Singularity and plurality of discourse reference to worlds

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Introduction

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Today: A common assumption that conditional antecedents are **plural** definite descriptions. (e.g. Schein 2001; Schlenker 2004)

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Hence the general constraint (de Swart 1996):

Quantificational adverbs (Q-adverbs) require non-singleton restrictors.

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  (5) If Mary shows up, John **might** show up, too.

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Main claim: Conditional antecedents can refer to **singular** referents.

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(11) *{**moshi** / ∅} John-ga ku-reba, **tabun** Mary-mo kuru.*
moshi J-nom come-reba maybe M-add come
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But why is *moshi* allowed in modal conditionals, then?

What's the difference between Q-adverbial and modal conditionals such that *moshi* is allowed in modal conditionals, but not in Q-adverbial conditionals?

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3. Independent assumption: Q-adverbial vs. modal quantification

4. Analysis

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But there's converging evidence that this construal for modals is incorrect.

(Frank 1996; Zvolenszky 2002 a.o.)

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Core assumption:
Modals in conditionals are not restricted by antecedents, but evaluated **pointwise at antecedent worlds** (e.g. at each `law-pass`-world).

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i_1	mary	$\mathbf{w}_1$
i_2	john	$\mathbf{w}_2$
i_3	bill	$\mathbf{w}_3$

$$I = \{i_1, i_2, i_3\}$$

$$u(i_3) = \texttt{bill}$$

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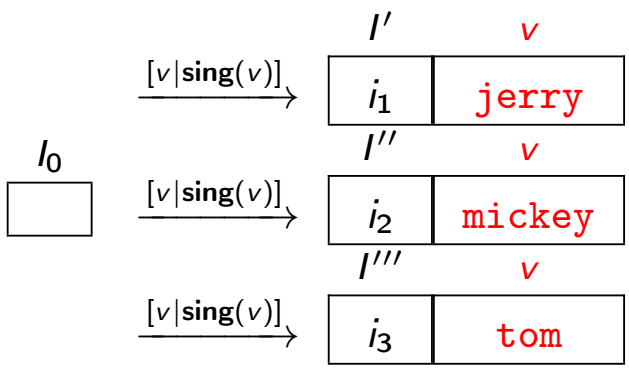

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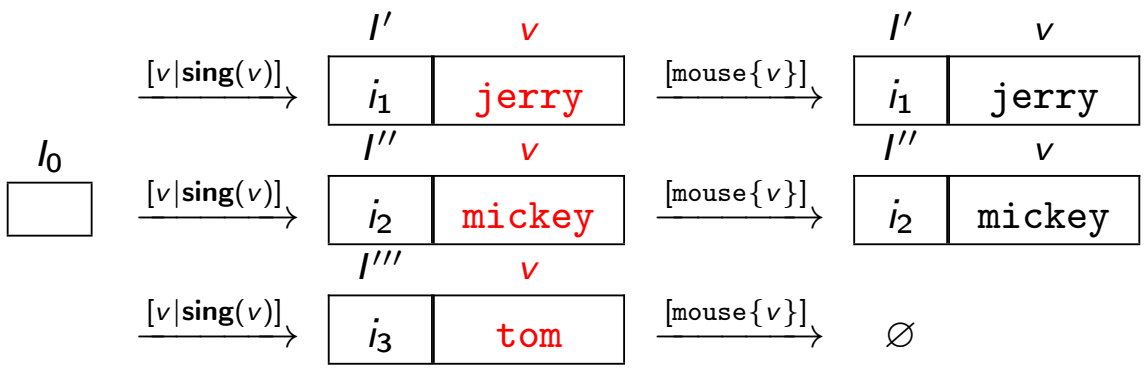

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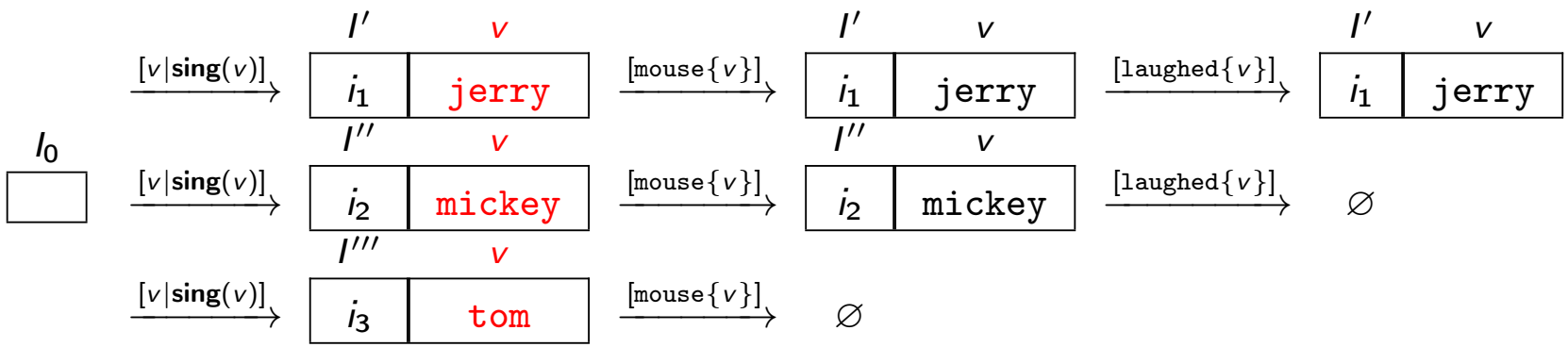

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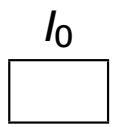

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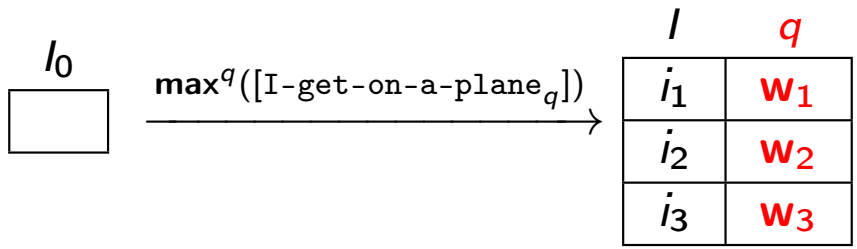

