

The morphosyntactic size of Japanese quantifiers and their scope taking movement

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March 4, 2025

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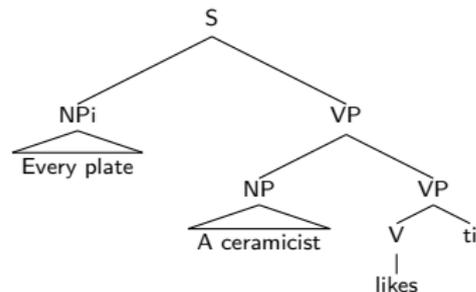
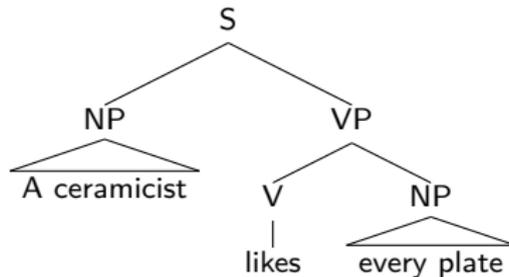
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Quantifier Raising (QR) I

- (1) a. A ceramicist likes every vase.
b. $\exists x [\text{Ceramicist}(x) \wedge \forall y [\text{Vase}(y) \rightarrow \text{Likes}(x, y)]]$
c. $\forall x [\text{Vase}(x) \rightarrow \exists y [\text{Ceramicist}(y) \wedge \text{Likes}(y, x)]]$

- (2) Quantifier raising (QR) (May (1985))



Clause Boundedness

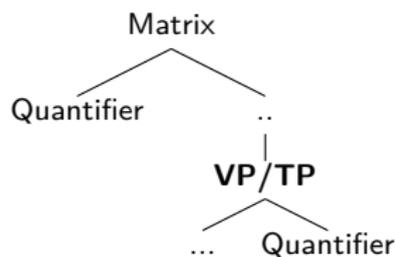
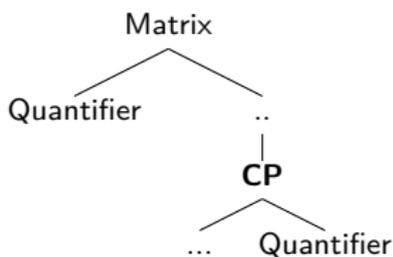
QR is syntactic

Quantifiers generated at the embedded position do not take scope over the other quantifier in matrix clause.

(3) Clause boundedness (Fox (1995), Fox (2000))

- a. Someone said that every man is married to Sue / Sue is married to every man. ($*\forall \gg \exists$)
- b. A different chef tries to prepare every dish / decided to prepare every dish. ($\forall \gg \exists$)

(4)



Quantifiers in Japanese

- (5) Two positions on Japanese quantifiers
- a. Japanese is a **scope rigid language** and therefore **QR is absent** in the language (cf. Yatsushiro (1996) and Takahashi (1996)).
 - b. Japanese is **not a scope rigid language** and the scope interpretation is subject to the same condition as English (Hoji (1985), Goro (2007)).

General questions

- Do Japanese quantifiers have the same syntactic structure and semantic properties as well-known similar ones in English?
- Which operation licenses the scope taking of Japanese quantifiers?

The Locality Constraint on QR in Japanese I

- (6) *Dareka-ga dono kyoujyu-mo hihan-sita*
 someone-NOM every professor criticize-did

'Someone criticized every professor'

- (7) *Dareka-ga Taroo-ni dono heya-mo souji-s-ase-ta.*
 someone-NOM Taroo-DAT every room clean-do-cause-past

'Someone made Taroo clean every room'

- (8) Scope ambiguous sentence ($\forall \gg \exists$)
Hanako-wa dareka-ga [Taroo-ni dono heya mo souji-s]-aseru
 Hanako-TOP someone-NOM Taroo-DAT every room particle clean-do-cause
youni sita
 COMP made

'Hanako made sure that someone would make Taroo clean every room'

The Locality Constraint on QR in Japanese II

(9) Relative clause

Taroo-wa dareka-ga [dono heya mo souji-sita] gakusei-o
 Taroo-TOP someone-NOM every room particle clean-did student-ACC
mitukeru youni sita
 find COMP made

