Bennett (1976): A Variation and Extension of a Montague Fragment of English

Presented by Yangsook Park

Ling 720 · December 10, 2013

- In this paper, Bennett presents a variation and extension of the fragment of English presented in PTQ. The fragment presented in this paper deals with adjectival phrases, three-place and other kinds of verbs, the passive voice, the dummy subject *it* and reflexive pronouns.

- In this presentation, I will focus on how pronoun variables are reflexivized in various constructions, e.g. under transitive, ditransitive and control verbs, etc.

1   The Syntax of the Fragment

1.1   Syntactic Categories

- The syntactic categories that Bennett uses in this paper are exactly same as those in PTQ.

  (1)   **Basic Syntactic Categories**

t	the category of declarative sentences
CN	the category of common nouns and common noun phrases
IV	the category of intransitive verbs and certain other verb phrases

  (2)   **Cat**
        The set of CATEGORIES OF THE FRAGMENT, Cat, is the smallest set X such that
        a. t, CN, and IV are in X
        b.   whenever A and B are in X, A/B and A//B are also in X

- We will use the following non-basic syntactic categories as in PTQ: T (t/IV), TV (IV/T), AJ (CN/CN), IAV (IV/IV), AJP (AJ/T), etc.

- In addition to these, there are some new syntactic categories that each set of these categories is non-empty.

  (3)   **Some New (non-empty) Syntactic Categories**
        a.   CN/T   the category of transitive common nouns - phrases that take a term to form a common noun phrase
        b.   TV/T   the category of three-place verbs

1.2 The Letters of the Fragment

- An EXPRESSION OF THE FRAGMENT is any finite concatenation of the LETTERS OF THE FRAGMENT.

  (4)   **The Letters of the Fragment**

    a.   a, b, ..., z
    b.   the blank
    c.   (
    d.   )
    e.   #
    f.   *
    g.   the numeral subscripts $_{0,1,...,9}$.

- Notice that '#' and '*' are the new letters that were not in PTQ. These two letters will be especially useful for the verb inflection and reflexivization.

1.3 The Basic Expressions of the Fragment

- Any element of B_A, the set of basic expressions for any category A, is a BASIC EXPRESSION OF THE FRAGMENT.

  (5)   a. B_T = {**John**,**Mary**, **Bill**, **Chicago**, **he**$_0$, **he**$_1$, **he**$_2$, ... }
        b. B_{CN} = {**man**,**woman**, **person**, **god**, **fish**, **unicorn**, **portrait**, **picture**, **house**, **park**, **conception**, **story**, **vision**, **entity**}
        c. B_{IV} = {#**walk**, #**talk**, #**disintegrate**, #**be**}
        d. $B_{CT/T}$ = {**portrait of**, **story about**, **picture of**, **conception of**, **vision of**}
        e. B_{TV} = {#**love**, #**eat**, #**see**, #**talk about**, #**wash**, #**worship**, #**build**, #**find**, #**form**, #**be**, #**have**, #**seek**, #**resemble**, #**avoid**, #**conceive of**}
        f. $B_{IV/t}$ = {#**believe**, #**assert**, #**expect**, #**prefer**, #**allege**, #**wish**}
        g. $B_{TV/T}$ = {#**give**, #**owe**}
        h. $B_{TV/t}$ = {#**promise**, #**say**}
        i. B_{AJ} = {**mortal**, **big**, **famous**, **fictional**, **alleged**}
        j. B_{IAV} = {**rapidly**, **slowly**, **voluntarily**, **almost**}
        k. $B_{IV//IV}$ = {#**try**, #**wish**, #**appear**, #**expect**, #**prefer**, #**be eager**, #**succeed**, #**fail**}
        l. $B_{t//IV}$ = {#**be easy**, #**be tough**}
        m. $B_{t/t}$ = {#**appear**, #**might be**, #**be true**, #**be necessary**}
        n. B_{AJP} = {**in**, **other than**}
        o. B_{IAVP} = {**in**, **about**}
        p. $B_{(IV//IV)/T}$ = {#**persuade**, #**expect**, #**force**}
        q. $B_{(IV/t)/T}$ = {#**persuade**, #**believe of**}
        r. $B_{(t//IV)/T}$ = {#**be easy**, #**be tough**}
        s. $B_{(t/t)/T}$ = {#**appear**}
        t. B_A = the empty set if A is any category other than those already mentioned

- Note that the basic expression of any category that contains either IV or TV begins with a # mark.

