Introduction to dynamic semantics

Session 3: Plural discourse representation theory

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Outline

Recap

Sentences introduce **discourse referents** and **conditions** on these drefs.

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u_1 u_2
Evelyn(u_1) Waymond(u_2) Marry(u_1,u_2)

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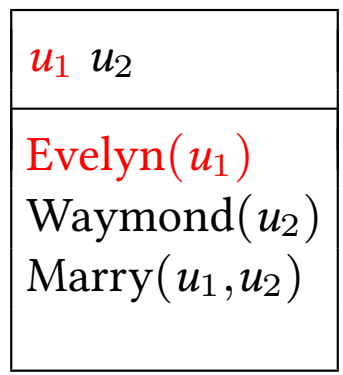

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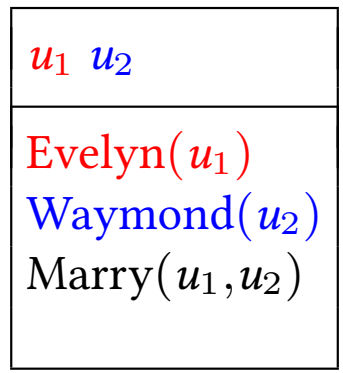

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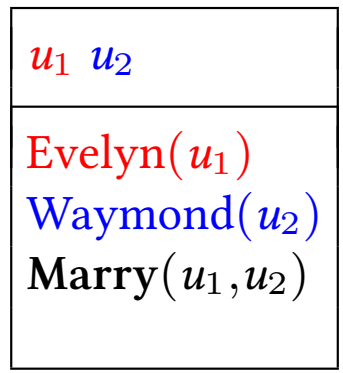

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The DRS of a sentence can be derived from its components.

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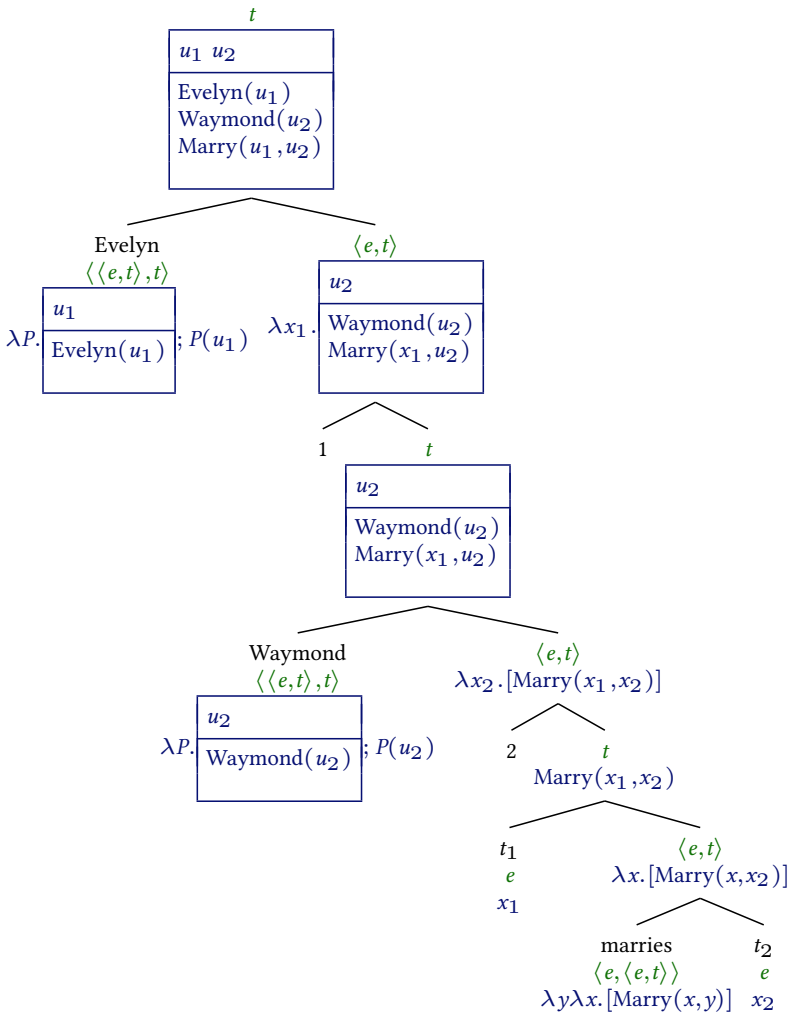

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DRSs can be combined using **dynamic conjunction** (;).

(3) Evelyn marries Waymond. Evelyn owns a laundromat.

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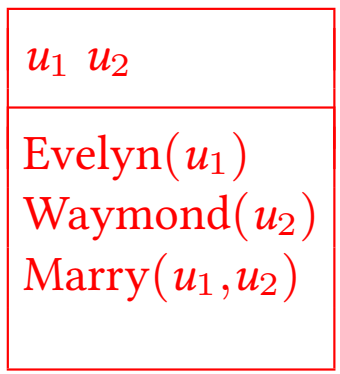

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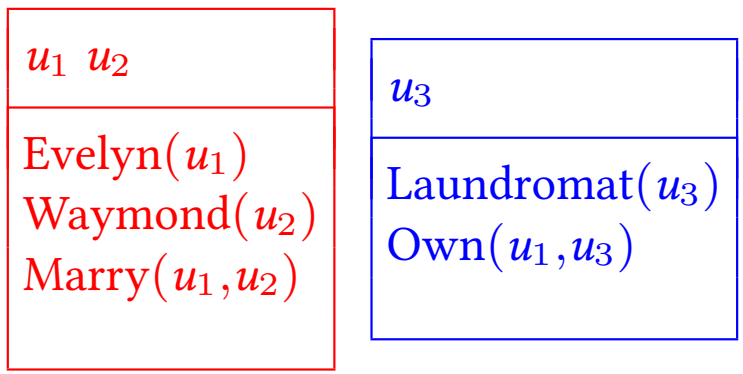