(* \forall >> \exists)

(10) Indirect clause

Taroo-wa dareka-ga [Hanako-ga dono heya mo souji-sita
 Taroo-TOP someone-NOM Hanako-NOM every room particle clean-did
kadouka] sitteiru youni sita
 whether know COMP did

(* \forall >> \exists)

The Locality Constraint on QR in Japanese III

(11) Adverbial clause

Taroo-wa dareka-ga [dono heya mo souji-suru mae]-ni
 Taroo-TOP someone-NOM every room particle clean-do before-DAT
gakkou-ni iku youni sita.
 school-DAT go COMP made

(* $\forall >> \exists$)

Issues I

	QR	CB
Universal quantifiers	Yes	Yes
Existential quantifiers	??	??

Table: The distribution of universal / existential quantifiers

Specific issues

- Do existential quantifiers in Japanese behave in the same fashion as universal ones (e.g., allowing an inverse scope)?
- Which type of quantifier does resist syntactic locality (e.g., prohibition of quantifier movement from a finite clause) ?
- How is the license of quantifiers accounted for in a principled way?

Design and Materials

Truth-value Judgement Task (TVJT)

Testing the possibility of inverse scope per on a quantifier type.

- Participants: 19 Japanese native speakers
- Materials: 8 targets and 16 fillers

(12) *Hanako-wa Dareka-ga Taro-ni dono-heya-mo soujis-ase-ru*
Hanako-TOP someone-NOM Taro-DAT which-room-UQ clean-CAUSE-Pres
yooni-shi-ta.
make-sure-PST

(13) *Hanako-wa Dareka-ga Taro-ni nan-heya-ka soujis-ase-ru*
Hanako-TOP someone-NOM Taro-DAT which-room-EQ clean-CAUSE-Pres
yooni-shi-ta.
make-sure-PST

Procedure

花子はある寮の掃除係の班長を任されています。花子は、1日の終わりに寮の全ての部屋が掃除されていることを寮長に報告しなければなりません。しかし、花子は、その日掃除担当であった太郎が部屋の掃除をしていないことを知りました。花子は、そのことを掃除係の班員5人(一郎、次郎、三郎、四郎、五郎)に伝え、「次郎は、太郎に掃除することを伝えてください」と彼らにお願いしました。一郎は、花子の外出中に、全ての部屋を掃除するよう伝えました。1時間後、花子が部屋の様子を確認すると、全ての部屋が掃除されていました。その後、寮長が花子のところにやってきて、寮の部屋掃除が終わっているかどうか尋ねました。花子は、先ほど指示をしたことを寮長に伝えました。寮長はそれを確認すると、自分の部屋へ戻って行きました。

