

Applying Various Theories of Exhaustification to the Analysis of Restatements

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Restatements: The term

Mann and Thompson (1988, p. 277):

- (1) A well-groomed car reflects its owner.
The car you drive says a lot about you.

Restatement—rhetorical relation
i.e. Restatement—theoretical construct

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Structure

- Restatements
- Groenendijk and Stokhof
- Van Rooy and Schulz

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Restatements: The term

My usage of the term

S restatements:

A pair of sentences whose main eventualities corefer.
(cf. Danlos' (1999) *Generalization* and *Particularization* relations)

- (2) a. Alena broke her ski.
b. She lost her only means of transportation.
- (3) a. Alena was cooking raspberry jam.
b. She was fulfilling Marina's assignment.

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Restatements: The term

My usage of the term

NP restatements:

A pair of coreferent NPs, functioning as elliptic statements in the context of a question.

(4) Who snores?

(5) a. A linguist.

b. Mary.

Restatement—a phenomenon

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Restatements: NP vs. S

Coreference effect with falling statement intonation

NP restatements:

(6) Who snores?

(7) a. A linguist ↘

b. Mary ↘

S restatements:

(8) What happened?

(9) a. Alena broke her ski ↘

b. She lost her only means of transportation ↘

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Structure

- Restatements
 - The term “Restatement”
 - **Common properties of S and NP restatements:**
 - * Coreference effect with falling statement intonation
 - * No coreference effect with conjunction *and*, or rising list intonation
 - * Inconsistency/Infelicity with incompatible descriptions
 - Analysis in terms of Exhaustification
- Groenendijk and Stokhof
- Van Rooy and Schulz

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Restatements: NP vs. S

No coreference effect with conjunction *and* or rising list intonation

NP restatements:

(10) Who snores?

(11) a. A linguist (↗) and Mary (↘).

b. A linguist (↗), Mary (↗), ...

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Restatements: NP vs. S

No coreference effect with conjunction *and* or rising list intonation

S restatements:

(12) What happened?

(13) a. Alena broke her ski (↗)
and she lost her only means of transportation (↘) .

b. Alena broke her ski (↗) ,
she lost her only means of transportation (↗) , ...

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Restatements: NP vs. S

Infelicity with incompatible descriptions: NP restatements

(17) Who snores?

(18) a. # Three linguists. John and Mary.

b. Three linguists. Two phonologists.

(19) a. # Two linguists. John.

b. # Two linguists. A phonologist.

c. Two linguists. One phonologist.

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Restatements: NP vs. S

Infelicity with incompatible descriptions: NP restatements

(14) Who snores?

(15) a. # A child. An adult.

b. # My brother. Mary.

c. # Three linguists. Mary and John.

(16) a. A child and an adult.

b. My brother and Mary.

c. Three linguists, Mary and John.

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Restatements: NP vs. S

Infelicity with incompatible descriptions: S restatements

(20) What did Mary do?

(21) a. # Mary praised John. She criticized him.

b. Mary praised John and (then) she criticized him.

Examples from Asher and Lascarides (2003, pp. 181-183, 199-204):

(22) What did Kim do today?

(23) a. ? Kim watched TV. She studied.

b. Kim watched TV. She studied. Then she went out.

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Structure

- Restatements
 - The term “Restatement”
 - Common properties of S and NP restatements
 - **Analysis in terms of Exhaustification**
- Groenendijk and Stokhof
- Van Rooy and Schulz

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Structure

- Restatements
- **Groenendijk and Stokhof**
 - The basic setting
 - Atomic individuals (singular NP restatements)
 - Complex individuals (plural NP restatements)
 - Events (S restatements)
- Van Rooy and Schulz

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Restatements: Analysis in terms of Exhaustification

Bare juxtaposition of answers with falling intonation:

(24) $\mathcal{A}_1 (\searrow). \mathcal{A}_2 (\searrow).$

(25) $\text{EXH}(\mathcal{A}_1) \wedge \text{EXH}(\mathcal{A}_2)$

Conjoined answers with rising intonation:

(26) $\mathcal{A}_1 (\nearrow)$ and $\mathcal{A}_2 (\searrow).$

(27) $\text{EXH}(\mathcal{A}_1 \wedge \mathcal{A}_2)$

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Groenendijk and Stokhof: The basic setting

(28) a. Who P ?

b. \mathcal{A} . (e.g. Mary.)

