Adjectives and semantic composition

Christopher Potts
Stanford Linguistics

Linguist 130a/230a: Introduction to semantics and pragmatics

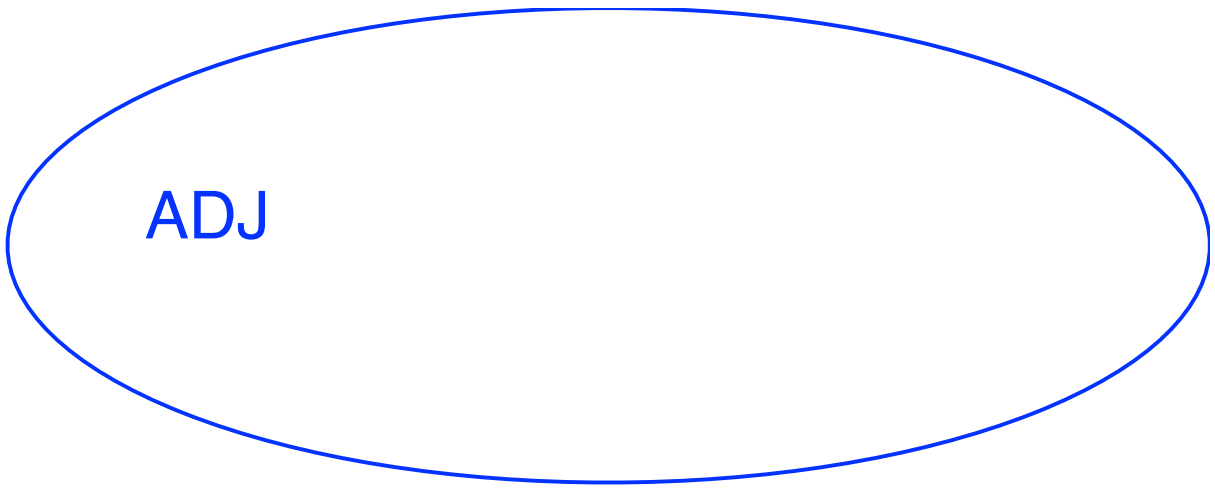
The typology

The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$

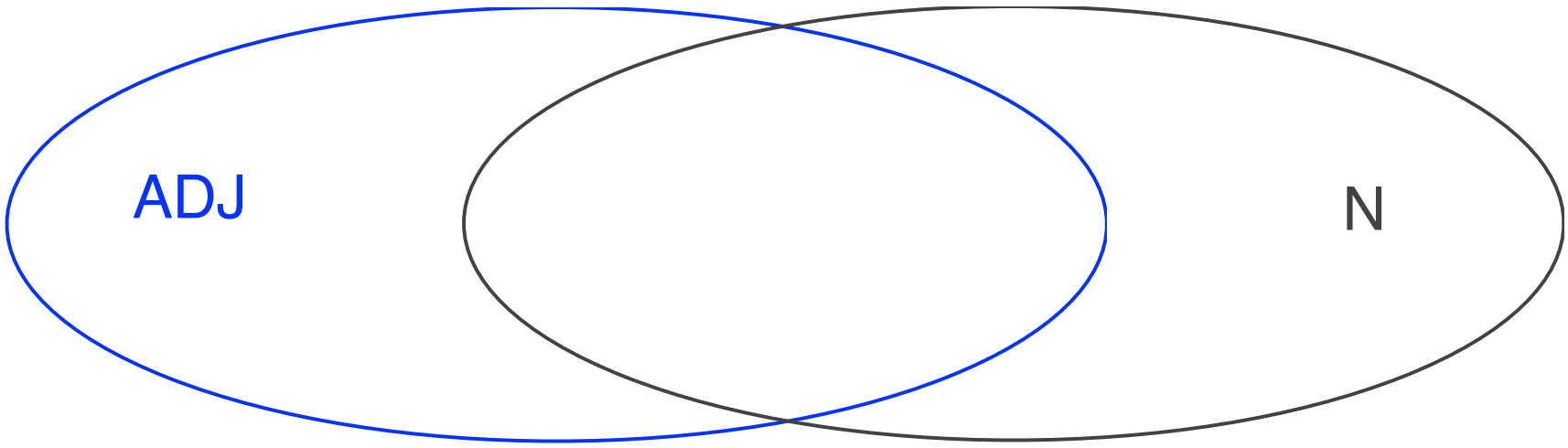
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



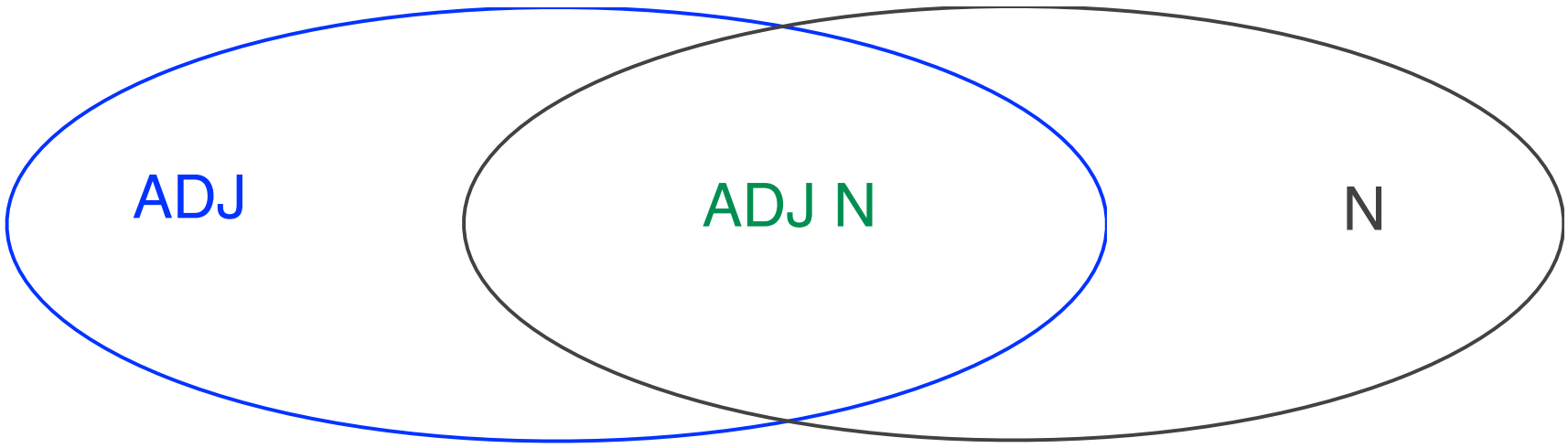
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



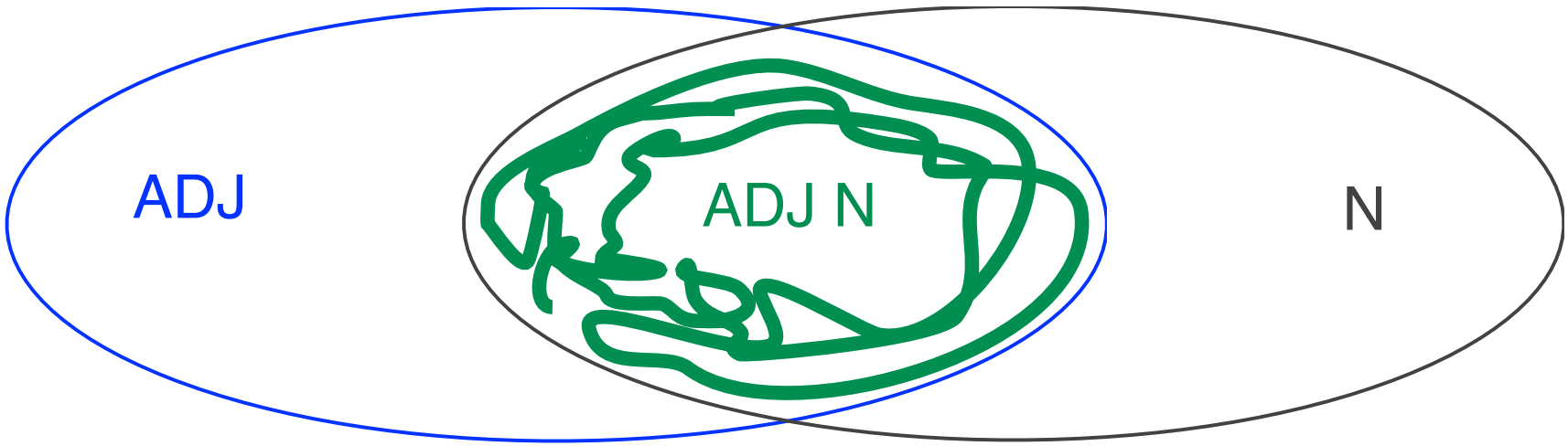
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



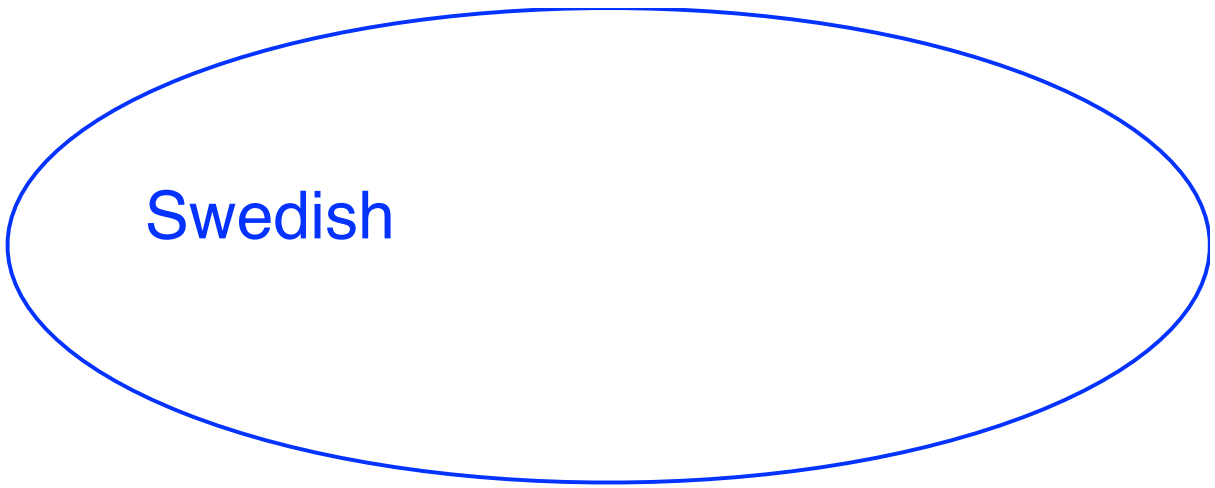
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



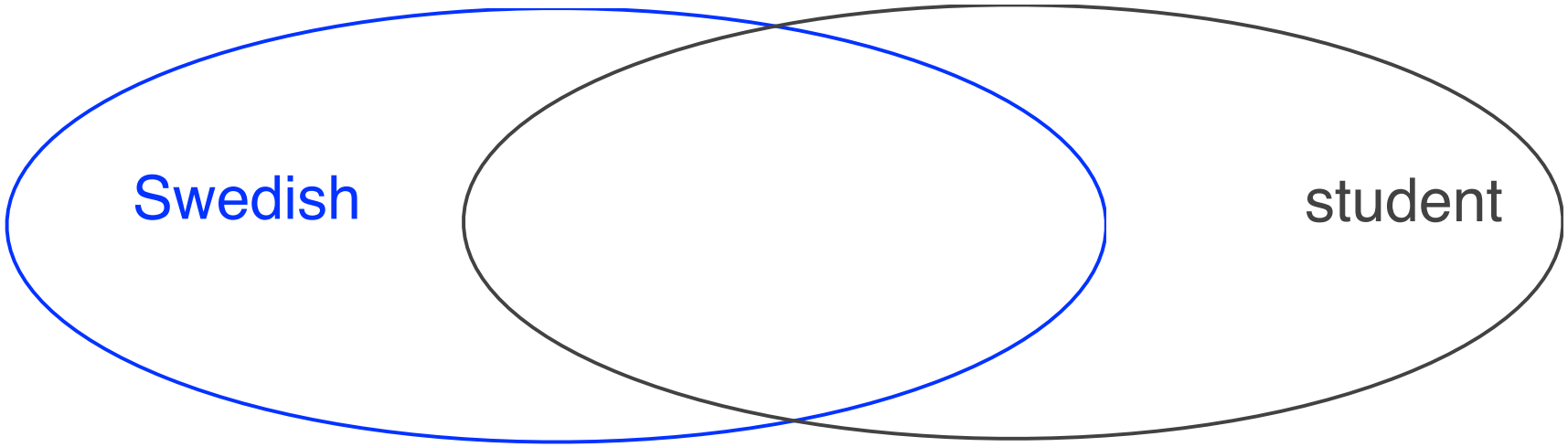
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



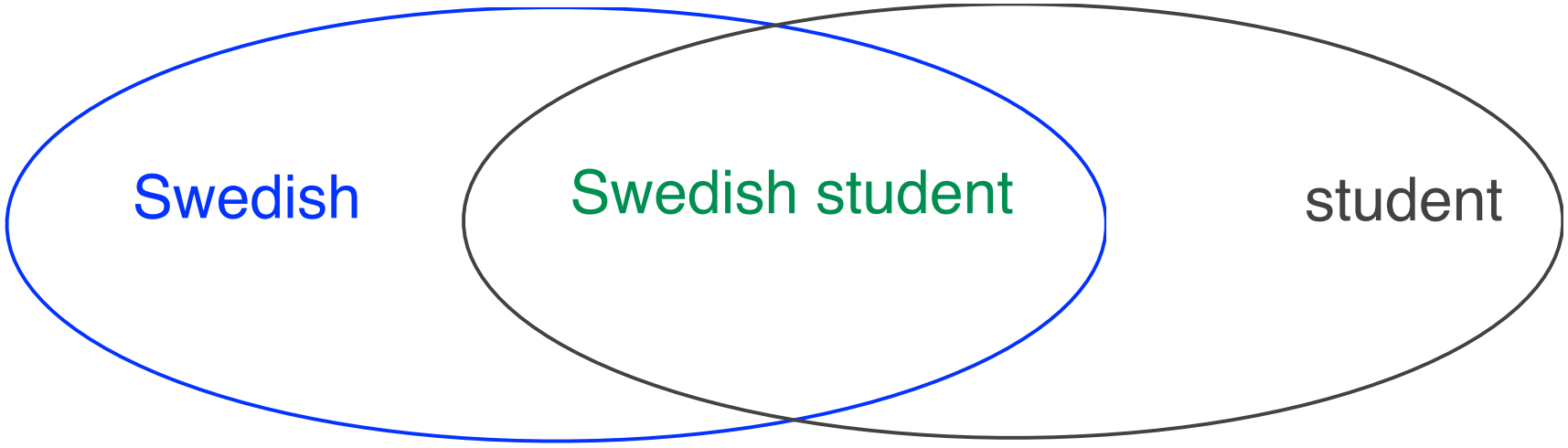
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



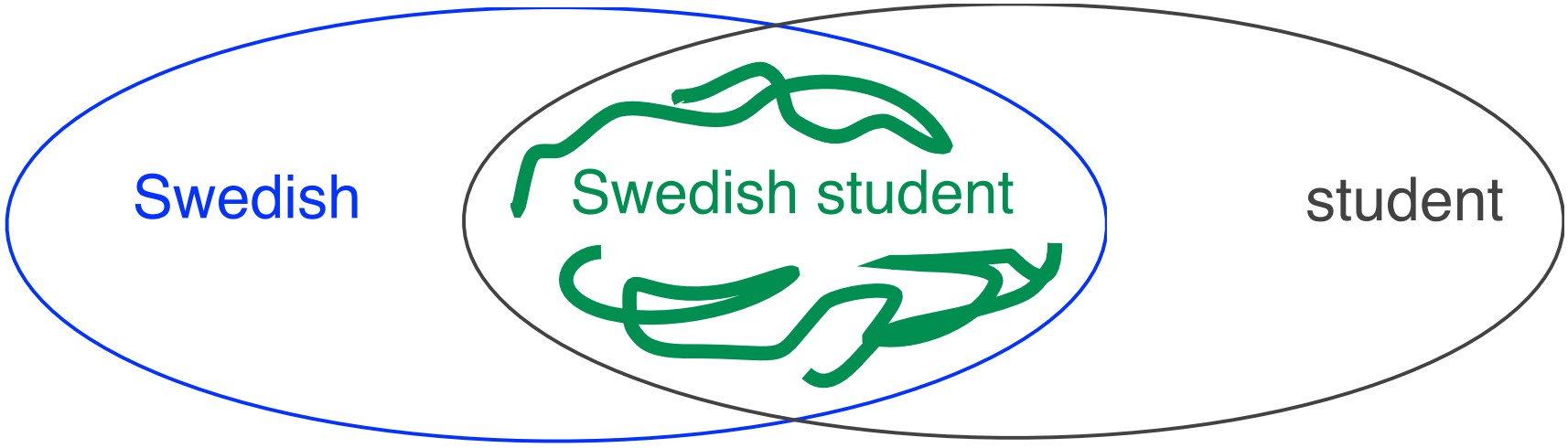
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$



The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$

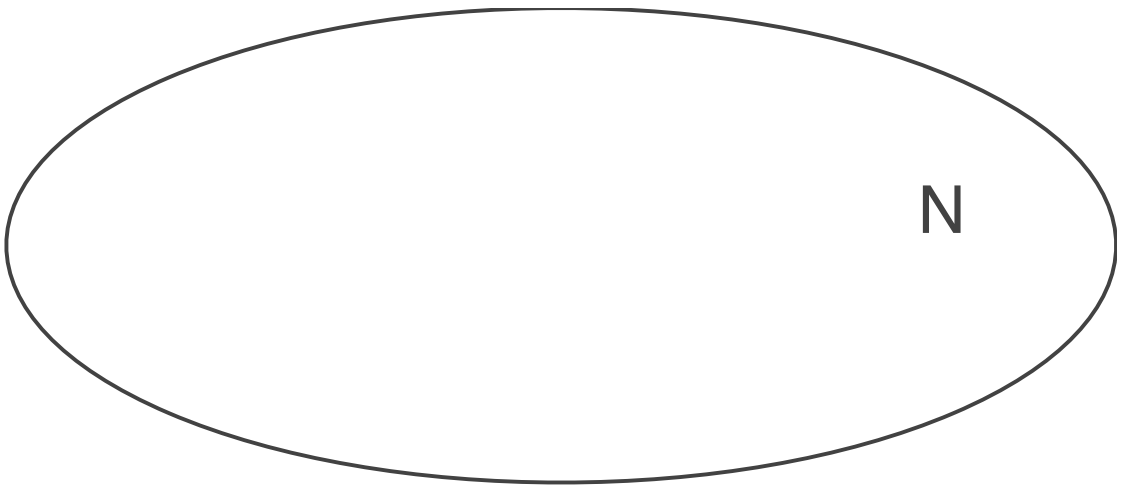


The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

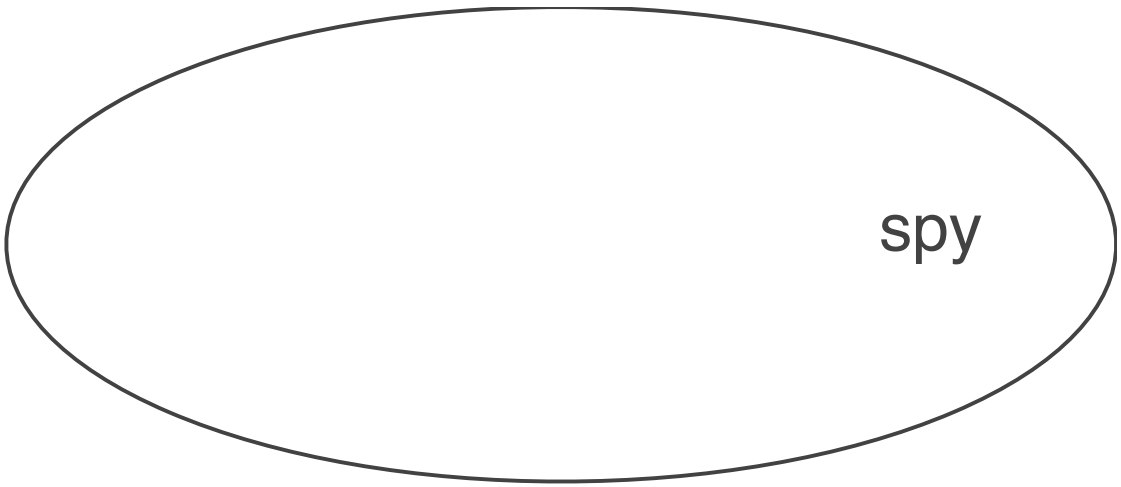


The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

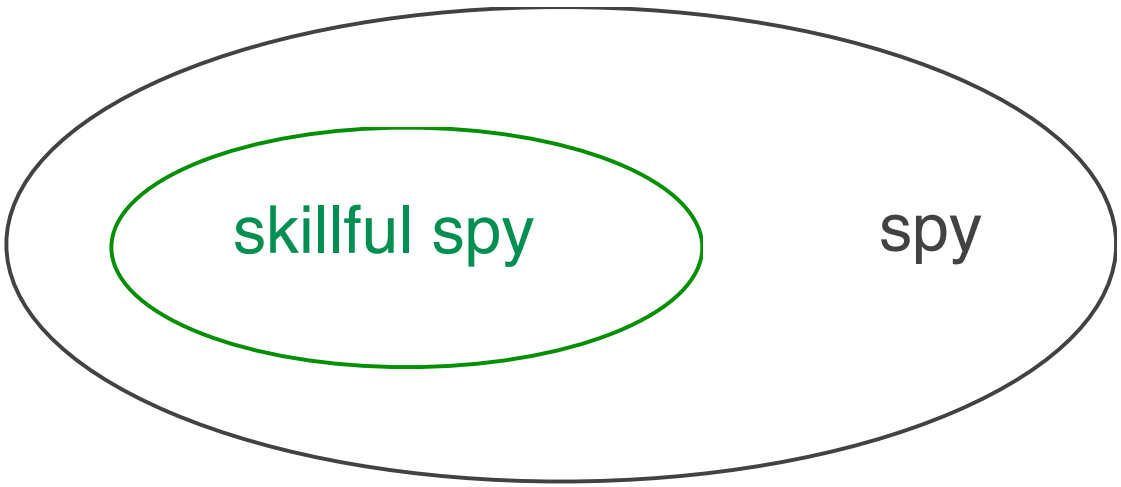
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$



