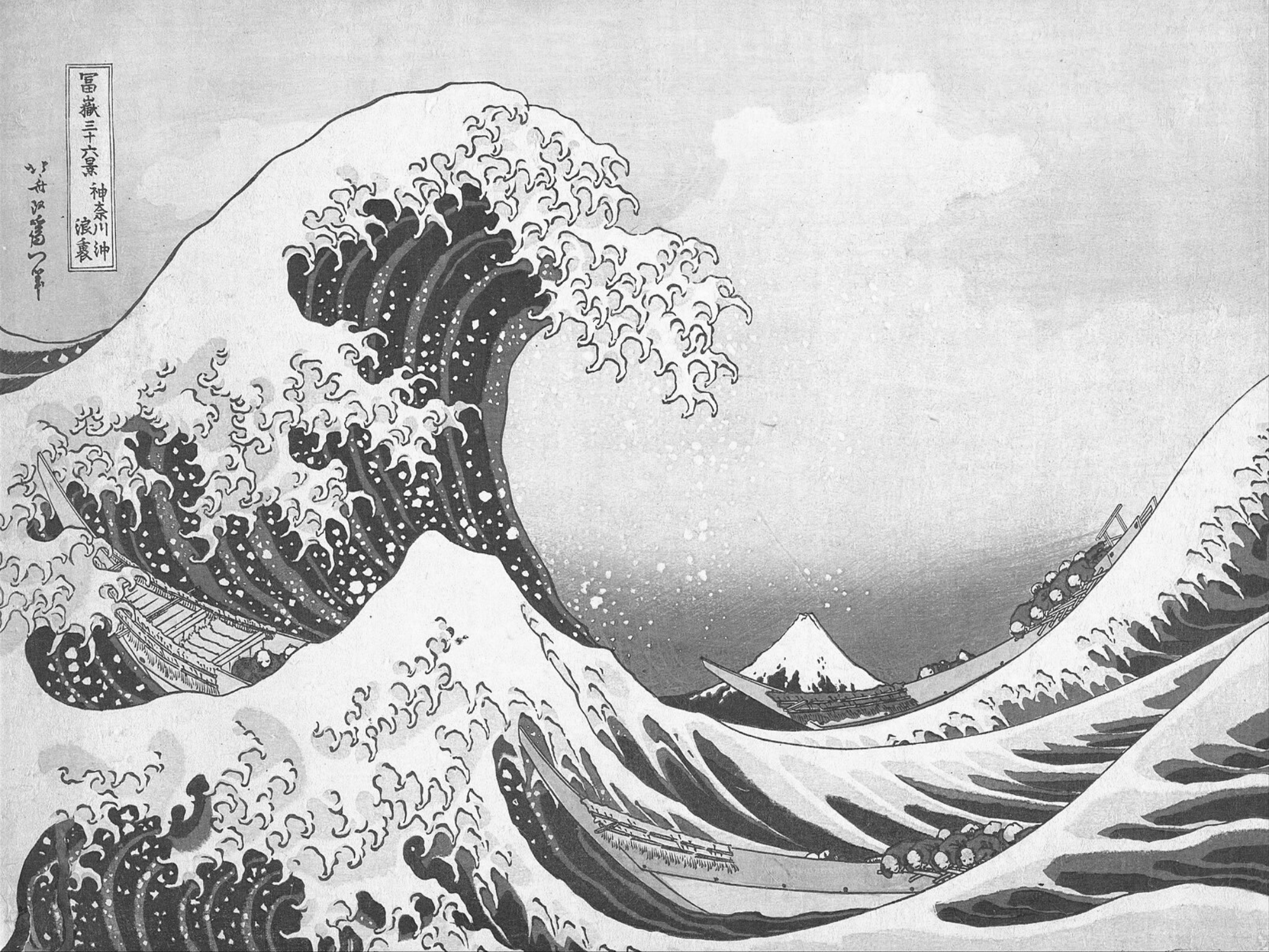
exh_C (Gali is allowed to attend any X) $\Rightarrow$