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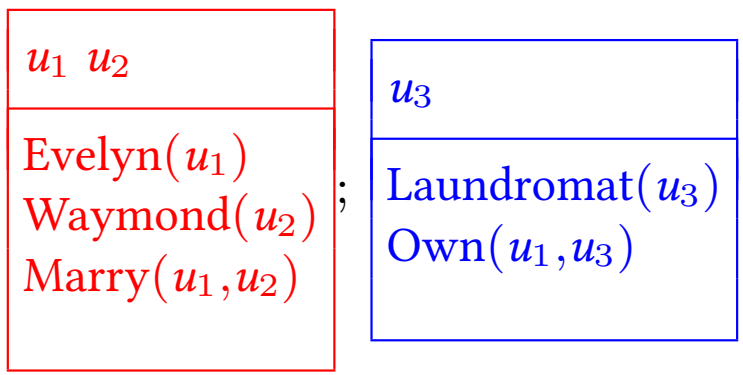

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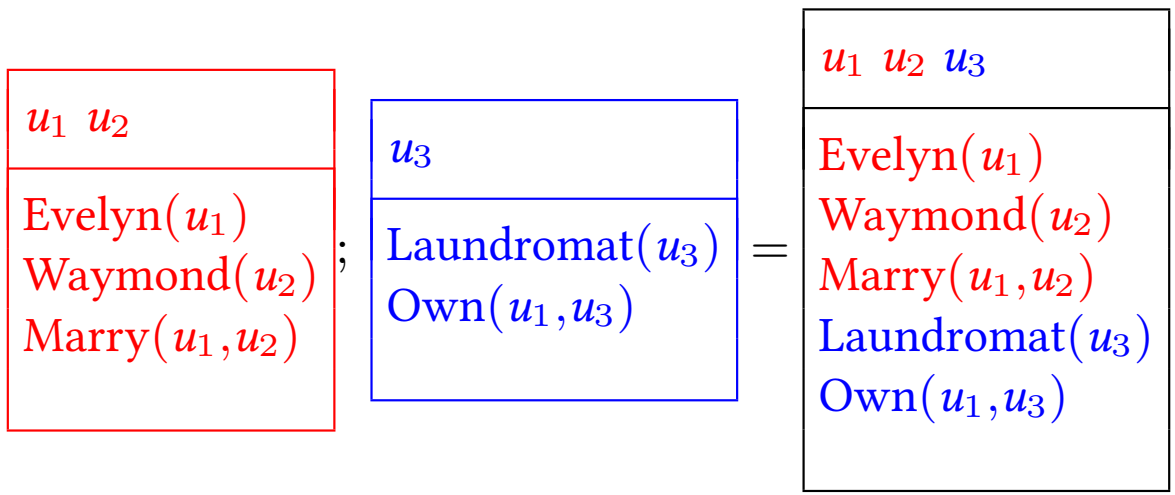

Outline

Plurals

How do we handle plurals?

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(4) Evelyn and Waymond smiled.

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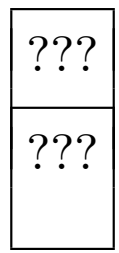

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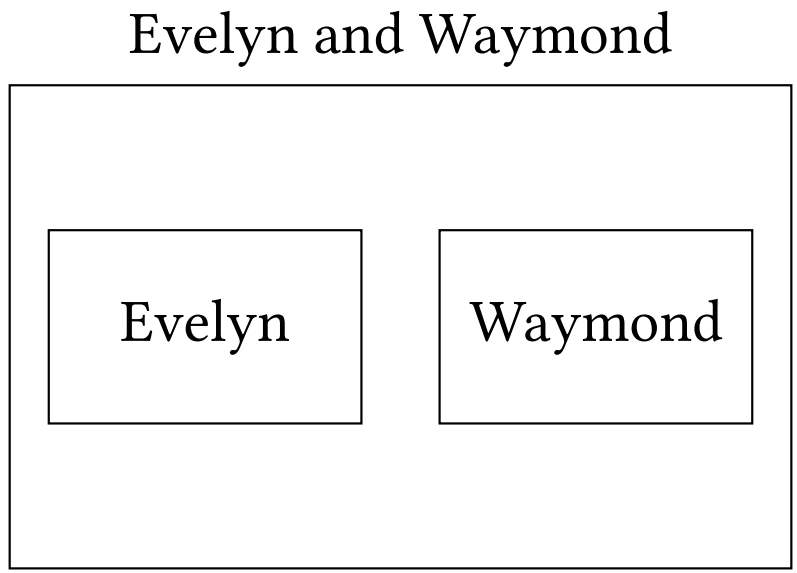

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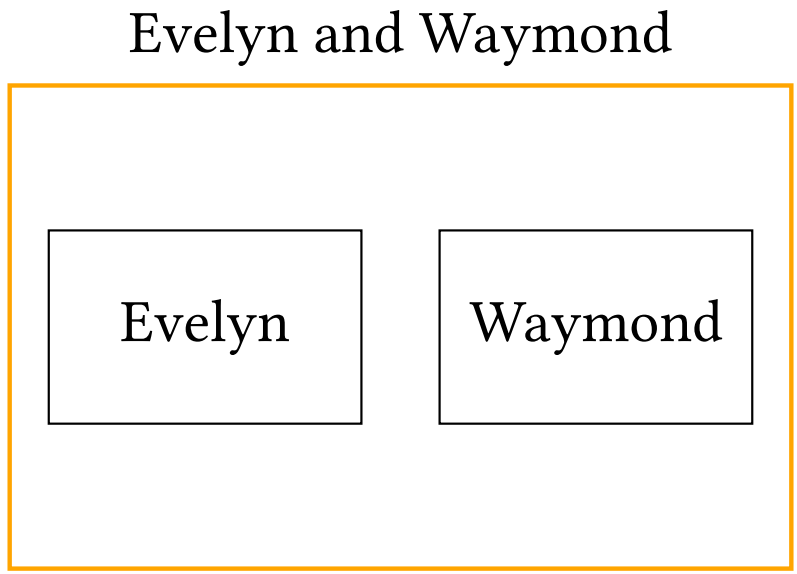