(29) $[\text{EXH}_{GS}(\mathcal{A})](P)$

(30) a. Who snores?

b. Which linguist snores?

c. Mary.

(31) a. $[\text{EXH}_{GS}(\| \text{Mary} \|)](\| \text{Who snores?} \|)$

b. $[\text{EXH}_{GS}(\| \text{Mary} \|)](\| \text{Which linguist snores?} \|)$

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Groenendijk and Stokhof: The basic setting

(32) Relational interpretation of questions:

$$\|\text{Who snores?}\| = \lambda x[\textit{snore}(x)]$$

(33) Definition of Exhaustification:

$$\text{EXH} = \lambda A \lambda P [\mathcal{A}(P) \wedge \neg \exists P' [\mathcal{A}(P') \wedge P \neq P' \wedge \forall x [P'(x) \rightarrow P(x)]]]$$

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Groenendijk and Stokhof: Atomic individuals

(34) a. Mary.

b. $\|\text{Mary}\| = \lambda P [P(m)]$

c. $\text{EXH}_{GS}(\|\text{Mary}\|) = \lambda P \forall x [P(x) \leftrightarrow x = m]$

d. $[\text{EXH}_{GS}(\|\text{Mary}\|)](\|\text{Who snores?}\|) = \forall x [\textit{snore}(x) \leftrightarrow x = m]$

$$D = \{j, m, b, j \oplus m, j \oplus b, m \oplus b, j \oplus m \oplus b\}$$

(35) a. $\|\text{Mary}\| =$

$$\{\{m\}, \{m, j\}, \{m, b\}, \dots,$$

$$\{j, m, b, j \oplus m, j \oplus b, m \oplus b, j \oplus m \oplus b\}\}$$

b. $\text{EXH}_{GS}(\|\text{Mary}\|) = \{\{m\}\}$

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Structure

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- Groenendijk and Stokhof
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- Van Rooy and Schulz

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Groenendijk and Stokhof: Atomic individuals

(36) a. A linguist.

b. $\|\text{A linguist}\| = \lambda P \exists x [\textit{linguist}(x) \wedge P(x)]$

c. $\text{EXH}_{GS}(\|\text{A linguist}\|) = \lambda P \exists x [\textit{linguist}(x) \wedge \forall y [P(y) \leftrightarrow x = y]]$

d. $[\text{EXH}_{GS}(\|\text{A linguist}\|)](\|\text{Who snores?}\|) = \exists x [\textit{linguist}(x) \wedge \forall y [\textit{snore}(y) \leftrightarrow x = y]]$

(37) a. $\textit{linguist} = \{j, m\}$

b. $\|\text{A linguist}\| = \{\{j\}, \{m\}, \{m, j\}, \{m, b\}, \dots,$
 $\{j, m, b, j \oplus m, j \oplus b, m \oplus b, j \oplus m \oplus b\}\}$

c. $\text{EXH}_{GS}(\|\text{A linguist}\|) = \{\{j\}, \{m\}\}$

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Groenendijk and Stokhof: Atomic individuals

(38) Who snores?

(39) A linguist. Mary.

(40) $[EXH_{GS}(\|A\ linguist\|)](\|Who\ snores?\|) \wedge [EXH_{GS}(\|Mary\|)](\|Who\ snores?\|)$

(41) $\exists x[linguist(x) \wedge \forall y[snore(y) \leftrightarrow x = y]] \wedge \forall z[snore(z) \leftrightarrow z = m]$

(42) $linguist(m) \wedge \forall y[snore(y) \leftrightarrow y = m]$

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Groenendijk and Stokhof: Atomic individuals

(48) Who snores?

(49) # A child. An adult.

(50) $[EXH_{GS}(\|A\ child\|)](\|Who\ snores?\|) \wedge [EXH_{GS}(\|An\ adult\|)](\|Who\ snores?\|)$

(51) $\exists x[child(x) \wedge \forall x'[snore(x') \leftrightarrow x = x']] \wedge \exists y[adult(y) \wedge \forall y'[snore(y') \leftrightarrow y = y']]$

(52) $\exists x[child(x) \wedge adult(x) \wedge \forall x'[snore(x') \leftrightarrow x = x']]$

But this is contradictory since $\forall x[child(x) \rightarrow \neg adult(x)] !!!$

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Groenendijk and Stokhof: Atomic individuals

(43) Who snores?

(44) A child. A girl.