花子は、一郎が太郎に全ての部屋を掃除させたことを不思議に思った。

この文が正しいと思ったら「正」を、間違っていると思ったら「誤」を押してください。

正

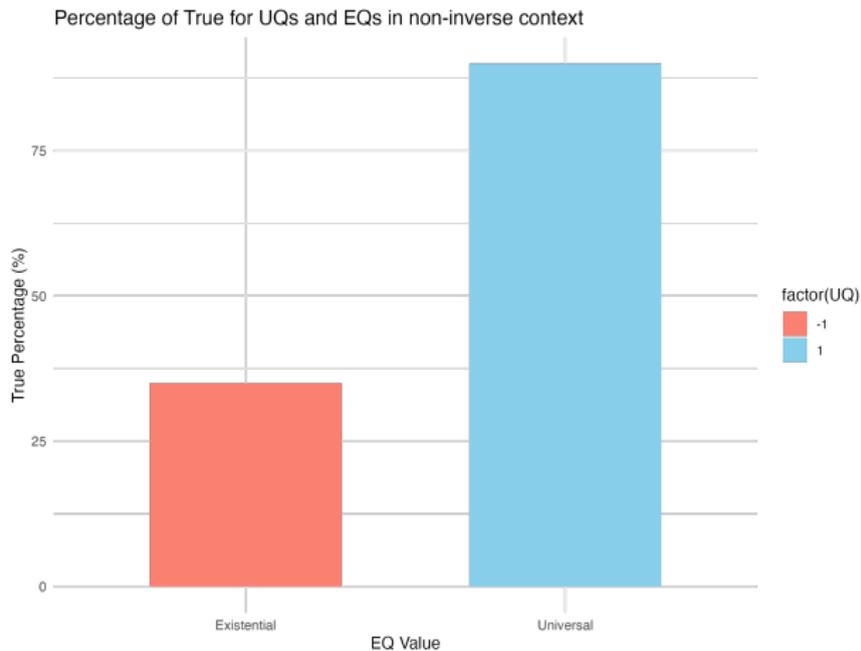
誤

Figure: Screen of TVTJ

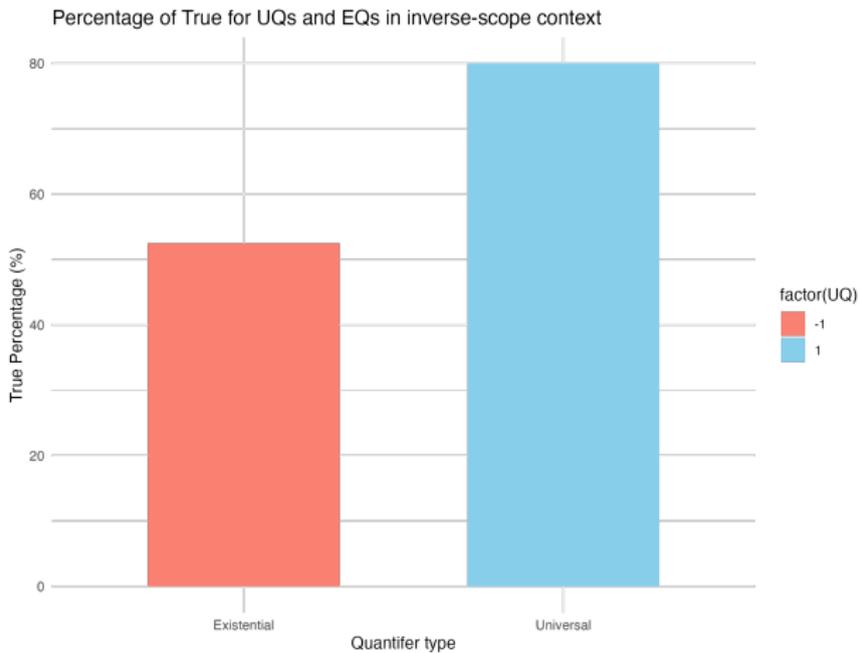
Prediction

- Universal quantifiers allows inverse scope easily → syntactic movement
- Existential quantifiers exhibit the same effect → syntactic movement; otherwise, bearing a different property from universal quantifiers.

Results I



Results II



Design I

Acceptability Judgement Task (AJT)

Testing the clause boundary effect of quantifier scope per on a quantifier type

- (14) 2 (Clause-boundedness: +CB vs. -CB) × 2 (quantifier type: +UQ vs. -UQ) × 2 (Wh: +Wh vs. -Wh)
- a. Clause-boundedness:
quantified expressions cannot move across a finite clause (CP), but can a non-finite clause (TP or VP).
 - b. Type of quantifier: Universal quantifier (UQ) or existential quantifiers (EQ)
 - c. Wh: Whether or not a sentence contain a wh-phrase
- Participants:
19 Japanese native speakers

Materials

12 targets and 24 fillers

- Universal quantifier ([+UQ])

(15) [+CB]

Hanako-wa dareka-ga Taro-ni dono-heya-mo soujis-ase-ta
Hanako-TOP someone-NOM Taro-DAT which-room-UQ clean-CAUSE-PST
to syutyoshi-ta.
COMP claim-PST

(16) [-CB]

Hanako-wa dareka-ga Taro-ni dono-heya-mo soujis-ase-ru
Hanako-TOP someone-NOM Taro-DAT which-room-UQ clean-CAUSE-Pres
yooni-shi-ta.
make-sure-PST

Material

- Existential quantifier ($[-UQ]$)

(17) $[+CB]$

Hanako-wa dareka-ga Taro-ni nan-heya-ka soujis-ase-ta
Hanako-TOP someone-NOM Taro-DAT which-room-EQ clean-CAUSE-PST
to syutyoshi-ta.
COMP claim-PST

