

The syntax and semantics of Japanese internally- and doubly-headed relatives

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(1)

a. **(Restrictive) IHRC (Internally-Headed Relative Clause)**

Junya-wa [[RC Ayaka-ga kukkii-o tsukut-ta]-no]-o tabe-ta.
Junya-TOP Ayaka-NOM cookie-ACC make-PAST-NL-ACC eat-PAST
'Ayaka made cookies_i and Junya ate them_i.'

b. **Restrictive DHRC (Doubly-Headed Relative Clause)**

Junya-wa [[RC Ayaka-ga kukkii-o tsukut-ta] *sono kukkii*]-o tabe-ta.
Junya-TOP Ayaka-NOM cookie-ACC make-PAST that cookie-ACC eat-PAST
'Ayaka made cookies_i and Junya ate those cookies_i.'

c. **Appositive DHRC**

Junya-wa [[RC Ayaka-ga kukkii-o tsukut-ta] *ano/kono kukkii*]-o tabe-ta.
Junya-TOP Ayaka-NOM cookie-ACC make-PAST that/this cookie-ACC eat-PAST
'Ayaka made cookies_i and Junya ate those/these cookies_i.'

Properties that distinguish IHRCs from DHRCs

Property 1: Integration

(2) IHRC (integrated)

Junya-wa [[_{RC} *dare-ga* *kukkii-o* *tsukut-ta*]-no]-o tabe-ta *no*.
Junya-TOP who-NOM cookie-ACC make-PAST-NL-ACC eat-PAST Q
'Who is such that (s)he made cookies and Junya ate them?'

(3) Restrictive DHRC (integrated)

Junya-wa [[_{RC} *dare-ga* *kukkii-o* *tsukut-ta*] *sono kukkii*]-o tabe-ta *no*
Junya-TOP who-NOM cookie-ACC make-PAST that cookie-ACC eat-PAST Q
'Who is such that (s)he made cookies and Junya ate those cookies?'

(4) **Appositive DHRC (not integrated)**

*Junya-wa [[_{RC} *dare-ga kukkii-o* tsukut-ta] *ano/kono kukkii*]-o tabe-ta *no*
Junya-TOP who-NOM cookie-ACC make-PAST that/this cookie-ACC eat-PAST Q

‘Who is such that (s)he made cookies and Junya ate those/these cookies?’

(Appositive DHRCs ignored below.)

Property 2: Necessary definiteness

Both IHRCs and DHRCs are necessarily definite.

a. **IHRC**

Junya-wa [[RC Ayaka-ga kukkii-o tsukut-ta]-no]-o tabe-ta.
Junya-TOP Ayaka-NOM cookie-ACC make-PAST-NL-ACC eat-PAST
'Ayaka made cookies_i and Junya ate **them_i**.'
(=Junya ate *all* of the cookies Ayaka made.)

b. **Restrictive DHRC**

Junya-wa [[RC Ayaka-ga kukkii-o tsukut-ta] *sono kukkii*]-o tabe-ta.
Junya-TOP Ayaka-NOM cookie-ACC make-PAST that cookie-ACC eat-PAST
'Ayaka made cookies_i and Junya ate that/those cookies_i.'
(=Junya ate *all* of the cookies Ayaka made.)

Property 3: Island (in)sensitivity

(7) **IHRCs are sensitive to islands**

a. *No island (Long Distance ok)*

Mary-wa [[John_i-ga [jibun_i-no gakusei-ga **juuyouna kasetu-o**
Mary-TOP John-NOM self-GEN student-NOM important hypothesis-ACC

teian-shi-ta to] jimanshite-ita]-no]-no kekkan]-o shiteki-shi-ta.
propose-do-PAST COMP boasted-had-NL-GEN defect-ACC point.out-do-PAST

‘[John had boasted [that his student proposed *an important hypothesis*]] and Mary pointed out a defect in *it*.’

b. *Complex NP island* (*)

*Mary-wa [[John-ga [[/e]_i atarashii kasetsu-o teianshi-ta] gakusei_i]-o
Mary-TOP John-NOM gap new hypothesis-ACC propose-PAST student-ACC
homete-ita]-no]-no kekkan]-o shiteki-shi-ta.
praise-had-NL-GEN defect-ACC point.out-do-PAST

'John praised [the student [who proposed *a new hypothesis*]] and Mary pointed out a defect in *it*.'