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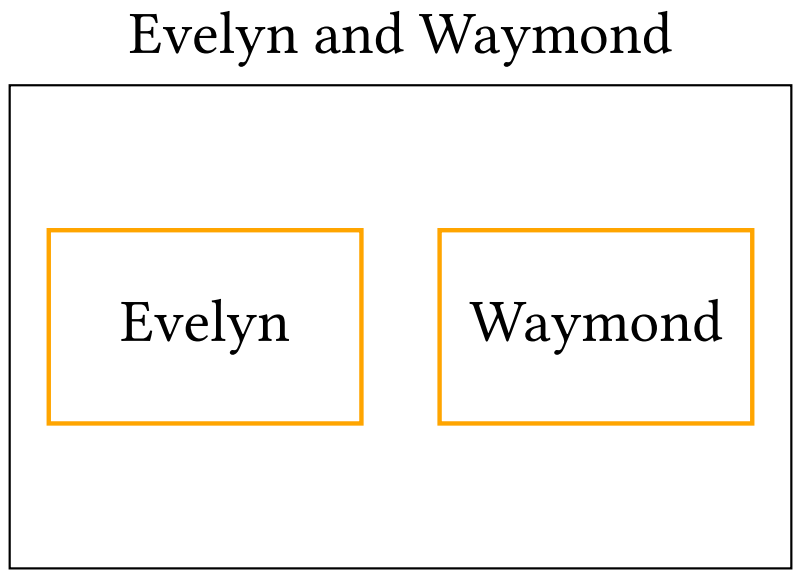

Outline

Collective reading

(5) Evelyn and Waymond met.

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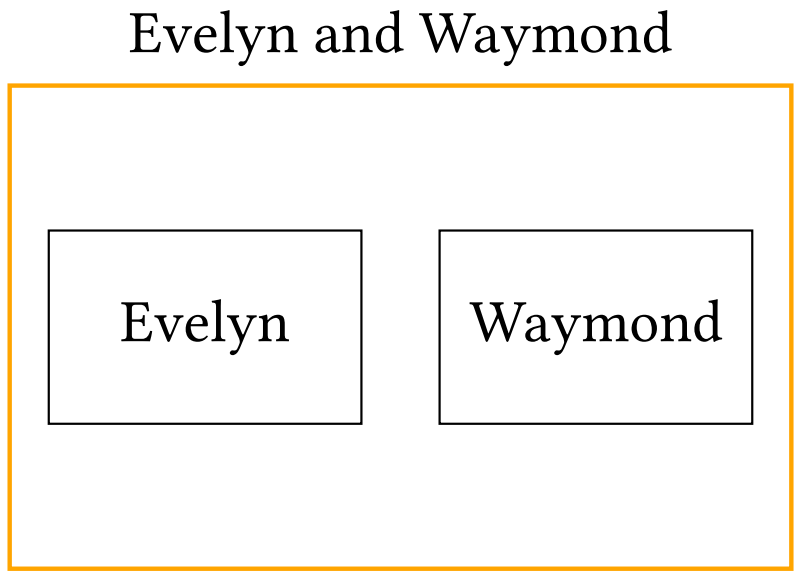

Distributive reading

(6) Evelyn and Waymond smiled.

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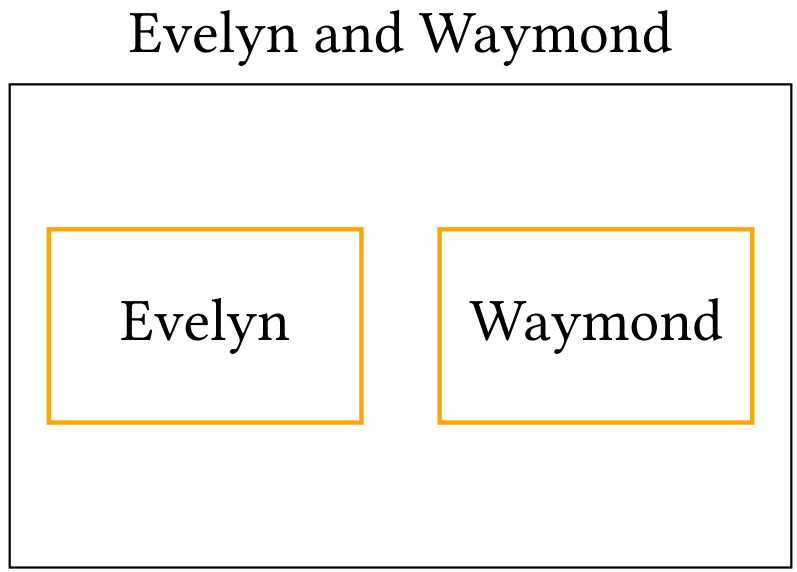

Activity 1: collective vs distributive readings

1. are numerous
2. are tall
3. ate a pizza
4. dispersed
5. gathered
6. laughed
7. read a book
8. scattered
9. watched a movie

Collective reading

(7) Evelyn and Waymond ate a pizza.