(18) $[-CB]$

Hanako-wa dareka-ga Taro-ni nan-heya-ka soujis-ase-ru
Hanako-TOP someone-NOM Taro-DAT which-room-EQ clean-CAUSE-Pres
yooni-shi-ta.
make-sure-PST

Material

Wh-question

(19) [+CB]

Hanako-wa dareka-ga Taro-ni dono-heya-o soujis-ase-ta
Hanako-TOP someone-NOM Taro-DAT which-room clean-CAUSE-PST
to syutyoshi-masi-ta ka.
COMP claim-Hon-PST Q

(20) [-CB]

Hanako-wa dareka-ga Taro-ni nan-heya-ka soujis-ase-ru
Hanako-TOP someone-NOM Taro-DAT which-room clean-CAUSE-Pres
yooni-shi-masi-ta ka.
make-sure-Hon-PST Q

Procedure I

Acceptability Judgement Task (Goro (2007), Syrett (2015)):
Participants are presented with each pair of a story and relevant sentence, and evaluates the target sentences in terms of **5-point Likert scale**.

[ストーリー]

花子はある寮の掃除係の班長を任されています。花子は、1日の終わりに寮の全ての部屋が掃除されていることを寮長に報告しなければなりません。しかし、花子は、その日掃除担当であった太郎が部屋の掃除をしていないことを知りました。花子は、そのことを掃除係の班員5人(一郎、次郎、三郎、四郎、五郎)に伝え、「誰でもいいから太郎に掃除することを伝えてください」と彼らにお願いしました。寮の部屋は全部で4部屋あります。部屋1と2は、一郎と次郎が、部屋3と4は、一郎、次郎、三郎が、それぞれ太郎に掃除させました。1時間後、花子が部屋の様子を確認すると、全ての部屋が掃除されていました。その後、寮長が花子のところにやってきて、寮の部屋掃除が終わっているかどうか尋ねました。花子は、先ほど指示をしたことを寮長に伝えました。寮長はそれを確認すると、自分の部屋へ戻って行きました。

以下の文の適格性を評価してください。

花子は、次郎が太郎にいくつの部屋を掃除させるようにしましたか？
(不適格)○○○○○○○(適格)

Proceed

Figure: Example of Truth-value Judgement Task

Results I

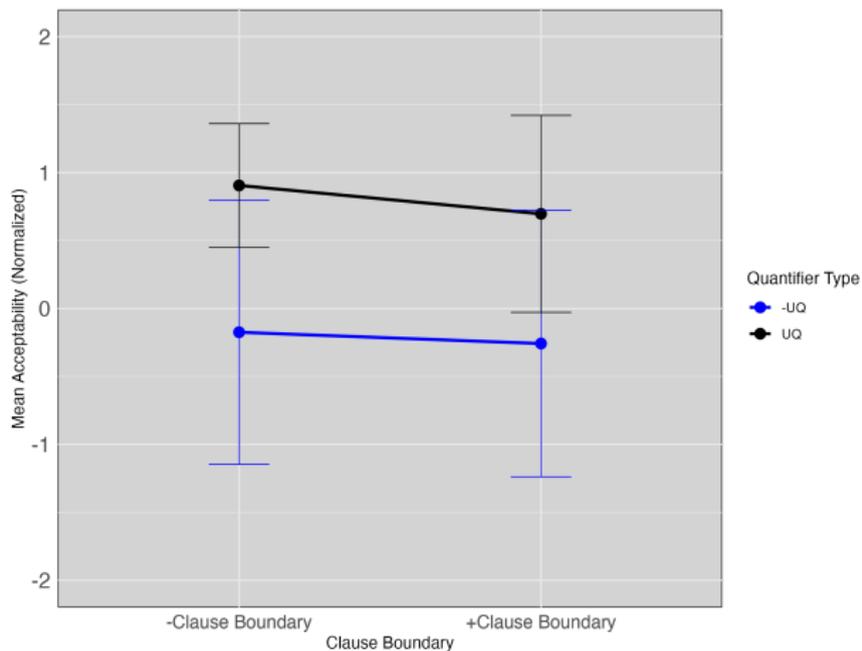


Figure: Mean Acceptability Per Conditions

Results II

Statistical analysis

Using Linear Mixed Effects (LME) model (R Core Team (2018)),

Fixed effects	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	3.3563	0.9316	3.603	0.1581
UQ1	0.3375	0.1766	1.911	0.0568
CB1	-0.2309	0.1150	-2.008	0.0454

Table: Fixed effects results for UQs and CB.

