

# LING/C SC 581:

## Advanced Computational Linguistics

Lecture 25

# Today's Topics

- Homework 10 Review
- Statistical Parsers: unimplemented theory
  - it's in the training data, but they throw it all away
- Let's take look at the verb *break*
- Big unanswered question:
  - why does *break* have so many different senses?
  - *seems tough to learn them ...*

# Homework 10 Review

## 4.3.2 Passives

**Object of verb.** The trace (NP \*) is put after the passive verb and coindexed with the constituent in subject position.

```
(S (NP-SBJ-1 John)
  (VP was
    (VP hit
      (NP *-1)
      (PP by
        (NP-LGS a ball))))))
```

Note that the \* may come before or after a PRT (particle). There is no policy governing this and either order is possible, though it is somewhat more likely for the PRT to come second:

```
(S (NP-SBJ-1 Arthur)
  (VP was
    (VP picked
      (NP *-1)
      (PRT up)
      (PP by
        (NP-LGS aliens))))))
```

```
(S (NP-SBJ-1 Arthur)
  (VP was
    (VP picked
      (PRT up)
      (NP *-1)
      (PP by
        (NP-LGS aliens))))))
```

- PRD (not MRG) shown:

- MRG = PRD + POS

1. @S < (@VP < @VP)
2. Last @VP < POS tag VBN
3. Last @VP < POS tag -NONE-
4. -NONE- < \*...-*index*
5. @S < NP-SBJ-*index*

# Homework 10 Review

@S < (@VP < (@VP < ...	5667	6070
@S < /^NP-SBJ-(\d+)/...	5168	5527
@S < /^NP-SBJ-(\d+)/...	5155	5502

#3

- Search patterns:

1. @S < (@VP < (@VP < VBN < (@NP < /^-NONE-/)))
2. @S < /^NP-SBJ-(\d+)/#1%i < (@VP < (@VP < VBN < (@NP < /^-NONE-/)))
3. @S < /^NP-SBJ-(\d+)/#1%i < (@VP < (@VP < VBN < (@NP < (^-NONE- / < /^\*.\*(\d+)/#1%i)))
4. @S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < be|is|am|are|was|were|been|being) < (@VP < VBN < (@NP < (^-NONE- / < /^\*.\*(\d+)/#1%i)))

# Homework 10 Review

Forms of *be*:

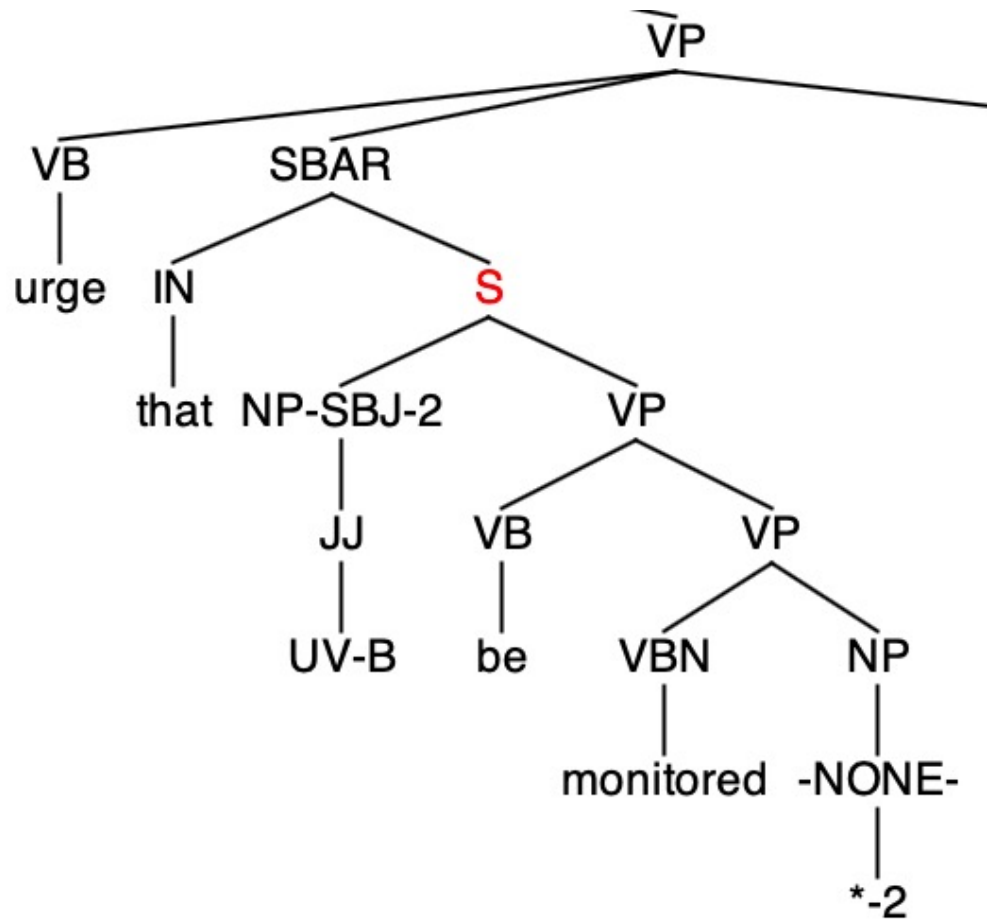
- is | am | are | was | were
- be | is | am | are | was | were
- be | is | am | are | was | were | been
- be | is | am | are | was | were | been | being

Statistics History		
Pattern	Trees ...	Total ...
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*-(\d+)/#1%i))))	5155	5502
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < is am are was were) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*-(\d+)/#1%i))))	4841	5134
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < be is am are was were) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*-(\d+)/#1%i))))	4909	5216
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < be is am are was were been) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*-(\d+)/#1%i))))	4915	5222
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < be is am are was were been being) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*-(\d+)/#1%i))))	5013	5337