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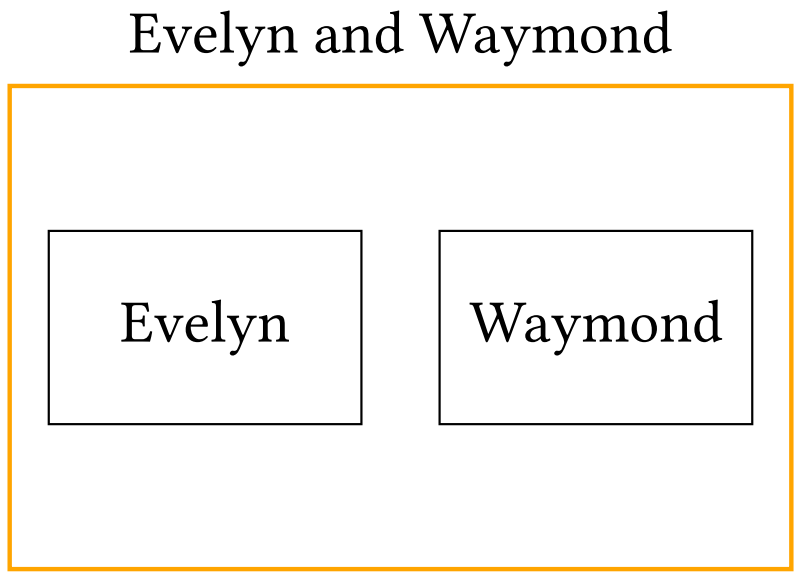
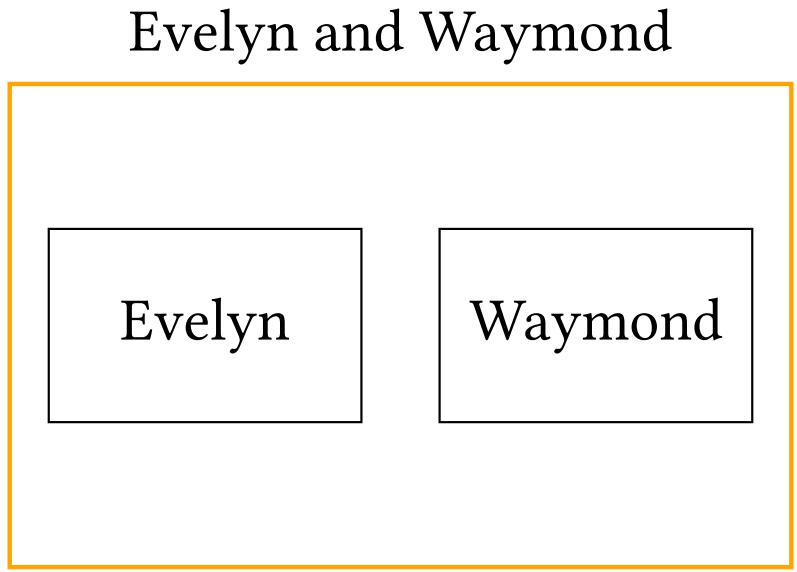


Collective reading

(7) Evelyn and Waymond ate a pizza.



$$\text{Ate}(E \oplus W, p)$$

Distributive reading

(8) Evelyn and Waymond ate a pizza.

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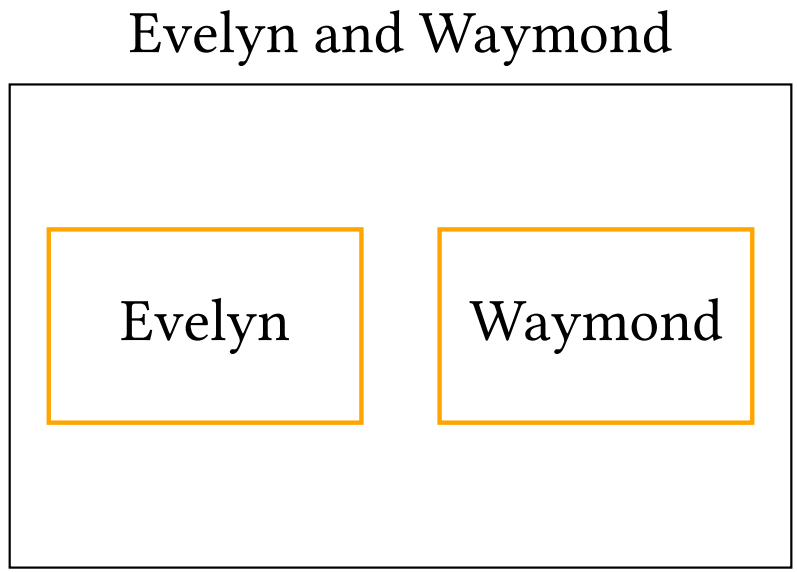

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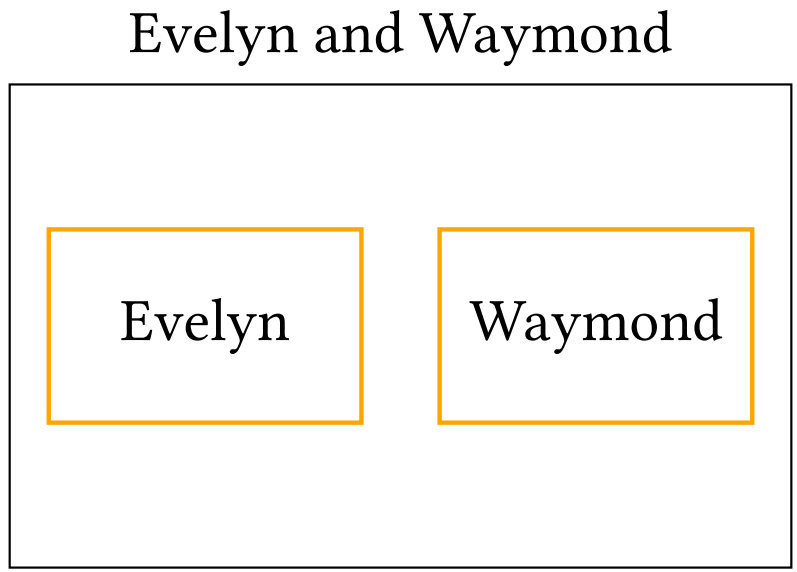

$\approx \text{Ate}(\text{EACH}(E \oplus W), p)$

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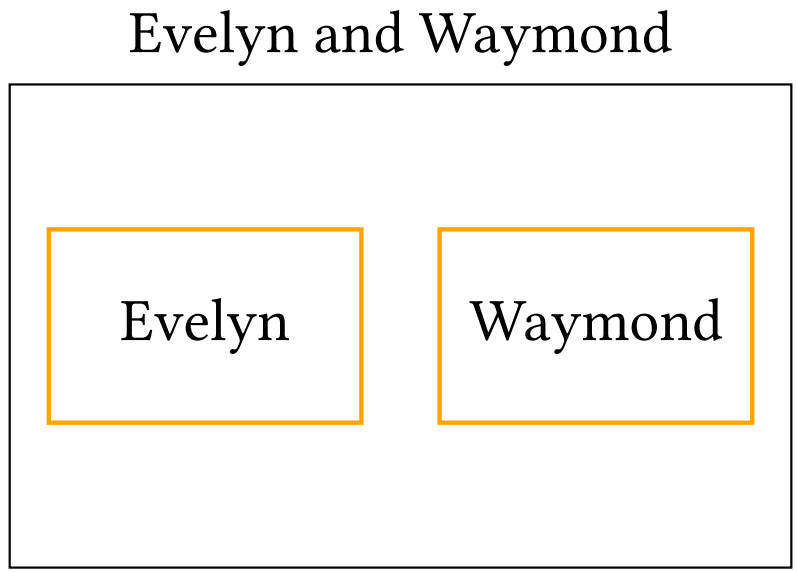

$$\approx \text{Ate}(\text{EACH}(E \oplus W), p)$$

Q: Is it the DP or the VP that "is plural"?