(45) $[EXH_{GS}(\|A\ child\|)](\|Who\ snores?\|) \wedge [EXH_{GS}(\|A\ girl\|)](\|Who\ snores?\|)$

(46) $\exists x[child(x) \wedge \forall x'[snore(x') \leftrightarrow x = x']] \wedge \exists y[girl(y) \wedge \forall y'[snore(y') \leftrightarrow y = y']]$

(47) $\exists x[child(x) \wedge girl(x) \wedge \forall x'[snore(x') \leftrightarrow x = x']]$

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- Van Rooy and Schulz

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Groenendijk and Stokhof: Complex individuals

A well known problem: Complex individuals in distributive contexts.

(53) a. John and Mary.

b. $\|John\ \text{and}\ Mary\| = \lambda P[P(j \oplus m)]$

c. $EXH_{GS}(\|John\ \text{and}\ Mary\|) = \lambda P \forall x[P(x) \leftrightarrow [x = j \oplus m]]$

d. $[EXH_{GS}(\|John\ \text{and}\ Mary\|)](\|Who\ snores?\|) = \forall x[snore(x) \leftrightarrow [x = j \oplus m]]$

(54) a. $\|John\ \text{and}\ Mary\| =$

$$\{\{j \oplus m\}, \{j \oplus m, j\}, \{j \oplus m, m\}, \{j \oplus m, b\}, \{j \oplus m, j, m\}, \dots, \{j \oplus m, j, m, b, j \oplus b, m \oplus b, j \oplus m \oplus b\}\}$$

b. $EXH_{GS}(\|John\ \text{and}\ Mary\|) = \{\{j \oplus m\}\}$

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Groenendijk and Stokhof: Complex individuals

(57) a. John and Mary.

b. $\|John\ \text{and}\ Mary\| = \lambda P[P(j \oplus m)]$

c. $EXH_{BC}(\|John\ \text{and}\ Mary\|) =$

$$\lambda P[P(j \oplus m) \wedge \forall z[P(z) \rightarrow z \leq j \oplus m]]$$

d. $[EXH_{BC}(\|John\ \text{and}\ Mary\|)](\|Who\ snores?\|) = snore(j \oplus m) \wedge \forall z[snore(z) \rightarrow [z \leq j \oplus m]]$

(58) a. $\|John\ \text{and}\ Mary\| =$

$$\{\{j \oplus m\}, \{j \oplus m, j\}, \{j \oplus m, m\}, \{j \oplus m, b\}, \{j \oplus m, j, m\}, \dots, \{j \oplus m, j, m, b, j \oplus b, m \oplus b, j \oplus m \oplus b\}\}$$

b. $EXH_{BC}(\|John\ \text{and}\ Mary\|) =$

$$\{\{j \oplus m\}, \{j \oplus m, j\}, \{j \oplus m, m\}, \{j \oplus m, j, m\}\}$$

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Groenendijk and Stokhof: Complex individuals

Bonomi and Casalegno's (1993) tentative adjustment of Groenendijk and Stokhof:

(55) Definition of EXH_{BC} in predicate notation:

a. $BC(\mathcal{A}) = \lambda x \exists P[\mathcal{A}(P) \wedge \forall y[P(y) \leftrightarrow y = x]]$

b. $EXH_{BC}(\mathcal{A}) = \lambda P \exists x[[BC(\mathcal{A})](x) \wedge P(x) \wedge \forall y[P(y) \rightarrow y \leq x]]$

(56) Definition of EXH_{BC} in set notation:

a. $BC(\mathcal{A}) = \{x | \{x\} \in \mathcal{A}\}$

b. $EXH_{BC}(\mathcal{A}) = \{P | \exists x \in BC(\mathcal{A})[x \in P \wedge \forall y \in P[y \leq x]]\}$

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Groenendijk and Stokhof: Complex individuals

(59) a. Two linguists.

b. $\|two\ linguists\| =$

$$\lambda P \exists x \exists y[x \neq y \wedge linguist(x) \wedge linguist(y) \wedge P(x \oplus y)]$$

c. $EXH_{BC}(\|two\ linguists\|) =$

$$\lambda P \exists x \exists y[x \neq y \wedge linguist(x) \wedge linguist(y) \wedge P(x \oplus y) \wedge \forall z[P(z) \rightarrow [z \leq x \oplus y]]]$$

d. $[EXH_{BC}(\|two\ linguists\|)](\|Who\ snores?\|) =$

$$\exists x \exists y[x \neq y \wedge linguist(x) \wedge linguist(y) \wedge snore(x \oplus y) \wedge \forall z[snore(z) \rightarrow [z \leq x \oplus y]]]$$

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Groenendijk and Stokhof: Complex individuals

(60) Who snores?