# Homework 10 Review

85d84

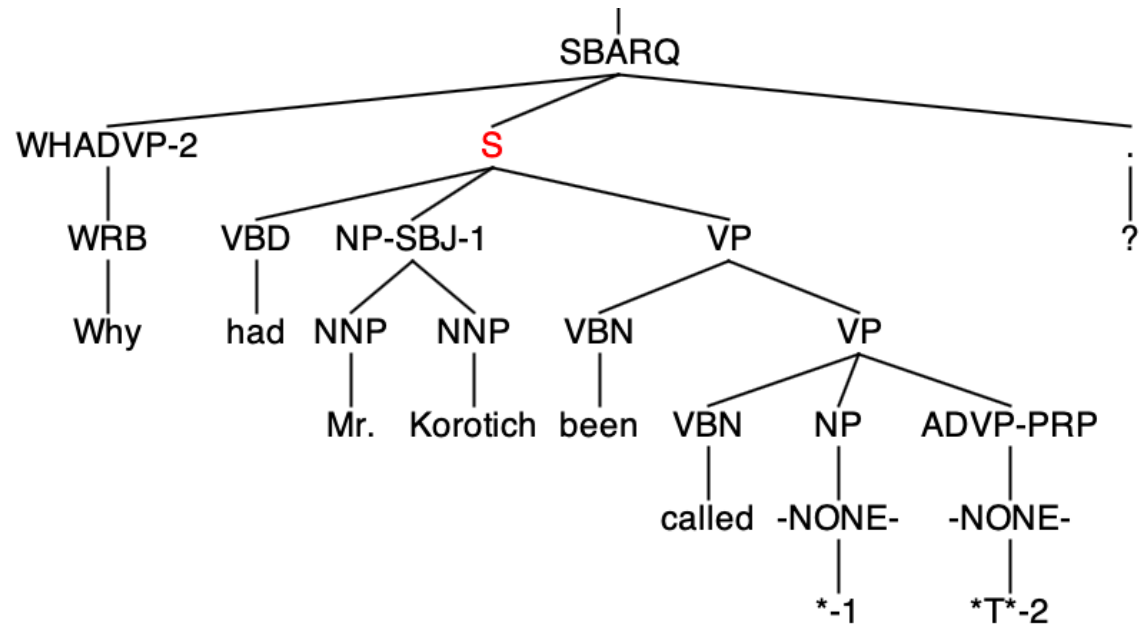
```
< wsj_0360.mrg-  
27  While *-1  
recognizing that  
professional  
environmentalists may  
feel threatened , I  
intend *-1 to urge  
that UV-B be  
monitored *-2  
whenever I can *?*  
*T*-3 .
```



# Homework 10 Review

235d234

< wsj\_0596.mrg-  
4 Why had Mr.  
Korotich been  
called \*-1 \*T\*-2 ?



# Homework 10 Review

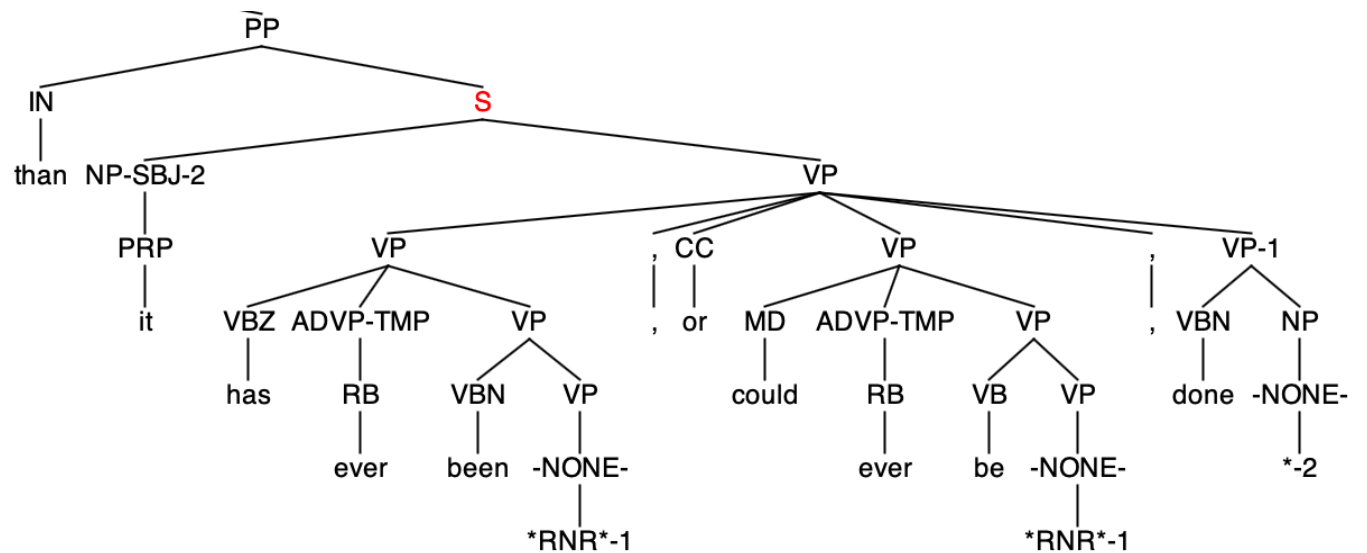
diff any being

82d81

< cg08.mrg-

65 Faulkner  
culminates the  
Southern legend  
perhaps more

masterfully than it  
has ever been \*RNR\*-1  
, or could ever be  
\*RNR\*-1 , done \*-2 .