Also sensitive to:
Adverbial islands
Coordinate structures
Left branch islands

(8) DHRCs are insensitive to islands

a. Complex NP island (ok)

Mary-wa [[[John-ga [[/e]_i **atarashii kasetu-o** teianshi-ta] gakusei_i]-o
Mary-TOP John-NOM gap new hypothesis-ACC propose-PAST student-ACC
homete-ita] sono atarashii kasetu]-no kekkan]-o shiteki-shi-ta.
praise-had that new hypothesis-GEN defect-ACC point.out-do-PAST

‘John praised the student who proposed *a new hypothesis* and Mary pointed out a defect in *that new hypothesis*.’

Also insensitive to:

Adverbial islands

Coordinate structures

Left branch islands

Property 4: (In)sensitivity to Kuroda's (1975/76) Relevancy Condition

(9) Kuroda Relevancy Condition (KRC)

The eventualities denoted by the relative clause and its matrix need to be construable, *in context*, as parts of a single *natural* eventuality.

(From Landman (2016))

IHRCs are sensitive to the KRC.

DHRCs are not.

(10) **IHRCs are restricted by the KRC**

a. *Satisfies KRC (ok)*

[[Daidokoro-no mado-kara shiroi neko-ga haitteki-ta]-no]-ga
kitchen-GEN window-from white cat-NOM come.in-PAST-NL-NOM

ima sakana-o totte nige-ta.
now fish-ACC steal run.away-PAST

‘**A white cat** came in from the kitchen window and *it* now stole a fish and ran away.’

b. *Violates the KRC (?*)*

?*[[Daidokoro-no mado-kara shiroi neko-ga kinoo deteit-ta]-no]-ga
kitchen-GEN window-from white cat-NOM yesterday go.out-PAST-NL-NOM

ima sakana-o tabete-i-ru.
now fish-ACC eat-Prog-PRES

‘**A white cat** went out of the kitchen window yesterday and *it* is now eating a fish.’

(12) **DHRCs are *not* restricted by Kuroda Relevancy**

a. *Satisfies the KRC (ok)*

[[Daidokoro-no mado-kara **shiroi neko-ga** haitteki-ta] sono shiroi
kitchen-GEN window-from white cat-NOM come.in-PAST that white
neko]-ga ima sakana-o totte nige-ta.
cat-NOM now fish-ACC steal run.away-PAST

‘A **white cat** came in from the kitchen window and *that white cat* now stole a fish and ran away.’

b. *Violates the KRC (ok)*

[[Daidokoro-no mado-kara **shiroi neko-ga** kinoo deteit-ta] sono
kitchen-GEN window-from white cat-NOM yesterday go.out-PAST that
shiroi neko]-ga ima sakana-o tabete-i-ru.
white cat-NOM now fish-ACC eat-Prog-PRES

‘A white cat went out of the kitchen window yesterday, and *that white cat* is now eating a fish.’

Property 5: (im)possibility of having referential IHs

(13) IHRCs cannot have referential IHs

?* Ken-wa [[[Naomi-ga ofisu-ni {**Lucky-o/ sono haiiro-no neko-o**}
Ken-TOP Naomi-NOM office-DAT Lucky-ACC/that grey-GEN cat-ACC
tsureteki-ta]-no] ke]-o kat-ta.
bring-PAST-NL-GEN hair-ACC cut-PAST

‘Naomi brought {**Lucky / that gray cat**} to the office and Ken cut **her** hair.’

(14) DHRCs can have referential IHs

Ken-wa [[[Naomi-ga ofisu-ni {**Lucky-o/ kono haiiro-no neko-o**}
Ken-TOP Naomi-NOM office-DAT Lucky-ACC this grey-GEN cat-ACC
tsureteki-ta] *sono* {**Lucky/ kono haiiro-no neko**}]-no ke]-o kat-ta.
bring-PAST that Lucky this grey-GEN cat-GEN hair-ACC cut-PAST

‘Naomi brought {**Lucky, this grey cat**} to the office and Ken cut *that* {*Lucky’s/ this grey cat’s*} hair.’

Analysis of IHRCs:

Prior analysis: Landman (2016)

(15) **IHRC structure:** σ [_{CP} Op_n [_{C'} [... [_{XP₁} [_{PP} t_n P] [_{XP₂} ... IH ...]] ...]]]

Op_n moves from t_n. Interpretation: $\lambda x_n. \dots x_n \dots$ (Accounts for island effects.)

P assigns a second occurrence of a thematic role π assigned within XP and identifies the bearer of π with x_n. (Accounts for headedness of IHRC.)