1.4 Syntactic Rules

- Among the thirty-five syntactic rules in this paper, I will introduce only the ones that are necessary for the discussion of reflexive pronouns.

BASIC RULES

(6) **Rule S1** $B_A \subseteq P_A$ for every category A.

(7) **Rule S2 (Relativization)**
If $\zeta \in P_{CN}$, ζ does not contain an occurrence of $_n$, and $\phi \in P_t$, then $F_{0,n}(\zeta, \phi) \in P_{CN}$, where if a member of B_{CN} occurs in ζ, then $F_{0,n}(\zeta, \phi) = \zeta$ **such that** ϕ', and ϕ' comes from ϕ by replacing each occurrence of **he**$_n$, **him**$_n$, or **himself**$_n$ by $\left\{ \begin{smallmatrix} \textbf{he} \\ \textbf{she} \\ \textbf{it} \end{smallmatrix} \right\}$, $\left\{ \begin{smallmatrix} \textbf{him} \\ \textbf{her} \\ \textbf{it} \end{smallmatrix} \right\}$, or $\left\{ \begin{smallmatrix} \textbf{himself} \\ \textbf{herself} \\ \textbf{itself} \end{smallmatrix} \right\}$, respectively, according as the member of B_{CN} that occurs first in ζ is of $\left\{ \begin{smallmatrix} masc. \\ fem \\ neuter \end{smallmatrix} \right\}$ gender;
otherwise $F_{0,n}(\zeta, \phi) = \zeta$ **such that** ϕ.

(8) **Rule S3 (Forming Quantificational Terms)**
If $\zeta \in P_{CN}$, then $F_1(\zeta)$, $F_2(\zeta)$, $F_3(\zeta) \in P_T$,
where $F_1(\zeta) = \mathbf{a}\ \zeta$ or $\mathbf{an}\ \zeta$ according as the first word in ζ takes **a** or **an**,
      $F_2(\zeta) = \mathbf{every}\ \zeta$, and
      $F_3(\zeta) = \mathbf{the}\ \zeta$

RULES OF FUNCTIONAL APPLICATION

(9) **Rule S4 (Subject-Predicate Rule)**
If $\alpha \in P_T$ and $\delta \in P_{IV}$, then $F_4(\alpha, \delta) \in P_t$, where $F_4(\alpha, \delta) = \alpha'\ \delta'$, α' comes from α by deleting all occurrences of *, and δ' comes from δ by performing the following operations in order:
   a.   replacing all occurrences of #**not be** by **is not**,
   b.   replacing all remaining occurrences of #**not** by **does not**,
   c.   replacing each remaining occurrence of a word of the form #η or the form (#)η by the third-person singular simple present tense form of #η or (#)η, respectively,
   d.   if $\alpha = \mathbf{he}_n$, replacing all occurrences of ***him**$_n$ by **himself**$_n$,
   e.   deleting all parentheses and any remaining occurrences of *.

$\Rightarrow$ Structural operation F_4 deletes every # mark so that every verb is inflected and reflexivizes the pronoun variable in the element of P_{IV} when there is another pronoun in the subject with the same index. It also deletes any remaining parentheses or *, thus any further operations cannot change the form of the resulting expressions.