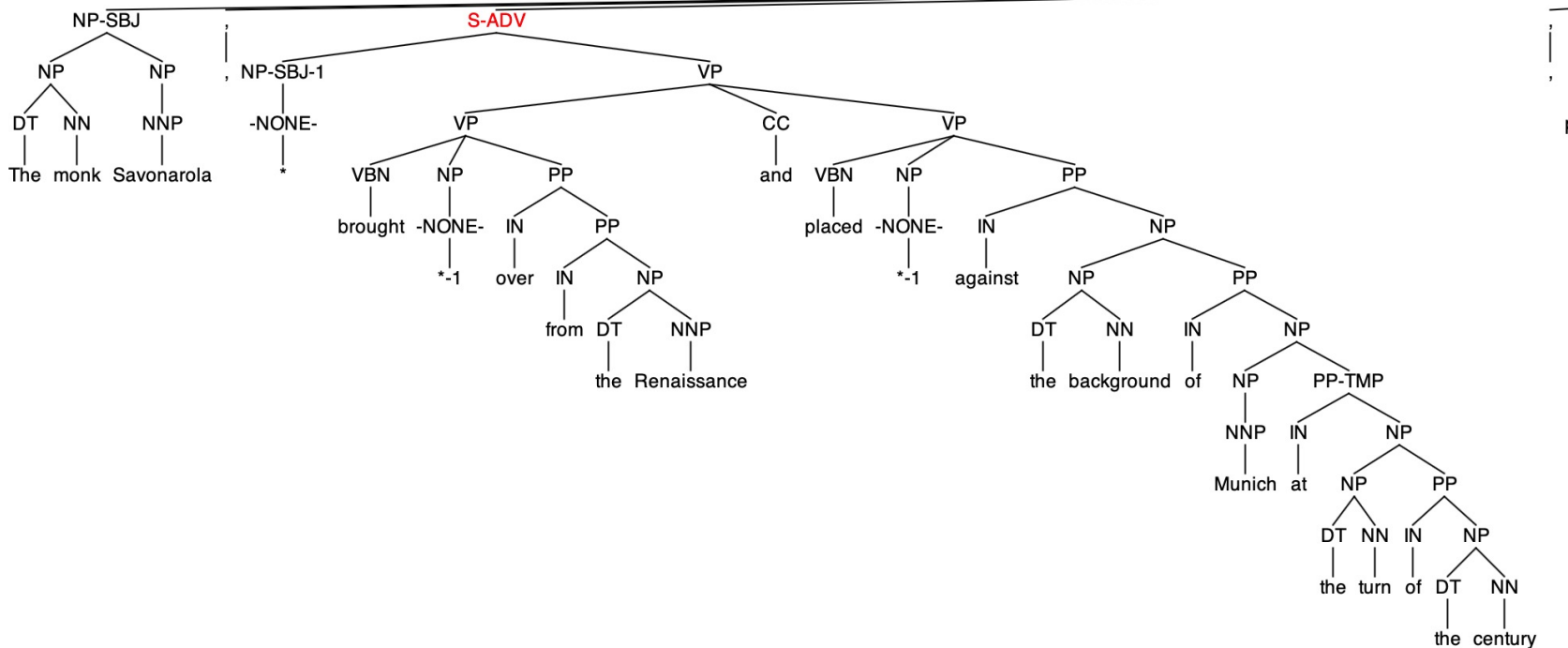




# Homework 10 Review

283d281

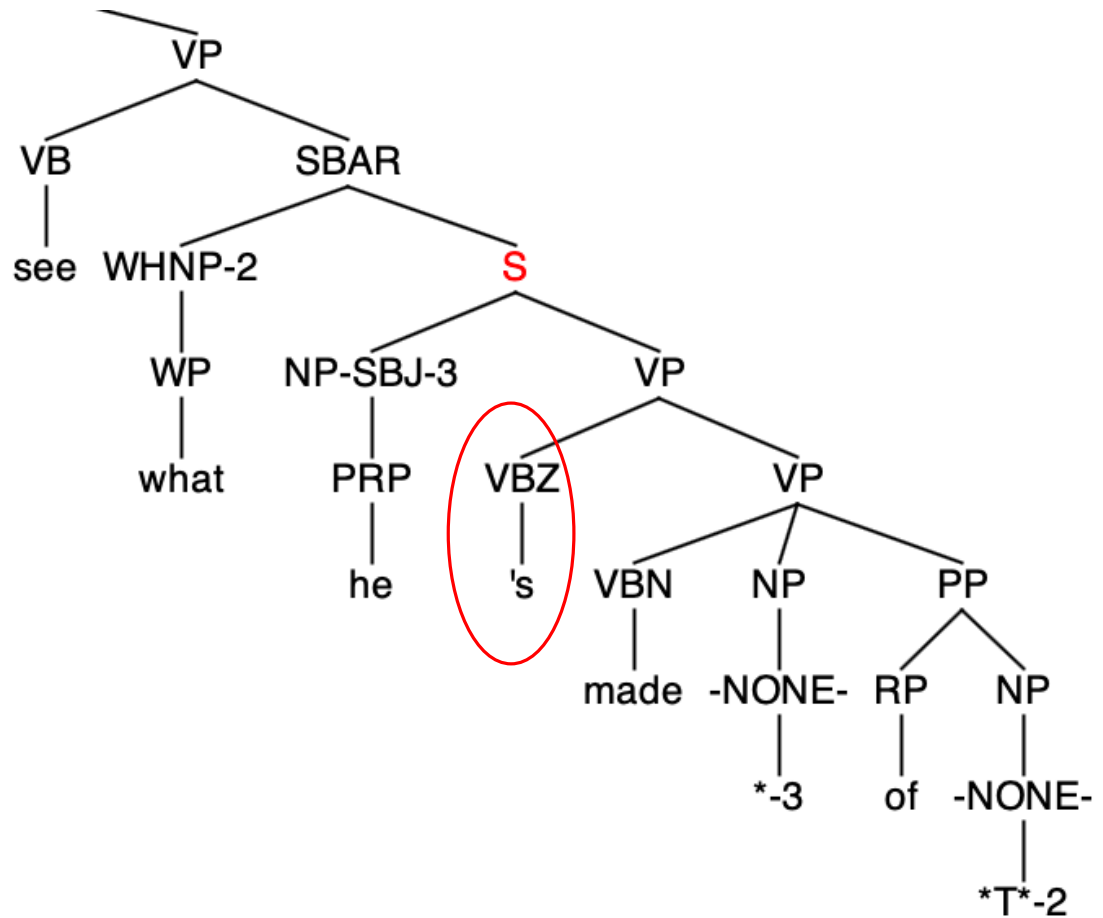
< cg15.mrg-68 The monk Savonarola , \* brought \*-1 over from the Renaissance and placed \*-1 against the background of Munich at the turn of the century , protests against the luxurious works displayed \* in the art-shop of M. Bluthenzweig ; ; in particular against a Madonna portrayed \* in a voluptuous style and modeled \* , according to gossip , upon the painter 's mistress .