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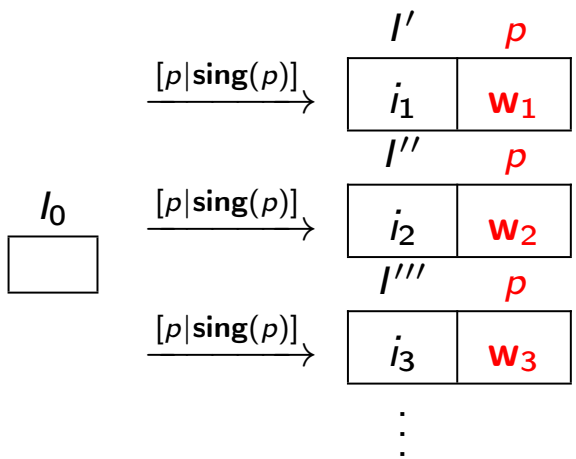

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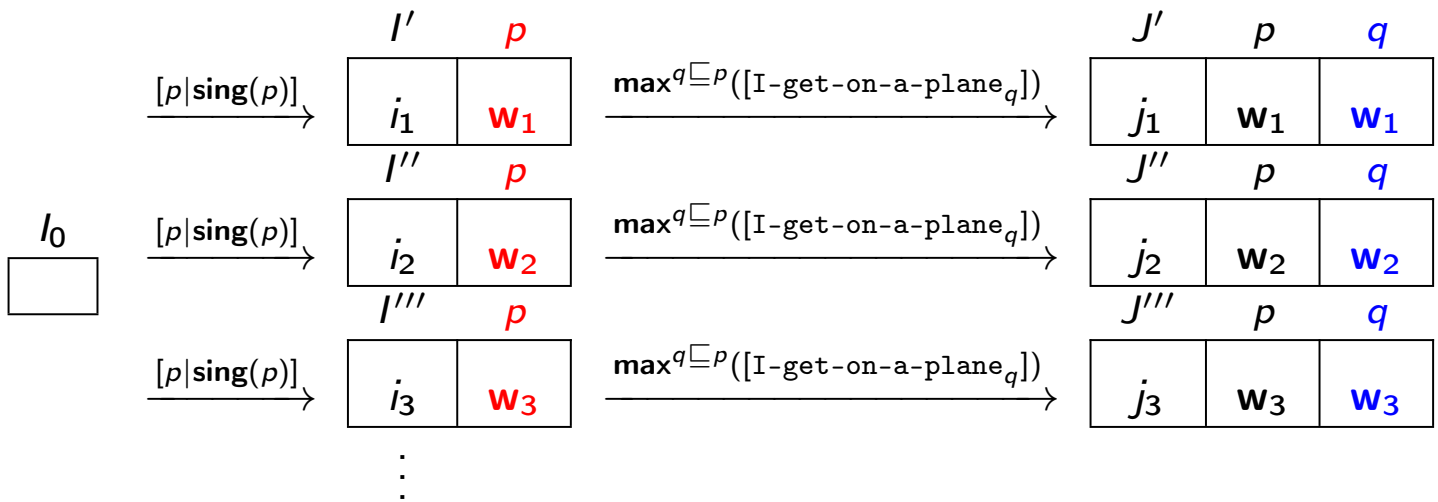

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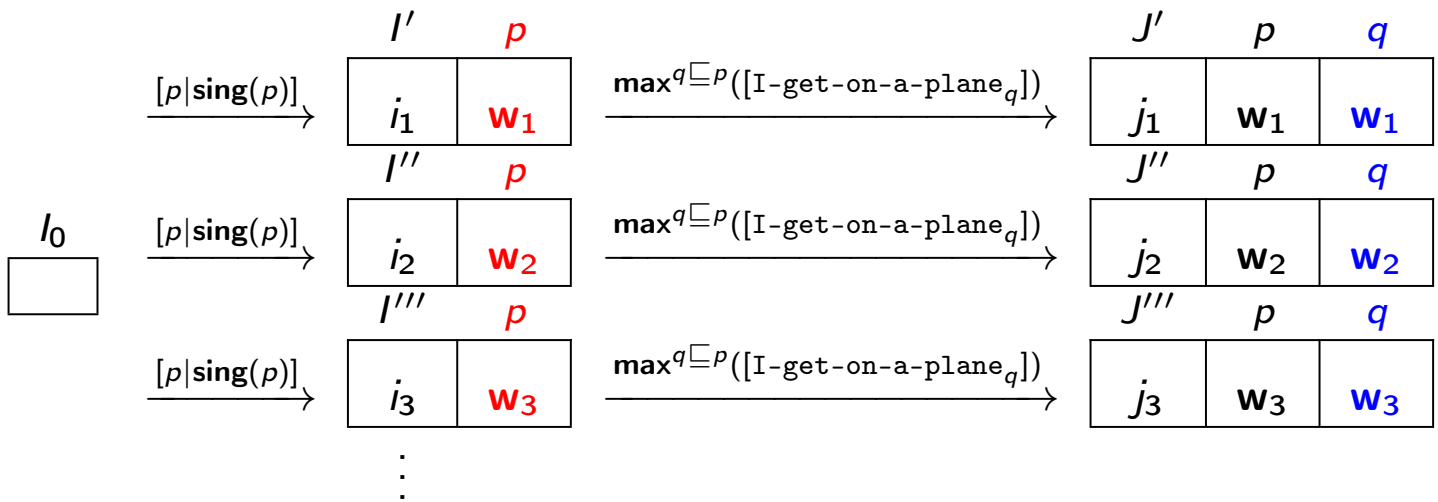

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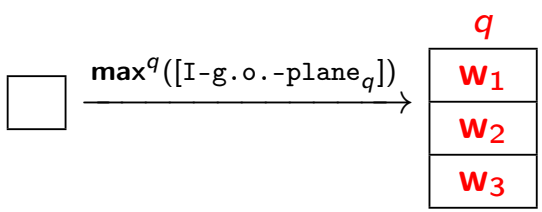

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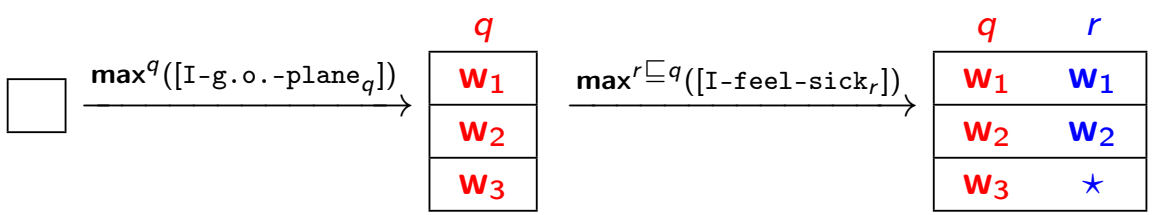