$\Rightarrow$ Since only the first verb is inflected by Rule S4 in PTQ, there was a problem when a predicate contains coordinated verbs, e.g. *'John walks and talk'. However, both

3

verbs are inflected in Bennett's system by having the $\#$ marker.

$$\text{John walks and talks, 4}$$

$$\text{John, T} \qquad \#\text{walk and } \#\text{talk, 18}$$

$$\#\text{walk, IV} \qquad \#\text{talk, IV}$$
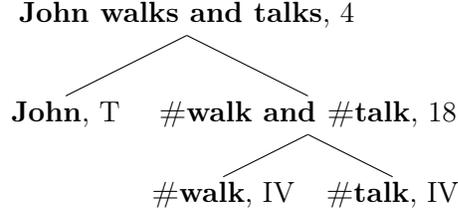
(10)   **Rule S5**
If $\zeta \in P_{CN/T}$ and $\alpha \in P_T$, then $F_5(\zeta, \alpha) \in P_{CN}$, where
a.   if $\alpha = \mathbf{he}_n$, then $F_5(\zeta, \alpha) = \zeta \; \mathbf{*him}_n$,
b.   otherwise $F_5(\zeta, \alpha) = \zeta \; \alpha$

(11)   **Rule S6 (Direct/Indiriect Object Rule)**
If $\delta \in P_{TV}$ and $\alpha \in P_T$, then $F_6(\delta, \alpha) \in P_{IV}$, where
a.   if either $\delta \in B_{TV}$ or $\delta = \#\eta \; \mathbf{by}$, then
   (i)   if $\alpha = \mathbf{he}_n$, then $F_6(\delta, \alpha) = \delta \; \mathbf{*him}_n$
   (ii)   otherwise $F_6(\delta, \alpha) = \delta \; \alpha$
b.   otherwise
   (i)   if $\alpha = \mathbf{he}_n$ and δ contains an occurrence of $(\mathbf{*him}_n)$, then $F_6(\delta, \alpha) = \delta \; \mathbf{to \; himself}_n$
   (ii)   if $\alpha = \mathbf{he}_n$ and δ does not contain an occurrence of $(\mathbf{*him}_n)$, then $F_6(\delta, \alpha) = \delta \; \mathbf{to \; *him}_n$
   (iii)   if $\alpha \neq \mathbf{he}_n$ and δ contains an occurrence of $(\mathbf{*him}_n)$, then $F_6(\delta, \alpha) = \delta \; \mathbf{to} \; \alpha'$, where α' comes from α by replacing all occurrences of $\mathbf{*him}_n$ by $\mathbf{himself}_n$
   (iv)   otherwise $F_6(\delta, \alpha) = \delta \; \mathbf{to} \; \alpha$

$\Rightarrow$ (11b) shows the operations that introduce an indirect object. Given these operations, a pronoun inside the indirect object phrase is reflexivized only when there is a pronoun with the same index, $(\mathbf{*him}_n)$, in the verb phrase with a ditransitive verb and its direct object, e.g. $F_6(\#\mathbf{give} \; (\mathbf{*him}_0), \mathbf{he}_0) = \#\mathbf{give} \; (\mathbf{*him}_0) \; \mathbf{to \; himself}_0$.

(12)   **Rule S8 (Ditransitive Predicate-Direct Object Rule)**
If $\delta \in P_{TV/T}$ and $\alpha \in P_T$, then $F_8(\delta, \alpha) \in P_{TV}$, where
a.   if $\alpha = \mathbf{he}_n$, then $F_8(\delta, \alpha) = \delta \; (\mathbf{*him}_n)$;
b.   otherwise $F_8(\delta, \alpha) = \delta \; \alpha$.

$\Rightarrow$ This rule makes the direct object of a ditransitive verb somewhat special when it is $\mathbf{he}_n$ by enclosing it in parentheses, compare to the direct object of a transitive verb in (11ai), $F_6(\delta, \alpha) = \delta \; \mathbf{*him}_n$.