Model: lmer (Value ~ UQ + CB + (1|id) + (1|Wh), data = data)

Fixed Effects	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	4.6579	0.1988	23.426	<2e-16***
CB1	-0.3421	0.1608	-2.127	0.0378*

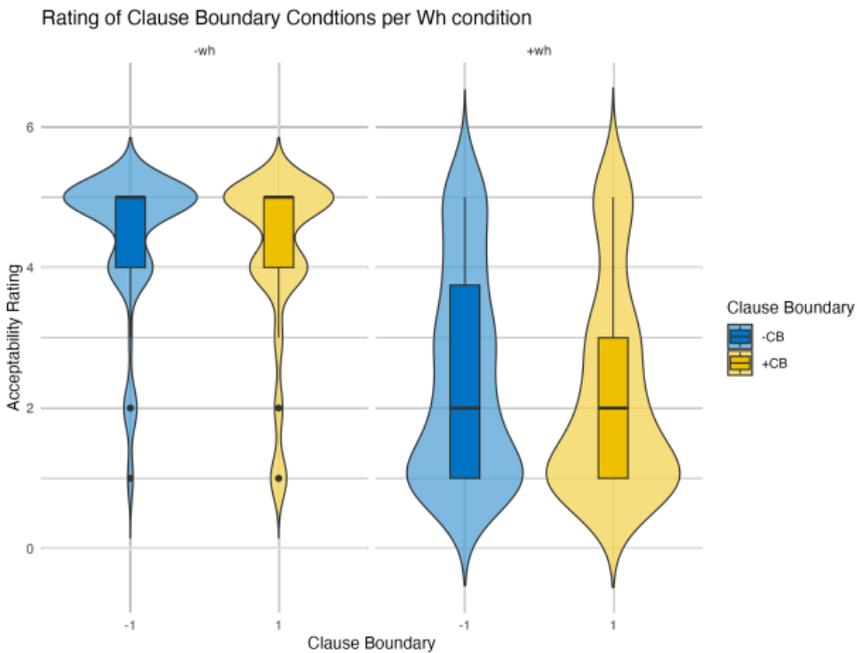
Table: Linear mixed-effects model results for $UQ = +1$ (Universal quantifiers). Significant effects are marked with * ($p < 0.05$) and *** ($p < 0.001$).

Results III

Fixed Effects	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	2.8882	0.2329	12.402	1.79×10^{-11} ***
CB1	-0.1363	0.1588	-0.858	0.392

Table: Linear mixed-effects model results for $UQ = -1$ (Existential quantifiers). Significant effects are marked with *** ($p < 0.001$).

Results IV



Discussion: Does clause boundary exist in Japanese?

Summary

	QR	CB
Universal quantifiers	Yes	Yes
Existential quantifiers	No	No

Table: The distribution of universal / existential quantifiers

- Universal quantifiers undergo syntactic movement.
- Existential quantifiers do not under syntactic movement due to the lack of clause boundary effect. → How is it explained?
- Nevertheless, **the acceptability of universal quantifiers is always higher than that of existential quantifiers.** → Why?

Choice Function I

The first question

There is a **labor-division between QR and choice function**: QR is applied to generalized quantifiers (GQ) such as *every* and *each* while choice function is applied to indefinite NPs such as *some*, *three*, and *many*.

(21) Choice function (CH) (Reinhart (1997))

A function f is a choice function (CH (f)) if it applies to any non-empty set and yields a member of that set.