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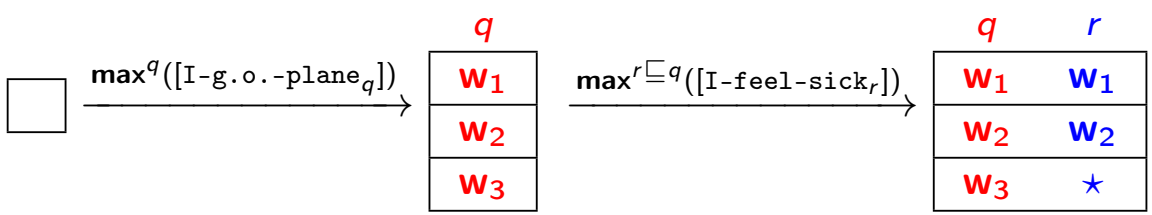

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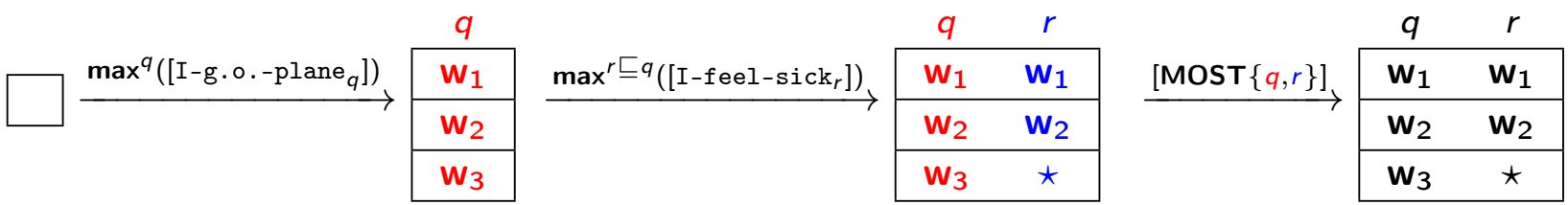

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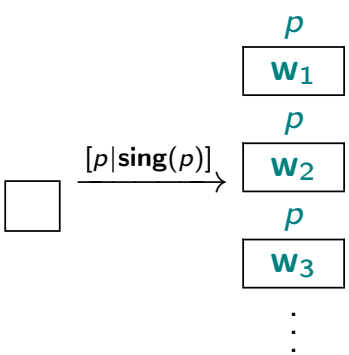

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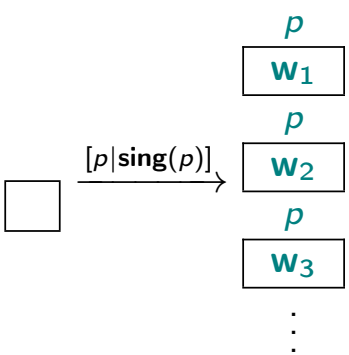

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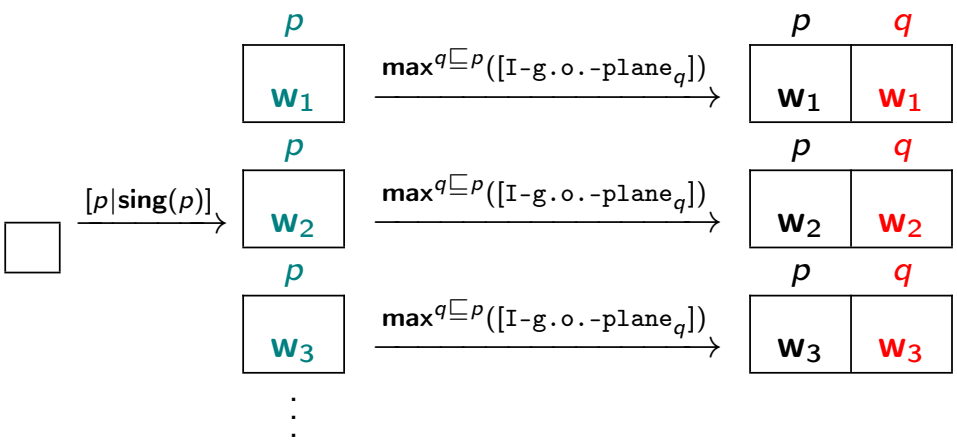

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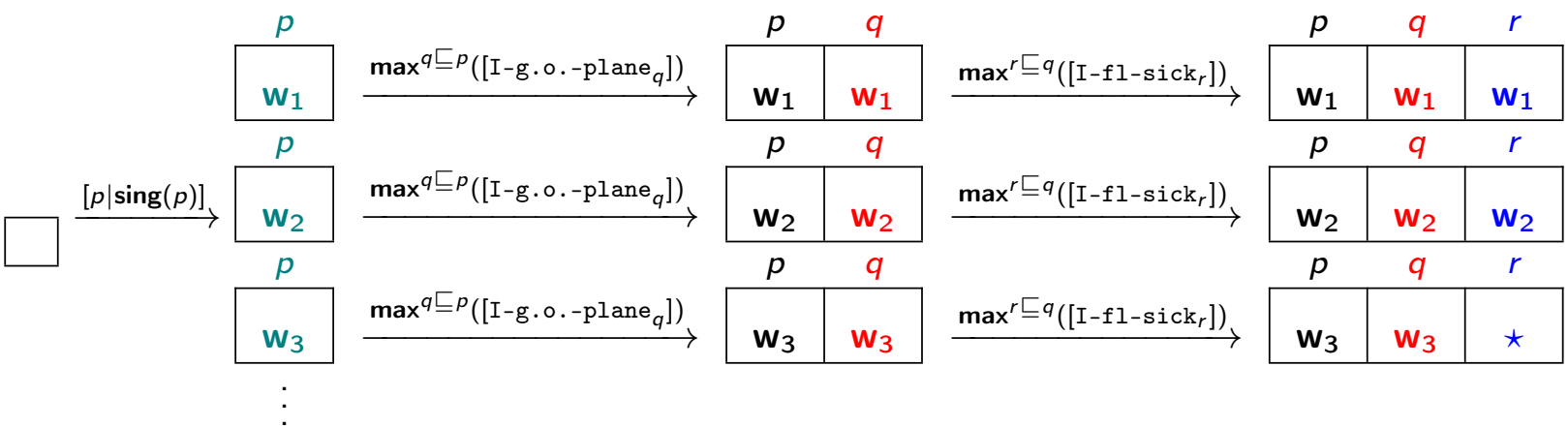