The typology

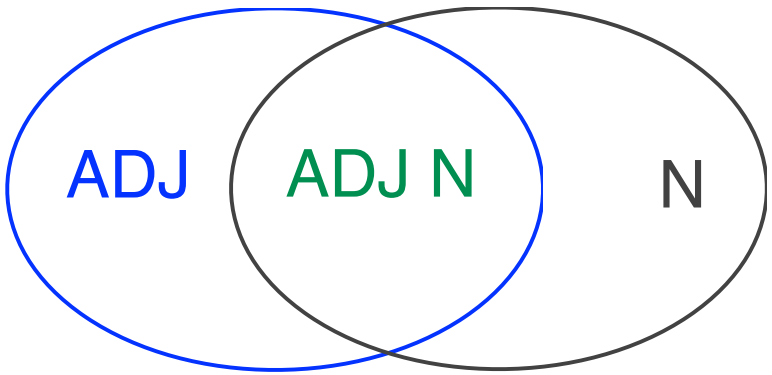
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$



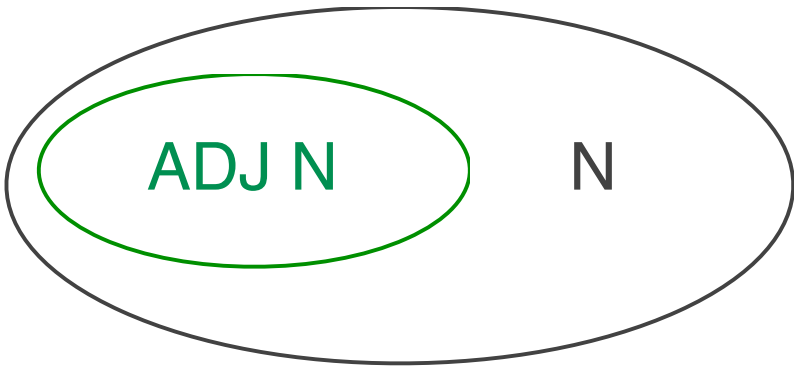
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

Intersective



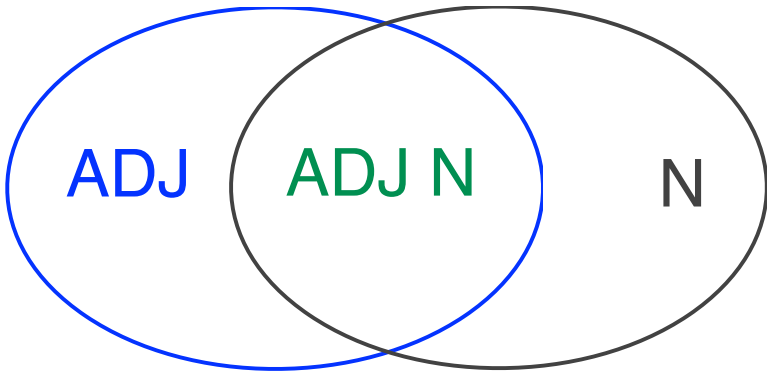
Subsective



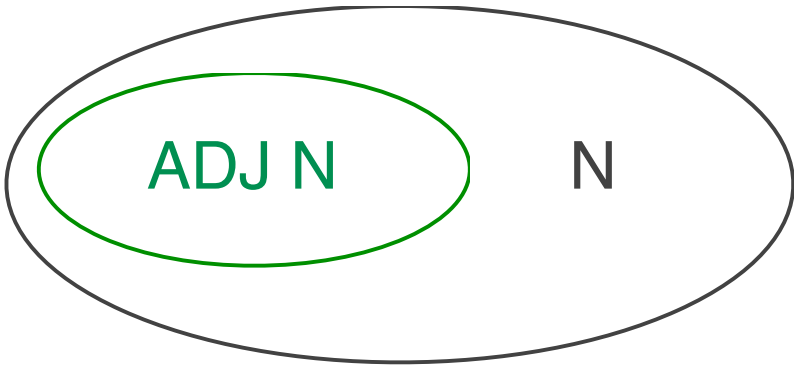
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

Intersective



Subsective



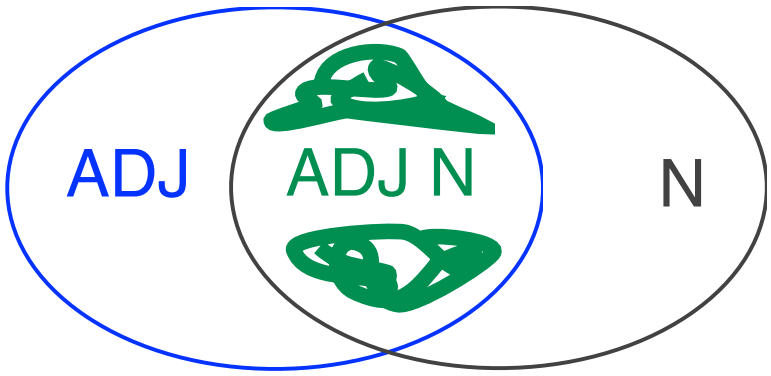
$A \cap B \subseteq A$

$A \cap B \subseteq B$

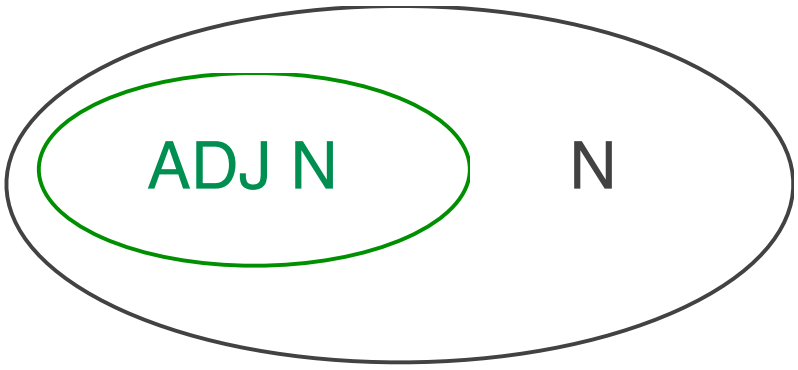
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

Intersective



Subsective



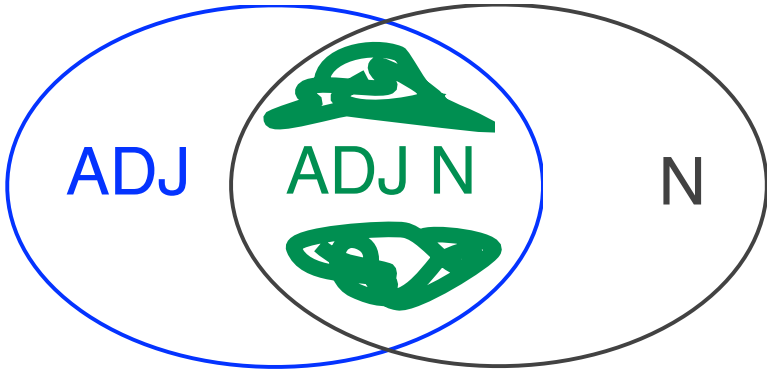
$A \cap B \subseteq A$

$A \cap B \subseteq B$

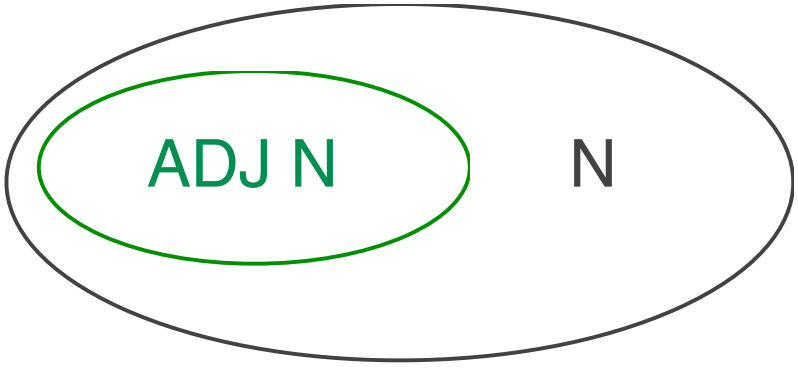
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$

Intersective

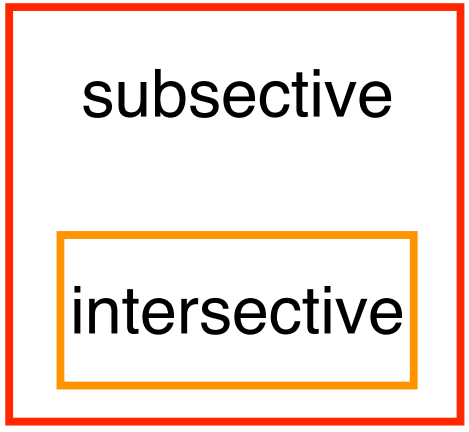


Subsective



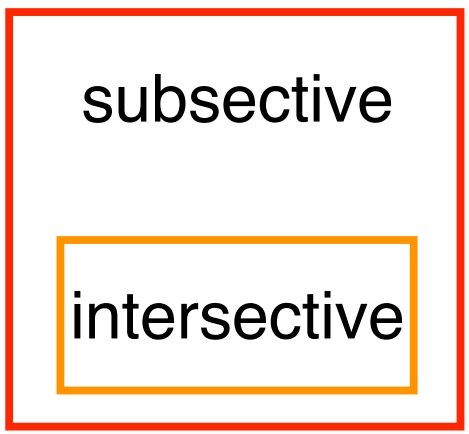
$A \cap B \subseteq A$

$A \cap B \subseteq B$



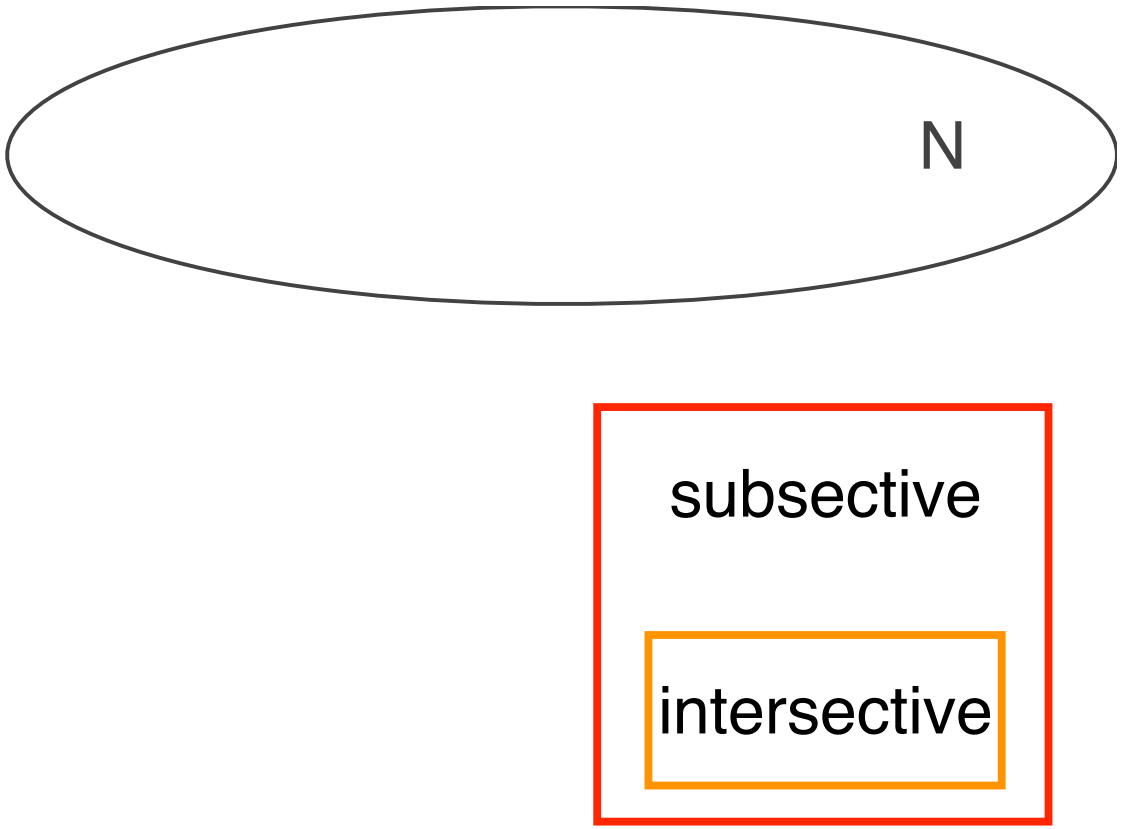
The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$



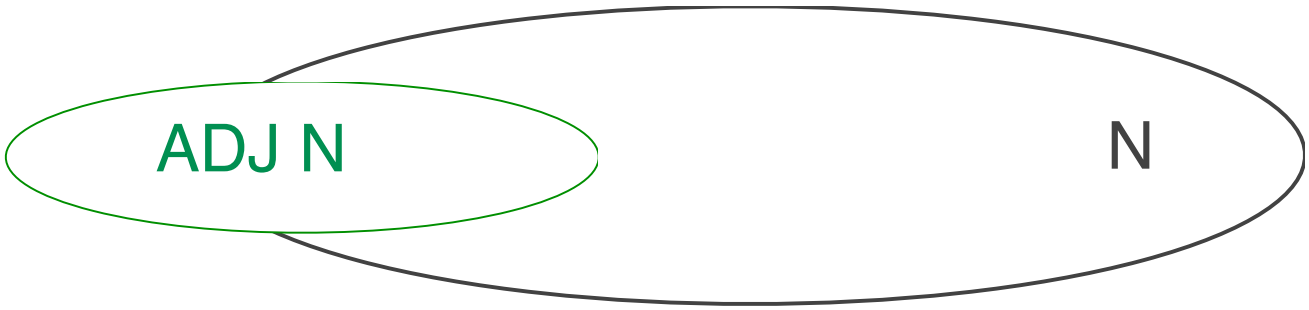
The typology

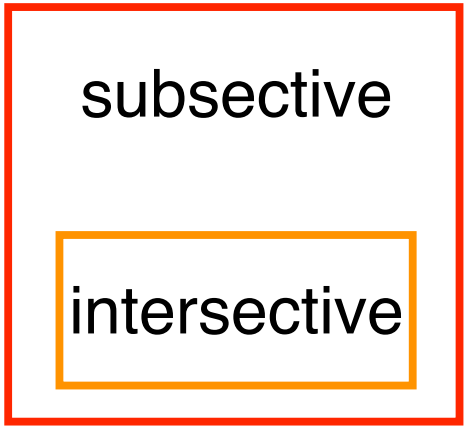
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$



The typology

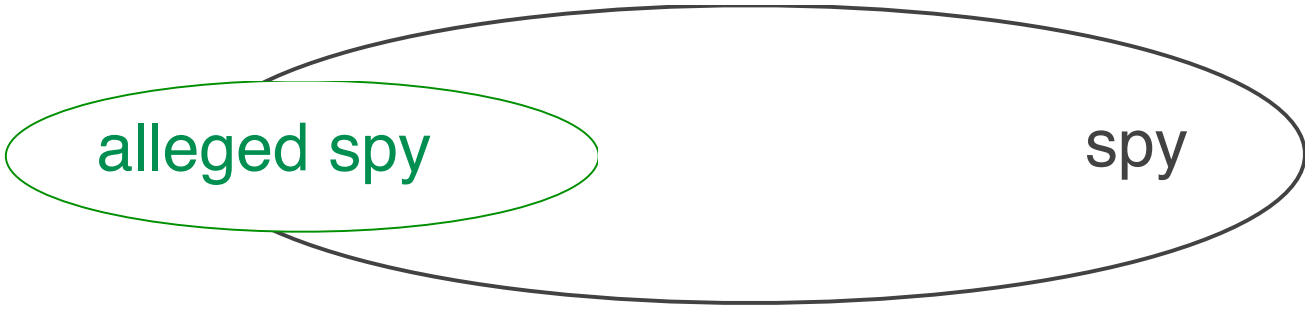
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

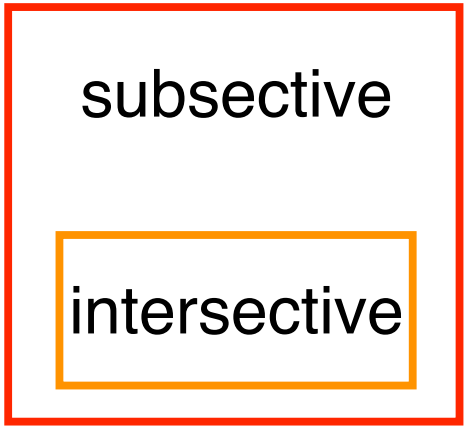




The typology

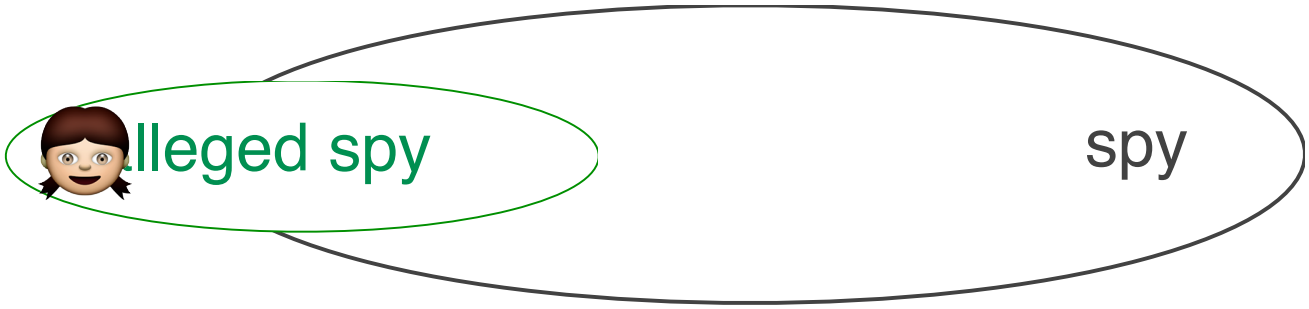
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