---

[1]S28 (Rule of Conjunction). If $\gamma, \delta \in P_{IV}$, then $F_{18}(\gamma, \delta) = \gamma \; \mathbf{and} \; \delta$

(13)   **Rule S12**
       If $\gamma \in P_{IV//IV}$ and $\delta \in P_{IV}$, then $F_{11}(\gamma, \delta) \in P_{IV}$, where

       a.   if $\delta = \#$**not** η, then $F_{11}(\gamma, \delta) = \gamma$ **not to** η', where η' comes from η by

           (i)   deleting all occurrences of $\#$ and $(\#)$;

          (ii) if $\gamma = \#\nu$ and γ contains an occurrence of (***him**$_n$), replacing all occurrences of (***him**$_n$) in η by ***himself**$_n$;

         (iii) if $\gamma = \#\nu$, $\gamma \notin B_{IV//IV}$, and γ does not contain an occurrences of (***him**$_n$), replacing all occurrences of ***him**$_n$ in η by **him**$_n$

       b.   if $\delta \neq \#$**not** η, then $F_{11}(\gamma, \delta) = \gamma$ **to** δ', where δ' comes from δ by operations (i)-(iii).

$\Rightarrow$ We can introduce infinitival clauses by Rule S12. Again, a pronoun ***him**$_n$ in the infinitival clause P_{IV} is reflexivized only when the verb phrase $P_{IV//IV}$ contains an occurrence of (***him**$_n$), e.g. $F_{11}(\#$**persuade** (***him**$_0$), $\#$**wash *him**$_0$) = $\#$**persuade** (***him**$_0$) **to wash himself**$_0$.

RULES OF QUANTIFICATION

(14)   **Rule S33 (Quantifying In to IVs)**
       If $\alpha \in P_T$, α contains no occurrences of numerical subscripts, and $\delta \in P_{IV}$, then $F_{24,n}(\alpha, \delta) = \delta'$ and δ' comes from δ by performing the following operations in order:

       a.   replacing the first occurrence, if there is one, of **he**$_n$, **him**$_n$ or ***him**$_n$, whichever is first, by α;

       b.   replacing any remaining occurrences of **he**$_n$ by the singular nominative transform of α;

       c.   replacing any remaining occurrences of **him**$_n$ or ***him**$_n$ by the singular objective transform of α;

       d.   replacing any remaining occurrences of **himself**$_n$ by the singular reflexive objective transform of α.

$\Rightarrow$ We can see that the form of every pronoun is fixed by Quantifying In, thus no further transformation is possible after going through $F_{24,n}$.

(15)   **Rule S34 (Quantifying In to CTs)**
       If $\alpha \in P_T$, α contains no occurrences of numerical subscripts, and $\zeta \in P_{CN}$, then $F_{24,n}(\alpha, \zeta) \in P_{CN}$

(16)   **Rule S35 (Quantifying In to Sentences)**
       If $\alpha \in P_T$, α contains no occurrences of numerical subscripts, and $\phi \in P_t$, then $F_{24,n}(\alpha, \phi) \in P_t$
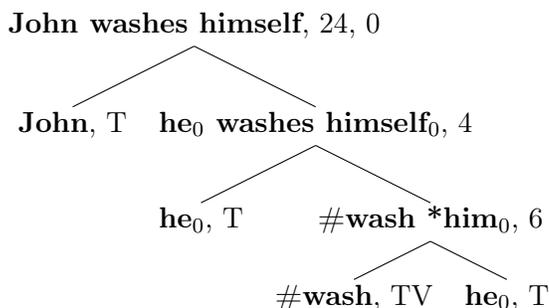
1.5   Some Illustrations of the Fragment

- Let's first look at a simple example where an object pronoun is reflexivized under a transitive verb.