P encodes KRC effects. (Relates KRC to the event denoted by sister of PP.)

σ turns the property-denoting CP into a referring expression. ($\sigma(P)$ is the sum of the elements in P. Presupposition: that sum itself is in P.)

Illustration (minus KRC effects):

(18) σ [_{CP} Op_n [_{C'} ... [_{VP₁} [_{PP} t_n P] [_{VP₂} Ayaka-ga kukkii-o tsukut]]-ta]]

(= [_{IHRC} Ayaka made **cookies**]).

σ ($\lambda x_n. \exists e$ [make(e) & Ag(e)=Ayaka & cookies(Th(e)) & **Th(e)=x_n**])

This denotes the maximal plural individual that is cookies that Ayaka made.

KRC Effects under Landman:

P introduces a contextually identified Kuroda Relevancy function \mathbf{k} , where for all e, e' , $\mathbf{k}(e)=e'$ iff e, e' satisfy the KRC.

In $\mathbf{k}(e)=e'$, e is the event that P thematically relates to.

\mathbf{k} and e' are free variables whose values are contextually determined.

Identifying e' with the event variable of the matrix event predicate establishes the desired connection between the IHRC event and the matrix event.

Problems for Landman:

Problem 1: Landman's analysis misidentifies the **IHRC-external event** e' that has to satisfy the KRC: e' is bindable by any event predicate that c-commands the IHRC. However, accounting for observations requires restriction to only the most local such binding.

(24) [3-part explanation: (a)-(c)]

a. **IHRC that fails to satisfy KRC**

#_{[e₁[e₂Ayaka-ga kukkii-o tsukut-ta-no]-ga choko-chippu kukkii-de aru]}
Ayaka-NOM cookies-ACC make-PAST-NL-NOM chocolate-chip cookies-COP

Intended: 'Ayaka made cookies, and they are chocolate chip cookies.'

There is no Kuroda Relevancy function \mathbf{k} such that $\mathbf{k}(e_2) = e_1$.

b. IHRC that satisfies KRC

[_{e₃} Junya-wa [_{e₂} Ayaka-ga kukkii-o tsukut-ta-no]-o tanoshin-da]
Junya-TOP Ayaka-NOM cookies-ACC make-PAST-NL-ACC enjoy-PAST

‘Ayaka made cookies, and Junya enjoyed them.’

There is a Kuroda Relevancy function \mathbf{k}' such that $\mathbf{k}'(e_2) = e_3$.

Ayaka making cookies and Junya enjoying them constitutes a single natural eventuality.

c. **Embedding (a) into e_2 from (b) fails to salvage it**

#<sub>[e_3 Junya-wa [[<sub>[e_1 [<sub>[e_2 Ayaka-ga kukkii-o tsukut-ta-no]]-ga choko-chippu
Junya-TOP Ayaka-NOM cookies-ACC make-PAST-NL-NOM chocolate-chip
kukkii-de aru] *oyatsu*]-o tanoshin-da]
cookies-COP snack-ACC enjoy-PAST</sub></sub></sub>

Intended: ‘Ayaka made cookies, and they are chocolate chip cookies; Junya enjoyed the snack.’

There is a Kuroda Relevancy function \mathbf{k}' such that $\mathbf{k}'(e_2) = e_3$.

Ayaka making cookies and Junya enjoying the snack constitutes a single natural eventuality.

Still, the sentence is unacceptable.

Problem 2 for Landman: the analysis makes incorrect predictions about which **IHRC-internal event** needs to satisfy the KRC when the IH is embedded.

For Landman, the KRC is imposed by P:

$$[_{CP} Op_n [C' [A \dots [XP_1 [PP t_n P] [XP_2 \dots IH \dots]]] \dots]]$$

Prediction: in $k(e) = e'$, e should be the event of the event predicate that assigns IH a thematic role (= XP_2 above).

Observation: The IHRC-internal event that has to satisfy the KRC is that of the highest event predicate in the IHRC. (= A above)

[2-part explanation: (a)-(b)]

(23) *Misidentification of IHRC-internal event that must satisfy KRC*

a. *IH non-embedded, KRC satisfied*

[_{e₁} Junya-wa [_{e₂} Ayaka-ga kesa kukkii-o tsukut-ta-no]-o
Junya-TOP Ayaka-NOM this-morning cookies-ACC make-PAST-NL-ACC

sudeni tabeteshimat-ta]
already eat.up-PAST

‘Ayaka made cookies this morning, but Junya already ate them up.’