Distributive reading: DIST operator

- DIST is an operator that applies to the predicate (in this case *ate*).

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Distributive reading: DIST operator

- DIST is an operator that applies to the predicate (in this case *ate*).
- In general, we need to specify which argument we are distributing over.
- On its distributive reading, the sentence *Evelyn and Waymond ate a pizza* roughly means:
  For each x that is a part of the sum of Evelyn and Waymond, x ate a pizza.

Distributive readings

- From this point on, we will set distributive readings to one side.

Distributive readings

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- Refer to the Appendix for more on intermediate (distributive) readings.

Outline

Activity 2: Cumulative readings

What “readings” does the following sentence have?

(9) Evelyn, Waymond and Joy lifted three pianos.

(Ignore distributive readings.)

Cumulative readings

(10) Evelyn, Waymond and Joy lifted three pianos.

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(10) Evelyn, Waymond and Joy lifted three pianos.

Collective reading:

	person	piano
s	$E \oplus W \oplus J$	$p_1 \oplus p_2 \oplus p_3$

Cumulative readings

(10) Evelyn, Waymond and Joy lifted three pianos.

Collective reading:

	person	piano
s	$E \oplus W \oplus J$	$p_1 \oplus p_2 \oplus p_3$

Cumulative reading:

	person	piano
s_1	E	p_1
s_2	$W \oplus J$	$p_2 \oplus p_3$

Cumulative reading: * operator (Link 1983 *et seq.*)

Cumulative reading:

	person	piano
s_1	E	p_1
s_2	$W \oplus J$	$p_2 \oplus p_3$

Cumulative reading: * operator (Link 1983 *et seq.*)

Cumulative reading:

	person	piano
s_1	E	p_1
s_2	$W \oplus J$	$p_2 \oplus p_3$

- * is an operator that applies to the predicate (in this case ** applies to *lift*).

Cumulative reading: * operator (Link 1983 *et seq.*)

Cumulative reading:

	person	piano
s_1	E	p_1
s_2	$W \oplus J$	$p_2 \oplus p_3$

- * is an operator that applies to the predicate (in this case ** applies to *lift*).

- Approximate meaning:
  - For each x that is a part of the sum of Evelyn, Waymond and Joy, there is a y that is a part of the pianos such that x lifted y.
  - For each y that is a part of the pianos, there is an x that is a part of the sum of Evelyn, Waymond and Joy such that x lifted y.

Outline

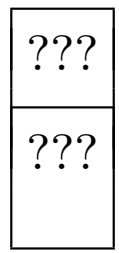
Plurals in DRT

- Plural (C)DRT treats DRSs as relations between plural information states, i.e., sets of information states.

- Conditions can be satisfied:
  - distributively within each information state or
  - collectively across all information states.

Plurals in DRT

(11) Evelyn and Waymond smiled.



Plurals in DRT

(12) Evelyn and Waymond smiled.

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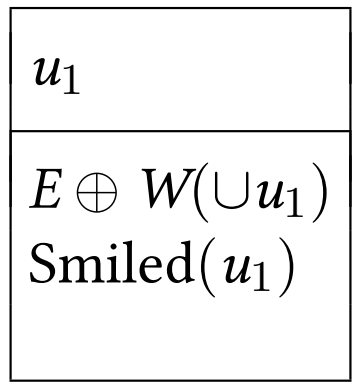

Plurals in DRT

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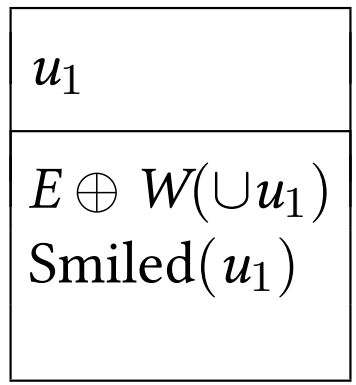

	u_1
s_1	E
s_2	W

Plurals in DRT

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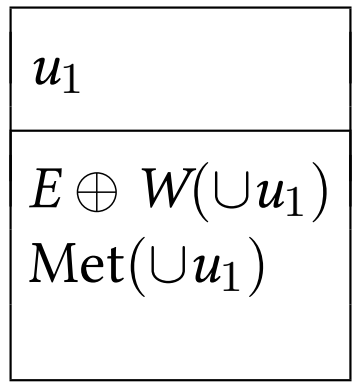

Plurals in DRT

(14) Evelyn, Waymond and Joy lifted three pianos.

Plurals in DRT

(14) Evelyn, Waymond and Joy lifted three pianos.

u_1 u_2
$E \oplus W \oplus \mathcal{J}(\cup u_1)$ 3-atoms$(\cup u_2)$ Piano(u_2) Lifted(u_1, u_2)

Plurals in DRT

(15) Evelyn, Waymond and Joy lifted three pianos.

u_1 u_2
$E \oplus W \oplus \mathcal{J}(\cup u_1)$ 3-atoms$(\cup u_2)$ Piano(u_2) Lifted(u_1, u_2)

Collective "reading":

	person	piano
s	$E \oplus W \oplus \mathcal{J}$	$p_1 \oplus p_2 \oplus p_3$

Cumulative "reading":

	person	piano
s_1	E	p_1
s_2	$W \oplus \mathcal{J}$	$p_2 \oplus p_3$

Plurals in DRT

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Q: Why is "reading" in quotes?