(61) Two linguists. John and Mary.

(62) $\exists x \exists y [x \oplus y = j \oplus m \wedge x \neq y \wedge \text{linguist}(x) \wedge \text{linguist}(y) \wedge \text{snore}(x \oplus y) \wedge \forall z [\text{snore}(z) \rightarrow [z \leq x \oplus y]]]$

With just a little reasoning with meaning postulates and/or world knowledge, this entails:

(63) $\text{linguist}(j) \wedge \text{linguist}(m) \wedge \text{snore}(j \oplus m) \wedge \forall z [\text{snore}(z) \rightarrow [z \leq j \oplus m]]]$

Groenendijk and Stokhof: Complex individuals

(68) Who snores?

(69) # Three linguists. John and Mary.

(70) $\exists x \exists y \exists z [x \oplus y \oplus z = j \oplus m \wedge x \neq y \wedge x \neq z \wedge y \neq z \wedge \text{linguist}(x) \wedge \text{linguist}(y) \wedge \text{linguist}(z) \wedge \text{snore}(x \oplus y \oplus z) \wedge \forall z' [\text{snore}(z') \rightarrow [z' \leq x \oplus y \oplus z]]]$

This is contradictory!!! A group of three persons ($x \oplus y \oplus z$) cannot be equal to a group of two persons ($j \oplus m$), which follows from the meaning postulates of predicate *person*.

Groenendijk and Stokhof: Complex individuals

(64) Who snores?

(65) Two linguists. A student and a professor.

(66) $\exists x \exists y \exists x' \exists y' [x \oplus y = x' \oplus y' \wedge x \neq y \wedge \text{linguist}(x) \wedge \text{linguist}(y) \wedge \text{student}(x') \wedge \text{professor}(y') \wedge \text{snore}(x \oplus y) \wedge \forall z [\text{snore}(z) \rightarrow [z \leq x \oplus y]]]$

(67) $\exists x \exists y [x \neq y \wedge \text{linguist}(x) \wedge \text{linguist}(y) \wedge \text{student}(x) \wedge \text{professor}(y) \wedge \text{snore}(x \oplus y) \wedge \forall z [\text{snore}(z) \rightarrow [z \leq x \oplus y]]]$

Groenendijk and Stokhof: Summary

	G&S + B&C
A linguist. Mary.	=
A child. A girl.	=
A child. An adult.	*
2 linguists. John and Mary.	=
2 linguists. A student and a professor.	=
2 boys. Mary and Sue.	*
3 linguists. John and Mary.	*
3 linguists. 2 phonologists.	*

Structure

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 - **Events (S restatements)**
- Van Rooy and Schulz

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Groenendijk and Stokhof: Events

(75) What happened?

(76) a. Alena broke her ski.
b. She lost her only means of transportation.

(77) a. “A ski-breaking by Alena.”
b. “A loss of her only transportation means.”

(78) $\exists e[\text{broke-ski}(e) \wedge \text{lost-transportation}(e) \wedge \text{happen}(e) \wedge \forall e'[\text{happen}(e') \leftrightarrow e' \leq e]]$

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Groenendijk and Stokhof: Events

An analogy

(71) a. Who snores?
b. What happened?

(72) a. $\lambda x[\text{snores}(x)]$
b. $\lambda e[\text{happen}(e)]$

(73) a. A child.
b. Alena broke her ski. (“A ski-breaking by Alena”)

(74) a. $\lambda P \exists x[\text{child}(x) \wedge P(x)]$
b. $\lambda P \exists e[\text{broke-ski}(e) \wedge P(e)]$

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Structure

- Restatements
- Groenendijk and Stokhof
- **Van Rooy and Schulz**
 - The basic setting
 - Models with minimal background information
 - Models with rich background information

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Van Rooy and Schulz: The basic setting

(79) Definition of (dynamic) Exhaustification:

$$exh_{dyn}^{\sigma}(A, P) = \{w \in \sigma[A] \mid \neg \exists v \in \sigma[A](v <_P w)\}$$

(80) Ordering worlds:

$$w_1 <_P w_2 \text{ iff world } w_1 \text{ is just like } w_2 \text{ except that } P(w_1) \subset P(w_2).$$

(81) Ordering worlds (simplified):

$$w_1 <_P w_2 \text{ iff } P(w_1) \subset P(w_2)$$

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Van Rooy and Schulz: The basic setting

The treatment of complex individuals in distributive contexts:

(85) Meaning postulates are treated as constraints on the information state (model) σ .