There is a Kuroda Relevance function **k** such that **k**(*e*₂) = *e*₁: Ayaka making cookies and Junya having already eaten them constitutes a single natural event.

b. *IH embedded, KRC not satisfied*

$[_{e_1}$ Junya-wa $[_{e_3}$ Taro-ga $[_{e_2}$ Ayaka-ga kesa **kukkii-o**
Junya-TOP Taro-NOM Ayaka-NOM this-morning cookies-ACC

tsukut-ta-to] (kore-kara) houkoku-su-ru-no]-o sudeni tabeteshimat-ta]
make-PAST-COMP (this-after) announce-do-PRES-NL-ACC already eat.up-PAST

‘Taro will announce (after this) that Ayaka made cookies this morning, but Junya already ate them up.’

There is a Kuroda Relevance function **k** such that $\mathbf{k}(e_2) = e_1$: Ayaka making cookies and Junya having already eaten them constitutes a single natural event. This fails to render the sentence acceptable, though.

There is no Kuroda Relevance function **k'** such that $\mathbf{k}'(e_3) = e_1$: Taro’s future announcement that Ayaka made cookies and Junya’s having already eaten them do not constitute a single natural event.

Proposal, Part 1: IHRC syntax

Overall idea:

I: Redistribute the pieces used to interpret IHRCs

	Landman	Us
P	KRC effects thematic role doubling	thematic role doubling ($P \rightarrow \theta$)
Op	predicate abstraction	[movement triggers predicate abstraction] KRC effects definiteness (from σ)
σ	independent operator	incorporated into Op

II: Derive impossibility of a referential IH in IHRCs from the theta-criterion.

Thematic roles are assigned outside the event predicate (following Chompollion):

[argument [θ [event predicate]]]

(θ replaces Landman's P as a thematic role assigner. This is how ALL thematic roles are assigned.)

(25) IHRC: $__$ [_{CP} Op n [_{C'} [... [_{X₁} t_n [θ [_{X₂} ... IH ...]]] ...]]]-no

Op raises to SpecCP, where it takes two arguments:

- (i) (the predicate abstraction of) its C' sister,
- (ii) an IHRC-external expression (typically a projection of the matrix V combined with a thematic role assigner, not shown).

Op imposes Kuroda Relevance on the main events contributed by its two arguments.

Two types of thematic roles:

Restricting thematic roles introduce indefinites (e.g. Th_r)

Identifying thematic roles introduce definites (e.g. Ag_i)

Interpretation of [*cookies* [*Th_r* [*make*]]]:

$\lambda f_{vt}. \exists e [\text{make}(e) \ \& \ \mathbf{cookies}(\text{Th}(e)) \ \& \ f(e)]$

(*cookies* gives a **property** of the theme but does not identify the theme)

Interpretation of [*Ayaka* [*Ag_i* [*cookies* [*Th_r* [*make*]]]]]:

$\lambda f_{vt}. \exists e [\text{make}(e) \ \& \ \mathbf{Ag}(e)=\mathbf{ayaka} \ \& \ \text{cookies}(\text{Th}(e)) \ \& \ f(e)]$

(*ayaka* **identifies** the agent)

Proposal Part 2: IHRC Semantics

(30) *IHRC-internal structure*

[_{CP} Op [_Z 1 [_{C'}... [**t**_i [**Th**_i [_{TP} *Ayaka-ga kukkii-o tsukut-ta*]]]]]]]

$[[Z]] = \lambda x_e. \lambda f_{vt}. \exists e [\text{make}(e) \ \& \ \underline{\text{cookies}(\text{Th}(e))} \ \& \ \text{Ag}(e)=\text{ayaka} \ \& \ \underline{\text{Th}(e)=x} \ \& \ f(e)]$

$[[Op]]$ relates $[[Z]]$ to an external expression.

θ -criterion:

An event domain can contain at most one identifying thematic role and one restricting thematic role of the same kind.

Consequence: Since the trace of *Op* is of type *e*, the associated thematic role has to be identifying. The θ -criterion then prohibits the overt IH from receiving an identifying thematic role.

This accounts for the impossibility of referential IHs in IHRCs.

(32) *IHRC-external structure:*

[IHRC [θ_i H*]]

IHRC is the main semantic function of the structure in (32).

Op is the semantic head of IHRC.

Op imposes Kuroda Relevance on the main RC and H* events.