(17)   **John washes himself.**

$\qquad$ (i)   **John**, **he**$_0$ $\in$ B$_T$, #**wash** $\in$ B$_{TV}$ $\hfill$ (by (5))
$\qquad$ (ii) **John**, **he**$_0$ $\in$ P$_T$, #**wash** $\in$ P$_{TV}$ $\hfill$ (by S1)
$\qquad$ (iii) #**wash** ***him**$_0$ $\in$ P$_{IV}$ $\hfill$ (by S6)
$\qquad$ (iv) **he**$_0$ **washes himself**$_0$ $\in$ P$_t$ $\hfill$ (by S4)
$\qquad$ (v)   **John washes himself** $\in$ P$_t$ $\hfill$ (by S35)

$\underline{\text{Analysis Tree}}$

John washes himself, 24, 0

$\qquad$ **John**, T $\qquad$ **he**$_0$ **washes himself**$_0$, 4

$\qquad\qquad\qquad$ **he**$_0$, T $\qquad$ #**wash** ***him**$_0$, 6

$\qquad\qquad\qquad\qquad\qquad$ #**wash**, TV $\quad$ **he**$_0$, T
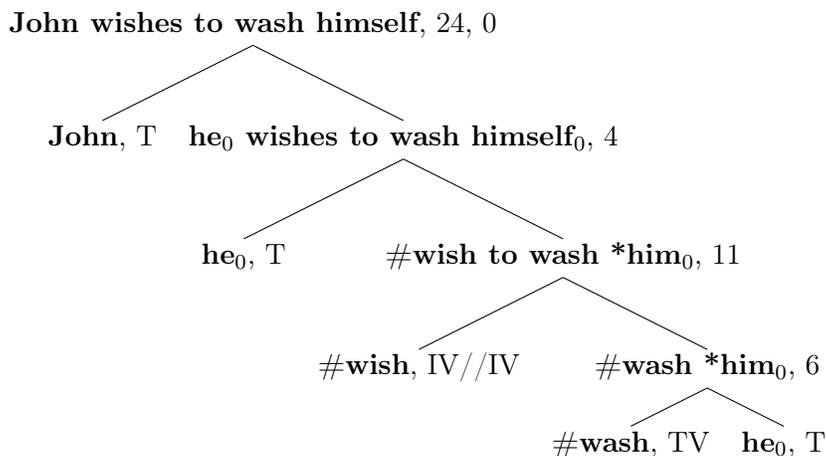
2 Reflexive Pronouns

2.1 Reflexivization by structural operations

- As we saw, Bennett provides an analysis for reflexive pronouns by complicating the syntactic rules. Given certain structural operations that reflexivize occurrences of pronoun variable, the right reflexive forms of pronoun can be derived.

- First, structural operation F_4 in Rule S4 (Subject-Predicate Rule) introduces reflexivization.
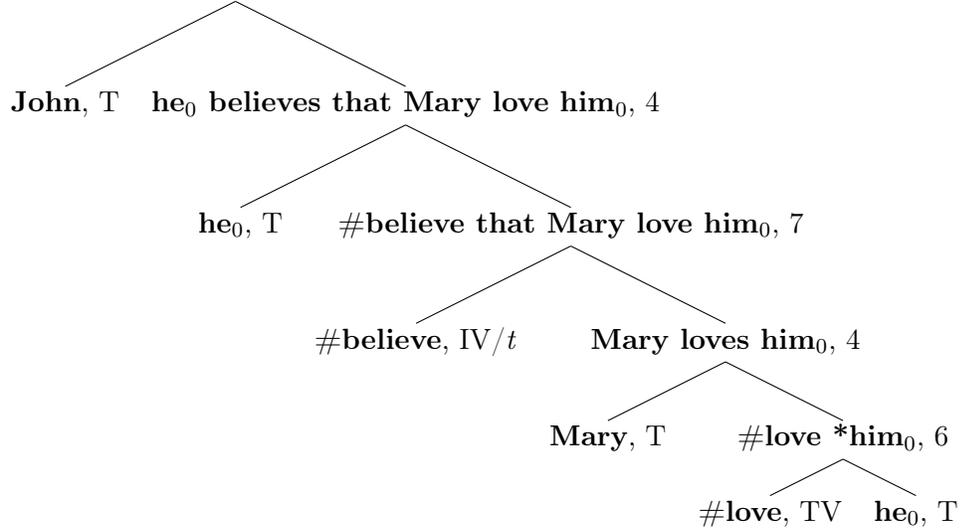
(18)   **Reflexivization by F_4**