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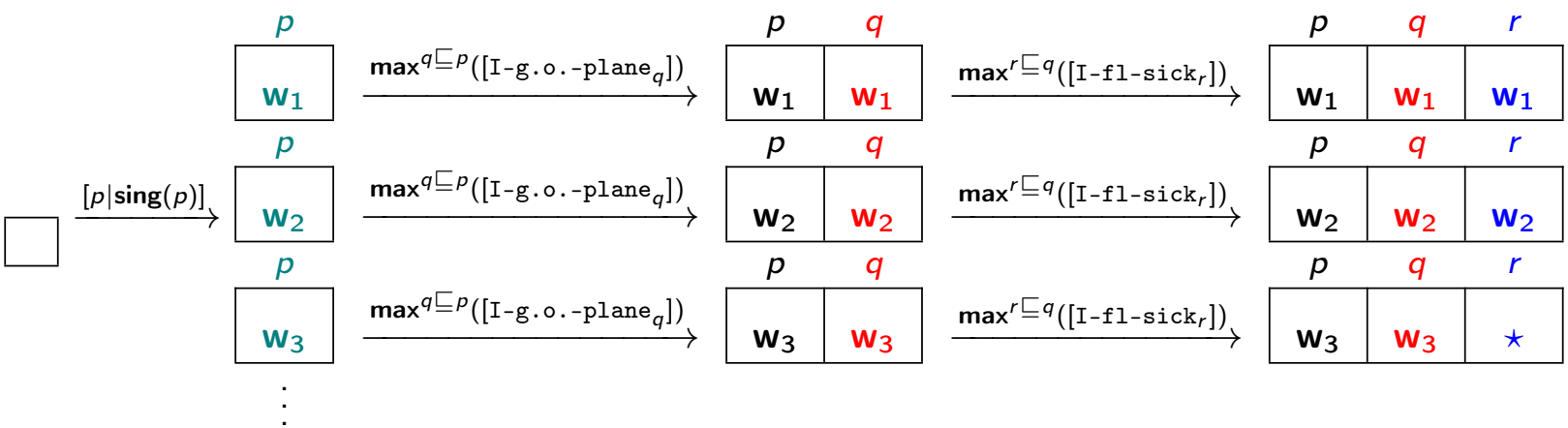

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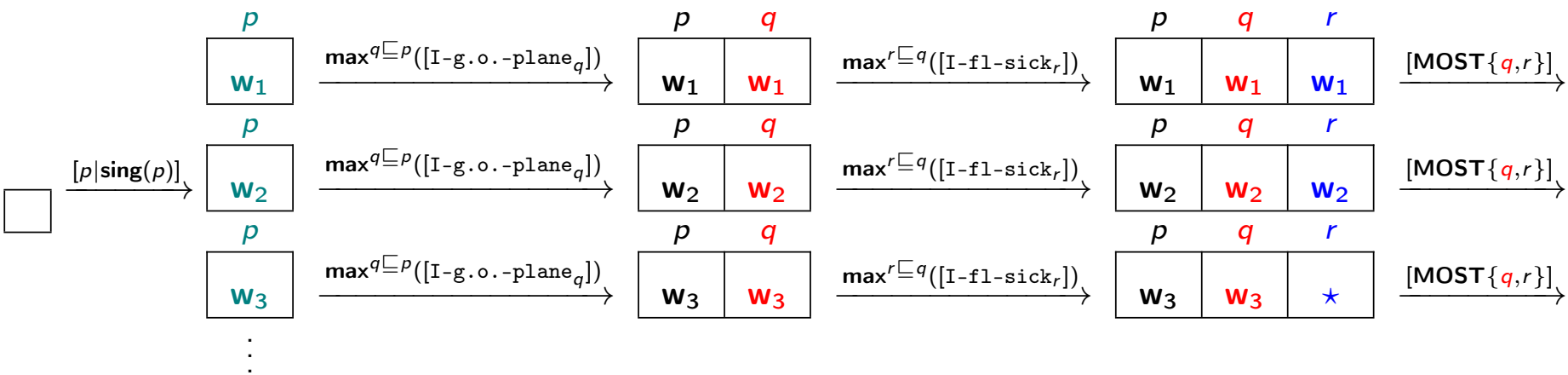

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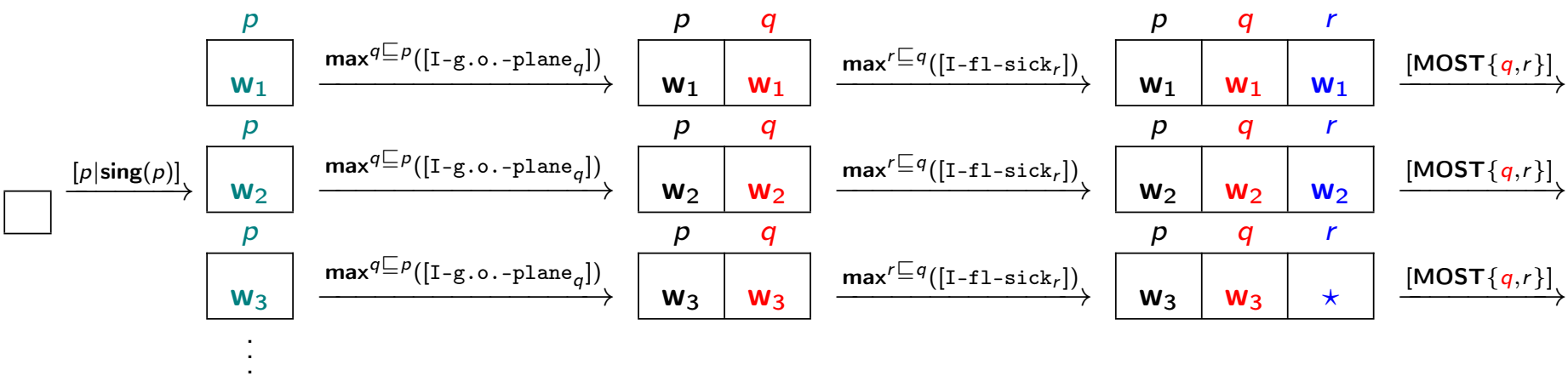