Formal analysis:

(33) **Kuroda Relevance relation (KR):**

KR(e, e') is true iff e and e' are parts of a single natural eventuality.

[IHRC [θ_i H*]] = [[_{CP} *Op* [x 1 [c' ...]]] [θ_i H*]]

[[*Op*]] = $\lambda P_{\langle e, \langle vt, t \rangle \rangle} \cdot \lambda Q_{\langle e, \langle vt, t \rangle \rangle} \cdot \lambda f_{vt}$.

$\exists e_1, e_2 [Q (\sigma(\lambda x_e. P(x)(\lambda e_v. e=e_1) \& KR(e_1, e_2))) (\lambda e_v. e=e_2 \& f(e))]$

(The *P* argument is X and the *Q* argument is [θ_i H*].)

$$\begin{aligned} \llbracket Op \rrbracket &= \lambda P_{\langle e, \langle vt, t \rangle \rangle}. \lambda Q_{\langle e, \langle vt, t \rangle \rangle}. \lambda f_{vt}. \\ &\quad \exists e_1, e_2 [Q (\sigma(\lambda x_e. P(x)(\lambda e_v. e=e_1) \& KR(e_1, e_2))) (\lambda e_v. e=e_2 \& f(e))] \end{aligned}$$

Landman's σ -operator makes the argument of Q definite. This argument can be thought of as the intuitive reference of the IHRC.

Note 1: Kuroda Relevance is a presupposition: σ only generates a reference when the KR relation is satisfied by the pair of events it operates on.

Note 2: The IHRC-internal event required to stand in the KR relation is the main event of the P argument, i.e. the highest event internal to the IHRC.

Note 3: The IHRC-external event required to stand in the KR relation is the main event of the Q argument, i.e. the event of the predicate intuitively selecting the IHRC as argument.

Illustration

- (36) Junya-wa [Ayaka-ga kukkii-o tsukut-ta-no]-o tabe-ta.
Junya-TOP Ayaka-NOM cookies-ACC make-PAST-NL-ACC eat-PAST
'Ayaka made cookies, and Junya ate them.'

$$= \exists e_1, e_2 [\exists e' [\text{eat}(e') \ \& \\ \text{Th}(e') = \sigma(\lambda x_e. \exists e [\text{make}(e) \ \& \ \text{cookies}(\text{Th}(e)) \ \& \ \text{Ag}(e) = \text{ayaka} \\ \ \& \ \text{Th}(e) = x \ \& \ e = e_1] \ \& \ \text{KR}(e_1, e_2)) \ \& \\ e' = e_2 \ \& \ \text{Ag}(e') = \text{junya}]]$$

This is true iff there are two events, e_1 and e_2 , such that e_1 is a making of cookies by Ayaka, and e_2 is an eating by Junya of the cookies involved in e_1 , on the presupposition that e_1 and e_2 satisfy Kuroda Relevance.

Explanations

Integration: IHRC constructions are functionally composed and so constitute a single illocutionary unit.

Necessary Definiteness: from σ operator in the interpretation of *Op*.

Island sensitivity: *Op* is generated as sister to a thematicized event quantifier whose main event is thematically related to IH, and raises to SpecCP of the IHRC.

KRC effects: requirement that two events in the semantics of *Op* satisfy the KR relation. The identity of the KR-related events is fixed semantically by the arguments of *Op*. (Overcomes problems for Landman)

Ban on referential IHs: *Op* requires an identifying thematic role, adding a conjunct of the form $\theta(e)=x$ to an event quantifier. The θ -criterion blocks this when the event quantifier already has a conjunct of that form.

DHRCs

- (52) [[[Ayaka-ga **kukkii-o** tsukut-ta] [so-no *kukkii*]]
 Ayaka-NOM cookies-ACC make-PAST so-GEN cookies
 ‘Ayaka made cookies: those cookies’

Examined above:

Property 1: Integrated and non-integrated versions

Property 2: Necessarily definite

Property 3: Island insensitive

Property 4: No KRC effects

Property 5: IH can be referential

(Property 2 is shared with IHRCs, but the others are not.)

Additional properties of DHRCs:

Property 6: DHRCs with externally anaphoric EH are non-integrated

(43) *Referential ambiguity with quantificational IH*

[Context: Ayaka-ga kukkii-o 20-mai tsukut-ta.]
Ayaka-NOM cookies-ACC 20-CL make-PAST
'Ayaka made 20 cookies.'