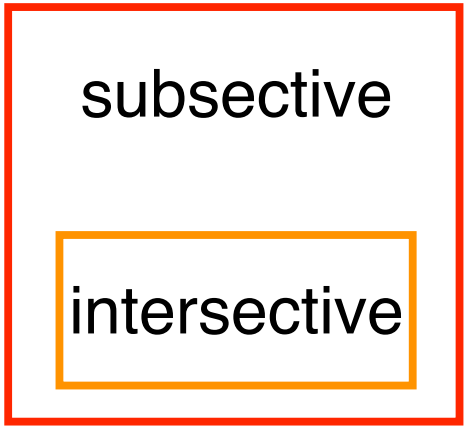




The typology

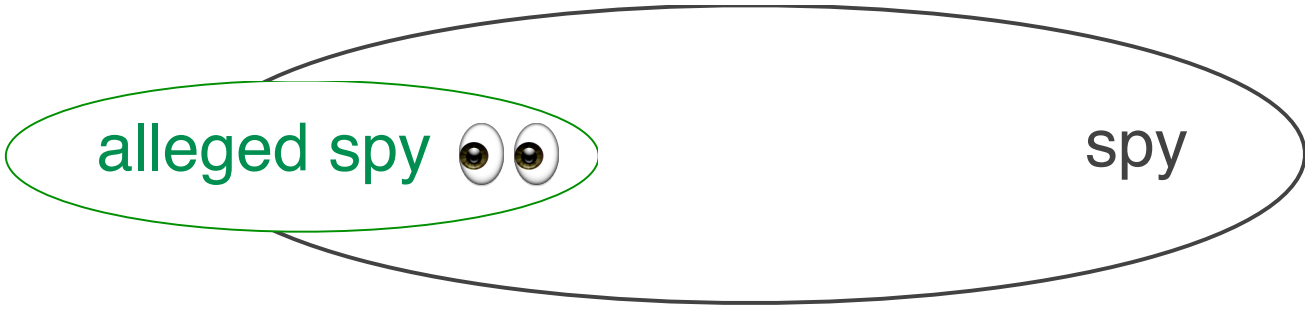
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

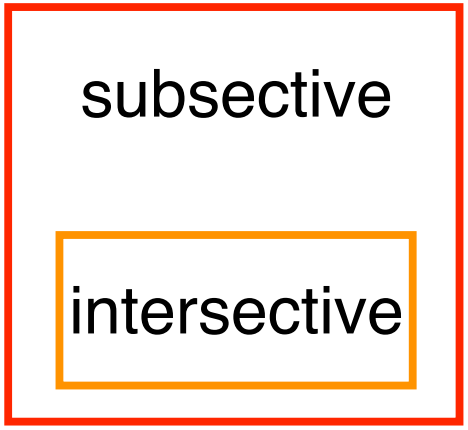




The typology

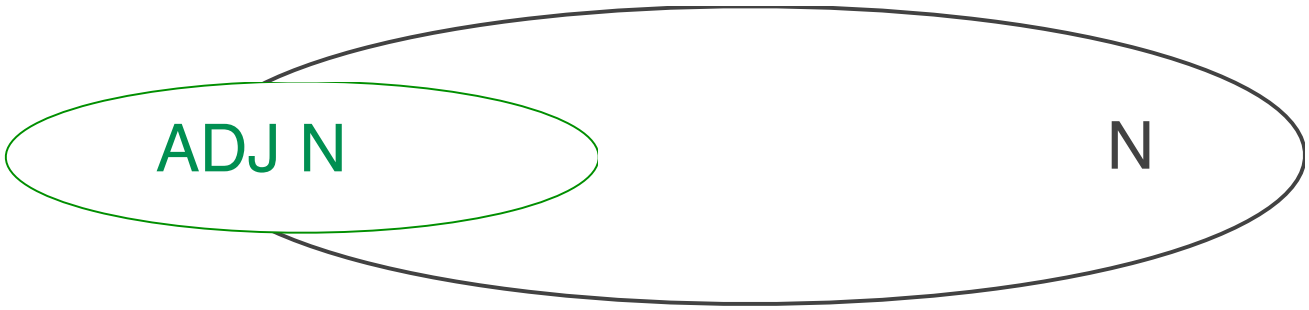
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

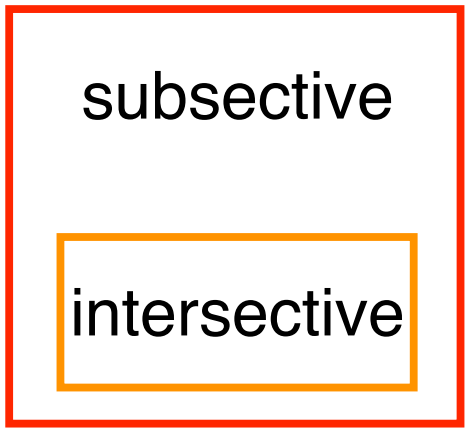




The typology

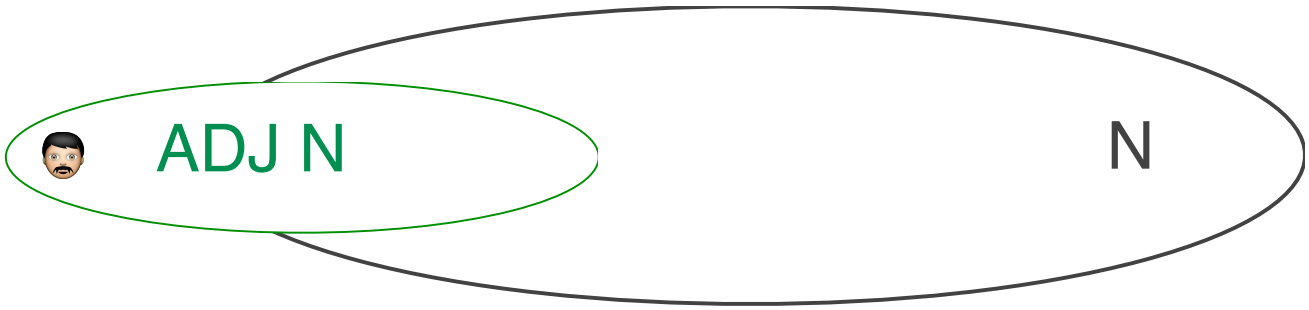
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

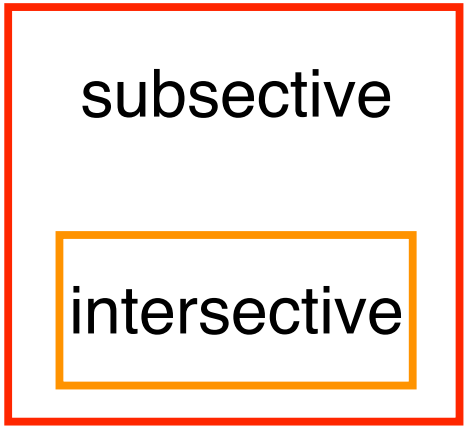




The typology

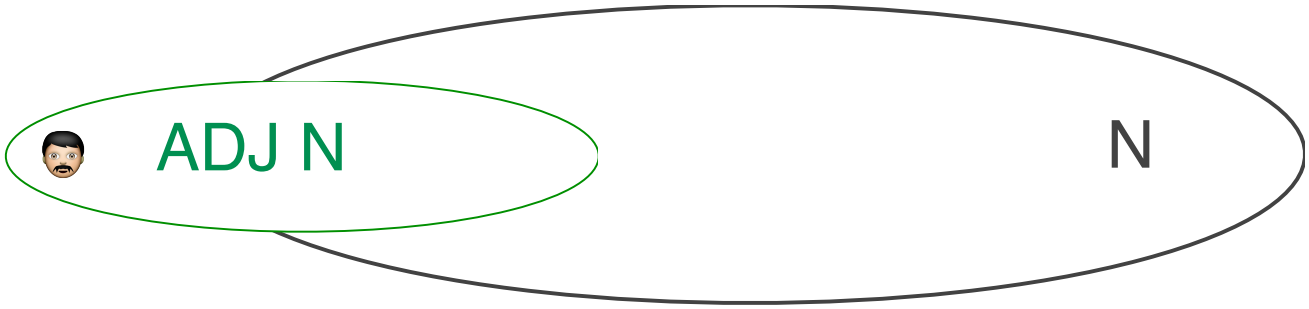
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$

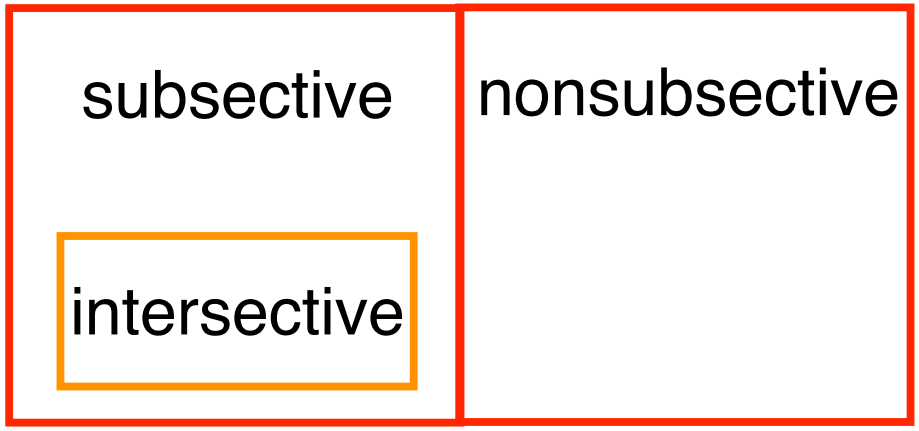




The typology

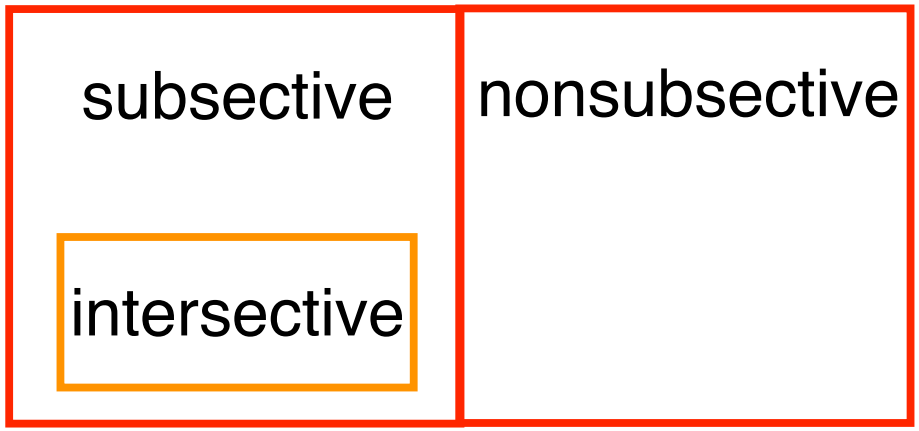
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$





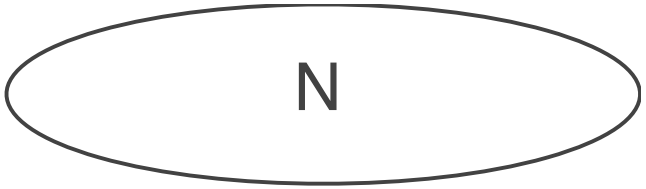
The typology

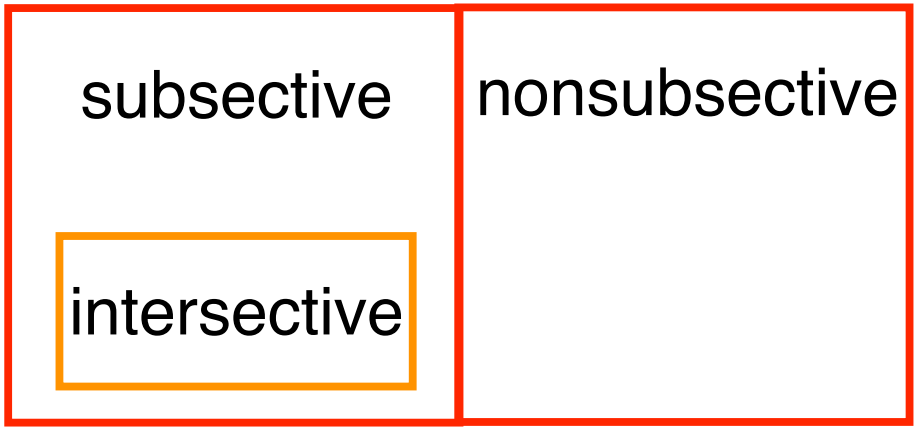
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$



The typology

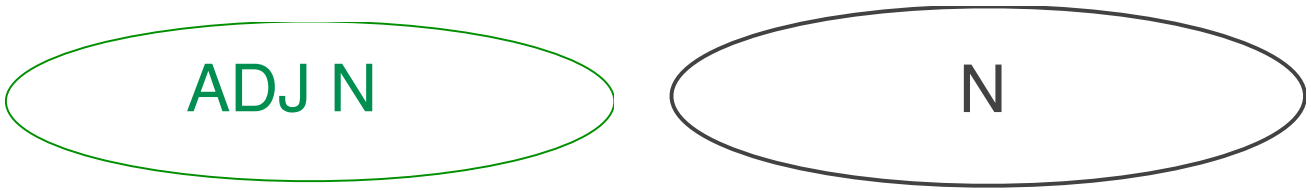
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

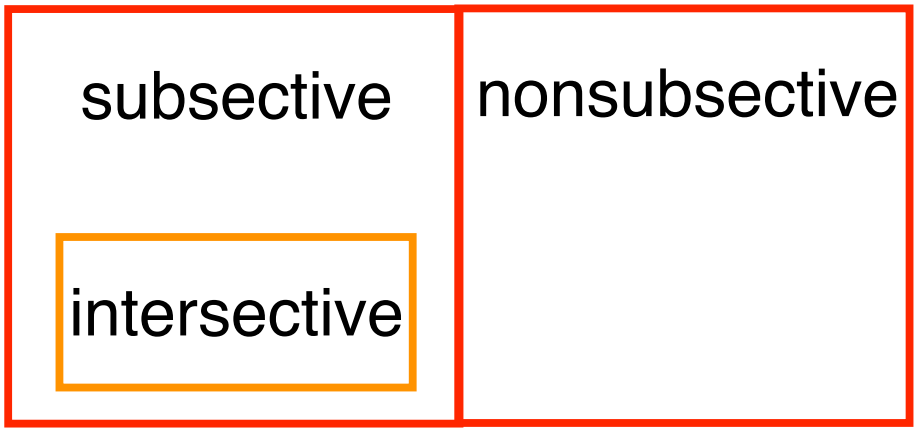




The typology

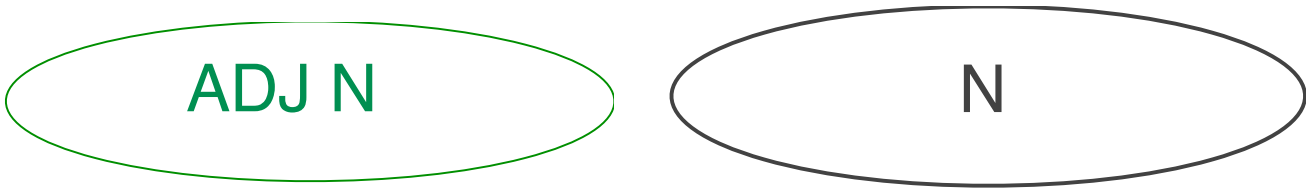
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

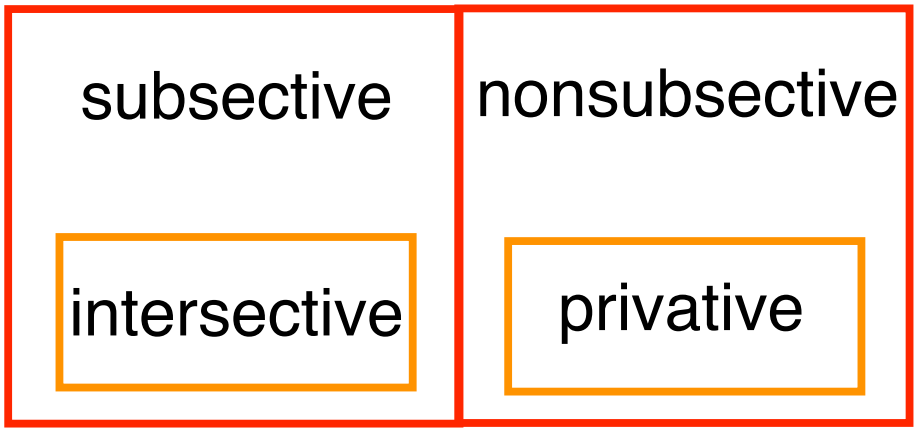




The typology

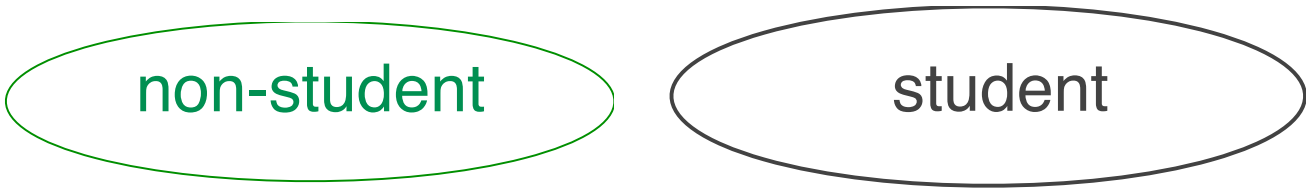
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

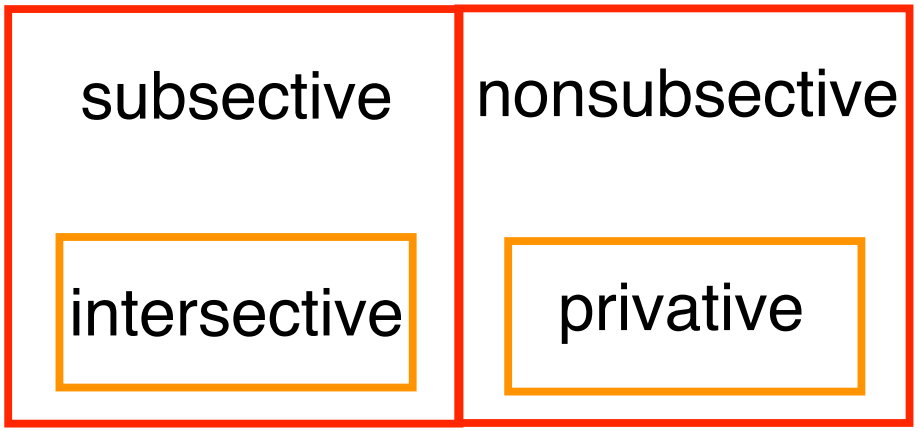




The typology

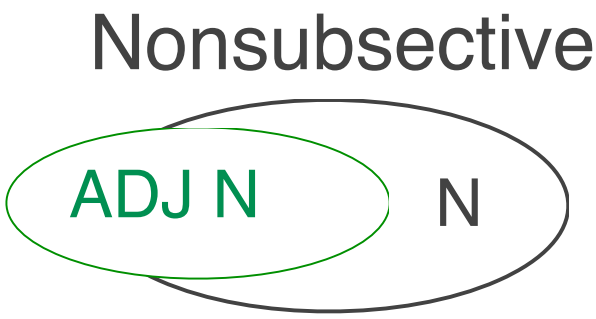
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