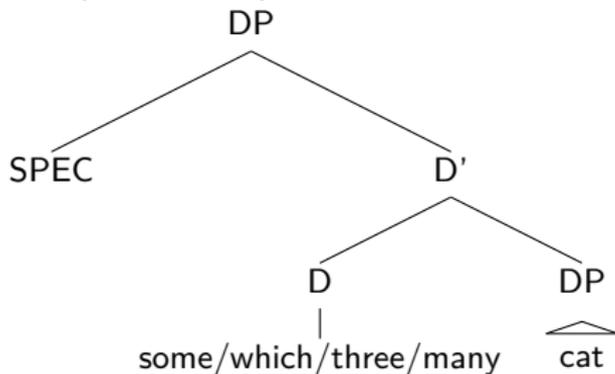
(22) Every lady read some book.

a. $\exists f (\text{CH} (f) \wedge \forall z (\text{lady} (z) \rightarrow z \text{ read } f(\text{book})))$

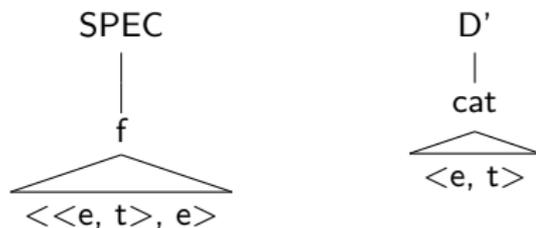
b. $\exists x (\text{book}(x) \wedge \forall z (\text{lady} (z) \rightarrow x \text{ read } x))$

Choice Function II

(23) The syntax of quantified expressions with a choice function (CH)



(24)



Choice Function III

	clause boundary	selection of DP
QR	Yes	No
Choice function (CH)	No	Yes

Table: Summary of the properties of QR and CH

LF piped-piping I

The second question

Japanese universal quantifiers undergo syntactic movement with another element that contains it (Pied-piping) (cf. Nichigauchi (1990)).

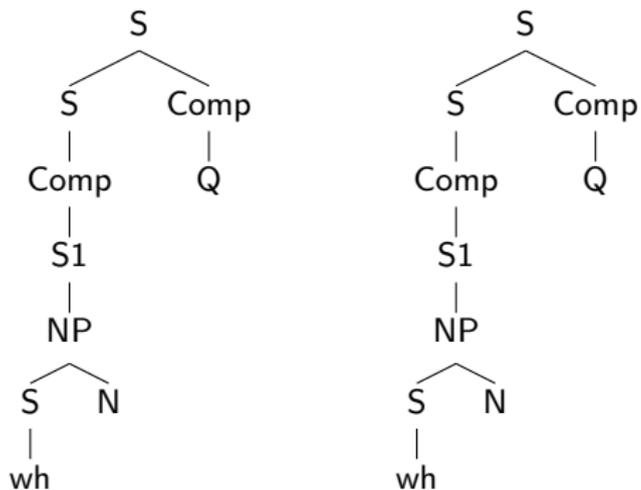
Nichigauchi (1990) points out that Japanese does not show a relative-island effect, and thus covert wh-extraction from relative clause is allowed.

(25) *Kimi-wa* *[[dare-ga kai-ta] hon]-o* *yomi-masi-ta ka.*
 You-smallTOP who-NOM write-PST book-ACC read-Hon-PST Q

You read books that who wrote?

LF piped-piping II

(26)



LF piped-piping III

- (27) a. *Hanako-wa dareka-ga Taro-ni dono-heya-mo soujis-ase-ta*
 Hanako-TOP someone-NOM Taro-DAT which-room-UQ clean-CAUSE-PST
to syutyoshi-ta.
 COMP claim-PST
- b. [CP Hanako-wa [CP Dareka-ga [TP Taro-ni dono-heya-mo soujis
]-ase-ta]syutyooshi-ta]
- c. [CP Hanako-wa [TP Taro-ni dono-heya-mo soujis]][CP Dareka-ga ti
 -ase-ta]syutyooshi-ta]

Existential quantifiers do not under movement, and thus such a piped-piping movement is not operative.