John wishes to wash himself, 24, 0

$\qquad$ **John**, T $\qquad$ **he**$_0$ **wishes to wash himself**$_0$, 4

$\qquad\qquad\qquad$ **he**$_0$, T $\qquad$ #**wish to wash** ***him**$_0$, 11

$\qquad\qquad\qquad\qquad\qquad$ #**wish**, IV//IV $\qquad$ #**wash** ***him**$_0$, 6

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ #**wash**, TV $\quad$ **he**$_0$, T

$\Rightarrow$ When forming an infinitival clause by F_{11}, ***him**$_0$ is not reflexivized because there is no occurrence of (***him**$_n$) in an element of P$_{IV//IV}$, #**wish**. Also, ***him**$_0$ keeps

6

the * mark since F_{11} replaces ***him$_n$** to **him$_n$** only when the element of $P_{IV//IV}$ is not a basic expression in $B_{IV//IV}$. Thus, ***him$_0$** still has a chance to be reflexivized in the later step. Finally, ***him$_0$** becomes **himself$_0$** by F_4, since the subject is **he$_0$**.

- Unlike in (18), a pronoun variable is not reflexivized with F_4 when the subject term is not of the form **he$_n$**.

(19)　　**No-Reflexivization with F_4**
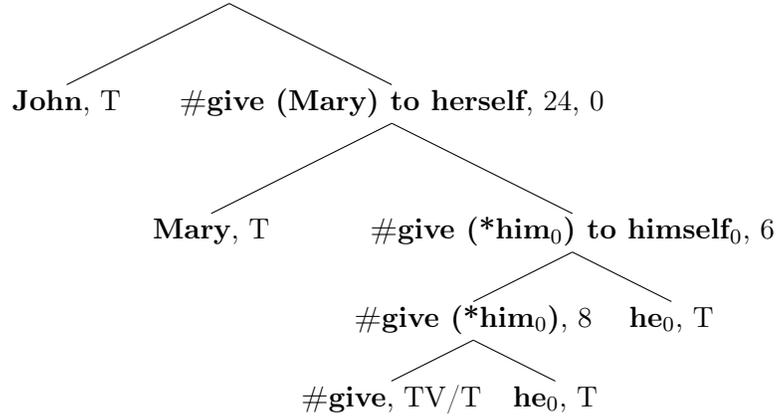
John believes that Mary love him, 24, 0

John, T　　**he$_0$ believes that Mary love him$_0$**, 4

he$_0$, T　　**#believe that Mary love him$_0$**, 7

#believe, IV/t　　**Mary loves him$_0$**, 4

Mary, T　　**#love *him$_0$**, 6

#love, TV　　**he$_0$**, T

$\Rightarrow$ In (19), ***him$_0$** in **#love *him$_0$** becomes **him$_0$** after combining with the subject **Mary** by F_4, since the subject is not **he$_0$**. Once it loses the * mark, there is no chance for **him$_0$** to change its form in the later derivation.

- Structural operation F_6 in S6 (Direct/Indirect Object Rule) also introduces reflexivization.

(20)　　**Reflexivization by F_6**

John gives Mary to herself, 4

John, T　　**#give (Mary) to herself**, 24, 0

Mary, T　　**#give (*him$_0$) to himself$_0$**, 6

#give (*him$_0$), 8　　**he$_0$**, T

#give, TV/T　　**he$_0$**, T

$\Rightarrow$ First, since the element of P_{TV}, **#give (*him$_0$)**, contains **(*him$_0$)** in (20), the

7

indirect object $\mathbf{he}_0$ is reflexivized by F_6. Also, notice that the direct object $\mathbf{he}_0$ of a ditransitive verb is always enclosed in the parentheses with the * mark, so it still has chances to be reflexivized later. In this case, **(*him$_0$)** becomes **(Mary)** by Quantifying In.