Junya-wa [[Yoko-ga kore-kara **hotondo-no kukkii-o** reezooko-ni
Junya-TOP Yoko-NOM this-after almost-all-GEN cookies-ACC fridge-DAT

ire-ru] *sono kukkii*]-o zenbu paatii-ni motteik-u tsumori da.
put-in-PRES those cookies-ACC all party-DAT bring-PRES intention COP

'After this, Yoko will put most of the cookies into the fridge, and Junya intends to bring those cookies to the party.'

Reading 1: all 20 cookies

Reading 2: all the cookies placed in the fridge

(45) *Reading 2 is integrated; Reading 1 is not.*

[Context: Ayaka-ga kukkii-o 20-mai tsukut-ta.]
Ayaka-NOM cookies-ACC 20-CL make-PAST
Ayaka made 20 cookies.

Junya-wa [[**dare-ga** kore-kara hotondo-no kukkii-o reezooko-ni
Junya-TOP who-NOM this-after almost-all-GEN cookies-ACC fridge-DAT

ire-ru] *sono kukkii*]-o zenbu paatii-ni motteik-u tsumori na **no?**
put-in-PRES those cookies-ACC all party-DAT bring-PRES intention COP Q

‘After this, who will put most of the cookies into the fridge such that Junya will bring those cookies to the party?’

Reading 1 (all 20 cookies): unavailable

Reading 2 (all the cookies placed in the fridge): ok

Property 7: Pseudo-DHRCs can lack an overt IH

(46) *Pseudo-DHRC*

Junya-wa [[sakana-ga yake-ta] *sono nioi*]-ga kininat-ta.

Junya-TOP fish-NOM get-broiled-PAST that smell-NOM worry.about-PAST

‘A fish got broiled, and Junya worried about that smell.’

Property 8: IH and EH can be mismatched

(47) *Adverb vs. Noun*

Junya-wa [[Ayaka-ga **tegiwayoku** kukkii-o tsukut-ta] *sono tegiwayosa*]-o
Junya-TOP Ayaka-NOM with-finesse cookie-ACC make-PAST that finesse-ACC

home-ta.

praise-PAST

‘Ayaka made cookies with finesse, and Junya praised that finesse.’

(48) *Sub-kind vs. Super-kind*

Junya-wa [[John-ga **san-ko-no** **nashi-o** kat-te Mary-ga **ni-ko-no**
Junya-TOP John-NOM three-CL-GEN pear-ACC buy-and Mary-NOM two-CL-GEN

ringo-o kat-ta] *sono kudamono*]-o tabe-ta.
apple-ACC buy-PAST that fruit-ACC eat-PAST

‘John bought three pears and Mary bought two apples and Junya ate that fruit (= the 3 pears and the 2 apples).’

Conclusion: The EH of a DHRC is not a simple syntactic copy of the IH.

Restrictive DHRC Analysis: Assumptions

DHRCs have an overt E(xternal)H(ead). (Like EHRCs but unlike IHRCs)

The denotation of a restrictive DHRC is recovered from an event. (Like E-type anaphora, unlike EHRCs and IHRCs)

The event from which a restrictive DHRC recovers its reference lies in its RC. (Unlike E-type anaphora)

The EH of a restrictive DHRC has to be a *so*-expression:

sono NP (*that NP*), *sore* (*that*), *sorera* (*those*), *soitsu* (*that guy*),
soitsura (*those guys*), *soko* (*there*), *sou* (*that way*), *socchi* (*there*),
sochira (*there*), *sonna* (*that kind of*)

Structure: [DHRC RC [*sono NP*]]

DHRC semantics

The RC of a DHRC is a normal clause, of type $\langle vt, t \rangle$.

(51) *Interpretation of DHRC* so:

$\llbracket so- \rrbracket = \lambda N_{et}. \lambda V_{\langle vt, t \rangle}. \sigma(\lambda x_e. N(x) \ \& \ \exists e' [V(\lambda e_v. e=e') \ \& \ x \text{ is a participant of } e'])$

N: from the NP in *sono NP*

V: from the RC in $[_{DHRC RC} [_{sono NP}]]$

$[_{DHRC RC} [_{sono NP}]]$ refers to the maximal individual x in the NP denotation that participates in the main RC event.

Assumptions:

no in *sono* is semantically vacuous.

so is ambiguous between DHRC *so* and simple *so*.

With simple *so*, *sono NP* is referential, and any RC preceding *sono NP* can only be appositive. (Parallel to *ano/kono*. Analysis not given here.)