Plurals in DRT

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Cumulative "reading":

	person	piano
s_1	E	p_1
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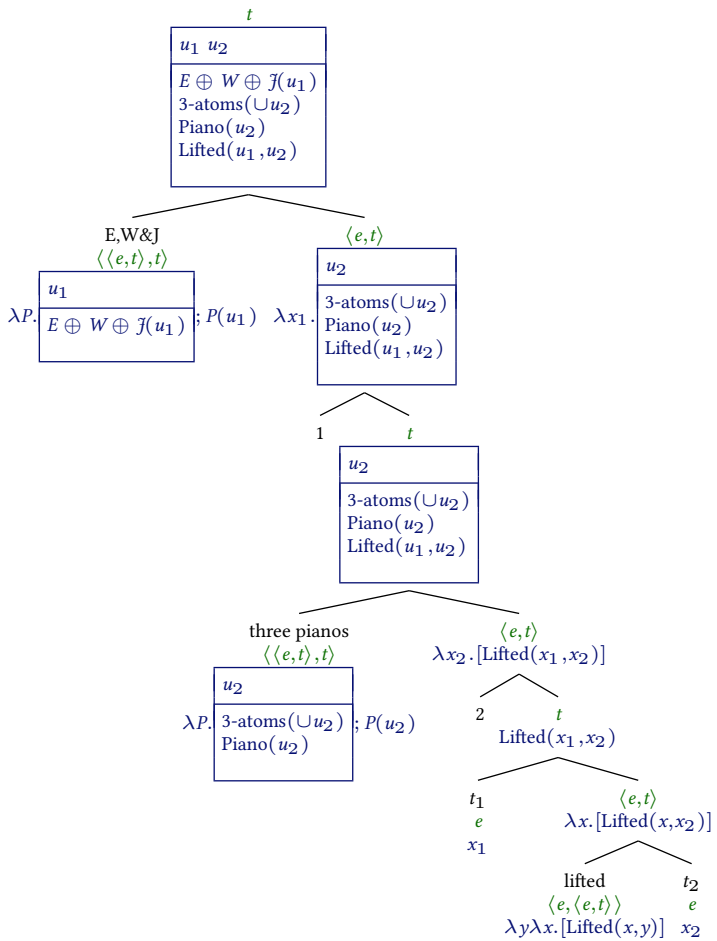
Q: Why is "reading" in quotes?

Q: Is this simpler than an operator-based approach?

Plurals in CDRT

(16) Evelyn, Waymond and Joy lifted three pianos.



Summary

- Sentences with plurals have different “readings”: e.g. collective, distributive, cumulative...

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- Plural (C)DRT treats DRSs as relations between plural information states.

Further reading

Overviews:

1. Nouwen (2016)
2. Haug and Dalrymple (2020)

Technical details of plural (C)DRT

1. van den Berg (1996)
2. Brasoveanu (2007)

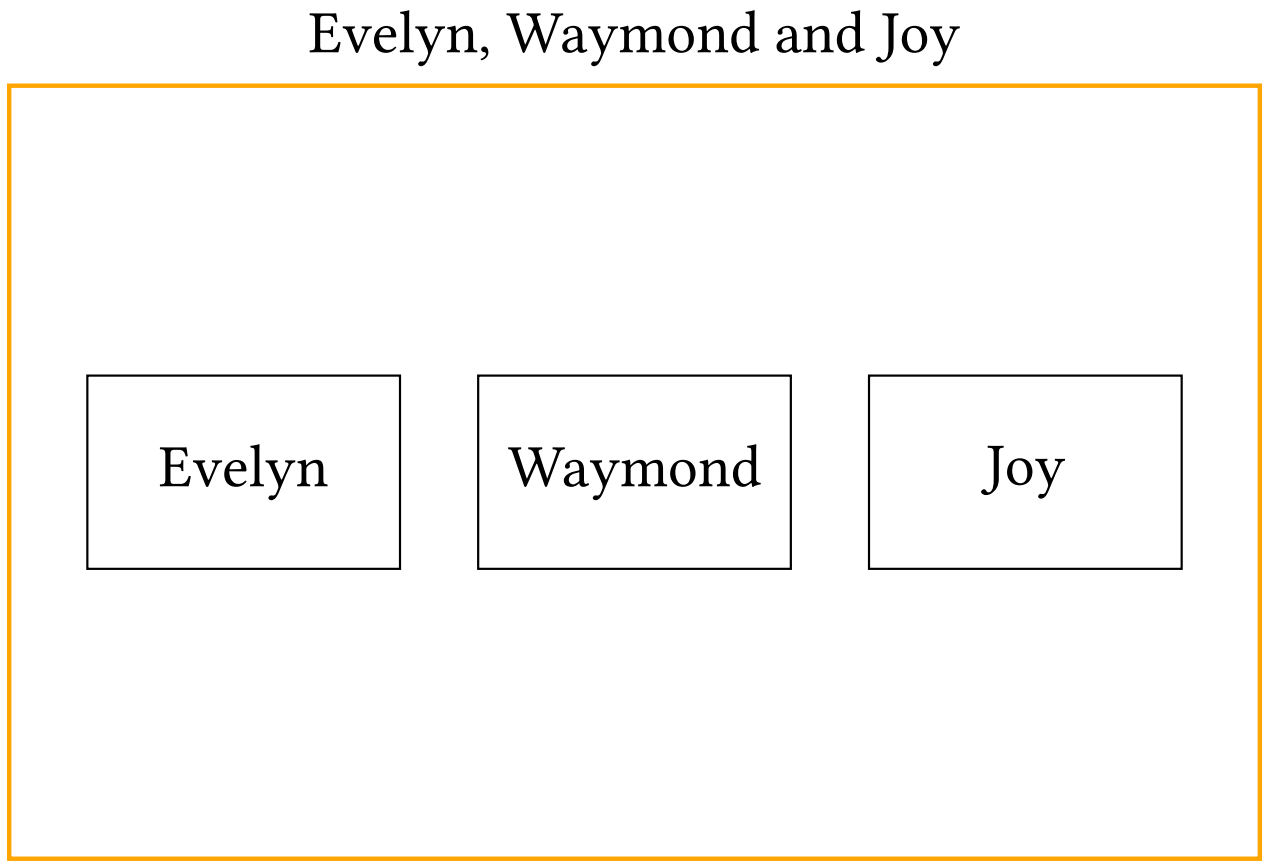
Activity: Intermediate readings

What “readings” does the following sentence have?