$\forall$Dom: card($[\![$Dom$]\!]$) $\geq 1 \rightarrow \Diamond$(Gali attends a Dom) $\wedge$

$\forall$Dom: card($[\![$Dom$]\!]$) $\geq 2 \rightarrow \neg\Diamond$(Gali attends every Dom) $\wedge$

$\neg\Diamond$(Gali attends a X')

condition on the domain of *exh* in [exh_C S]: C $\subseteq$ excl(S)


富嶽三十六景 神奈川沖浪裏

the remaining challenge

✓ **the acceptability and variation challenge**

✓ **the strength challenge**

the plural/mass challenge

(45) Tina is allowed to attend any class.

(46) *Tina is allowed to attend any classes.

(47) *Tina is allowed to donate any blood.

plurality as cumulation (for simplicity)

(48) a. $[\![\text{classes}]\!]$ = the closure of $[\![\text{class}]\!]$ on sum (+) formation
b. if X, Y $\in [\![\text{classes}]\!]$, X+Y $\in [\![\text{classes}]\!]$

target sentence

(49) *Tina is allowed to attend any classes.

(innocently) excludable alternatives

(50) Gali is allowed to attend every Dom,
where card($[\![\text{Dom}]\!]$) ≥ 2

(51) Gali is allowed to attend any Dom,
where $[\![\text{class}]\!] \cap [\![\text{Dom}]\!] = \emptyset$

(innocently) includable alternatives

(52) Gali is allowed to attend a(ny) Dom,
where $\emptyset \neq [\![\text{Dom}]\!] \subseteq [\![\text{class}]\!]$

exhaustification

(53) exh_C (Gali is allowed to attend any classes) =
$\Diamond$(Gali attend a class) $\wedge$
$\forall$Dom: $\emptyset \neq [\![\text{Dom}]\!] \subseteq [\![\text{class}]\!] \rightarrow \Diamond$(Gali attends a Dom) $\wedge$
$\forall$Dom: $\text{card}([\![\text{Dom}]\!]) \geq 2 \rightarrow \neg\Diamond$(Gali attends every Dom)

non-DMness

(54) exh_C (Gali is allowed to attend any classes) $\not\Rightarrow$
exh_C (Gali is allowed to attend any X), where $[\![\text{X}]\!] \cap [\![\text{class}]\!] = \emptyset$

revision: locus of the environment condition

conclusion:

(55) [exh$_C$ Gali is allowed to attend any classes] is not DM wrt *classes*

but does this also mean the following?

(56) [exh$_C$ Gali is allowed to attend any class] is not DM wrt *class* ??

recall namely the two formulations of DMness

(57) A constituent C of a conjoinable type β is downward-monotone with respect to the position of a constituent A of a conjoinable type α that C dominates iff $[\lambda X_\alpha.[\![C]\!]^{[A \to X]}]$ is a DM function. (cf. Gajewski 2005)

(58) A constituent C of a conjoinable type β is downward-monotone with respect to a constituent A of a conjoinable type α that C dominates iff $\forall X\text{: } [\![A]\!] \Rightarrow [\![X]\!] \rightarrow [\![C[A/X]]\!] \Rightarrow [\![C]\!]$ (or $\forall X\text{: } [\![X]\!] \Rightarrow [\![A]\!] \rightarrow [\![C]\!] \Rightarrow [\![C[A/X]]\!]$)

on the 'positional' notion of DMness

(59) **Env-Condition-any:** An *any*-DP is acceptable iff it occurs at LF in a constituent that is DM* wrt the position of the resource domain of *any*.

[$_S$ ... [[any D] NP] ...]

on the 'phrasal' notion of DMness

(60) **Env-Condition-any:** An *any*-DP is acceptable iff it occurs at LF in a constituent that is DM* with respect to its complement.

✓ **the acceptability and variation challenge**

✓ **the strength challenge**

✓ **the plural/mass challenge**