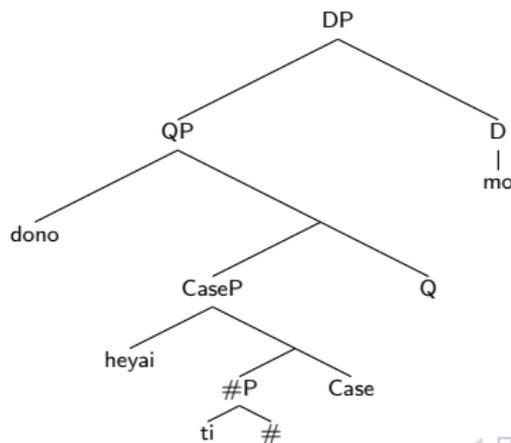
The Syntax of Quantifiers in Japanese I

Prospects

The labor-division between QR and choice function, or the different properties of UQs and EQs comes from the internal syntactic structures of them (cf. Watanabe (2006), Hiraiwa (2018))

(28) a. *dono heya mo*
every room

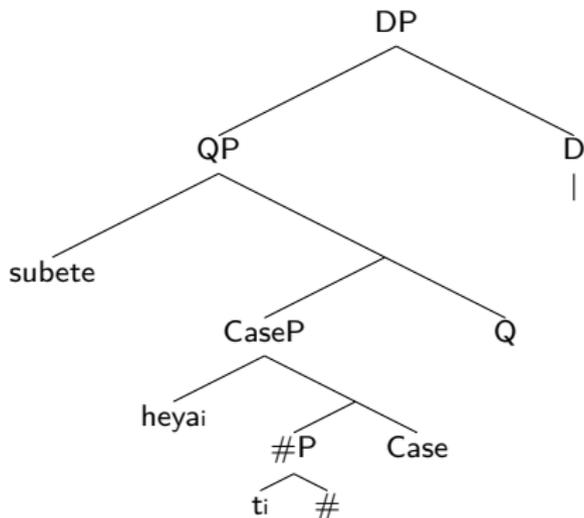
b.



The Syntax of Quantifiers in Japanese II

(29) a. *subete no heya*
 all of room

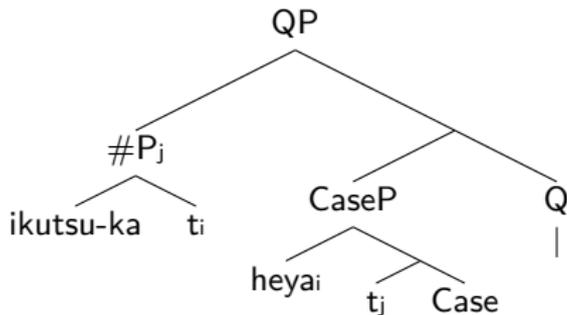
b.



The Syntax of Quantifiers in Japanese III

(30) a. *ikutsu-ka no heya*
 some-particle of room

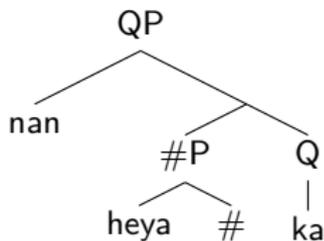
b.



The Syntax of Quantifiers in Japanese IV

- (31) a. *nan heya ka*
 which room particle

b.



- (32) a. *Taro-wa ikutsuka no heya *(-o) mawatta.*
 Taro-TOP some of room ACC visited
- b. *Taro-wa nan heya ka (-o) mawatta.*
 Taro-TOP which room particle ACC visited

The Syntax of Quantifiers in Japanese V

	universal quantifiers (GQ)	indefinite NPs
English	QR	CH
Japanese	QR (cf. Goro (2007))	CH (cf. Reinhart (1997))

Table: The prediction that previous studies made

- (33) a. Only maximal projection which has a Spec-head configuration contains a choice function.
 b. QR is applied to only the DP without any operators relevant to choice function.
- (34) a. [QP ikutsuka $\langle \langle e, t \rangle, e \rangle$ [CaseP heya $\langle e, t \rangle$] Q]
 b. [QP nan $\langle \langle e, t \rangle, e \rangle$ [CaseP heya $\langle e, t \rangle$] Q ka]

Summary

- (35) a. Japanese universal and existential quantifiers have distinct properties: their syntactic structure, sensitivity to clause-boundedness.
- b. Japanese universal quantifiers allow wide scope more easily than English ones (due to covert piped-piping movement).

Possible follow-up

- Testing the effects of internal syntactic structure of QP (e.g., subete-no NP vs. dono-NP-mo)

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