(17) Evelyn, Waymond and Joy ate a pizza.

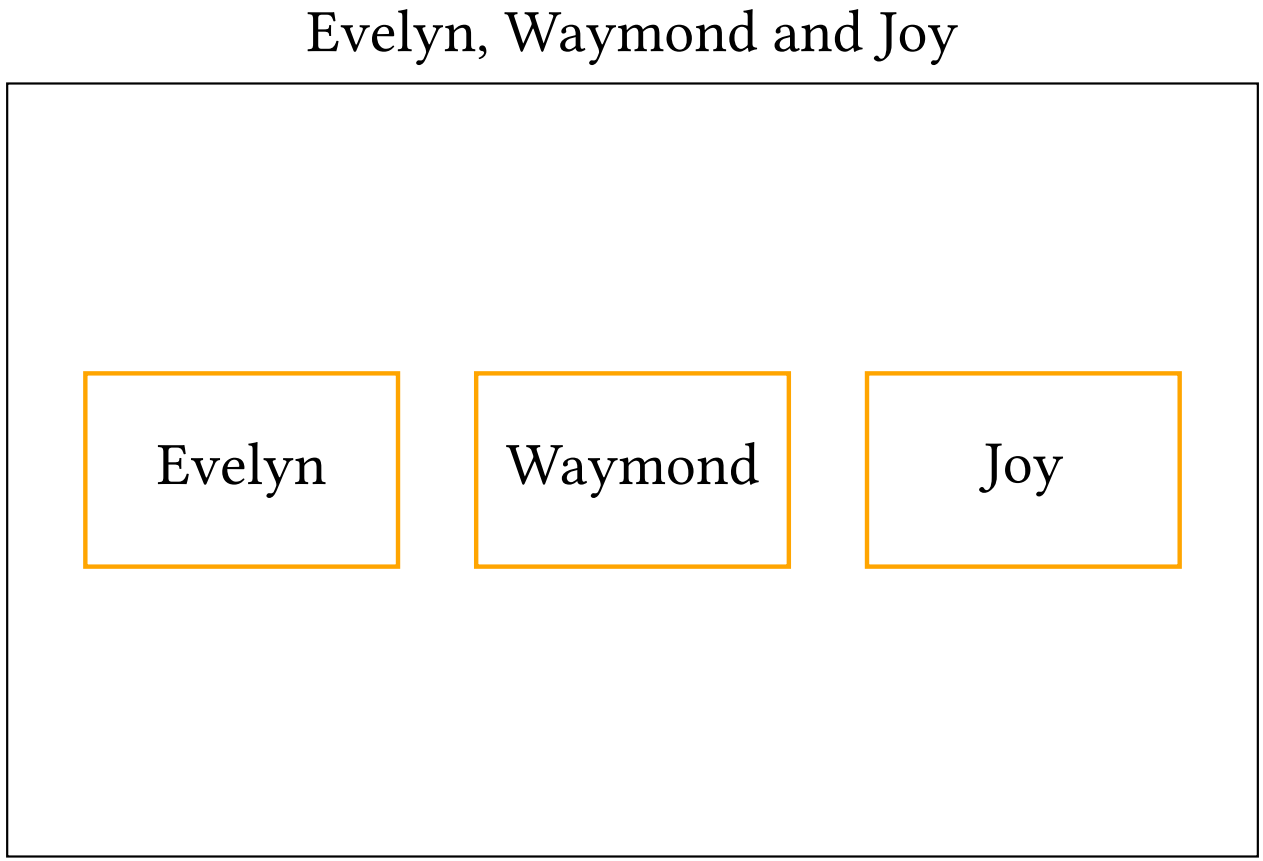
Collective reading

(18) Evelyn, Waymond and Joy ate a pizza.