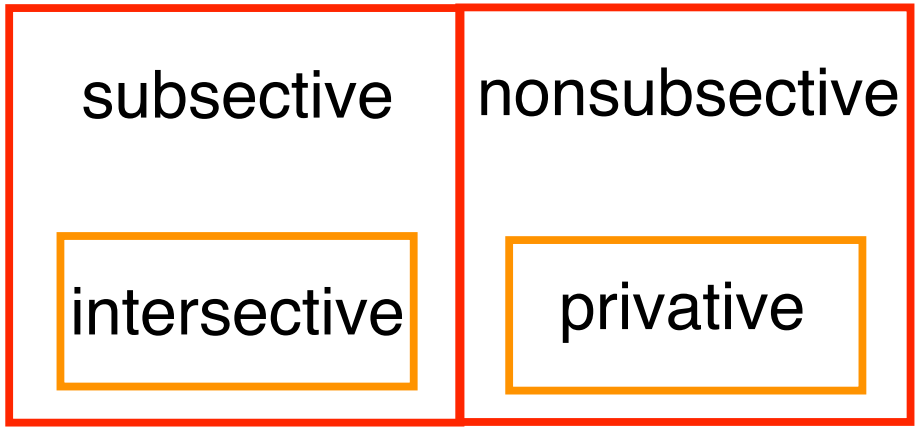




The typology

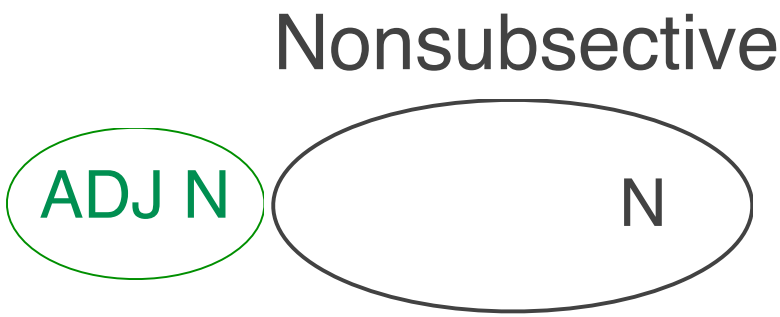
1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

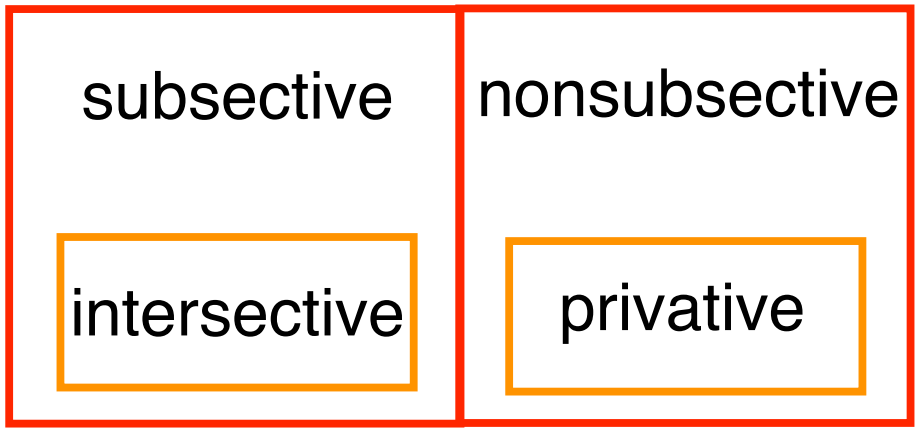




The typology

1. An adjective ADJ is intersective iff, for all N, $[\![\text{ADJ N}]\!] = [\![\text{ADJ}]\!] \cap [\![\text{N}]\!]$
2. An adjective ADJ is subsective iff, for all N, $[\![\text{ADJ N}]\!] \subseteq [\![\text{N}]\!]$
3. An adjective ADJ is nonsubsective iff ADJ is not subsective, i.e., there is at least one N such that $[\![\text{ADJ N}]\!] \not\subseteq [\![\text{N}]\!]$
4. An adjective ADJ is privative iff, for all N, $[\![\text{ADJ N}]\!] \cap [\![\text{N}]\!] = \emptyset$

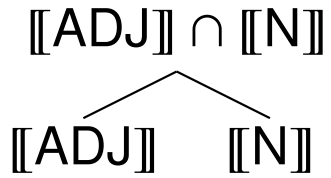




Interpretation

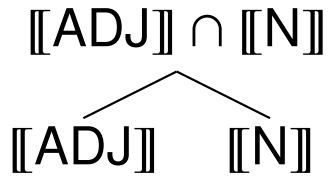
Interpretation

1. If ADJ is intersective:

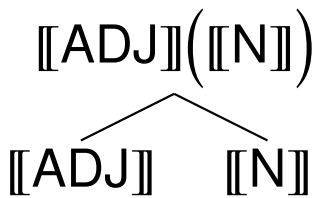


Interpretation

1. If ADJ is intersective:

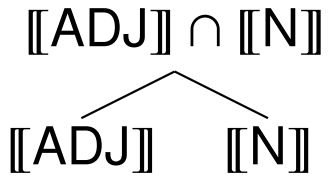


2. If ADJ is not intersective:

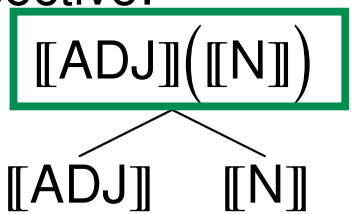


Interpretation

1. If ADJ is intersective:

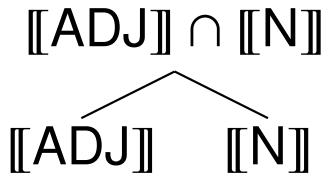


2. If ADJ is not intersective:

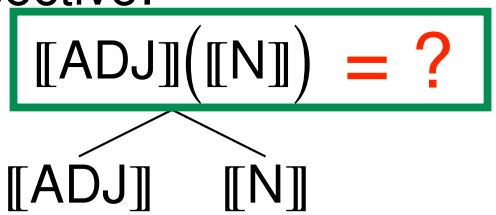


Interpretation

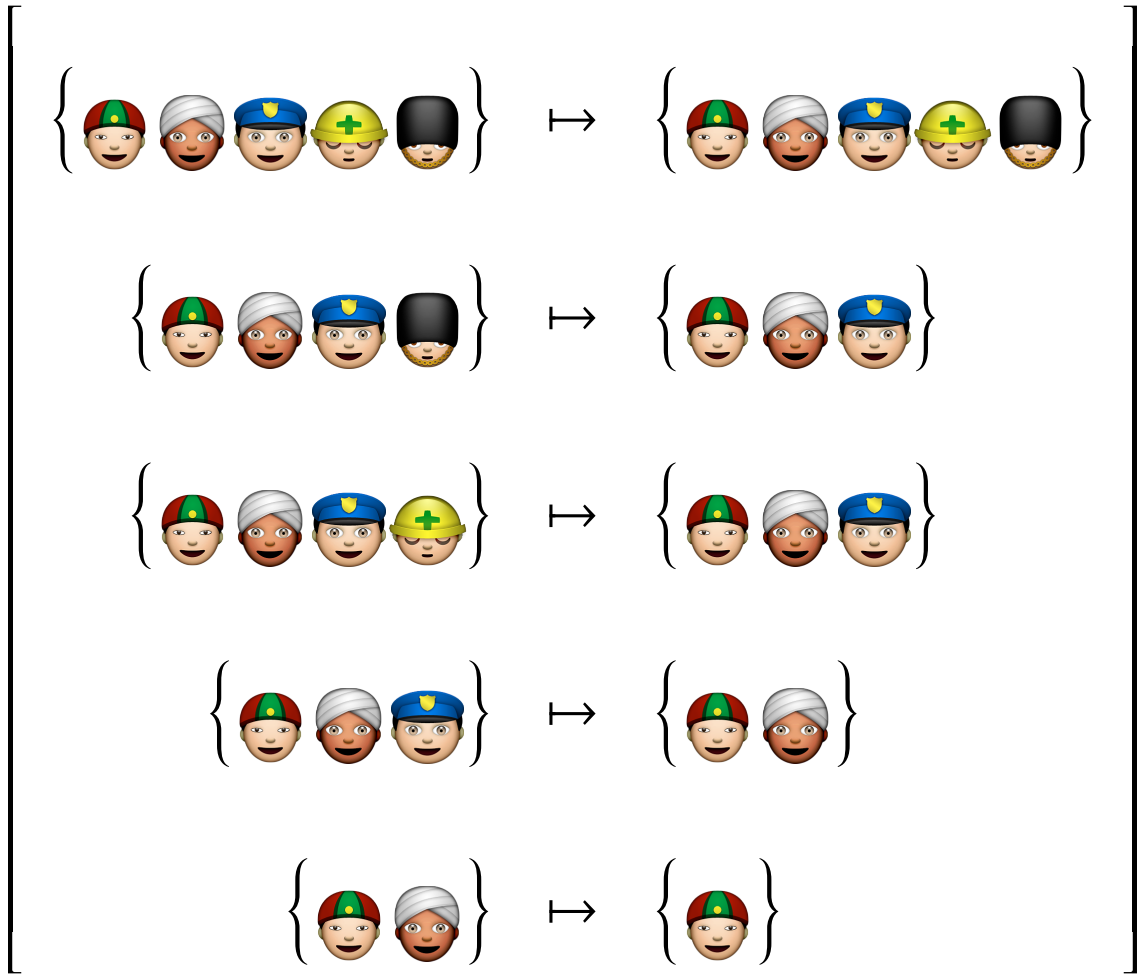
1. If ADJ is intersective:



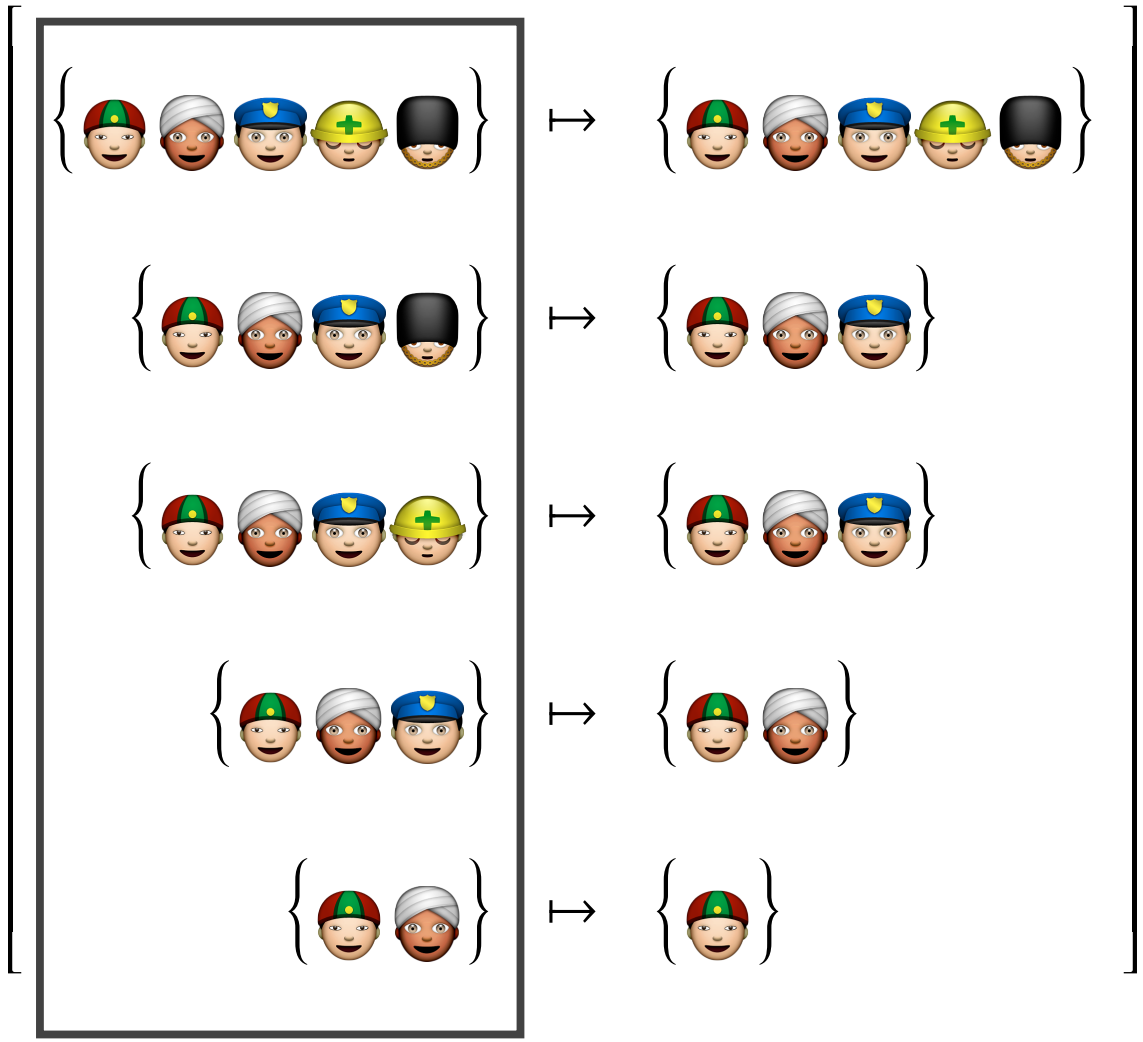
2. If ADJ is not intersective:



Adjectives as function

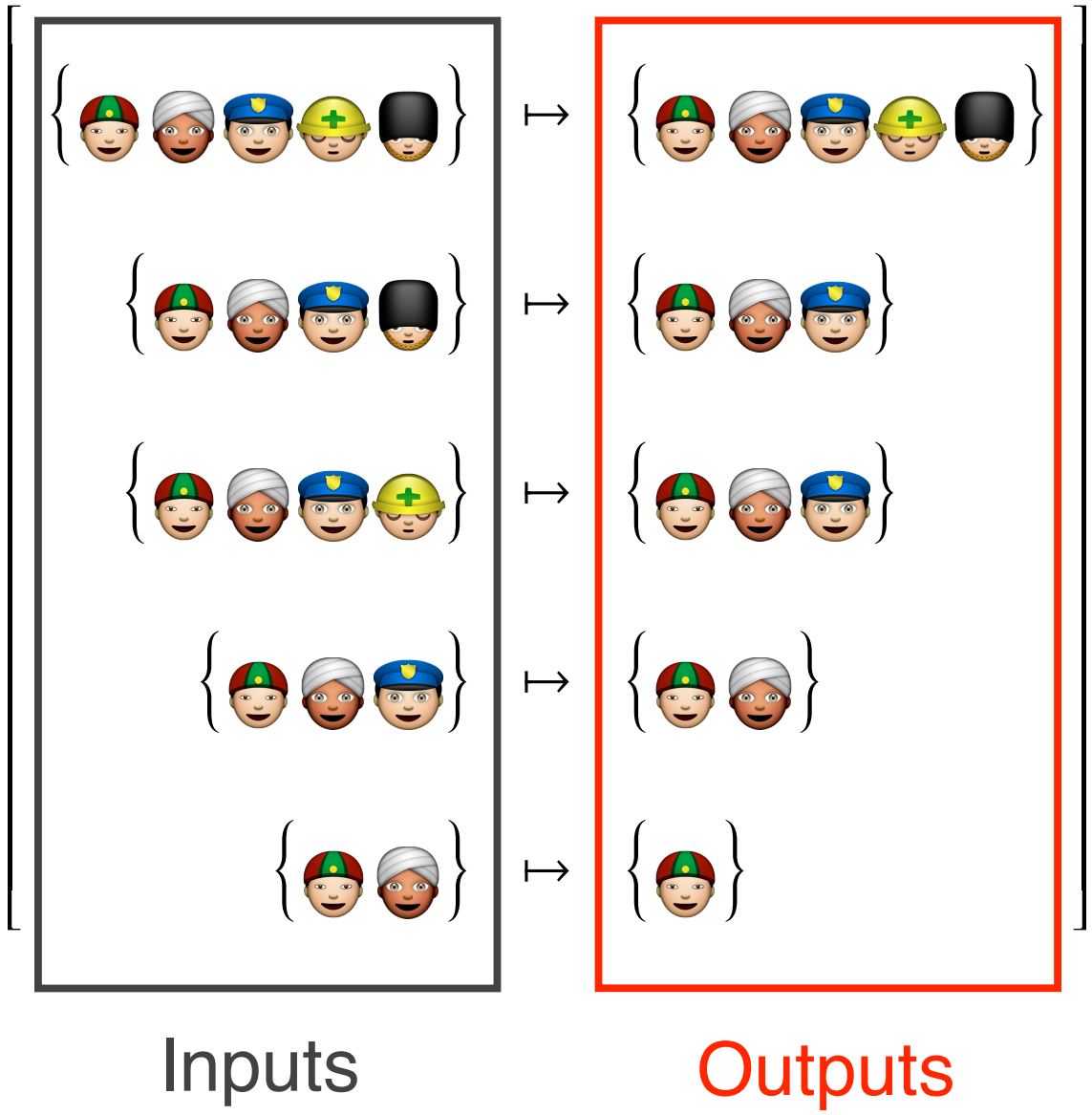


Adjectives as function

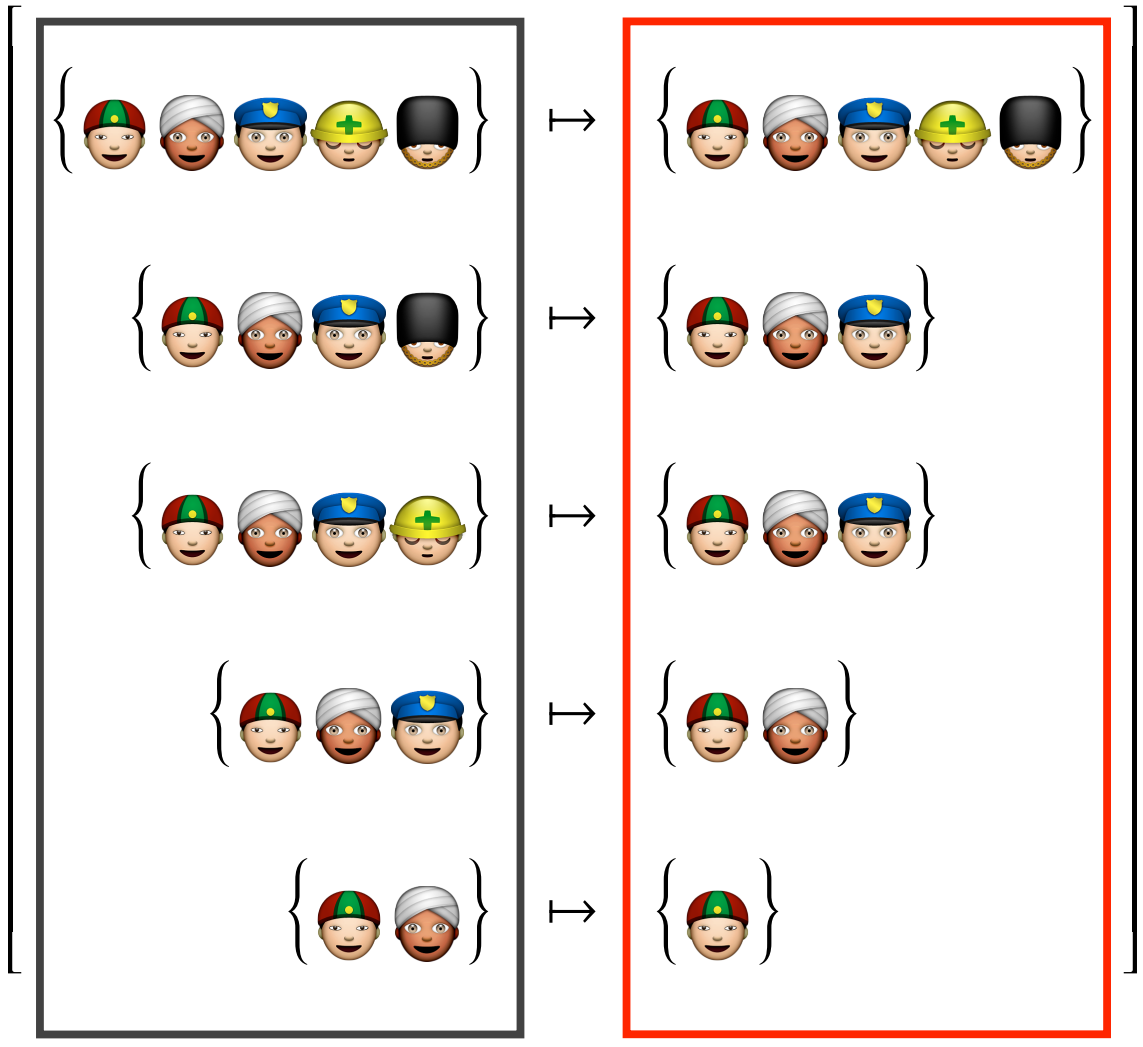


Inputs

Adjectives as function



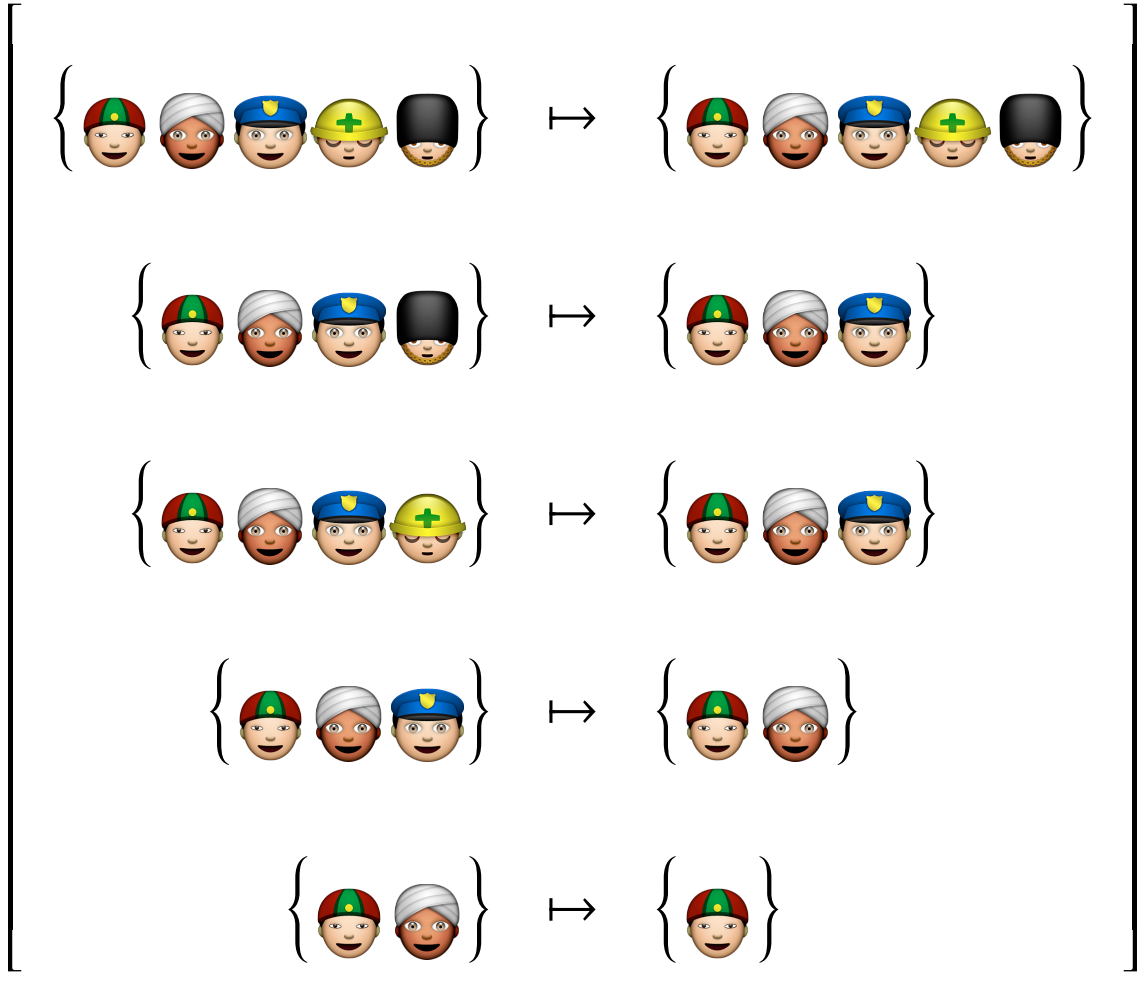
Adjectives as function



Inputs

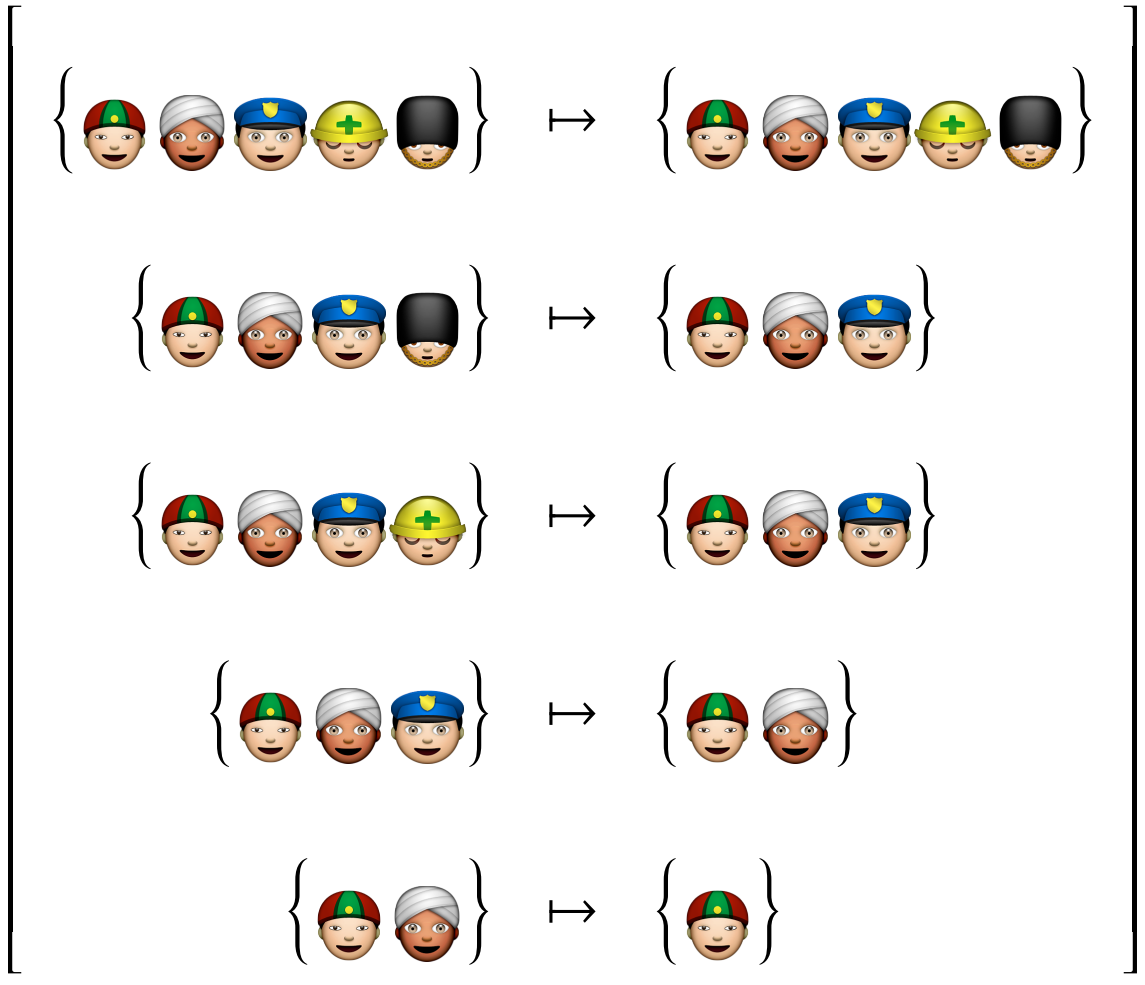
Modified N meanings

Adjectives as function



(subsective)

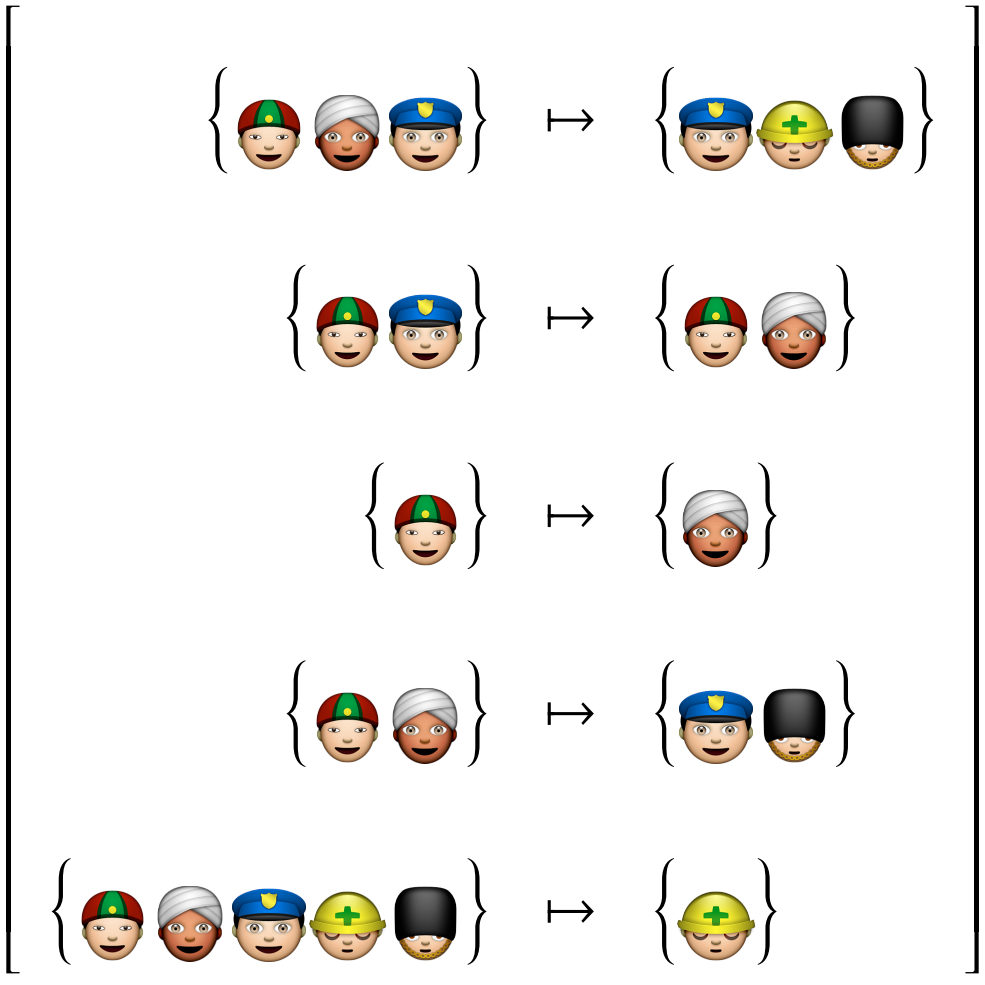
Adjectives as function



$\supseteq$

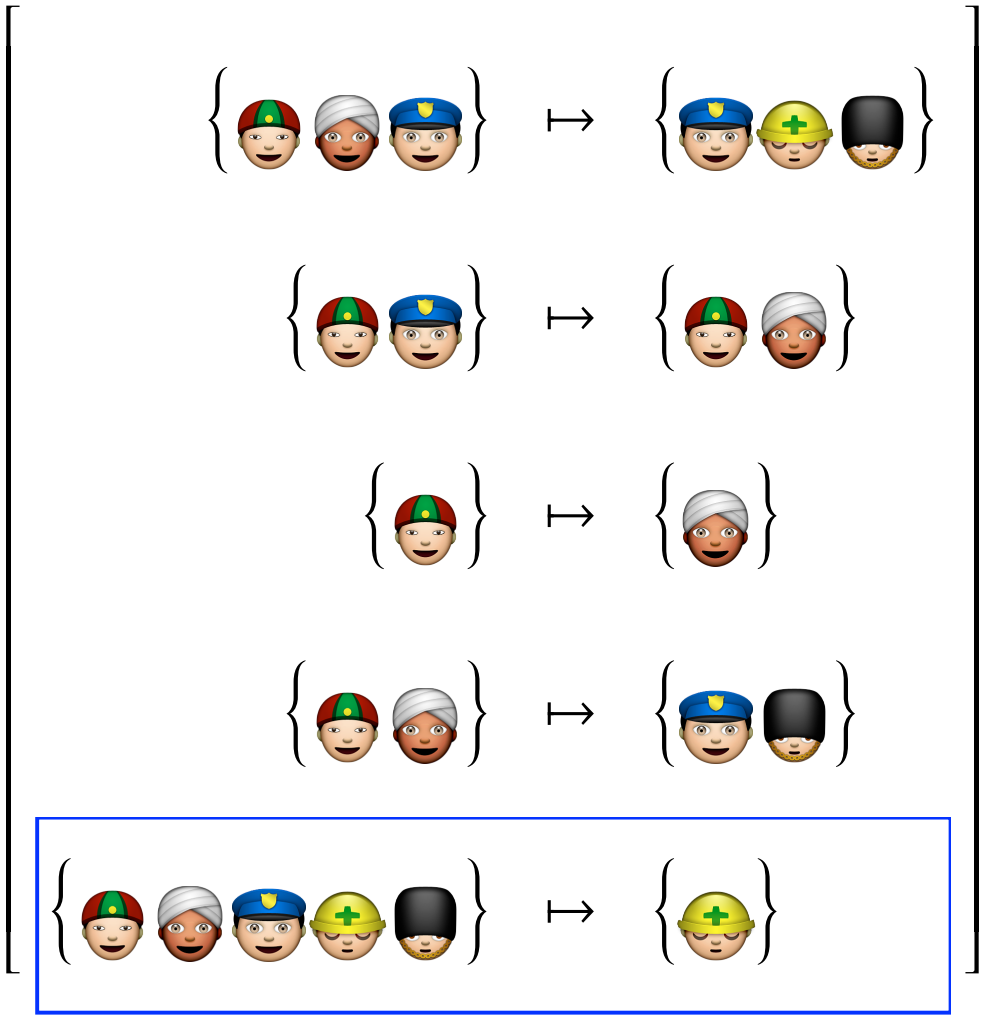
(subsective)

Adjectives as function



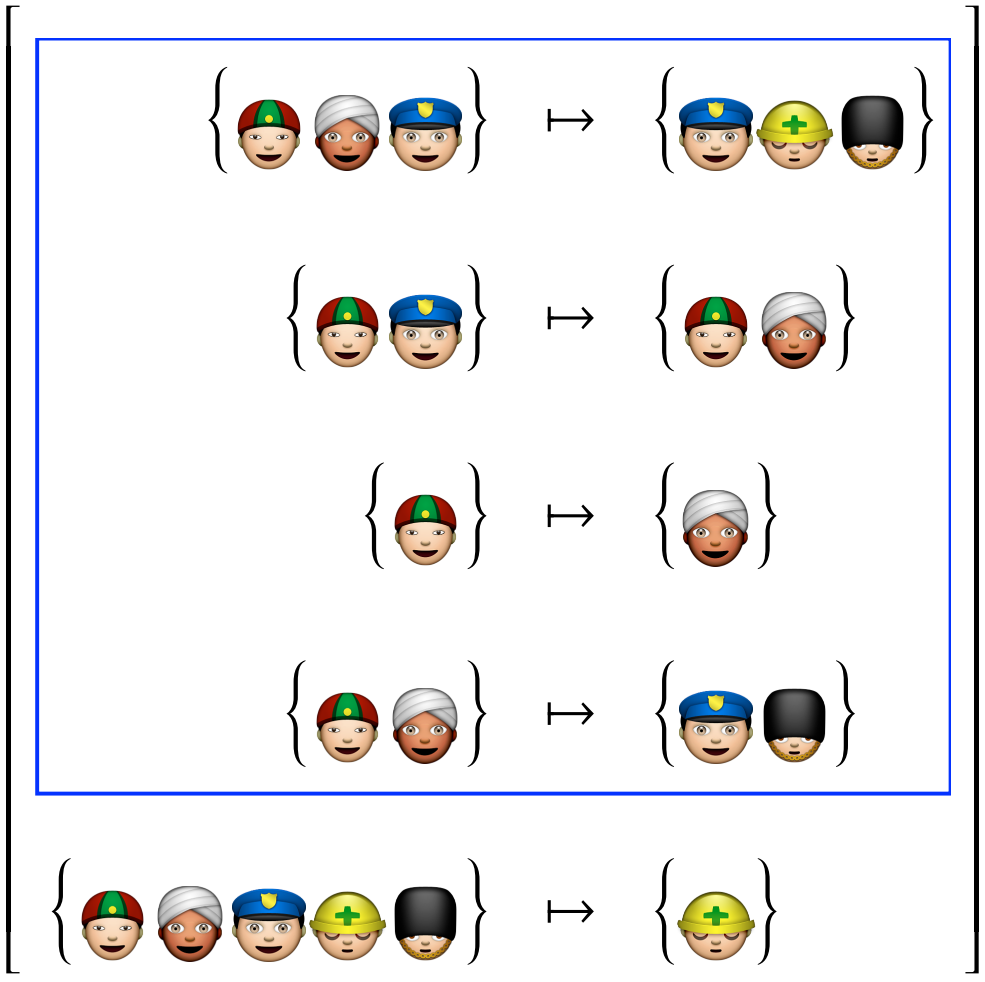
(nonsubsective)

Adjectives as function



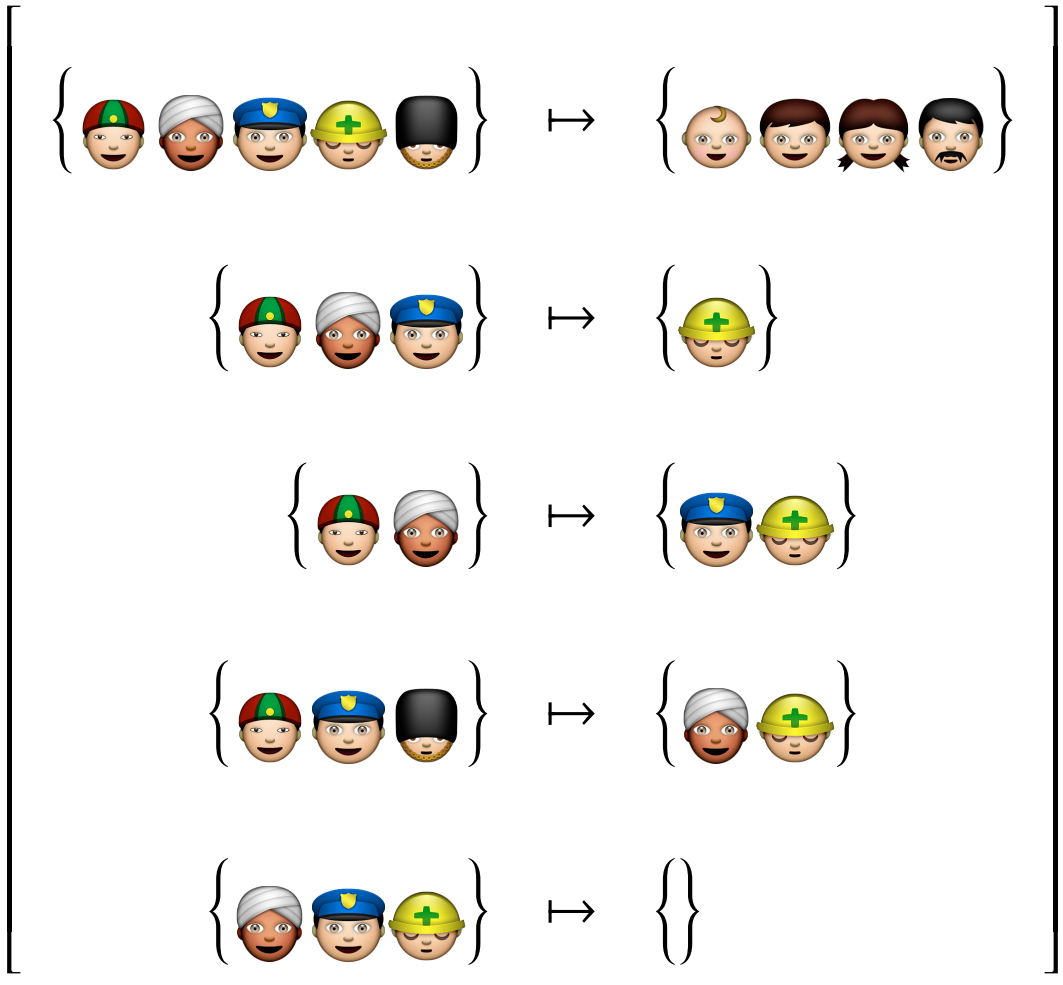
(nonsubsective)

