Names and Predicates in Natural Language. Part II

1. Lexikon.

■ We view NatLg predicates as sets:

- sets of individuals (for intransitive verbs or 1-place predicates)

(1) a. $[\![\textbf{run}]\!]^w$ = {x: x runs in w}
b. $[\![\textbf{run}]\!]^{w23}$ = {a, c}

(2) Universe in w_{23}: {a, b, c}

- sets of pairs (for transitive verbs or 2-place predicates)

(2) a. $[\![\textbf{love}]\!]^w$ = {<x,y>: x loves y in w}
b. $[\![\textbf{love}]\!]^{w23}$ = {<a,b>, <b,c>, <c,c>}
↑ ↑
Convention order: SU DO

- set of triples (for ditransitive verbs or 3-place predicates)

(3) a. $[\![\textbf{assign}]\!]^w$ = {<x,y,z>: x assigns y to z in w}
b. $[\![\textbf{assign}]\!]^{w23}$ = {<a,b,b>, <b,a,c>, <c,a,c>}
↑ ↑ ↑
Convention order: SU DO IO

2. Semantic rules.

(4) IP (r, u)
NPsu VP
$[\![\text{IP}]\!]^w = 1$ iff $[\![\textbf{NPsu}]\!]^w \in [\![\textbf{VP}]\!]^w$

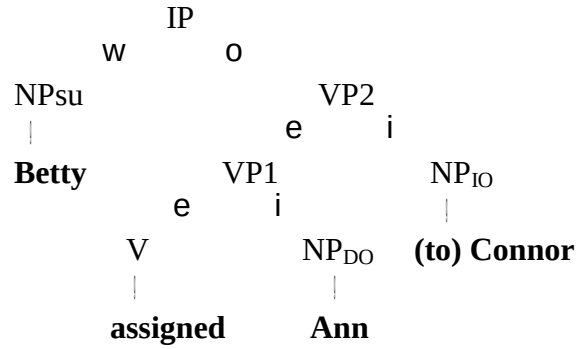
(5) VP (r, u)
Vtr NPob
$[\![\text{VP}]\!]^w = \{ x: \langle x, [\![\textbf{NPob}]\!]^w\rangle \in [\![\textbf{Vtr}]\!]^w \}$

(6) VP (r, u)
Vditr NPobj
$[\![\text{VP}]\!]^w = \{ \langle x,z\rangle: \langle x, [\![\textbf{NPobj}]\!]^w, z\rangle \in [\![\textbf{Vditr}]\!]^w \}$

3. Sample derivations.

■ Example with a ditransitive verb for an arbitrary world w:

(7)



$[\![\textbf{assign}]\!]^w$ = {<x,y,z>: x assigns y to z w}

$[\![\textbf{Ann}]\!]^w$ = a

$[\![\ \textbf{[assign Ann]}_{\textbf{VP1}}\ ]\!]^w$ = {<x,z>: <x, $[\![\textbf{Ann}]\!]^w$, z> ∈ $[\![\textbf{assign}]\!]^w$ }
= {<x,z>: <x, a, z> ∈ {<x,y,z>: x assigns y to z in w} }
= {<x,z>: x assigns a to z in w }

$[\![\textbf{Connor}]\!]^w$ = c

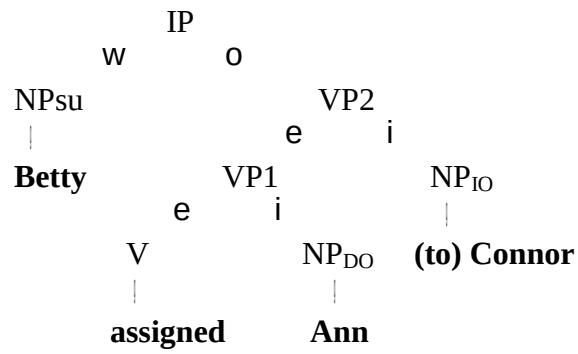
$[\![\ \textbf{[[assign Ann]}_{\textbf{VP1}}\textbf{ to Connor]}_{\textbf{VP2}}\ ]\!]^w$
= { x: <x, $[\![\textbf{Connor}]\!]^w$> ∈ $[\![\ \textbf{[assign Ann]}_{\textbf{VP1}}\ ]\!]^w$ }
= { x: <x, c> ∈ {<x,z>: x assigns a to z in w } }
= { x: x assigns a to c in w }

$[\![\textbf{Betty}]\!]^w$ = b

$[\![\ \textbf{[Betty [assigns Ann to Connor]}_{\textbf{VP2}}\textbf{]}_{\textbf{IP}}\ ]\!]^w$ = 1 iff
$[\![\textbf{Betty}]\!]^w$ ∈ $[\![\ \textbf{[assigns Ann to Connor]}_{\textbf{VP2}}]\!]^w$
= 1 iff b ∈ { x: x assigns a to c in w }
= 1 iff b assigns a to c in w

■ Example with a ditransitive verb for world w_{23}:

(8)



$[\![\textbf{assign}]\!]^{w23}$ = {<a,b,b>, <b,a,c>, <c,a,c>}

$[\![\textbf{Ann}]\!]^{w23}$ = a

$[\![\textbf{[assign Ann]}_{\textbf{VP1}}]\!]^{w23}$ = {<x,z>: <x, $[\![\textbf{Ann}]\!]^{w23}$, z> ∈ $[\![\textbf{assign}]\!]^{w23}$ }

= {<x,z>: <x, a, z> ∈ {<a,b,b>, <b,a,c>, <c,a,c>} }

= {<b,c>, <c,c> }

$[\![\textbf{Connor}]\!]^{w23}$ = c

$[\![\textbf{[[assign Ann]}_{\textbf{VP1}} \textbf{to Connor]}_{\textbf{VP2}}]\!]^{w23}$

= { x: <x, $[\![\textbf{Connor}]\!]^{w23}$> ∈ $[\![\textbf{[assign Ann]}_{\textbf{VP1}}]\!]^{w23}$ }

= { x: <x, c> ∈ {<b,c>, <c,c> } }

= { b, c }

$[\![\textbf{Betty}]\!]^{w23}$ = b

$[\![\textbf{[Betty [assigns Ann to Connor]}_{\textbf{VP2}} \textbf{]}_{\textbf{IP}}]\!]^{w23}$ = 1 iff

$[\![\textbf{Betty}]\!]^{w23}$ ∈ $[\![\textbf{[assigns Ann to Connor]}_{\textbf{VP2}}]\!]^{w23}$

= 1 iff b ∈ { b, c }

= 1

QUESTION: Take the predicate **assign** to have the denotation in w_{30} indicated below. Run the semantic computation of the tree (8) for the world w_{30}, with as much detail as used above.

$[\![\textbf{assign}]\!]^{w30}$ = {<a,a,b>, <b,b,c>, <c,a,c>, <a,a,c>, <c,a,a>}