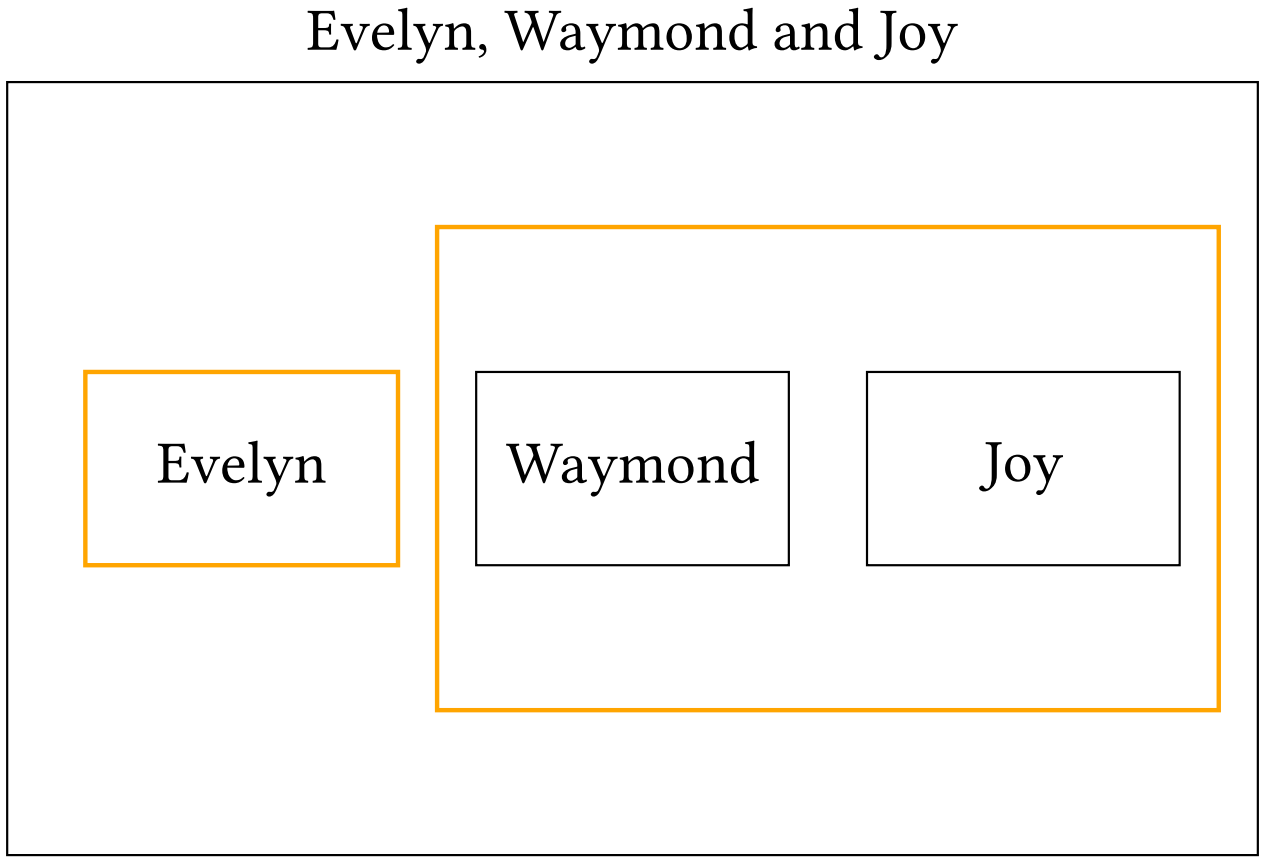
Distributive reading

(19) Evelyn, Waymond and Joy ate a pizza.



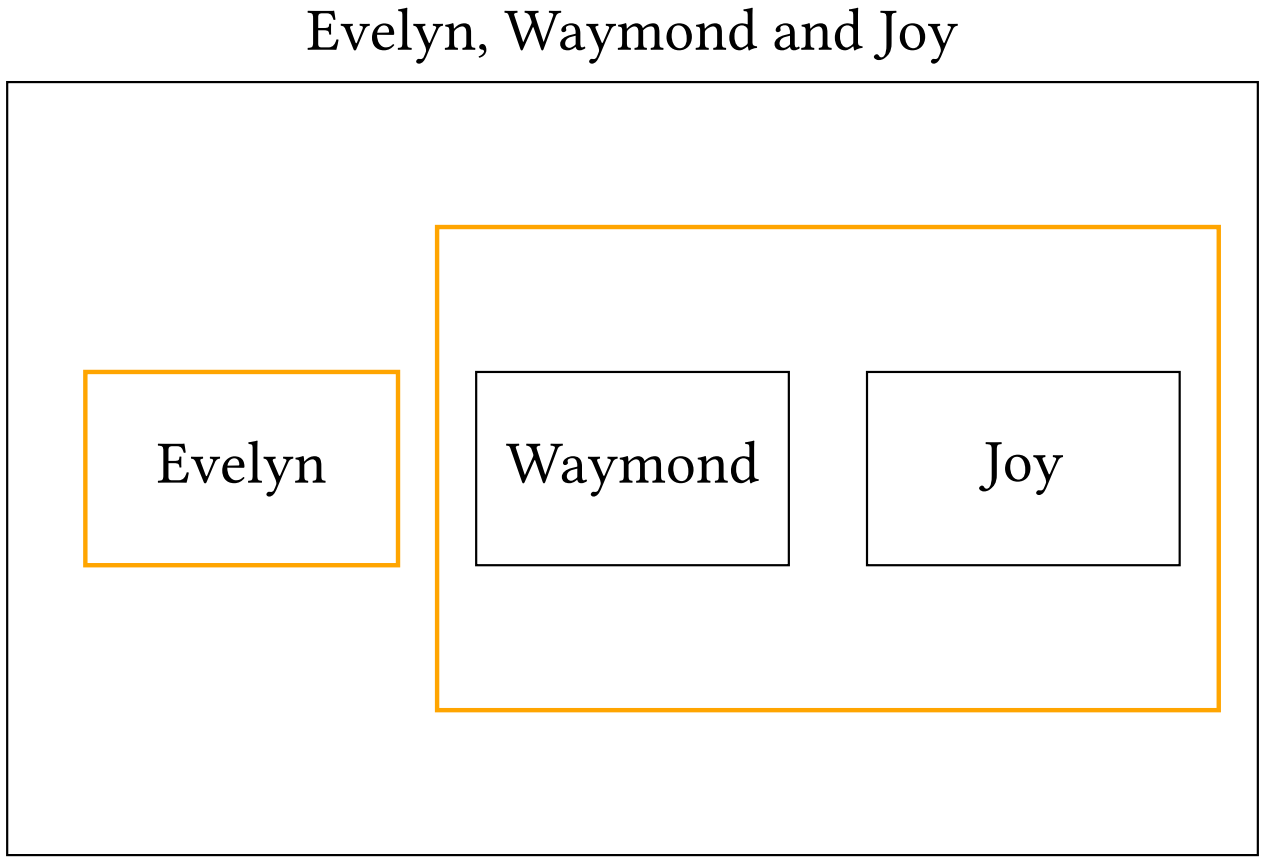
Intermediate distributive reading

(20) Evelyn, Waymond and Joy ate a pizza.



Intermediate distributive reading

(20) Evelyn, Waymond and Joy ate a pizza.



Q: Do you get this reading?

References I

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Nouwen, Rick. 2016. Plurality. In *The Cambridge Handbook of Formal Semantics*, ed. Maria Aloni and Paul Dekker, 267–284. Cambridge: Cambridge University Press.

van den Berg, Martin. 1996. Some aspects of the internal structure of discourse: The dynamics of nominal anaphora. Doctoral dissertation, University of Amsterdam.