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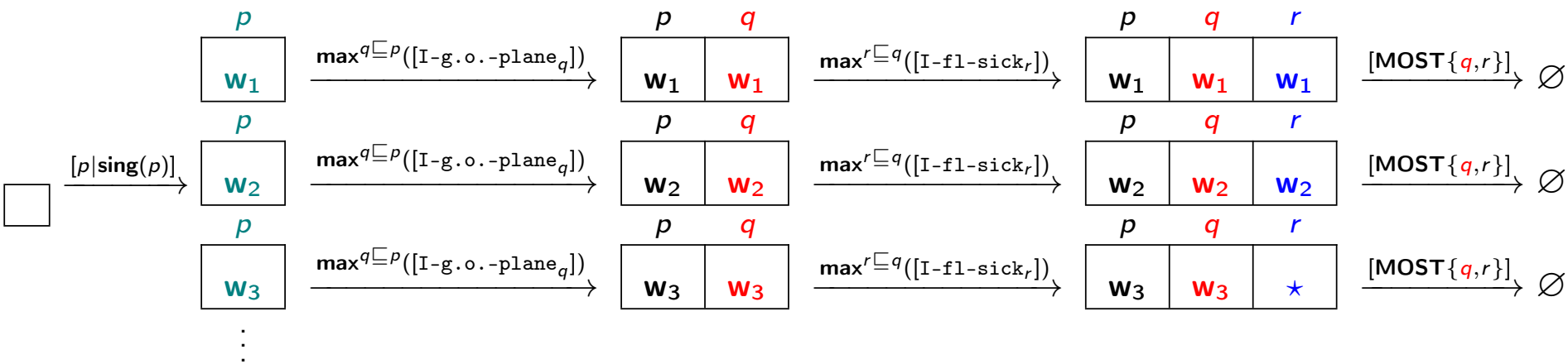

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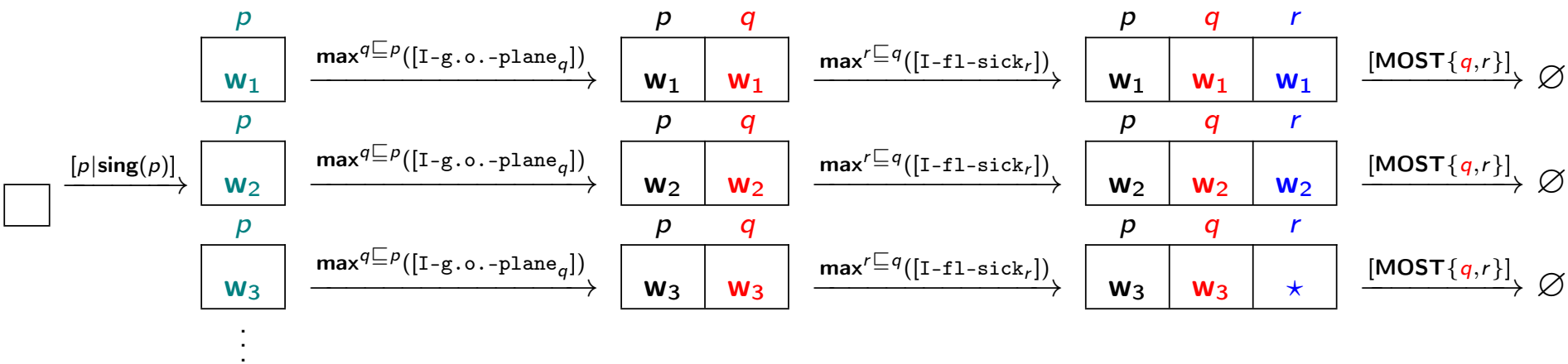

Moshi **prevents the antecedent from providing a meaningful restrictor for Q-adverbs.**

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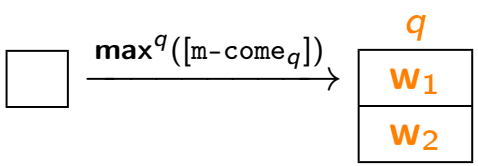

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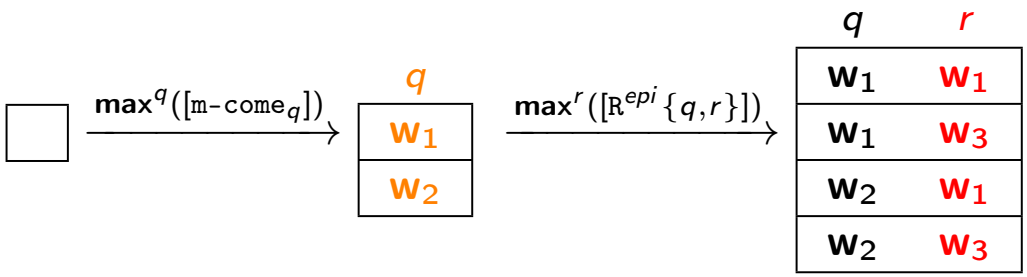

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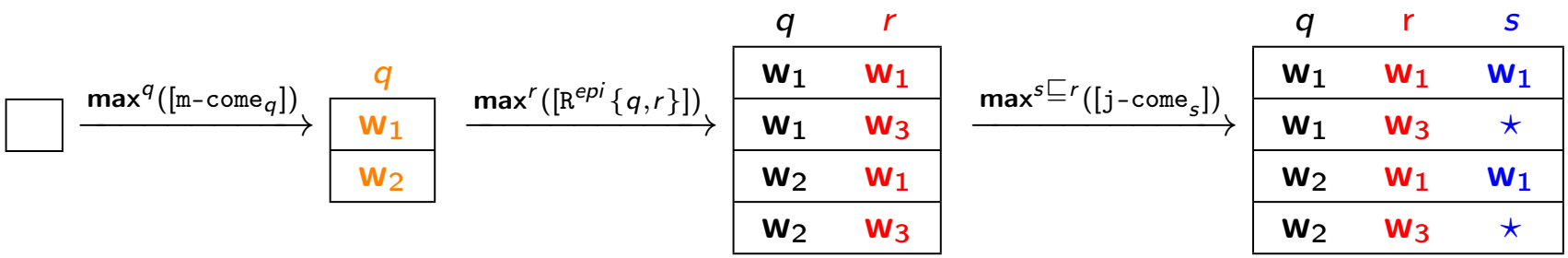