- The direct object $\mathbf{he}_0$ is not reflexivized by F_6 when the element of P_{TV} does not contain **(*him$_0$)**.

(21)   **No-Reflexivization with $\boldsymbol{F}_6$**

John gives a picture of Mary to her, 4
- **John**, T
- **#give a picture of Mary to her**, 24, 0
  - **Mary**, T
  - **#give a picture of *him$_0$ to *him$_0$**, 6
    - **#give a picture of *him$_0$**, 8
      - **#give**, TV/T
      - **a picture of *him$_0$**, 1
        - **picture of *him$_0$**, 5
          - **picture of**, CN/T
          - **he$_0$**, T
    - **he$_0$**, T
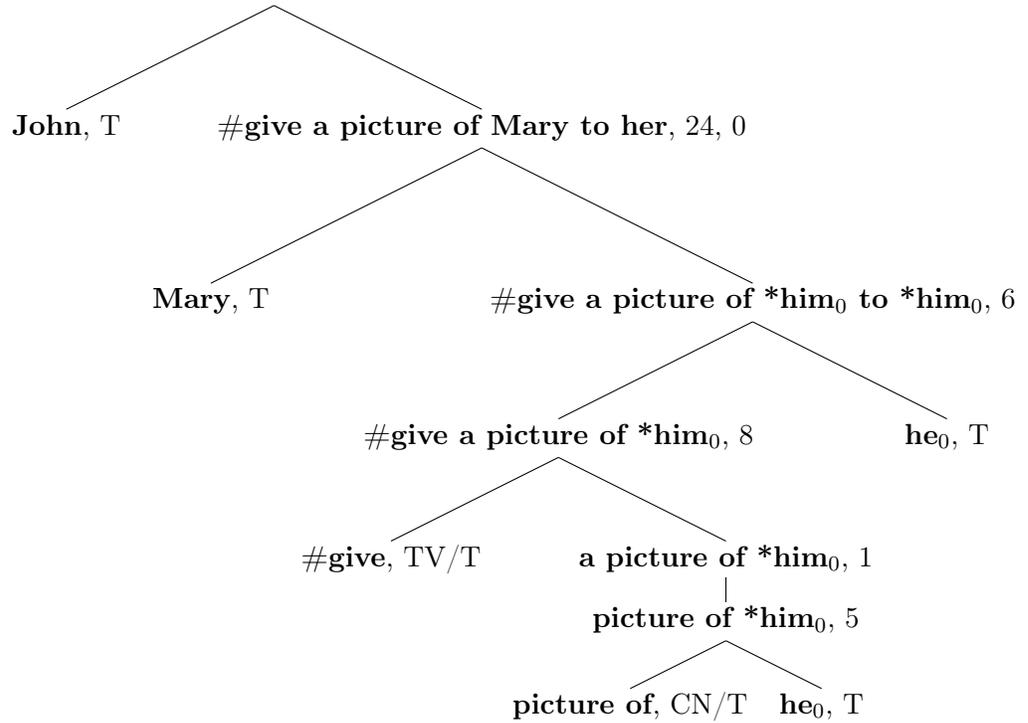
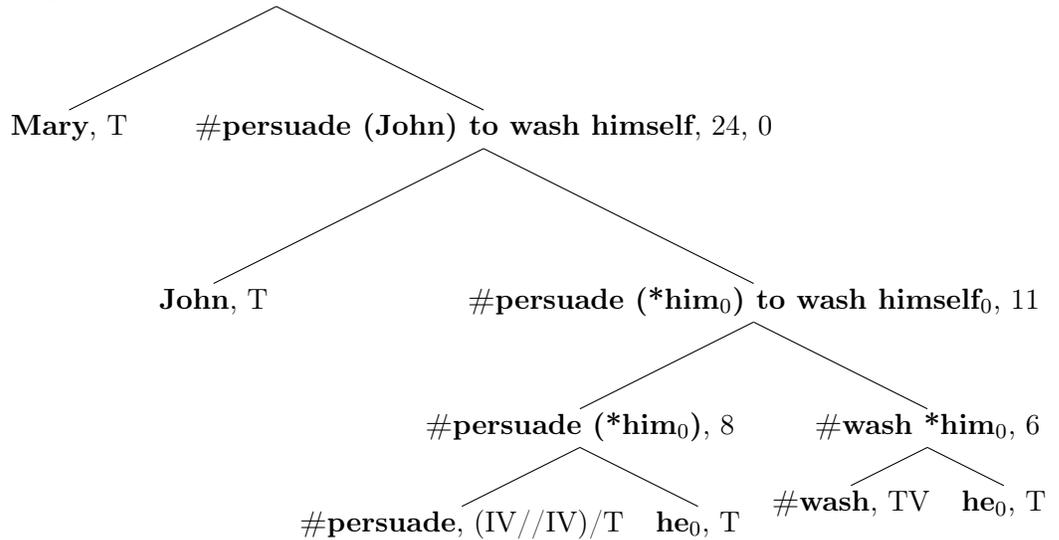$\Rightarrow$ Note that ***him$_0$** in **#give a picture of *him$_0$** is not enclosed in parentheses, since the direct object of a ditransitive verb becomes **(*him$_0$)** only when it is the form of $\mathbf{he}_0$. Thus, the indirect object $\mathbf{he}_0$ cannot be reflexivized due to no occurrence of **(*him$_0$)** in the element of P_{TV} that it is combined with. Then, the second occurrence of **(*him$_0$)** is replaced by the singular objective form of **Mary**, **her**, by the Quantifying In Rule.