# Homework 10 Review

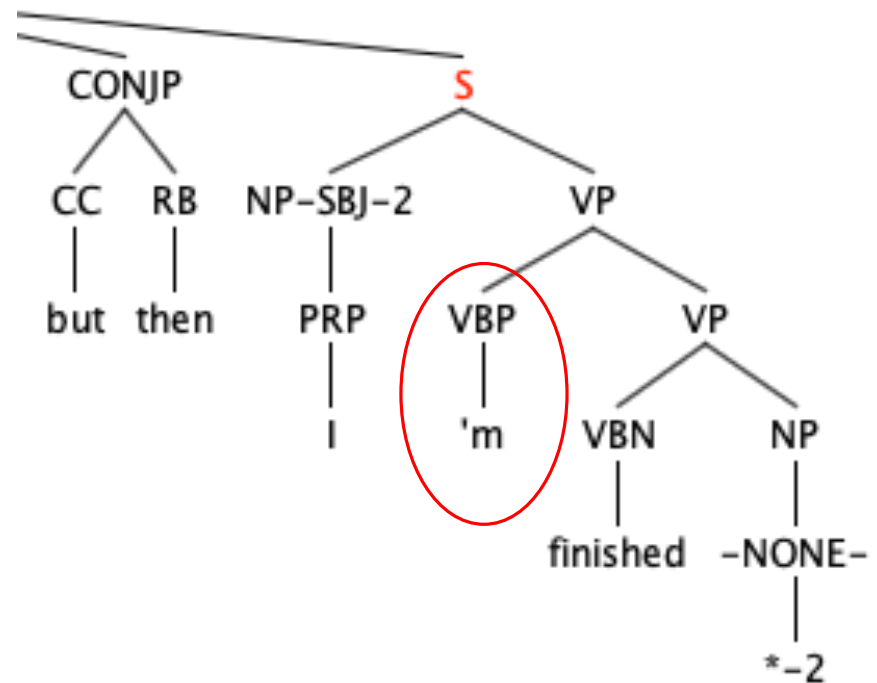
371d368

< cn14.mrg-66 If  
we have \*-1 to \*?\*  
we 'll take him  
apart and see what  
he 's made \*-3 of  
\*T\*-2 ' ' ! !



# Homework 10 Review

< cn29.mrg-29 ...  
wrestle you for ten  
minutes -- but then  
I 'm finished \*-2 .



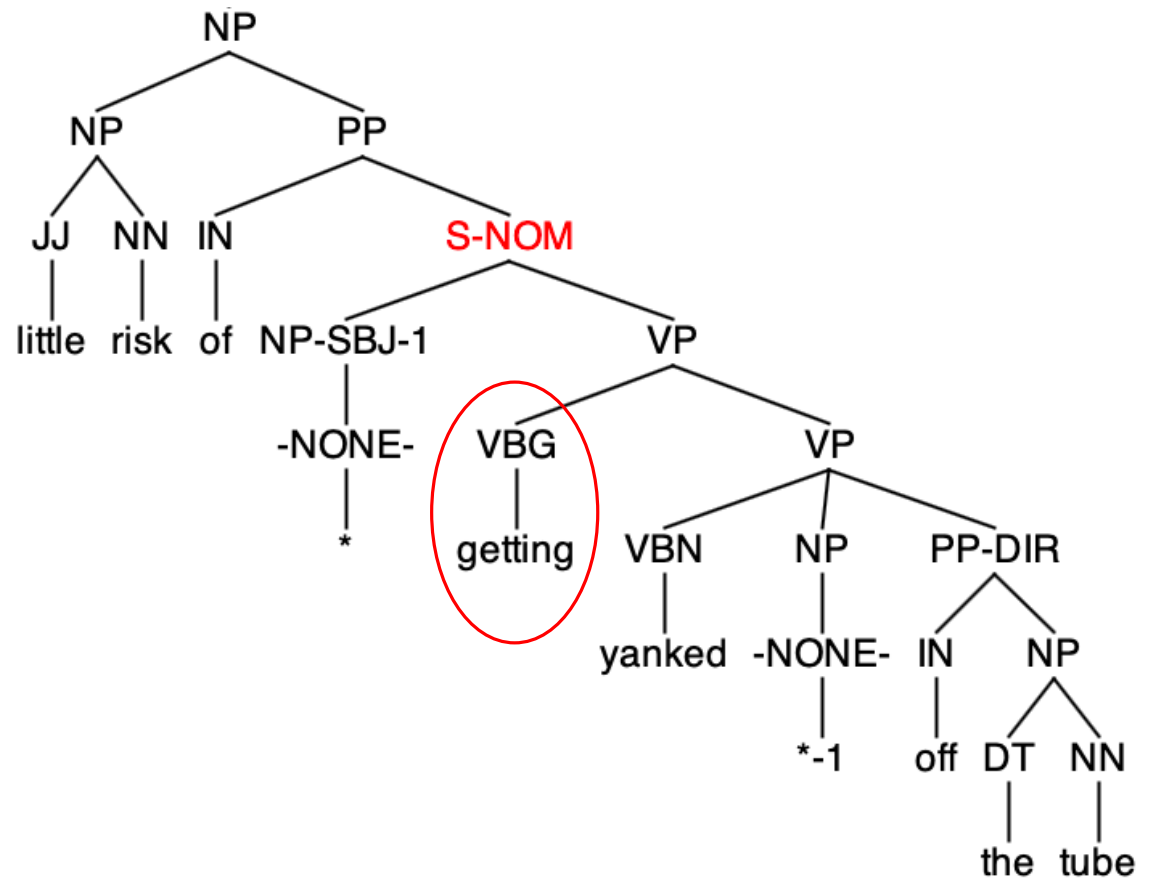
# Homework 10 Review

diff any been

40d39

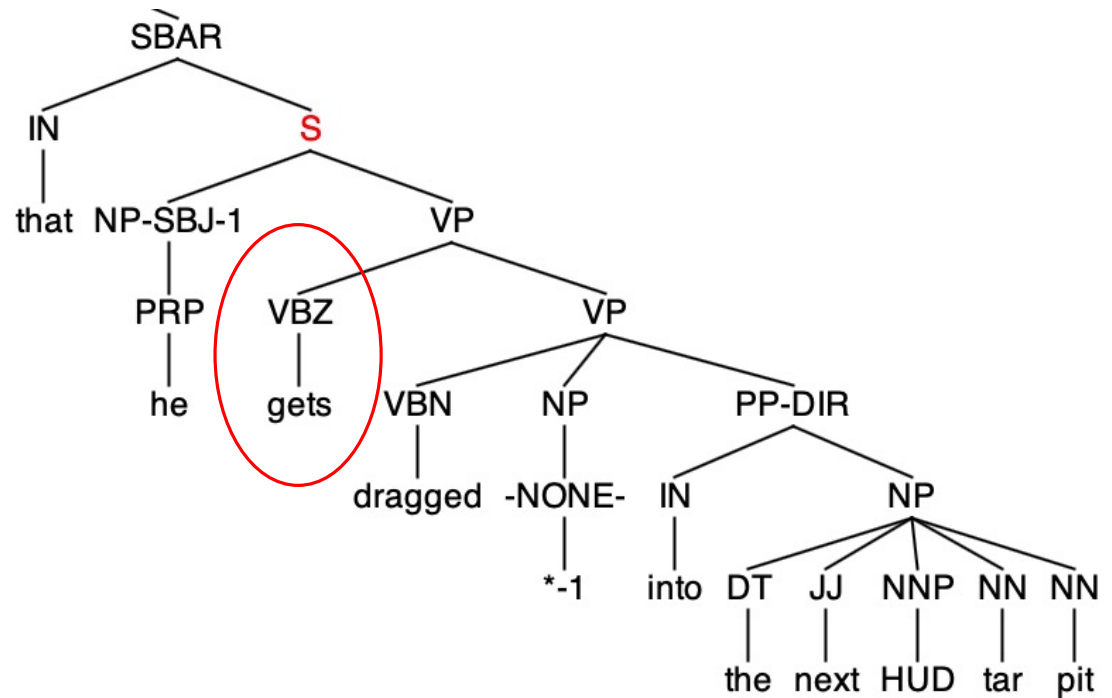
< wsj\_0326.mrg-

27 Despite the  
criticism , Philip  
Morris 's corporate  
campaign runs little  
risk of \* getting  
yanked \*-1 off the  
tube .