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$\square \xrightarrow{\mathbf{max}^{q}([\texttt{m-come}_{q}])}$

q
w_1
w_2

$\xrightarrow{\mathbf{max}^{r}([\texttt{R}^{epi}\{q,r\}])}$

q	r
w_1	w_1
w_1	w_3
w_2	w_1
w_2	w_3

$\xrightarrow{\mathbf{max}^{s\sqsubseteq r}([\texttt{j-come}_{s}])}$

q	r	s
w_1	w_1	w_1
w_1	w_3	$\star$
w_2	w_1	w_1
w_2	w_3	$\star$

$\xrightarrow{[\mathbf{SOME}\{r,s\}]}$

q	r	s
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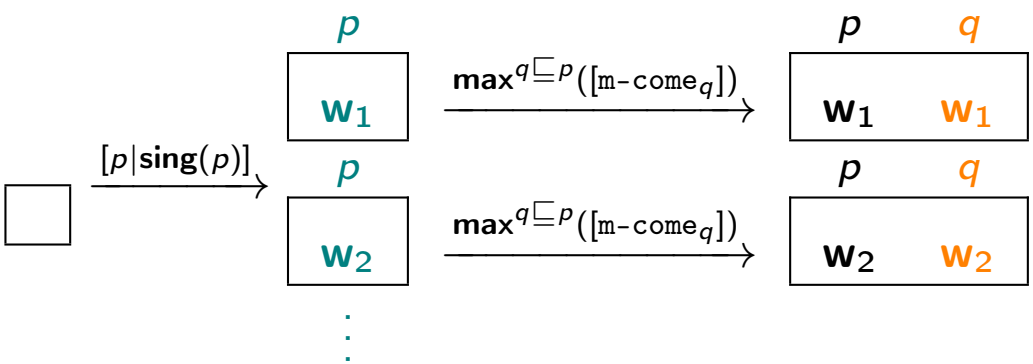

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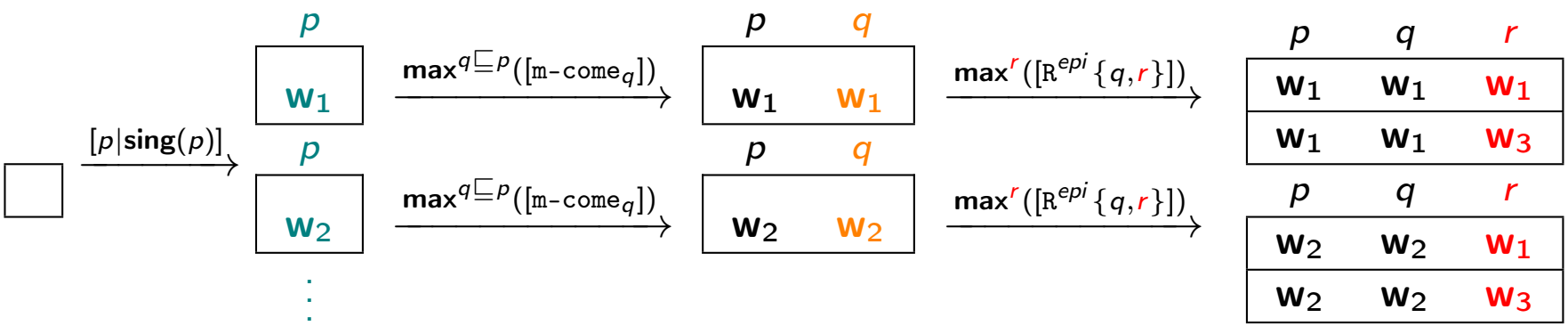

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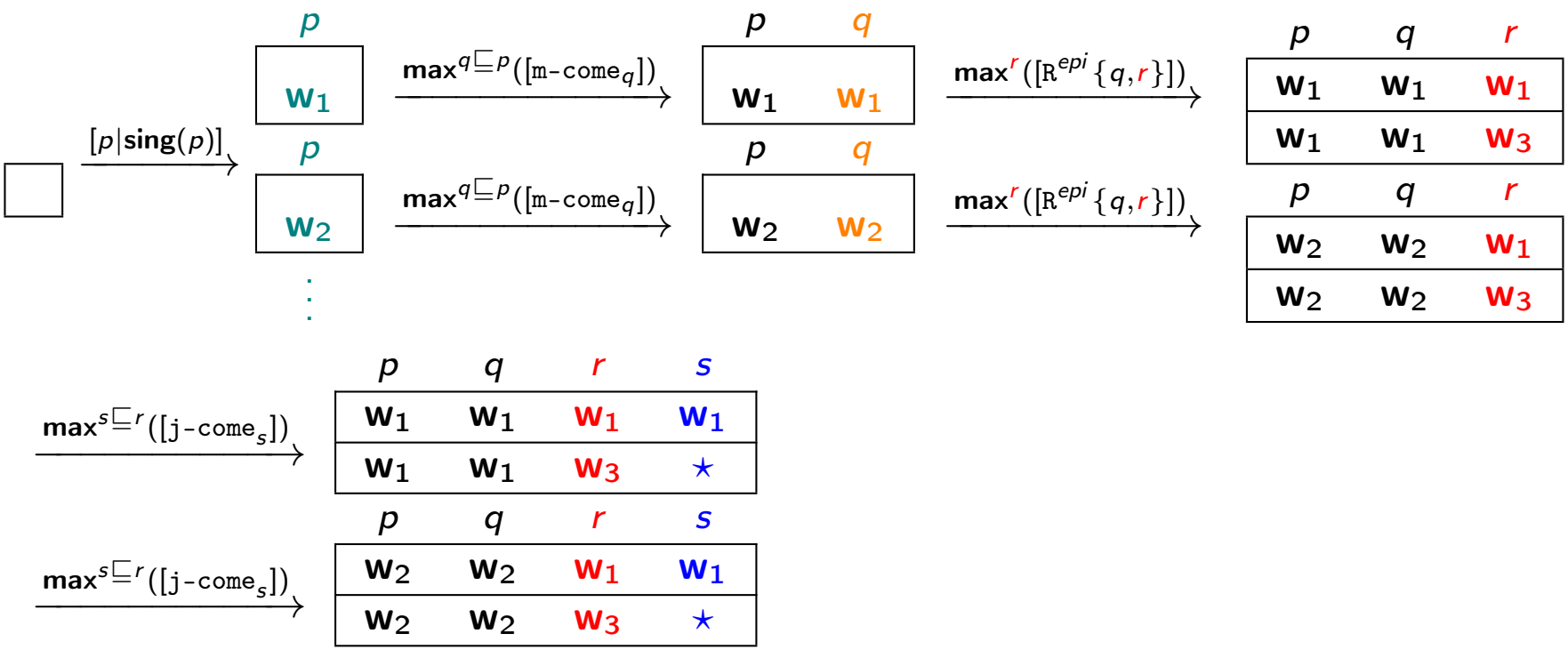