E.g. in all worlds in σ , $snore(j \oplus m)$ iff $snore(j)$ and $snore(m)$.

(86) Exhaustification respects all information in the model.

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Van Rooy and Schulz: The basic setting

(82) a. Who P ?

b. A . (e.g. Mary P .)

Bare juxtaposition of answers with falling intonation:

(83) a. Who P ?

b. A_1 (\searrow). A_2 (\searrow).

First update the information state σ with the exhaustive interpretation of A_1 .
Then update the resulting state $exh_{dyn}^{\sigma}(A_1, P)$ with the exhaustive interpretation of A_2 .

$$(84) exh_{dyn}^{exh_{dyn}^{\sigma}(A_1, P)}(A_2, P)$$

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Van Rooy and Schulz: The basic setting

(87) Who snores?

(88) John and Mary (snore).

Step 1: $\sigma[|| \text{John and Mary snore } ||]$

Step 2: $exh_{dyn}^{\sigma}(|| \text{John and Mary snore } ||, snore)$

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Initial information state σ

$$D = \{j, m, b, j \oplus m, j \oplus b, m \oplus b, j \oplus m \oplus b\}$$

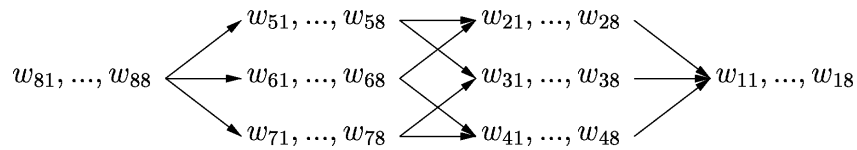
<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j \oplus m \oplus b</i>	w_{11}	w_{12}	w_{13}	w_{14}	w_{15}	w_{16}	w_{17}	w_{18}
<i>j, m, j \oplus m</i>	w_{21}	w_{22}	w_{23}	w_{24}	w_{25}	w_{26}	w_{27}	w_{28}
<i>j, b, j \oplus b</i>	w_{31}	w_{32}	w_{33}	w_{34}	w_{35}	w_{36}	w_{37}	w_{38}
<i>m, b, m \oplus b</i>	w_{41}	w_{42}	w_{43}	w_{44}	w_{45}	w_{46}	w_{47}	w_{48}
<i>j</i>	w_{51}	w_{52}	w_{53}	w_{54}	w_{55}	w_{56}	w_{57}	w_{58}
<i>m</i>	w_{61}	w_{62}	w_{63}	w_{64}	w_{65}	w_{66}	w_{67}	w_{68}
<i>b</i>	w_{71}	w_{72}	w_{73}	w_{74}	w_{75}	w_{76}	w_{77}	w_{78}
\emptyset	w_{81}	w_{82}	w_{83}	w_{84}	w_{85}	w_{86}	w_{87}	w_{88}

Information state $\sigma[A]$

$A = \text{John and Mary snore.}$

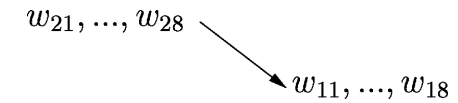
<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j \oplus m \oplus b</i>	w_{11}	w_{12}	w_{13}	w_{14}	w_{15}	w_{16}	w_{17}	w_{18}
<i>j, m, j \oplus m</i>	w_{21}	w_{22}	w_{23}	w_{24}	w_{25}	w_{26}	w_{27}	w_{28}
<i>j, b, j \oplus b</i>								
<i>m, b, m \oplus b</i>								
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

The $<_{snore}$ -ordering of worlds in σ



The $<_{snore}$ -ordering of worlds in $\sigma[A]$

$A = \text{John and Mary snore.}$



Information state $\sigma[A]$

$A = \text{John and Mary snore.}$

<i>snore</i>	<i>linguist</i>							
	j, m, b	j, m	j, b	m, b	j	m	b	\emptyset
$j, \dots, j \oplus m \oplus b$								
$j, m, j \oplus m$	w_{21}	w_{22}	w_{23}	w_{24}	w_{25}	w_{26}	w_{27}	w_{28}
$j, b, j \oplus b$								
$m, b, m \oplus b$								
j								
m								
b								
\emptyset								

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Van Rooy and Schulz: Minimal information

The initial information state σ does not contain any information on snoring.