# Homework 10 Review

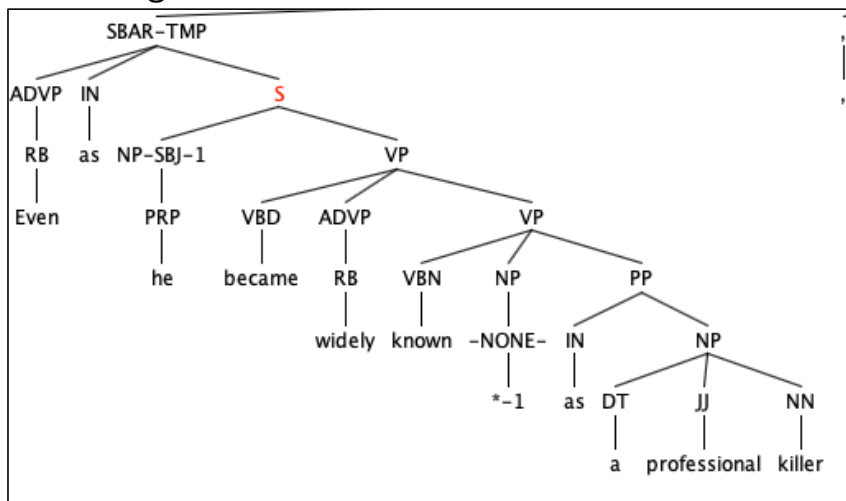
- 45d43
- < wsj\_0309.mrg-18 That sounds like a formula for \* ensuring that he gets dragged \*-1 into the next HUD tar pit .



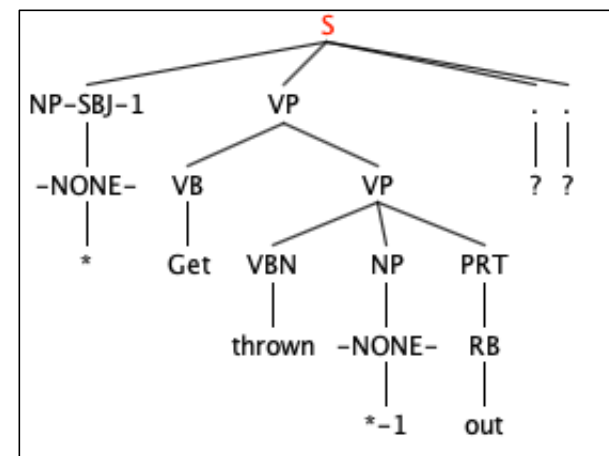
# Homework 10 Review

Statistics History			
Pattern	Trees Matched	Total Matches	
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ < be is am are was were been being) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*(\d+)/#1%))))	5013	5337	
@S < /^NP-SBJ-(\d+)/#1%i < (@VP < (/^VB/ !< be is am are was were been being) < (@VP < VBN < (@NP < (/^-NONE-/ < /^\*.*(\d+)/#1%))))	106	106	

cn11.mrg

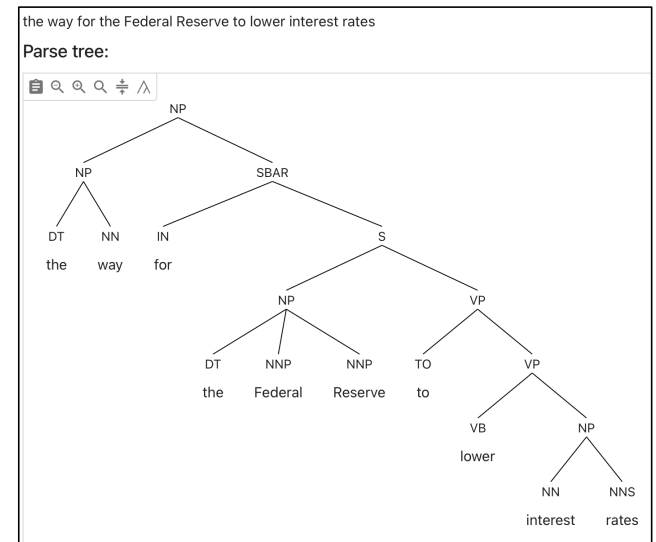
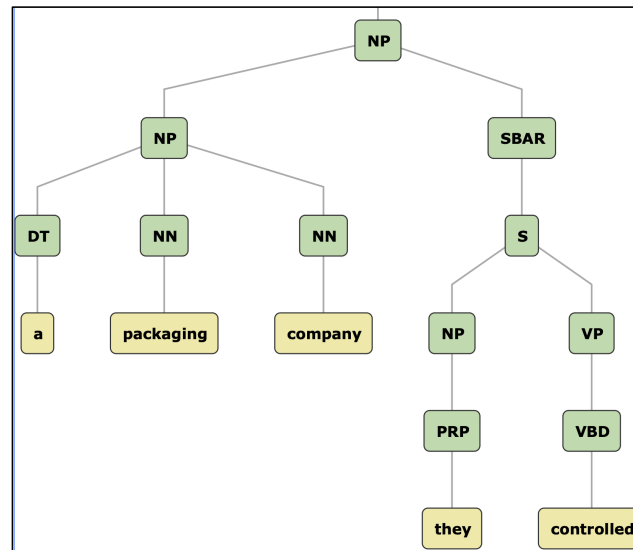
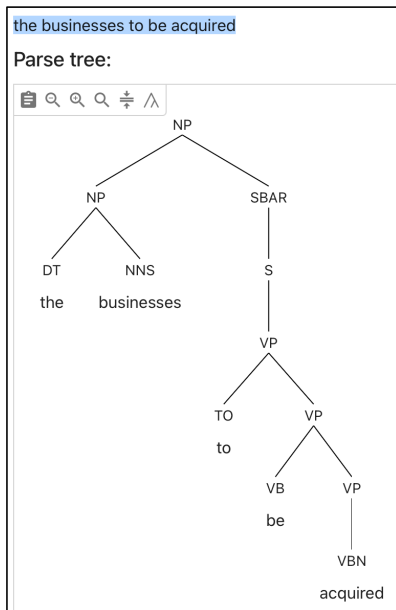


cn18.mrg



# Last Time: theory not implemented

- unary branchings, missing empty categories (identifying theta positions)