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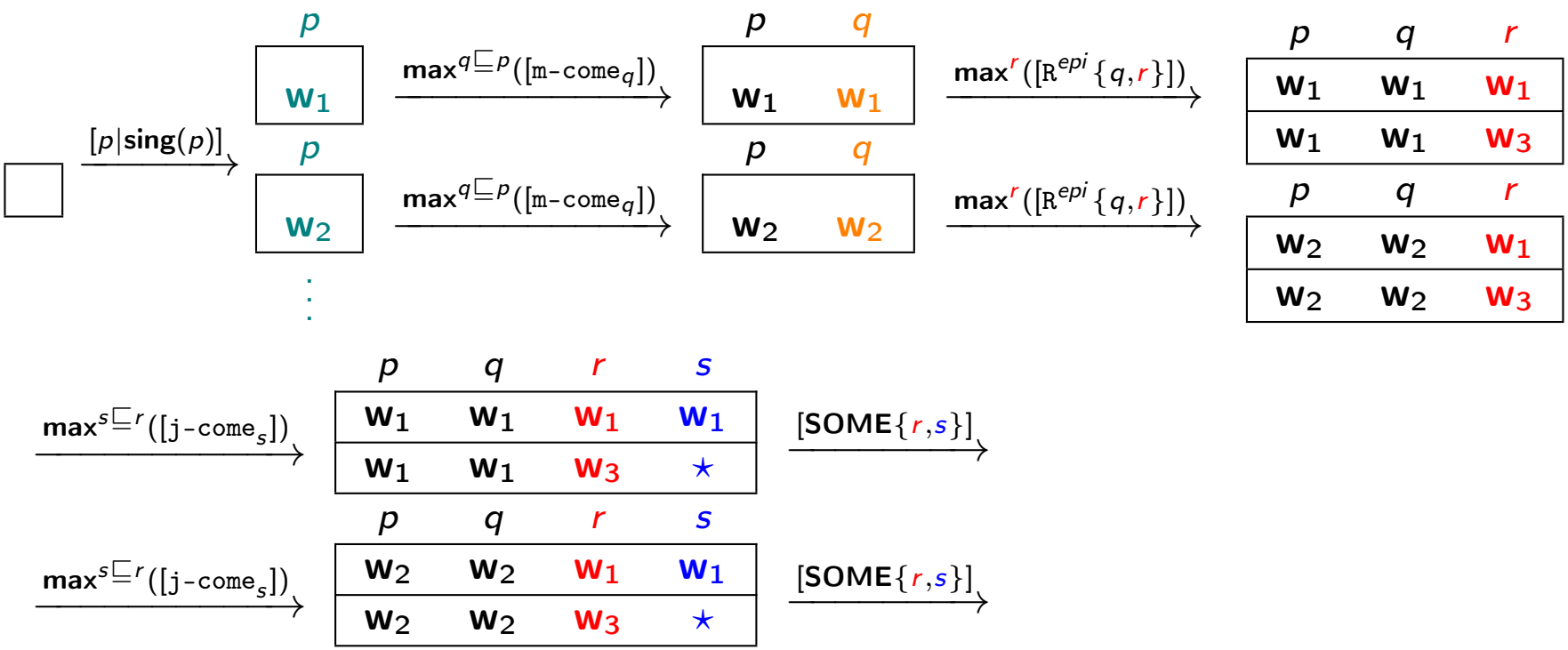

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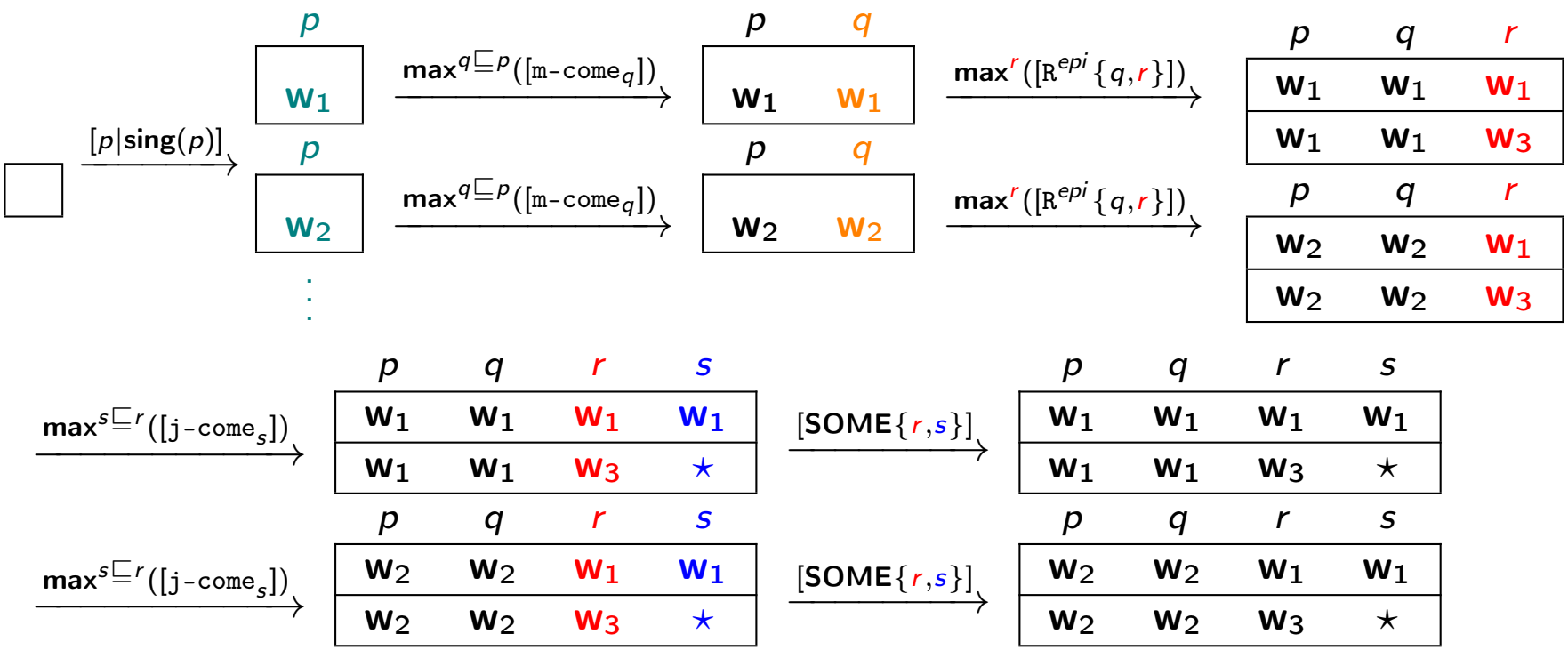

1. Introduction

2. Data

3. Independent assumption: Q-adverbial vs. modal quantification

4. Analysis

5. Summary

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  - a referential analysis of conditionals with **overt singularity marking** of situation-type drefs, i.e. by *moshi*.