Adjectives as function



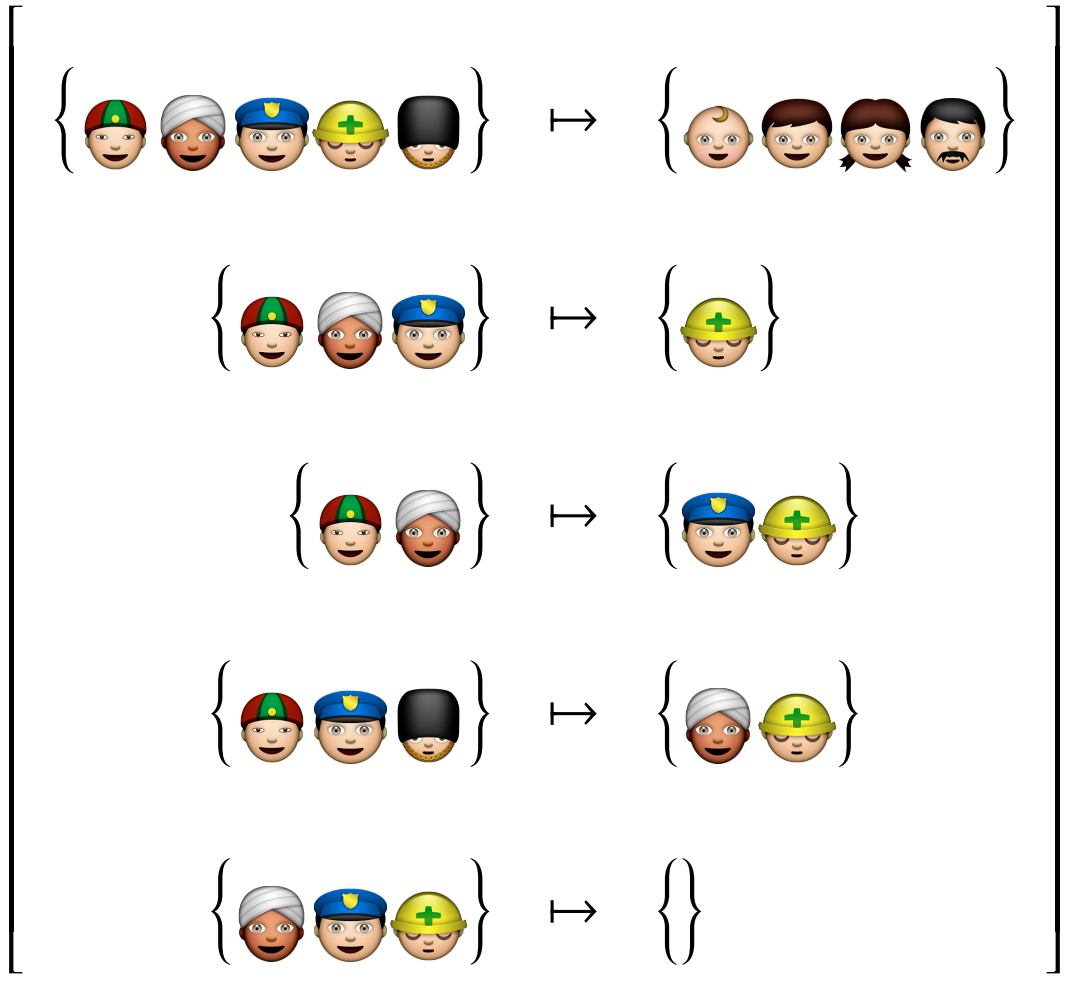
(nonsubsective)

Adjectives as function



(privative)

Adjectives as function



(privative)

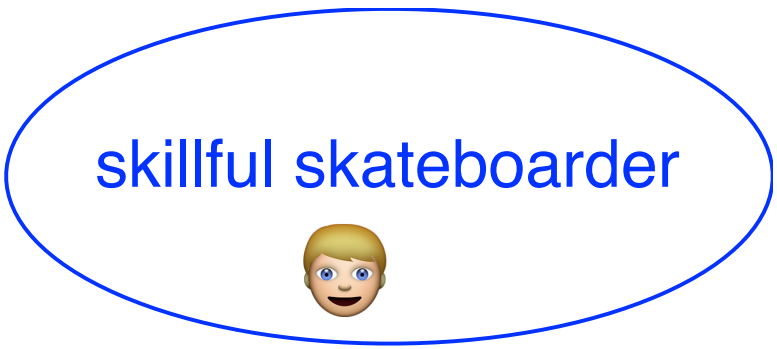
The limits of the intersective analysis

The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

The limits of the intersective analysis

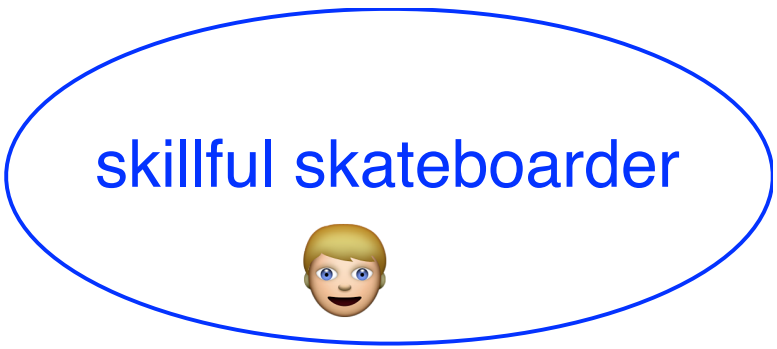
TRUE: Bart Simpson is a skillful skateboarder



The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

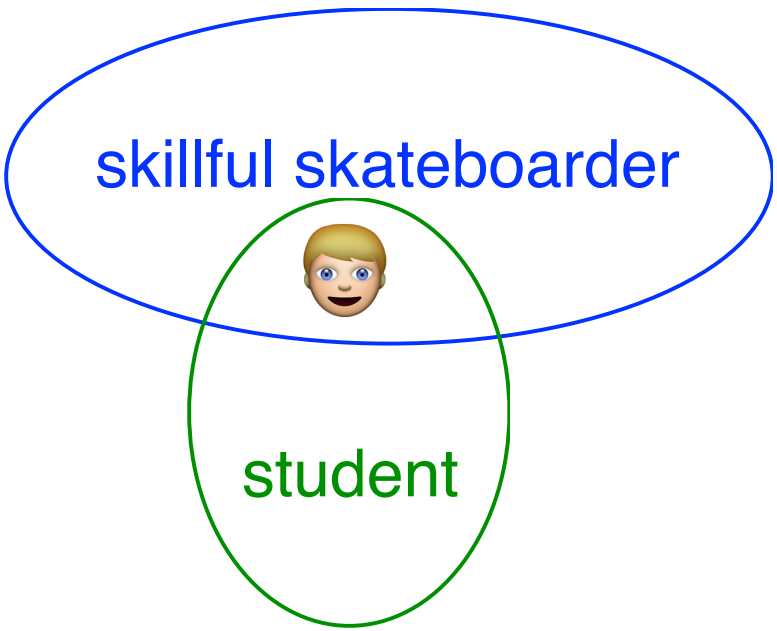
TRUE: Bart is a student



The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

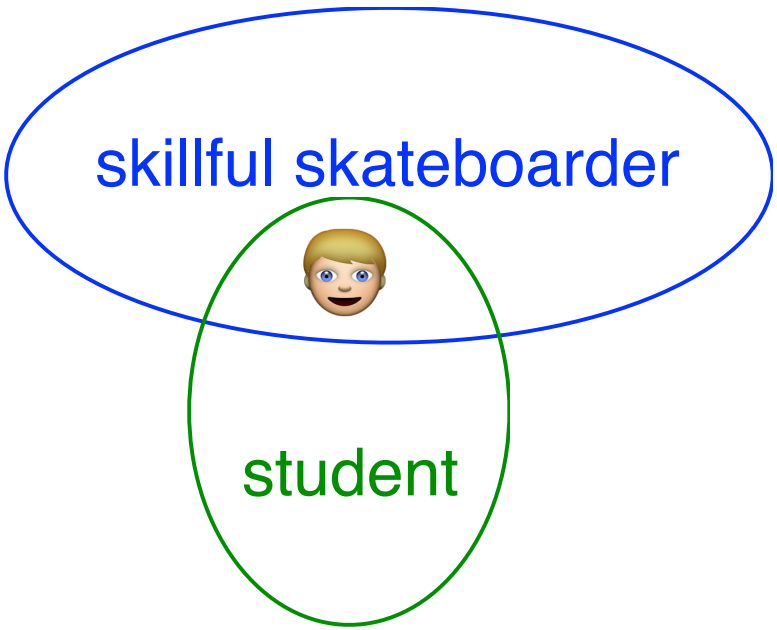


The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.

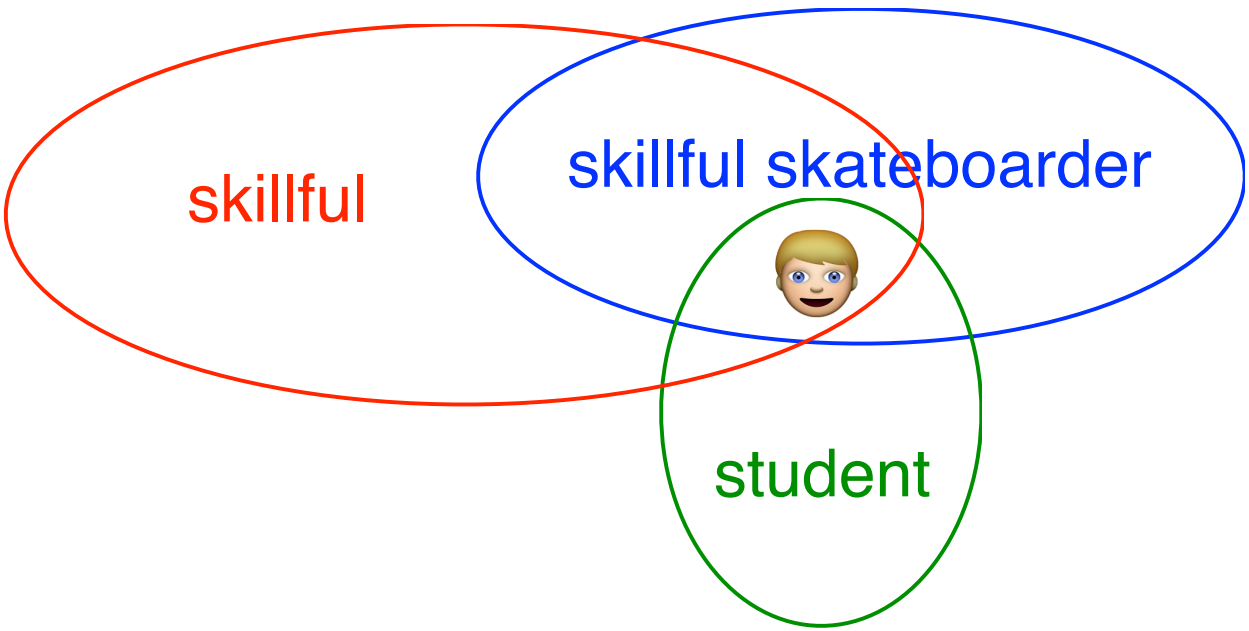


The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.

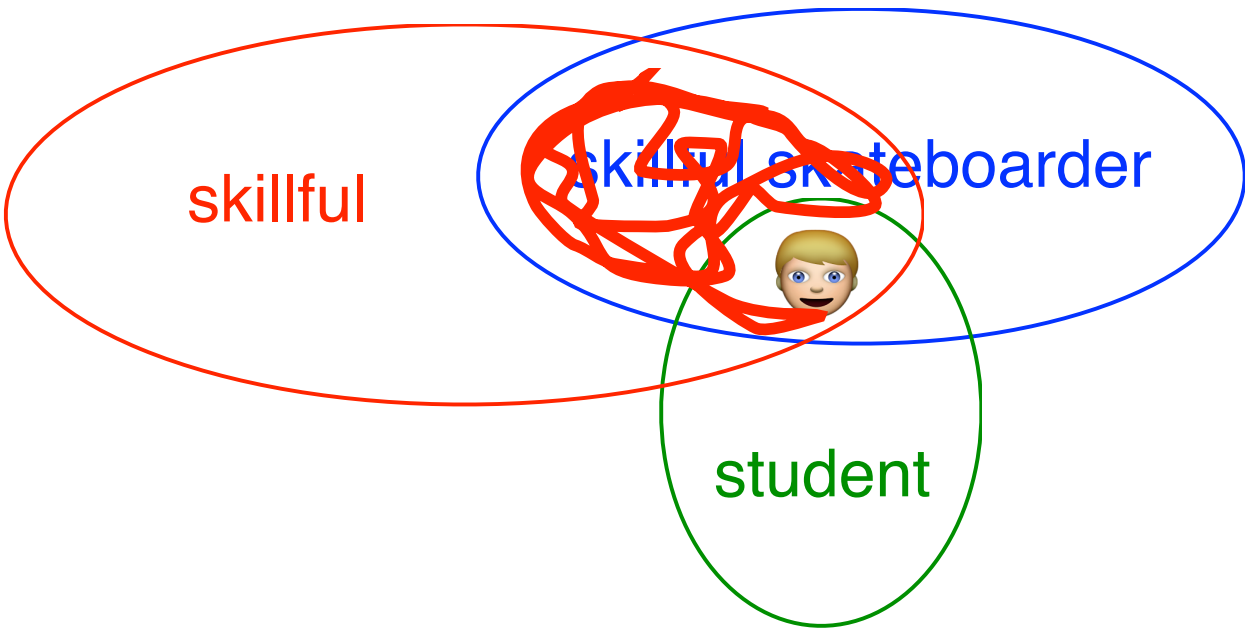


The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.



The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.

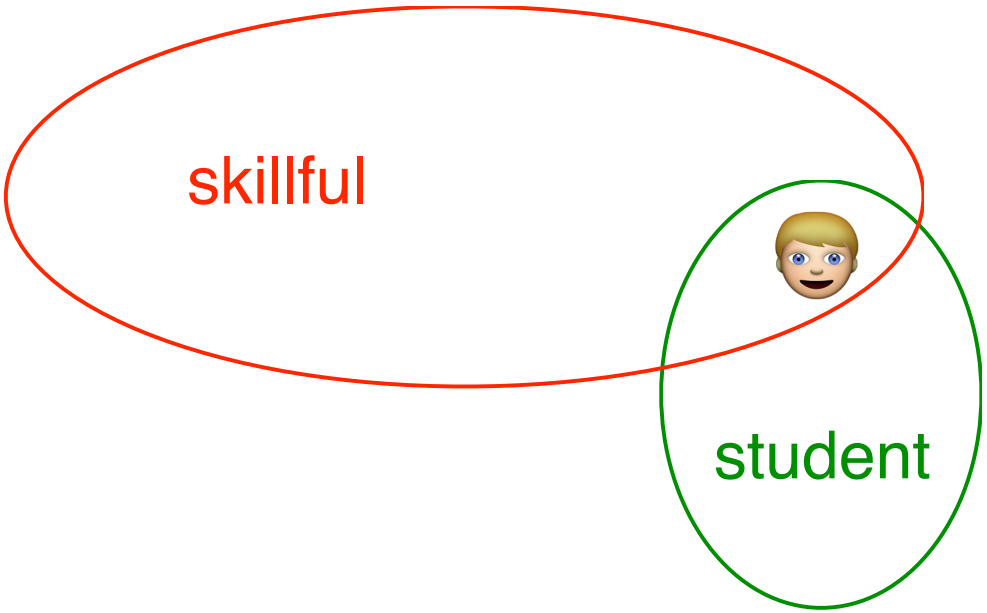
The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.

TRUE: Bart is a skillful student.



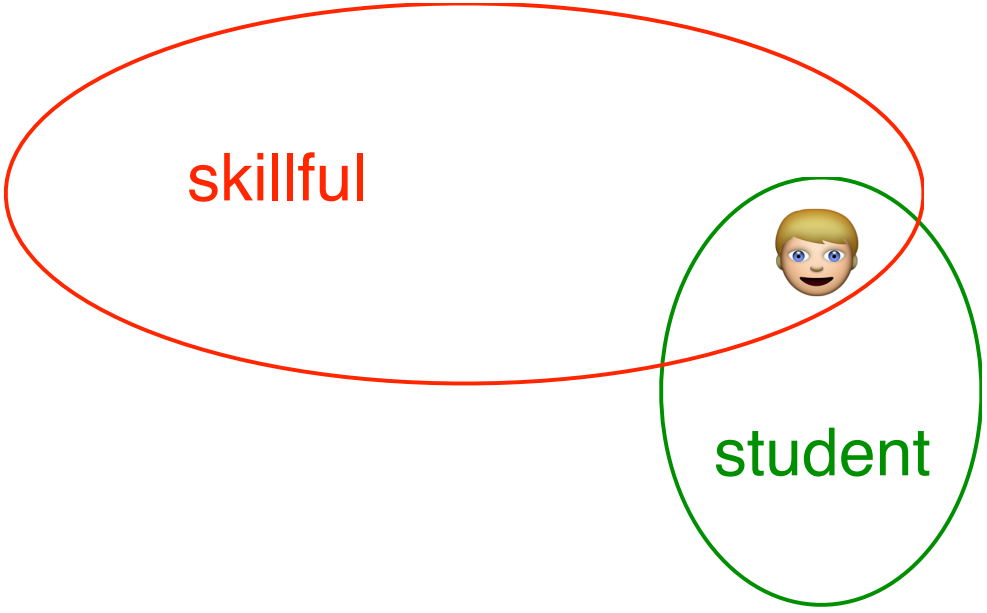
The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

FALSE: Bart is a skillful student.

TRUE: Bart is a skillful student.



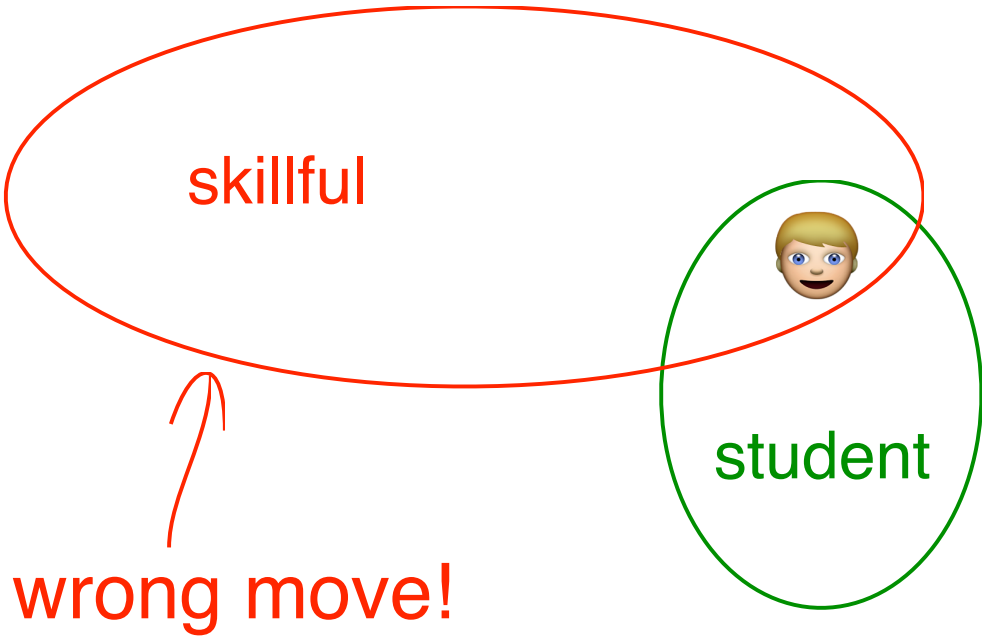
The limits of the intersective analysis

TRUE: Bart Simpson is a skillful skateboarder

TRUE: Bart is a student

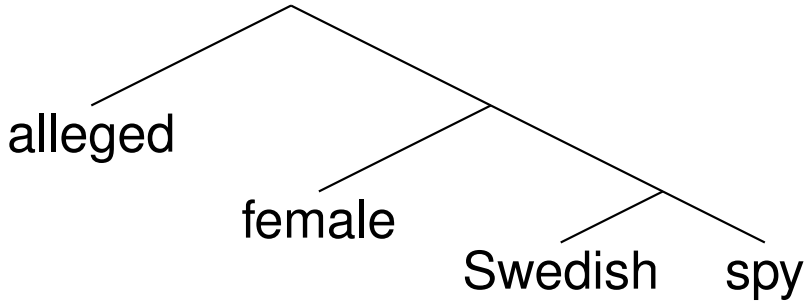
FALSE: Bart is a skillful student.