If x is directly or indirectly thematically related to e, x is a **participant** of e.

$\llbracket so- \rrbracket = \lambda N_{et}. \lambda V_{\langle vt, t \rangle}. \sigma(\lambda x_e. N(x) \ \& \ \exists e' [V(\lambda e_v. e=e') \ \& \ x \text{ is a participant of } e'])$

(52) $\llbracket \llbracket \llbracket \text{Ayaka-ga} \quad \mathbf{kukkii-o} \quad \text{tsukut-ta} \rrbracket \llbracket so-no \quad \text{kukkii} \rrbracket \rrbracket$
Ayaka-NOM cookies-ACC make-PAST so-GEN cookies
'Ayaka made cookies: those cookies'

$\llbracket \llbracket \llbracket \text{Ayaka-ga} \quad \text{kukkii-o} \quad \text{tsukut-ta} \rrbracket \llbracket so-no \quad \text{kukkii} \rrbracket \rrbracket$
 $= \sigma(\lambda x_e. \text{cookies}(x) \ \& \ \exists e [\text{make}(e) \ \& \ \text{cookies}(\text{Th}(e)) \ \& \ \text{Ag}(e)=\text{ayaka}$
 $\ \& \ x \text{ is a participant of } e])$

= the sum of cookies that are participants in an event of Ayaka making cookies

Explanations

1: *Integration:*

Restrictive DHRCs use *DHRC so* and are functionally composed, so they constitute a single illocutionary unit.

Appositive DHRCs use simple *so*, *a* or *ko*. *sono/ano/kono NP*, of type *e*, cannot functionally compose with a relative clause, of type $\langle vt, t \rangle$, leaving the RC non-integrated.

(Below, we only consider restrictive DHRCs.)

2: *Necessary Definiteness:*

Follows from inclusion of Landman's σ -operator in the interpretation of *so*.

3: *Island insensitivity:*

The EH is related to the IH via the *participation* relation. This relation is transitive: if *x* participates in *e* and *e* participates in *e'*, then *x* participates in *e'*. The connection between *x* and the events *x* participates in is independent of movement.

4: *Lack of KRC effects:*

Unlike *Op*, *so* does not incorporate KR into its semantics.

5: *Possibility of referential IHs:*

so only relates to individuals that are independently part of the semantics of the RC. It does not add any new thematic relations, so use of *so* does not create θ -criterion violations regardless of whether the IH is referential.

6: *DHRCs with externally anaphoric EH are non-integrated*

These use simple *so*, not DHRS *so*. (See 1)

7: *Pseudo-DHRCs can lack an overt IH*

Not all event participants need to be overtly identified within the RC. E.g. if an event of cooking causes an odor to be produced, that odor is a participant of the cooking event.

8: *IH and EH can be mismatched*

RC sono kudamono (that fruit) refers to all of the fruit participants in the RC, regardless of how they are specified.

$$(55) \quad \llbracket \textit{hotondo} \rrbracket \\ = \lambda N_{et}. \lambda \theta_{\langle e, \langle \langle vt, t \rangle, \langle vt, t \rangle \rangle \rangle}. \lambda P_{\langle vt, t \rangle}. \lambda f_{vt}. \exists z [z \sqsubseteq D \ \& \ N(z) \ \& \ |z| \gg |D-z| \ \& \ \theta(z)(P)(f)]$$

(56) *Integrated DHRC interpretation*

$\llbracket \textit{Yoko-ga kore-kara hotondo-no kukkii-o reezooko-ni ire-ru so-no kukkii} \rrbracket$

$$= \sigma(\lambda x_e. \text{cookies}(x) \ \& \ \exists e' [\exists z [\text{cookies}(D) \ \& \ z \sqsubseteq D \ \& \ |z| \gg |D-z| \ \& \ \text{put}(e') \ \& \ \text{Ag}(e')=yoko \ \& \ \text{Th}(e')=z \ \& \ \text{Goal}(e')=\text{the.fridge}] \ \& \ x \text{ is a participant of } e'])$$

This denotes the cookies that are participants of some event of Yoko putting cookies into the fridge.

A witness for z is directly thematically related to e' in the final line, making that witness a participant of e' .

D , the domain of cookies, only serves to place restrictions on z . It is not thematically related to e' either directly or indirectly and does not count as an independent participant of e' in any other way.