Thanks! Questions?

This work was supported by National Science Foundation, Award No. 2116972, "Research on conditional and modal language" (Magdalena Kaufmann, PI; Stefan Kaufmann, Co-PI).

For discussions and comments, I am indebted to Magdalena Kaufmann, Teruyuki Mizuno, Yoshiki Fujiwara, Giulio Ciferri Muramatsu, Yuya Noguchi, Floris Roelofsen, Yimei Xiang, Yusuke Yagi, Alessandro Zucchi, the audience at Many-time-zone Reading Group (December 2021), Theoretical Linguistics at Keio (TaLK) Semantics Conference (March 2022) and UConn Meaning Group (April 2022), and four anonymous reviewers of SALT 32.

Not all Q-adverbs have to be restricted by conditional antecedents (cf. Geurts 2004 for English):

- ***often*-type**: *yoku* 'often', *tokidoki* 'sometimes'; can take narrow scope and yield modal readings.

(27) *hikouki-ni nor-eba, {**yoku** / **tokidoki**} kibun-ga waruku naru.*
plane-dat get.on-reba often sometimes feeling-nom bad become
'If I'm on a plane, I often/sometimes feel sick.'

a. Q-adverbial: Many/Some situations where I'm on a plane are situations where I feel sick.
b. Modal: In case I get on a plane, I'll feel sick many times/on and off during that flight.

- ***usually*-type**: *itsumo* 'always', *taitei* 'usually'; can't take narrow scope.

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a. Q-adverbial: All/Most situations where I'm on a plane are situations where I feel sick.
b. ✗ Modal: In case I'm on a plane, I'll feel sick the whole time/many times during that flight.

Often-type + _moshi_: modal reading only.

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Usually-type + _moshi_: sentences are odd.

(30) ??***moshi*** *hikouki-ni nor-eba, {itsumo / taitei} kibun-ga waruku naru.*
moshi plane-dat get.on-reba always usually feeling-nom bad become
'If I'm on a plane, I always/usually feel sick.'

These data further confirm the observation that *moshi* prevents the antecedent from restricting Q-adverbs.

An alternative hypothesis: *Moshi* lexically selects the antecedents that refer to **situations**; antecedents of modal conditionals refer to **worlds**, and are thus incompatible with the lexical restriction of *moshi*.

Preliminary evidence against this hypothesis: *Moshi* shows **type-flexibility**.

Yang (t.a.) shows that *moshi* is allowed in *-wa*-marked topics:

(31) ***moshi*** *tameshi-ta koto nai kata-**wa** taiken shi-ta hou-ga ii*
moshi try-pst thing neg people-top try do-pst way-nom good
des-u yo!
cop.pol-npst sfp
lit. 'People who haven't tried are such that they should try it.'
(Roughly:) 'If one hasn't tried it, one should try it.' (Web ex.)

Crucially, in both conditionals and topics, *moshi* exhibits the requirement that the extension of the constituent modified by (antecedent clauses, topical NPs) vary across the context set.

E.g. Bad in factual conditionals: (Arita 2007: 114)

(32) A: 'I received my bonus yesterday.'
B: *(#**moshi**) kinou kin'ippuu-ga de-ta nara, ashita*
moshi yesterday bonus-nom release-pst cond tomorrow
kaimono-ni ik-ou.
shopping-dat go-vol
'If you received your bonus yesterday, let's go shopping tomorrow.'

E.g. Bad if the speaker knows which individuals satisfy the property expressed by the topic and which individuals don't:

(33) a. Teacher: 'Who wants to read newspapers?'
b. (Those who want newspapers raise their hands, those who do not want newspapers do not raise their hands.)
c. Teacher: *(#**moshi**) shinbun-o yomi-tai hito-**wa**, koko-ni aru yo.*
moshi newspaper read-want people-top here-dat be sfp
lit. 'People who want to read newspapers, they are here.'

Yang's analysis: *Moshi* exhibits a requirement of speaker uncertainty that is type-flexible between worlds and individuals.

But it still remains unclear whether *moshi* is type-flexible between **situation** and **worlds**. Suggestions for diagnostics are welcome!

References I

Arita, S. (2007). *Nihongo zyôkenbun to zisêsetusê [Japanese conditionals and tensedness]*. Kuroshio, Tokyo.

Brasoveanu, A. (2010). Decomposing modal quantification. *Journal of Semantics*, 27(4):437–527.

de Swart, H. (1996). (in)definites and genericity. In *Quantifiers, Deduction, and Context*, pages 171–194. CSLI Publications, Stanford.

Farkas, D. F. and Sugioka, Y. (1983). Restrictive if/when clauses. *Linguistics and Philosophy*, 6(2):225–258.

Frank, A. (1996). *Context dependence in modal constructions*. PhD thesis, Universität Stuttgart.

Geurts, B. (2004). On an ambiguity in quantified conditionals. *ms, University of Nijmegen*.

Kaufmann, M. (2017a). Japanese moodals and other evaluations [class handuot at mit].

Kaufmann, M. (2017b). What 'may' and 'must' may be in Japanese. In Funakoshi, K., Kawahara, S., and Tancredi, C., editors, *Proceedings of The 24th Japanese/Korean Linguistics Conference*, pages 14–16.

References II

Kratzer, A. (1989). An investigation of the lumps of thought. *Linguistics and philosophy*, 12(5):607–653.

Lewis, D. (1975). Adverbs of quantification. In Keenan, E. L., editor, *Formal Semantics of Natural Language*, pages 178–188. Cambridge University Press.

Schein, B. (2001). Adverbial, descriptive reciprocals. In *Proceedings of Semantics and Linguistic Theory 11*, pages 404–430.

Schlenker, P. (2004). Conditionals as definite descriptions. *Research on Language and Computation*, 2(3):417–462.

van den Berg, M. H. (1996). *Some aspects of the internal structure of discourse. The dynamics of nominal anaphora*. PhD thesis, University of Amsterdam.

Yang, M. (in prep). Iffy discourse: Japanese *moshi* in conditionals and nominal topics. To appear in *Natural Language Conditionals and Conditional Reasoning*, Special Issue of *Linguistics Vanguard*.

Zvolenszky, Z. (2002). Is a possible-worlds semantics of modality possible? a problem for kratzer's semantics. In *Semantics and Linguistic Theory*, volume 12, pages 339–358.