TRUE: Bart is a skillful student.

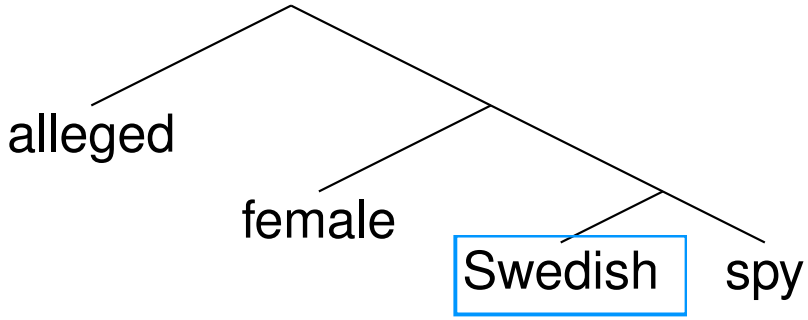


Compositionality

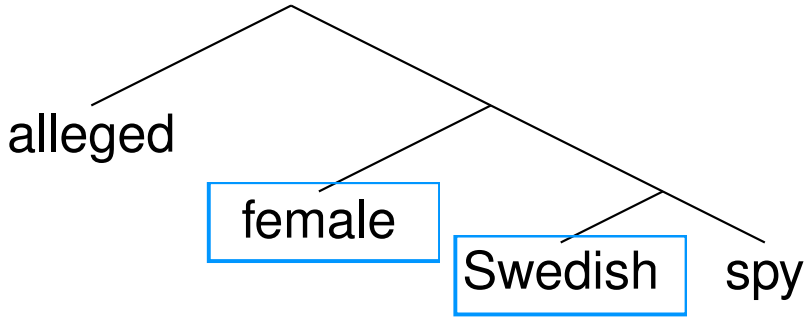
Compositionality



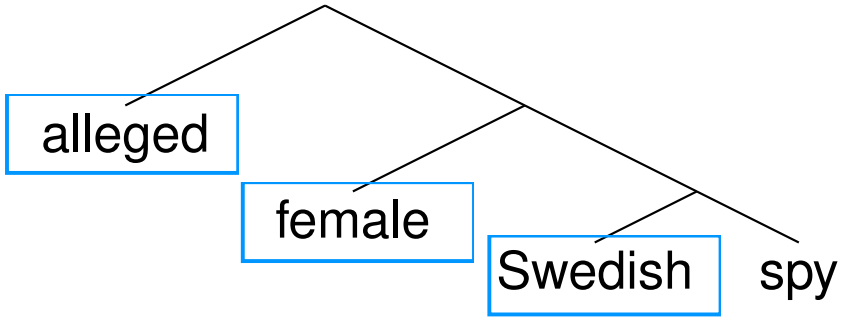
Compositionality



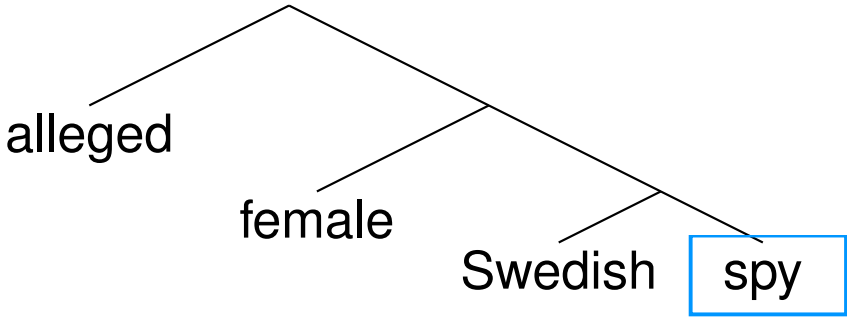
Compositionality



Compositionality

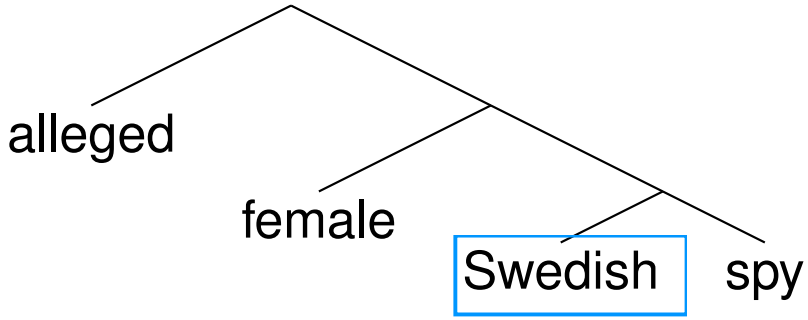


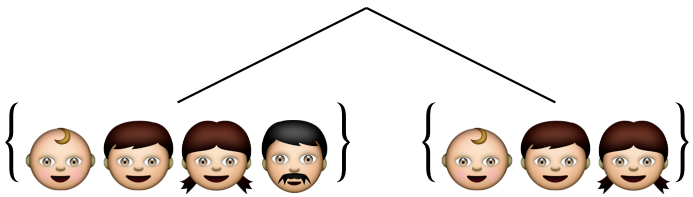
Compositionality



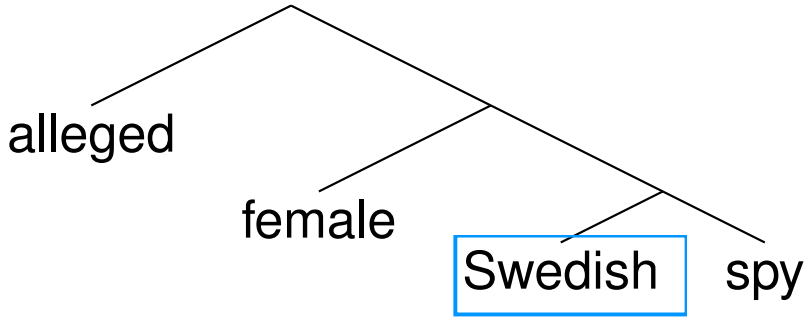
{👶👦👧}

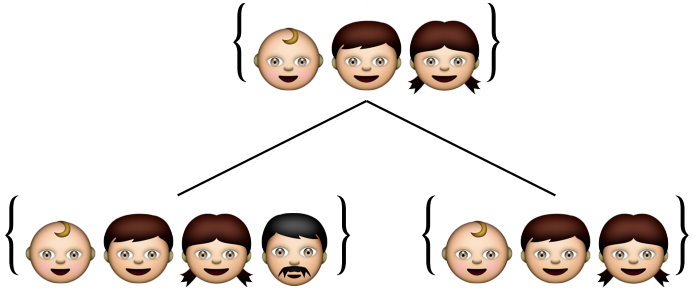
Compositionality



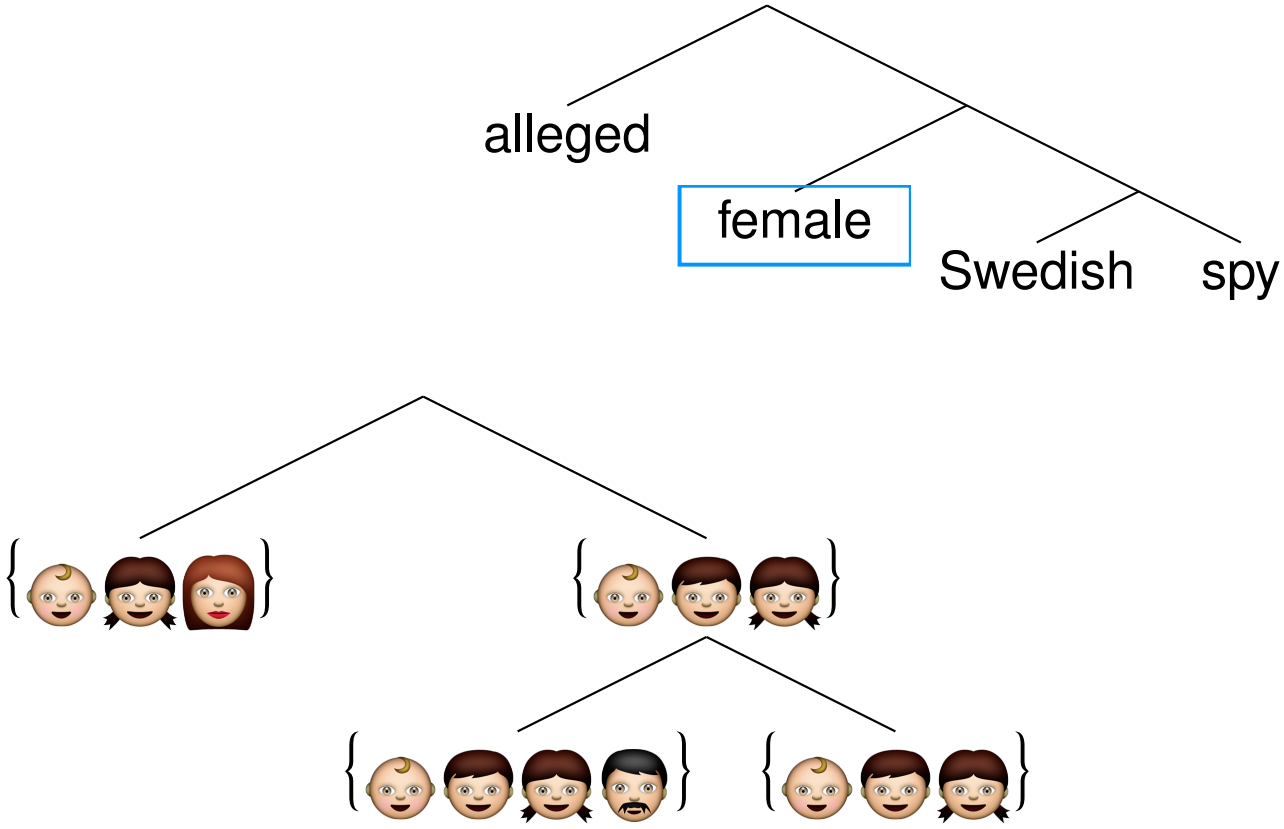