(89) Who snores?

(90) Two linguists. John and Mary.

Step 1: $\sigma[|| \text{Two linguists snore} ||]$

Step 2: $exh_{dyn}^{\sigma}(|| \text{Two linguists snore} ||, snore)$

Step 3: $[exh_{dyn}^{\sigma}(|| \text{Two linguists snore} ||, snore)] [|| \text{John and Mary snore} ||]$

Step 4:

$exh_{dyn}^{exh_{dyn}^{\sigma}(|| \text{Two linguists snore} ||, snore)} (|| \text{John and Mary snore} ||, snore)$

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Structure

- Restatements
- Groenendijk and Stokhof
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 - The basic setting
 - **Models with minimal background information**
 - Models with relevant background information

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Initial information state σ

$D = \{j, m, b, j \oplus m, j \oplus b, m \oplus b, j \oplus m \oplus b\}$

<i>snore</i>	<i>linguist</i>							
	j, m, b	j, m	j, b	m, b	j	m	b	\emptyset
$j, \dots, j \oplus m \oplus b$	w_{11}	w_{12}	w_{13}	w_{14}	w_{15}	w_{16}	w_{17}	w_{18}
$j, m, j \oplus m$	w_{21}	w_{22}	w_{23}	w_{24}	w_{25}	w_{26}	w_{27}	w_{28}
$j, b, j \oplus b$	w_{31}	w_{32}	w_{33}	w_{34}	w_{35}	w_{36}	w_{37}	w_{38}
$m, b, m \oplus b$	w_{41}	w_{42}	w_{43}	w_{44}	w_{45}	w_{46}	w_{47}	w_{48}
j	w_{51}	w_{52}	w_{53}	w_{54}	w_{55}	w_{56}	w_{57}	w_{58}
m	w_{61}	w_{62}	w_{63}	w_{64}	w_{65}	w_{66}	w_{67}	w_{68}
b	w_{71}	w_{72}	w_{73}	w_{74}	w_{75}	w_{76}	w_{77}	w_{78}
\emptyset	w_{81}	w_{82}	w_{83}	w_{84}	w_{85}	w_{86}	w_{87}	w_{88}

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Information state $\sigma[A_1]$

$A_1 =$ Two linguists snore.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j \oplus m \oplus b</i>	w_{11}	w_{12}	w_{13}	w_{14}				
<i>j, m, j \oplus m</i>	w_{21}	w_{22}						
<i>j, b, j \oplus b</i>	w_{31}		w_{33}					
<i>m, b, m \oplus b</i>	w_{41}			w_{44}				
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

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Information state $exh_{dyn}^\sigma(A_1, snore)$

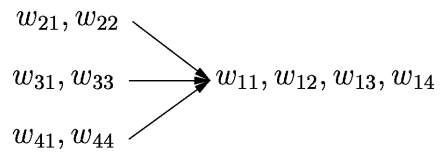
$A_1 =$ Two linguists snore.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j \oplus m \oplus b</i>								
<i>j, m, j \oplus m</i>	w_{21}	w_{22}						
<i>j, b, j \oplus b</i>	w_{31}		w_{33}					
<i>m, b, m \oplus b</i>	w_{41}			w_{44}				
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

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The $<_{snore}$ -ordering of worlds in $\sigma[A_1]$

$A_1 =$ Two linguists snore.



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Information state $[exh_{dyn}^\sigma(A_1, snore)][A_2]$

$A_1 =$ Two linguists snore, $A_2 =$ John and Mary snore.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j \oplus m \oplus b</i>								
<i>j, m, j \oplus m</i>	w_{21}	w_{22}						
<i>j, b, j \oplus b</i>								
<i>m, b, m \oplus b</i>								
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

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The $<_{snore}$ -ordering of worlds in $[exh_{dyn}^\sigma(A_1, snore)][A_2]$

$A_1 =$ Two linguists snore, $A_2 =$ John and Mary snore.

w_{21}, w_{22}

No comparable worlds left!!!