8

- We can also introduce reflexivization in control constructions by using F_{11}.

(22) **Reflexivization by F_{11}**

Mary persuades John to wash himself, 4

$\qquad$ **Mary**, T $\qquad$ **#persuade (John) to wash himself**, 24, 0

$\qquad\qquad$ **John**, T $\qquad\qquad$ **#persuade (*him$_0$) to wash himself$_0$**, 11

$\qquad\qquad\qquad$ **#persuade (*him$_0$)**, 8 $\qquad$ **#wash *him$_0$**, 6

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ **#wash**, TV $\qquad$ **he$_0$**, T

$\qquad\qquad$ **#persuade**, $(IV//IV)/T$ $\qquad$ **he$_0$**, T

$\Rightarrow$ <u>NOTE</u>: As for the ditransitive verbs, the same operation F_8 is used in the rule for object control verbs.

$\qquad$**Rule S17.** If $\delta \in \mathrm{P}_{(IV//IV/t)/T}$ and $\alpha \in \mathrm{P}_T$, then $F_8(\delta, \alpha) \in \mathrm{P}_{IV//IV}$

$\Rightarrow$ F_{11} also contains an operation that replaces ***him$_n$** in an element of P_{IV} with **himself$_0$** when an element of $\mathrm{P}_{(IV//IV)}$ contains **(*him$_n$)**. Thus, ***him$_0$** in **#wash *him$_0$** is reflexivized by F_{11} in (22).

2.2 Some Problematic Data

- Bennett points out that the objects of adverbial and adjectival prepositions are never reflexive pronouns in his fragment, e.g. *John finds a fish about himself.

- However, there are cases in English where reflexivization interacts even with adverbial and adjectival prepositions.

(23) **No-reflexivization with transitive verbs**
   a. John takes a pen with him.
   b. *John take a pen with himself.

(24) **Reflexivization with intransitive verbs**
   a. John walks with himself.
   b. *John walks him.