Compositionality

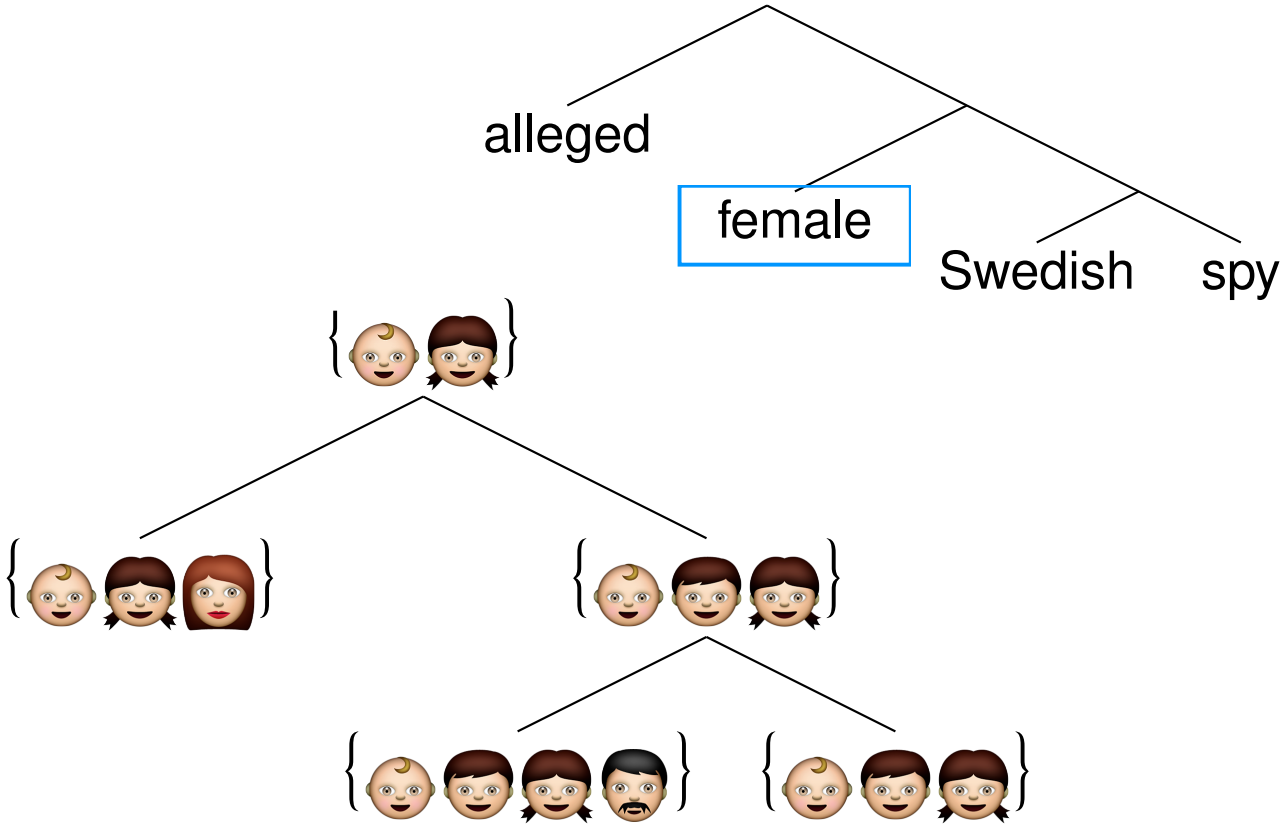




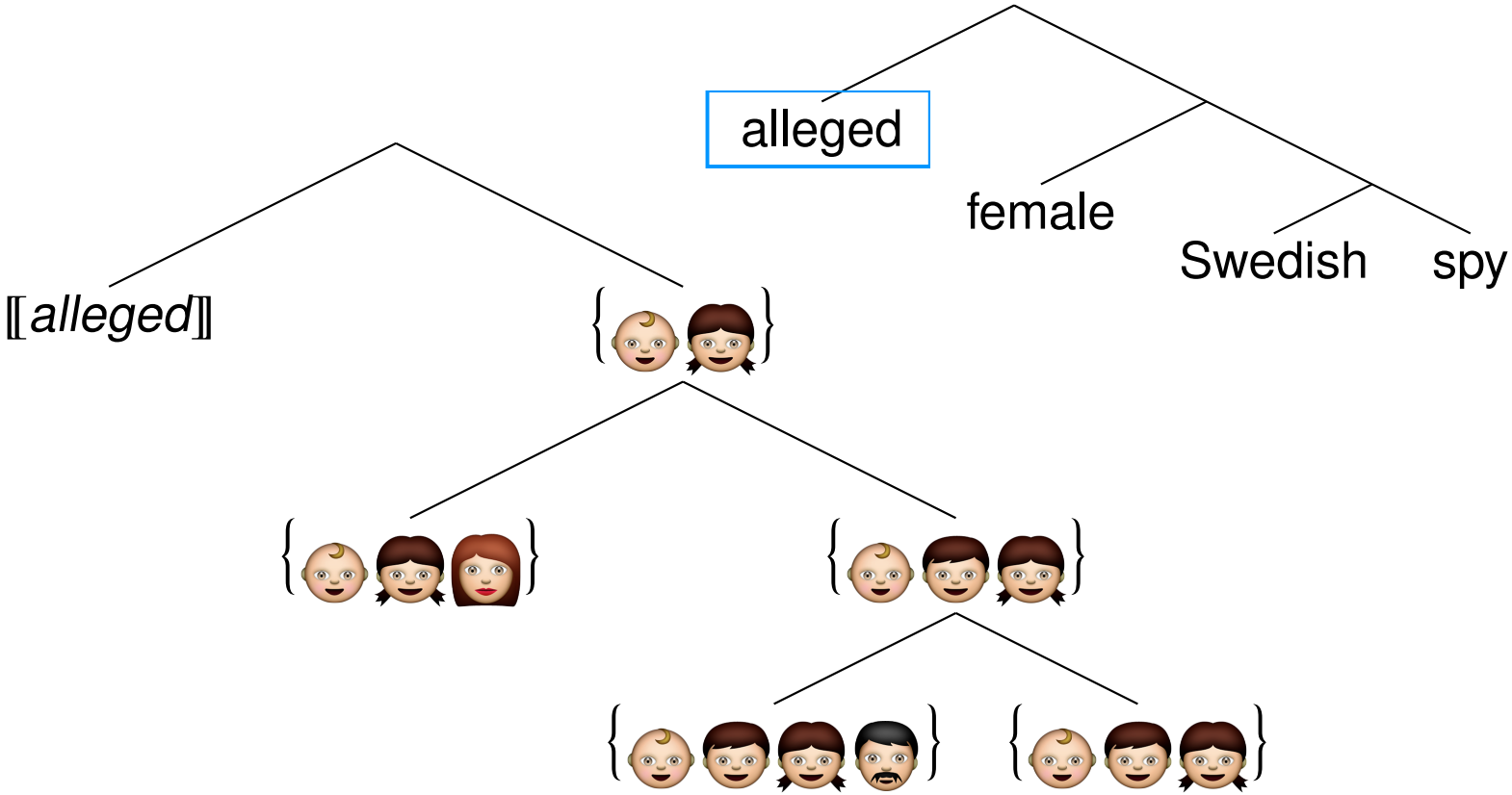
Compositionality



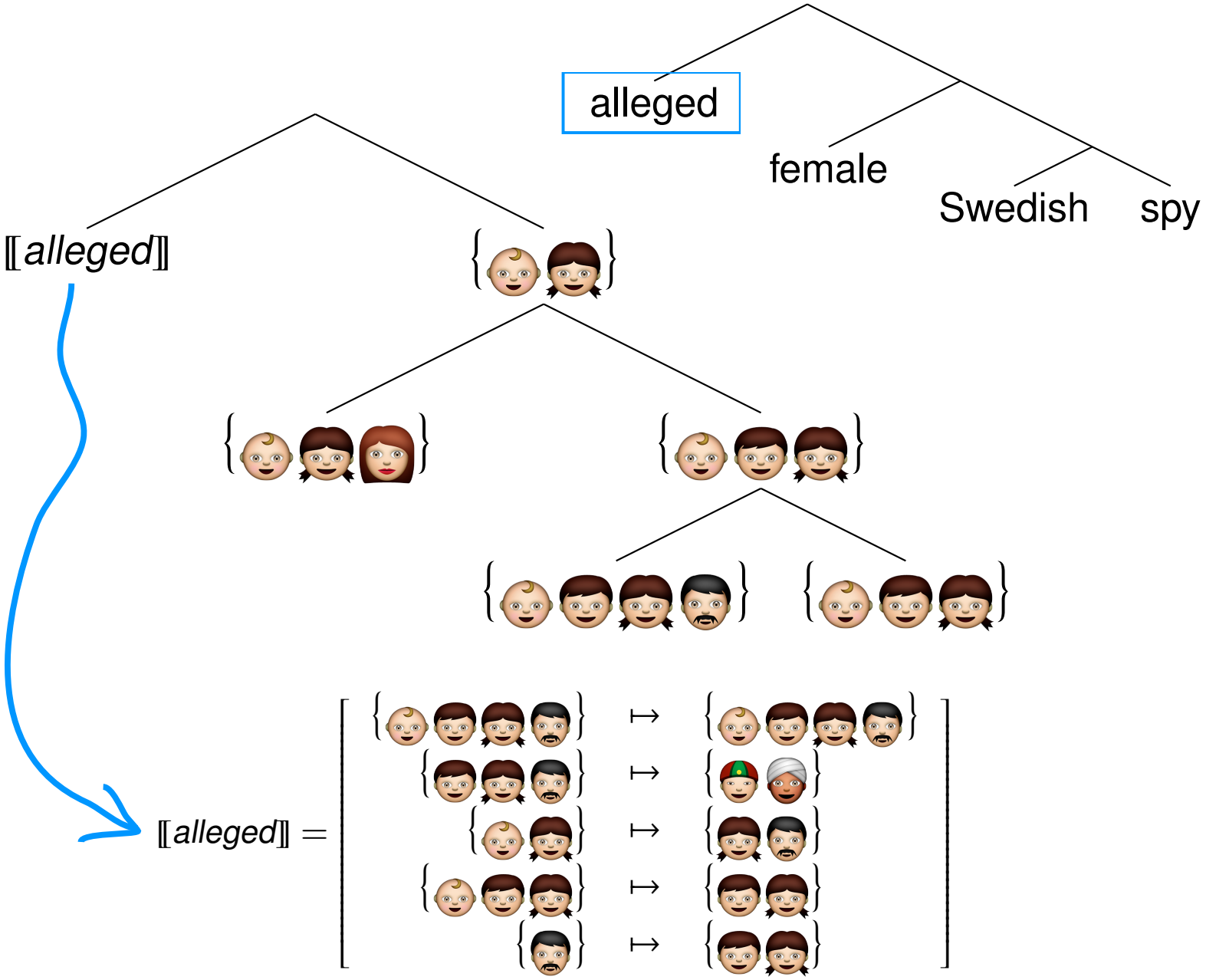
Compositionality



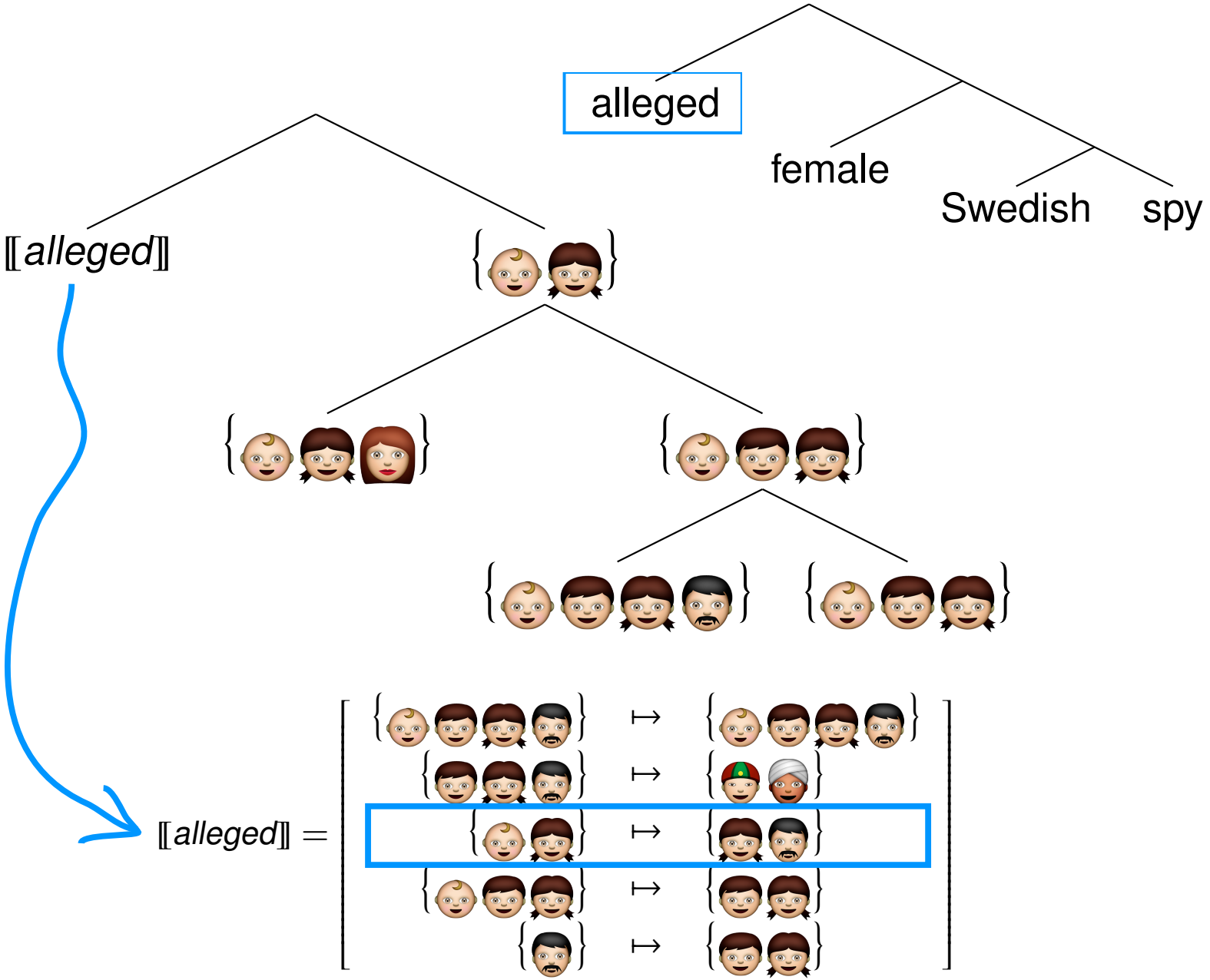
Compositionality



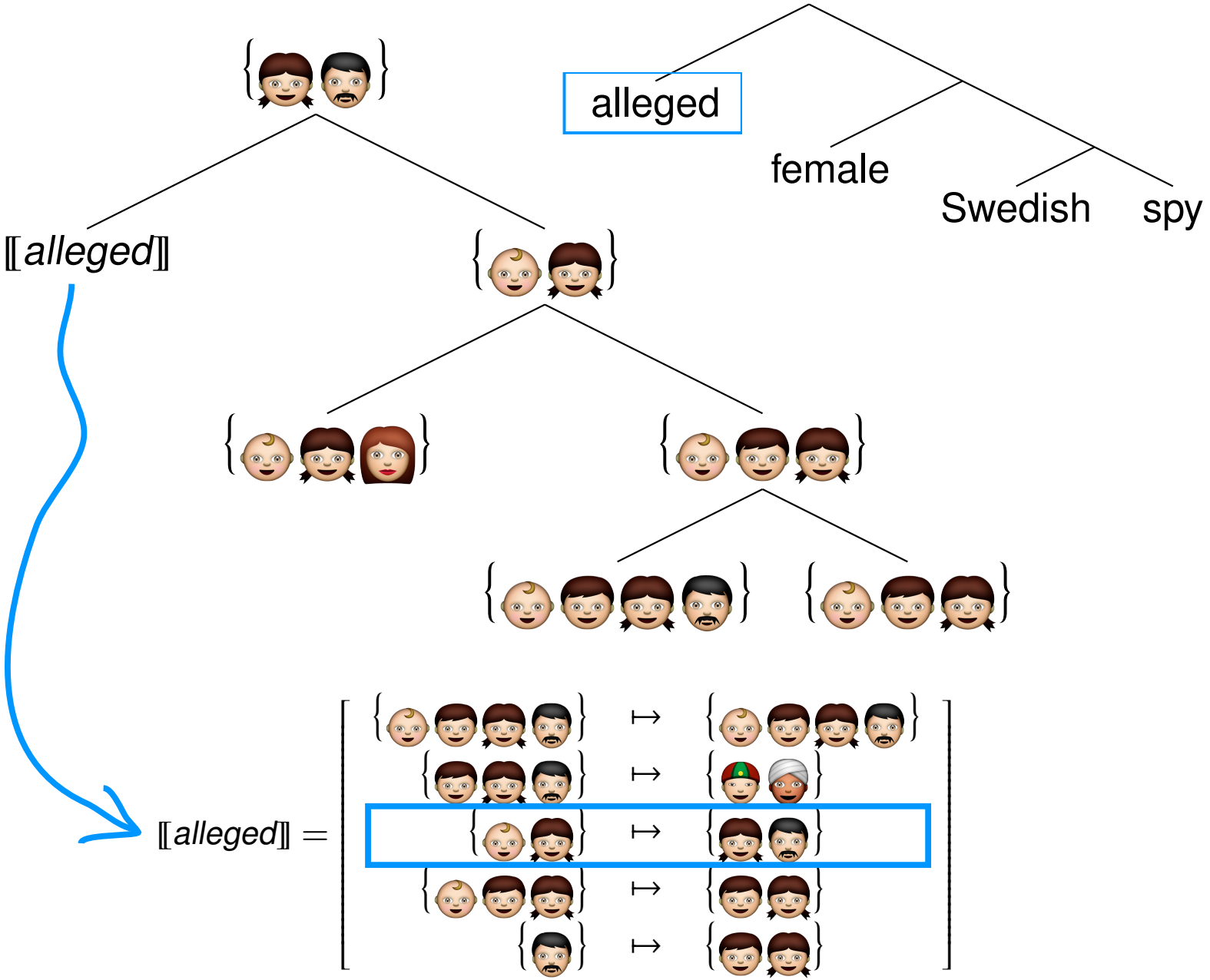
Compositionality



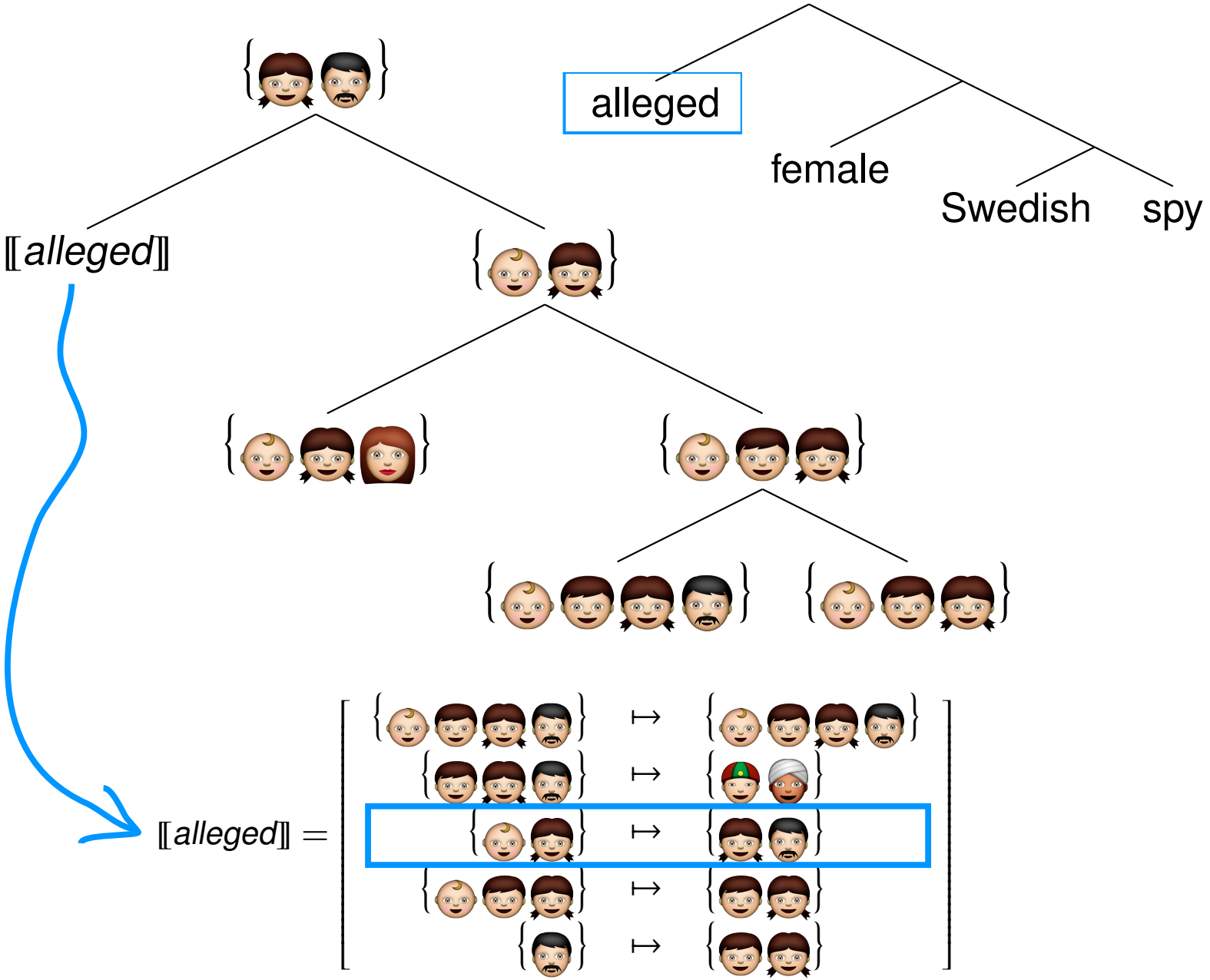
Compositionality



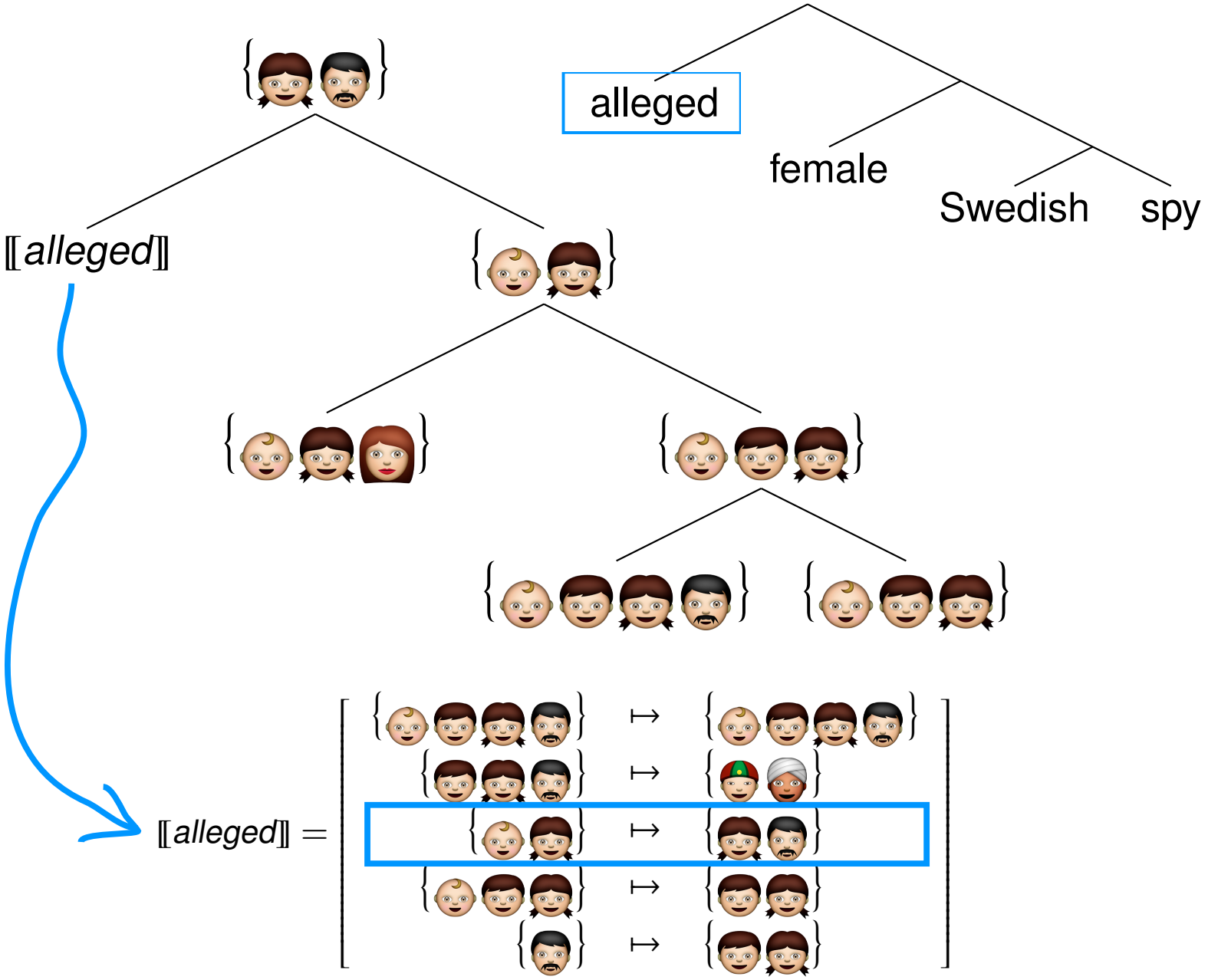
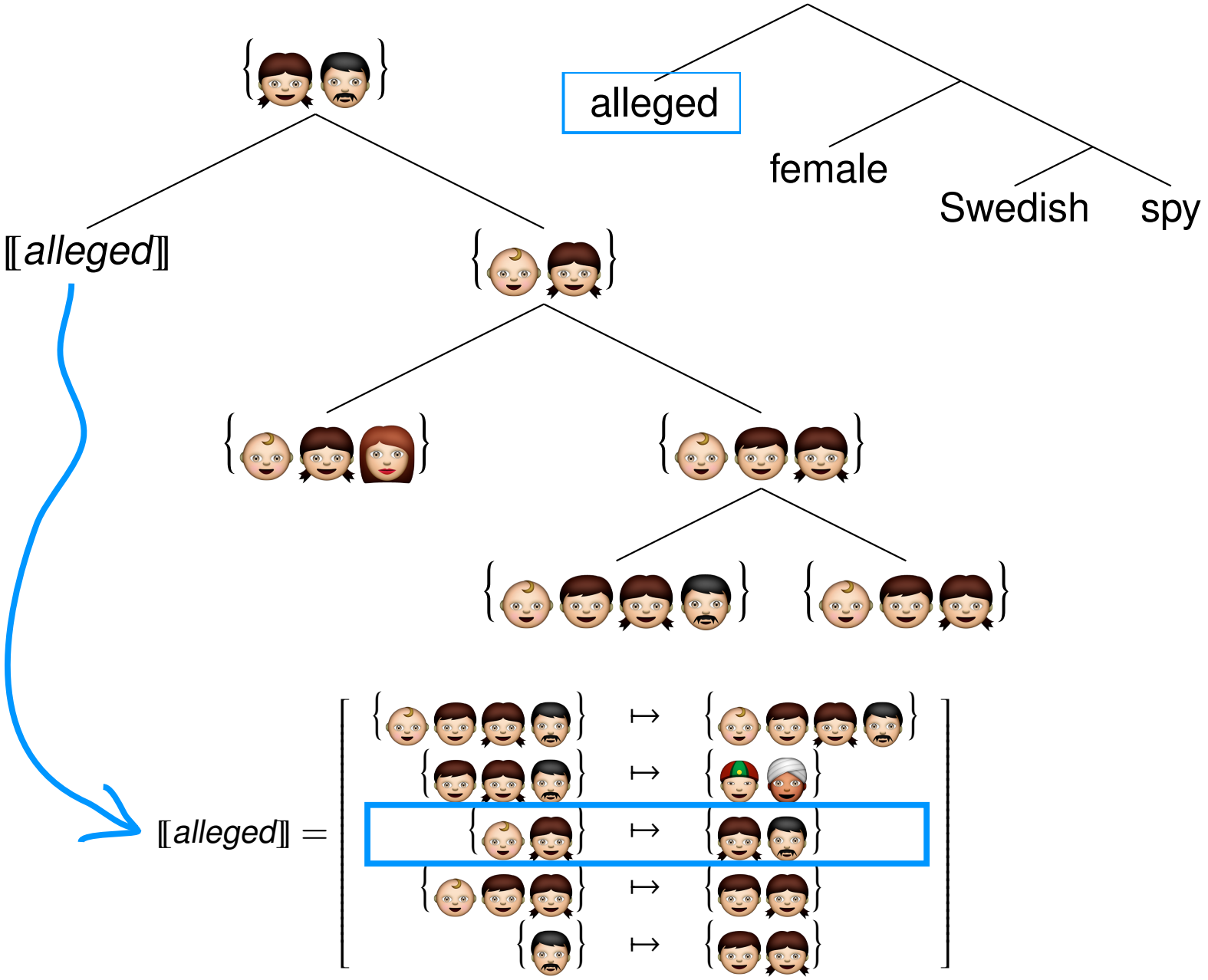
Compositionality



Compositionality



Compositionality



Compositionality