# Senses of *break*

(Petersen & Potts) <https://ling.auf.net/lingbuzz/006859>

Frame	Sense
1. break the vase	shatter
2. break the computer	render inoperable
3. break the news	reveal
4. break the silence	interrupt
5. break the record	surpass
6. break the code	decipher
7. break the law	violate
8. break the horse	tame
9. break a \$10 bill	make change
10. break the fall	lessen
11. the weather broke	changed
12. the day broke	began

- Change-of-state verb that undergoes the causative alternation:
  - *John broke the window*
  - *the window broke*
- "senses 1–4 all alternate, senses 5–10 are all strictly transitive, ... also strictly intransitive uses, as in 11–12"
  - *\*the law broke*
  - **careful**: need to expand for context:

"Well," said the man who handed his last cent to the lawyer, "I suppose turnabout is fair play. I broke the law and the law broke me."

Central Law Journal, vol. 36, 1893.



# Unaccusative

- Change-of-state verb that undergoes the causative alternation:
  - *John broke the window*
    - *agent causes patient/theme to undergo change of state (broken)*
  - *the window broke*
    - *window not an agent (usually an external argument)*
  - *\*the window broke the ball*
    - *window undergoes change of state*
  - [<sub>VP</sub> *broke the window*] is the underlying structure
    - *the window raises to subject position (in the absence of an external argument)*

# More senses of *break*

Frame	Sense
13. break off the engagement	end
14. break out	begin
15. break out in hives	get
16. break into the building	intrude
17. break down the problem	analyze
18. break down the proteins	decompose
19. break in	enter
20. break in	interrupt
21. break free	escape
22. break even	profit = loss
23. break forth	emerge
24. break to the right	turn

- "Except for 13, 17, and 18, these uses are all intransitive"
- Verb particles:
  - *off*
  - *out*
  - *down*
  - *free*
  - *even*
  - *forth*
- particle + NP or PP?:
  - *off the engagement*
  - *out in hives*
  - *into the building*
  - *down the problem/proteins*
  - *to the right*

# WordNet: verb senses of *break*

## Verb

- **S: (v) interrupt#4, break#1** (terminate) "*She interrupted her pregnancy*"; "*break a lucky streak*"; "*break the cycle of poverty*"
- **S: (v) break#2, separate#10, split up#4, fall apart#4, come apart#1** (become separated into pieces or fragments) "*The figurine broke*"; "*The freshly baked loaf fell apart*"
- **S: (v) break#3** (render inoperable or ineffective) "*You broke the alarm clock when you took it apart!*"
- **S: (v) break#4, bust#1** (ruin completely) "*He busted my radio!*"
- **S: (v) break#5** (destroy the integrity of; usually by force; cause to separate into pieces or fragments) "*He broke the glass plate*"; "*She broke the match*"
- **S: (v) transgress#1, offend#2, infract#1, violate#2, go against#2, breach#1, break#6** (act in disregard of laws, rules, contracts, or promises) "*offend all laws of humanity*"; "*violate the basic laws or human civilization*"; "*break a law*"; "*break a promise*"
- **S: (v) break#7, break out#3, break away#1** (move away or escape suddenly) "*The horses broke from the stable*"; "*Three inmates broke jail*"; "*Nobody can break out--this prison is high security*"
- **S: (v) break#8** (scatter or part) "*The clouds broke after the heavy downpour*"
- **S: (v) break#9, burst#2, erupt#6** (force out or release suddenly and often violently something pent up) "*break into tears*"; "*erupt in anger*"
- **S: (v) break#10, break off#2, discontinue#3, stop#6** (prevent completion) "*stop the project*"; "*break off the negotiations*"
- **S: (v) break in#1, break#11** (enter someone's (virtual or real) property in an unauthorized manner, usually with the intent to steal or commit a violent act) "*Someone broke in while I was on vacation*"; "*They broke into my car and stole my radio*"; "*who broke into my account last night?*"
- **S: (v) break in#6, break#12** (make submissive, obedient, or useful) "*The horse was tough to break*"; "*I broke in the new intern*"
- **S: (v) violate#1, go against#1, break#13** (fail to agree with; be in violation of; as of rules or patterns) "*This sentence violates the rules of syntax*"
- **S: (v) better#1, break#14** (surpass in excellence) "*She bettered her own record*"; "*break a record*"

- **S: (v) unwrap#2, disclose#1, let on#1, bring out#9, reveal#2, discover#6, expose#2, divulge#1, break#15, give away#2, let out#2, uncover#3** (make known to the public information that was previously known only to a few people or that was meant to be kept a secret) "*The auction house would not disclose the price at which the van Gogh had sold*"; "*The actress won't reveal how old she is*"; "*bring out the truth*"; "*he broke the news to her*"; "*unwrap the evidence in the murder case*"; "*The newspaper uncovered the President's illegal dealings*"
- **S: (v) break#16** (come into being) "*light broke over the horizon*"; "*Voices broke in the air*"
- **S: (v) fail#4, go bad#1, give way#4, die#4, give out#4, conk out#1, go#30, break#17, break down#4** (stop operating or functioning) "*The engine finally went*"; "*The car died on the road*"; "*The bus we travelled in broke down on the way to town*"; "*The coffee maker broke*"; "*The engine failed on the way to town*"; "*her eyesight went after the accident*"
- **S: (v) break#18, break away#3** (interrupt a continued activity) "*She had broken with the traditional patterns*"
- **S: (v) break#19** (make a rupture in the ranks of the enemy or one's own by quitting or fleeing) "*The ranks broke*"
- **S: (v) break#20** (curl over and fall apart in surf or foam, of waves) "*The surf broke*"
- **S: (v) dampen#7, damp#4, soften#2, weaken#5, break#21** (lessen in force or effect) "*soften a shock*"; "*break a fall*"
- **S: (v) break#22** (be broken in) "*If the new teacher won't break, we'll add some stress*"
- **S: (v) break#23** (come to an end) "*The heat wave finally broke yesterday*"
- **S: (v) break#24** (vary or interrupt a uniformity or continuity) "*The flat plain was broken by tall mesas*"
- **S: (v) break#25** (cause to give up a habit) "*She finally broke herself of smoking cigarettes*"
- **S: (v) break#26** (give up) "*break cigarette smoking*"
- **S: (v) break#27** (come forth or begin from a state of latency) "*The first winter storm broke over New York*"
- **S: (v) break#28** (happen or take place) "*Things have been breaking pretty well for us in the past few months*"
- **S: (v) break#29** (cause the failure or ruin of) "*His peccadilloes finally broke his marriage*"; "*This play will either make or break the playwright*"
- **S: (v) break#30** (invalidate by judicial action) "*The will was broken*"