Conclusion

IHRCs:

- [i] Syntactically, IHRCs are CPs without a null EH.
- [ii] Kuroda Relevancy targets only eventualities expressed by hierarchically adjacent constituents: the main event of the IHRC itself, and that of the predicate that selects it.
- [iii] Based on an independent mechanism of thematic role assignment and a stipulated *Op*.
- [iv] Island sensitivity is accounted for by the raising of a Null Operator (*Op*).
- [v] The semantics of *Op* accounts for
 - integration
 - necessary definiteness
 - KRC only restricting hierarchically adjacent eventualities
 - Lack of referring IHs (blocked by the θ -criterion)

DHRCs:

- [i] Syntactically, DHRCs are NPs with an overt EH headed by DHRC *so*.
- [ii] EH is related to IH through the (pragmatic) *participant* relation.
- [iii] The semantics of DHRC *so* accounts for
 - integration
 - necessary definiteness
 - lack of island effects
 - lack of KRC effects
 - lack of restrictions on IH
 - existence of Pseudo-DHRCs
 - possible mismatch between EH and IH

Thank you!

Change IHRCs

- (57) Bill-wa [[Mary-ga ringo-o shibottekure-ta]-no]-o non-da.
Bill-TOP Mary-NOM apple-ACC squeeze-PAST-NL-ACC drink-da
'Mary squeezed apples and Mary drank (the resulting juice).'

Op does not double up an already assigned thematic role.

Op relates to a separate thematic role, the role introduced by *juusu-ni* in:

Mary-ga ringo-o juusu-ni shibottekure-ta
Mary-NOM apple-ACC juice-DAT squeeze-PAST
'Mary squeezed an apple into juice.'

(39)

- a. # [Ayaka-ga kukkii-o tsukut-ta-no]-ga chokochippu kukkii da.
Ayaka-NOM cookies-ACC make-PAST-NL-NOM chocolate.chip cookie COP
'Ayaka made cookies, and they are chocolate chip cookies.'
- b. [[Ayaka-ga kukkii-o tsukut-ta-no]-no shurui]-ga chokochippu
Ayaka-NOM cookies-ACC make-PAST-NL-GEN kind-NOM chocolate-GEN
kukkii da.
cookie COP
'Ayaka made cookies, and their kind is chocolate chip cookies.'
- c. [[Ayaka-ga [e] tsukut-ta] kukkii]-ga chokochippu kukkii da.
Ayaka-NOM *gap* make-PAST cookies-NOM chocolate-GEN cookie COP
'The cookies Ayaka made are chocolate chip cookies.'

*embedded IHRCs with IHs in the same clause:

*Junya-wa [[[Ayaka-ga [[[kodomo-ga kukkii-o oishisoo-ni
Junya-nom Ayaka-nom child-nom cookie-acc delicious-lookingly

tabe-ta]-no]-no egao]-ni totemo kandoosi-ta]-no]-no aji]-o
eat-past-nl-gen smile-dat very be-touched-past-nl-gen taste-acc

well remember-pres
yoku oboetei-ru.

Intended: 'Their child deliciously ate some cookies, and Ayaka was touched by his/her smile, and Junya well remembers their taste.'

ok: embedded DHRCs with IHs in the same clause:

Junya-wa [[Ayaka-ga [[**kodomo-ga kukkii-o** oishisoo-ni
Junya-nom Ayaka-nom child-nom cookie-acc delicious-lookingly
tabe-ta] **sono kodomo**]-no egao]-ni totemo kandoosi-ta] **sono**
eat-past that cookie-gen smile-dat very be.touched-past that
kukkii]-no aji]-o well remember-pres
cookie-gen taste-acc yoku oboetei-ru.

'Their child deliciously ate some cookies, and Ayaka was touched by his/her smile, and Junya well remembers their taste.'

ok: DHRC and IHRC with the same IH:

[Junya-ga [[RC Ayaka-ga kukkii-o tsukut-ta]-no-no hanbun]-o tabe-ta
Junya-nom Ayaka-nom cookie-acc make-past-nl-gen half-acc eat-past

sono kukkii]-ga 20-mai-no chokochippu kukkii dat-ta
that cookie-nom 20-cl-gen chocolate.chip cookie cop-past

‘Ayaka made cookies_i and Junya ate half of them_i, and those cookies were 20 chocolate chip cookies.’

True in both Situations 1 and 2:

Situation 1: Ayaka made 20 cookies, and Junya ate 10 of them.
(IH for DHRC = IH for IHRC.)

Situation 2: Ayaka made 40 cookies, and Junya ate 20 of them.
(IH for DHRC = IHRC)

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