Therefore

$$[exh_{dyn}^\sigma(A_1, snore)][A_2] = exh_{dyn}^{exh_{dyn}^\sigma(A_1, snore)}(A_2, snore)$$

Van Rooy and Schulz: Minimal information

(91) Who snores?

(92) a. # Three linguists. John and Mary.

b. # Two linguists. John.

Step 1: $\sigma[|| \text{Two linguists snore} ||]$

Step 2: $exh_{dyn}^\sigma(|| \text{Two linguists snore} ||, snore)$

Step 3: $[exh_{dyn}^\sigma(|| \text{Two linguists snore} ||, snore)] [|| \text{John snores} ||]$

Step 4: $exh_{dyn}^{exh_{dyn}^\sigma(|| \text{Two linguists snore} ||, snore)} (|| \text{John snores} ||, snore)$

Information state $exh_{dyn}^{exh_{dyn}^\sigma(A_1, snore)}(A_2, snore)$

$A_1 =$ Two linguists snore, $A_2 =$ John and Mary snore.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j</i> \oplus <i>m</i> \oplus <i>b</i>								
<i>j, m, j</i> \oplus <i>m</i>	w_{21}	w_{22}						
<i>j, b, j</i> \oplus <i>b</i>								
<i>m, b, m</i> \oplus <i>b</i>								
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

Information state $exh_{dyn}^\sigma(A_1, snore)$

$A_1 =$ Two linguists snore.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j</i> \oplus <i>m</i> \oplus <i>b</i>								
<i>j, m, j</i> \oplus <i>m</i>	w_{21}	w_{22}						
<i>j, b, j</i> \oplus <i>b</i>	w_{31}		w_{33}					
<i>m, b, m</i> \oplus <i>b</i>	w_{41}			w_{44}				
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

Information state $[exh_{dyn}^\sigma(A_1, snore)][A_2]$

$A_1 =$ Two linguists snore, $A_2 =$ John snores.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j</i> \oplus <i>m</i> \oplus <i>b</i>								
<i>j, m, j</i> \oplus <i>m</i>	w_{21}	w_{22}						
<i>j, b, j</i> \oplus <i>b</i>	w_{31}		w_{33}					
<i>m, b, m</i> \oplus <i>b</i>								
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

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Information state $exh_{dyn}^{exh_{dyn}^\sigma(A_1, snore)}(A_2, snore)$

$A_1 =$ Two linguists snore, $A_2 =$ John snores.

<i>snore</i>	<i>linguist</i>							
	<i>j, m, b</i>	<i>j, m</i>	<i>j, b</i>	<i>m, b</i>	<i>j</i>	<i>m</i>	<i>b</i>	\emptyset
<i>j, ..., j</i> \oplus <i>m</i> \oplus <i>b</i>								
<i>j, m, j</i> \oplus <i>m</i>	w_{21}	w_{22}						
<i>j, b, j</i> \oplus <i>b</i>	w_{31}		w_{33}					
<i>m, b, m</i> \oplus <i>b</i>								
<i>j</i>								
<i>m</i>								
<i>b</i>								
\emptyset								

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The $<_{snore}$ -ordering of worlds in $[exh_{dyn}^\sigma(A_1, snore)][A_2]$

$A_1 =$ Two linguists snore, $A_2 =$ John snores.

w_{21}, w_{22}

w_{31}, w_{33}

No comparable worlds left!!!

Therefore

$$[exh_{dyn}^\sigma(A_1, snore)][A_2] = exh_{dyn}^{exh_{dyn}^\sigma(A_1, snore)}(A_2, snore)$$

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Van Rooy and Schulz: Minimal information

(93) Who snores?

(94) a. # Three linguists. John and Mary.

b. # Two linguists. John.

Van Rooy and Schulz' theory does not predict a contradiction:

(95) a. John and Mary \subseteq Three linguists.

b. John \subseteq Two linguists.

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Summary

	G&S + B&C	R&S
A linguist. Mary.	=	=
A child. A girl.	=	=
A child. An adult.	*	*
2 linguists. John and Mary.	=	=
2 linguists. A student and a professor.	=	≻
2 boys. Mary and Sue.	*	*
3 linguists. John and Mary.	*	≻
3 linguists. 2 phonologists.	*	≻
John and Mary. 3 linguists.	*	*
2 phonologists. 3 linguists.	*	*

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Structure

- Restatements
- Groenendijk and Stokhof
- Van Rooy and Schulz
 - The basic setting
 - Models with minimal background information
 - **Models with rich background information**

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