# WordNet: verb senses of *break*

- **S: (v) separate#8, part#2, split up#3, split#3, break#31, break up#2** (discontinue an association or relation; go different ways) "The business partners broke over a tax question"; "The couple separated after 25 years of marriage"; "My friend and I split up"
- **S: (v) demote#1, bump#4, relegate#2, break#32, kick downstairs#1** (assign to a lower position; reduce in rank) "She was demoted because she always speaks up"; "He was broken down to Sergeant"
- **S: (v) bankrupt#1, ruin#3, break#33, smash#3** (reduce to bankruptcy) "My daughter's fancy wedding is going to break me!"; "The slump in the financial markets smashed him"
- **S: (v) break#34** (change directions suddenly)
- **S: (v) break#35** (emerge from the surface of a body of water) "The whales broke"
- **S: (v) collapse#1, fall in#1, cave in#1, give#26, give way#2, break#36, founder#3** (break down, literally or metaphorically) "The wall collapsed"; "The business collapsed"; "The dam broke"; "The roof collapsed"; "The wall gave in"; "The roof finally gave under the weight of the ice"
- **S: (v) break dance#1, break-dance#1, break#37** (do a break dance) "Kids were break-dancing at the street corner"
- **S: (v) break#38** (exchange for smaller units of money) "I had to break a \$100 bill just to buy the candy"
- **S: (v) break#39, break up#9** (destroy the completeness of a set of related items) "The book dealer would not break the set"
- **S: (v) break#40** (make the opening shot that scatters the balls)
- **S: (v) break#41** (separate from a clinch, in boxing) "The referee broke the boxers"
- **S: (v) break#42, wear#7, wear out#2, bust#4, fall apart#2** (go to pieces) "The lawn mower finally broke"; "The gears wore out"; "The old chair finally fell apart completely"
- **S: (v) break#43, break off#4, snap off#1** (break a piece from a whole) "break a branch from a tree"
- **S: (v) break#44** (become punctured or penetrated) "The skin broke"
- **S: (v) break#45** (pierce or penetrate) "The blade broke her skin"
- **S: (v) break#46, get out#6, get around#1** (be released or become known; of news) "News of her death broke in the morning"
- **S: (v) pause#2, intermit#1, break#47** (cease an action temporarily) "We pause for station identification"; "let's break for lunch"
- **S: (v) break#48** (interrupt the flow of current in) "break a circuit"

- **S: (v) break#49** (undergo breaking) "The simple vowels broke in many Germanic languages"
- **S: (v) break#50** (find a flaw in) "break an alibi"; "break down a proof"
- **S: (v) break#51** (find the solution or key to) "break the code"
- **S: (v) break#52** (change suddenly from one tone quality or register to another) "Her voice broke to a whisper when she started to talk about her children"
- **S: (v) break#53, recrudescence#1, develop#20** (happen) "Report the news as it develops"; "These political movements recrudescence from time to time"
- **S: (v) crack#1, check#25, break#54** (become fractured; break or crack on the surface only) "The glass cracked when it was heated"
- **S: (v) break#55** (crack; of the male voice in puberty) "his voice is breaking--he should no longer sing in the choir"
- **S: (v) break#56** (fall sharply) "stock prices broke"
- **S: (v) fracture#6, break#57** (fracture a bone of) "I broke my foot while playing hockey"
- **S: (v) break#58** (diminish or discontinue abruptly) "The patient's fever broke last night"
- **S: (v) break#59** (weaken or destroy in spirit or body) "His resistance was broken"; "a man broken by the terrible experience of near-death"

down a proof

to a whisper

unaccusative:  
subject is affected

for lunch

# WordNet: senses of *break out* and *break down*

## Verb

- [S: \(v\) erupt#1](#), [break out#1](#) (start abruptly) "After 1989, peace broke out in the former East Bloc"
- [S: \(v\) break out#2](#) (begin suddenly and sometimes violently) "He broke out shouting"
- [S: \(v\) break#7](#), [break out#3](#), [break away#1](#) (move away or escape suddenly) "The horses broke from the stable"; "Three inmates broke jail"; "Nobody can break out--this prison is high security"
- [S: \(v\) break out#4](#) (take from stowage in preparation for use)
- [S: \(v\) erupt#8](#), [recrudesce#2](#), [break out#5](#) (become raw or open) "He broke out in hives"; "My skin breaks out when I eat strawberries"; "Such boils tend to recrudesce"

## Verb

- [S: \(v\) break down#1](#), [crush#7](#) (make ineffective) "Martin Luther King tried to break down racial discrimination"
- [S: \(v\) analyze#2](#), [analyse#3](#), [break down#2](#), [dissect#2](#), [take apart#3](#) (make a mathematical, chemical, or grammatical analysis of; break down into components or essential features) "analyze a specimen"; "analyze a sentence"; "analyze a chemical compound"
- [S: \(v\) break down#3](#), [lose it#1](#), [snap#11](#) (lose control of one's emotions) "When she heard that she had not passed the exam, she lost it completely"; "When her baby died, she snapped"
- [S: \(v\) fail#4](#), [go bad#1](#), [give way#4](#), [die#4](#), [give out#4](#), [conk out#1](#), [go#30](#), [break#17](#), [break down#4](#) (stop operating or functioning) "The engine finally went"; "The car died on the road"; "The bus we travelled in broke down on the way to town"; "The coffee maker broke"; "The engine failed on the way to town"; "her eyesight went after the accident"
- [S: \(v\) crumble#1](#), [crumple#1](#), [tumble#5](#), [break down#5](#), [collapse#4](#) (fall apart) "the building crumbled after the explosion"; "Negotiations broke down"
- [S: \(v\) break down#6](#) (cause to fall or collapse)
- [S: \(v\) decompose#1](#), [break up#18](#), [break down#7](#) (separate (substances) into constituent elements or parts)
- [S: \(v\) break down#8](#), [collapse#2](#) (collapse due to fatigue, an illness, or a sudden attack)



# WordNet: senses of *break in* and *break off*

## Verb

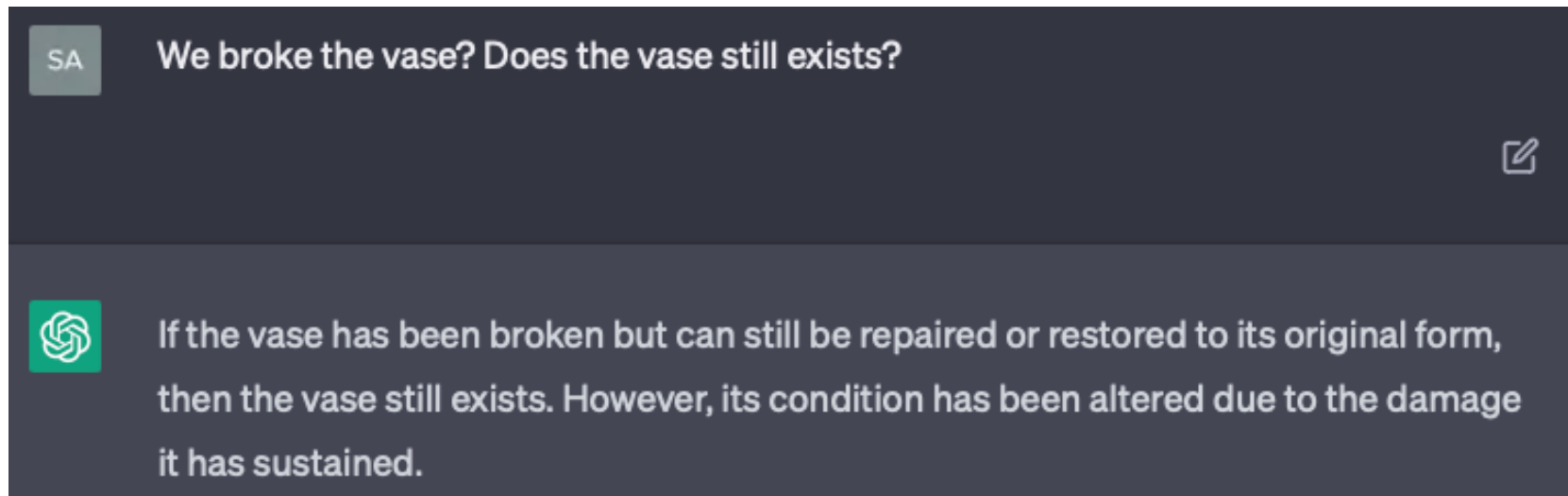
- [S: \(v\) break in#1](#), [break#11](#) (enter someone's (virtual or real) property in an unauthorized manner, usually with the intent to steal or commit a violent act) "*Someone broke in while I was on vacation*"; "*They broke into my car and stole my radio!*"; "*who broke into my account last night?*"
- [S: \(v\) chime in#1](#), [cut in#3](#), [put in#3](#), [butt in#1](#), [chisel in#1](#), [barge in#2](#), [break in#2](#) (break into a conversation) "*her husband always chimes in, even when he is not involved in the conversation*"
- [S: \(v\) break in#3](#) (start in a certain activity, enterprise, or role)
- [S: \(v\) break in#4](#) (intrude on uninvited) "*The nosy couple broke in on our conversation*"
- [S: \(v\) break in#5](#) (break so as to fall inward) "*He broke in the door*"
- [S: \(v\) break in#6](#), [break#12](#) (make submissive, obedient, or useful) "*The horse was tough to break*"; "*I broke in the new intern*"

## Verb


- [S: \(v\) cut short#1](#), [break short#1](#), [break off#1](#) (interrupt before its natural or planned end) "*We had to cut short our vacation*"
- [S: \(v\) break#10](#), [break off#2](#), [discontinue#3](#), [stop#6](#) (prevent completion) "*stop the project*"; "*break off the negotiations*"
- [S: \(v\) chip#1](#), [chip off#1](#), [come off#3](#), [break away#2](#), [break off#3](#) (break off (a piece from a whole)) "*Her tooth chipped*"
- [S: \(v\) break#43](#), [break off#4](#), [snap off#1](#) (break a piece from a whole) "*break a branch from a tree*"
- [S: \(v\) chip#5](#), [knap#2](#), [cut off#5](#), [break off#5](#) (break a small piece off from) "*chip the glass*"; "*chip a tooth*"

# Let's ask ChatGPT

- *Does the object still exist after being broken?*

A screenshot of a chat interface with a dark background. The user's question is in a grey bubble on the left, and the AI's response is in a dark grey bubble on the right. The AI's response includes the OpenAI logo.

SA We broke the vase? Does the vase still exists?

 If the vase has been broken but can still be repaired or restored to its original form, then the vase still exists. However, its condition has been altered due to the damage it has sustained.

# Let's ask ChatGPT

- *Does the object still exist after being broken?*

SA

We pulverized the vase Does the vase still exist?



If the vase has been pulverized, it likely no longer exists as a vase. "Pulverized" means to crush or grind something into a fine powder or dust, which would make it very difficult, if not impossible, to reconstruct the vase in its original form.



# Let's ask ChatGPT

- *Does the object still exist after being broken?*

SA

We obliterated the vase. Does the vase still exist?



If the vase has been obliterated, it likely no longer exists as a vase. "Obliterated" means to destroy completely, to the point where there is no trace of the original object left.

# nlTK ptb

- Recall we installed this a while ago:

```
>>> from nltk.corpus import ptb
>>> type(ptb)
<class 'nltk.corpus.util.LazyCorpusLoader'>
>>> ptb.fileids()
['BROWN/CF/CF01.MRG', 'BROWN/CF/CF02.MRG', ... , 'WSJ/24/WSJ_2453.MRG', 'WSJ/24/WSJ_2454.MRG']
>>> len(ptb.fileids())
2504
>>> len(ptb.parsed_sents())
73451
>>> len(ptb.words())
1740895
```

# nlTK ptb.parsed\_sents()

- a list of trees: Tree objects.
- Tree printing:
  - `t.pretty_print()`      ascii graphics
  - `t.pprint()`              parentheses
  - `t.draw()`                window
- Tree objects are recursively defined. Given a tree `t`:
  - `t.label()`                category label of `t`
  - `len(t)`                    number of children of `t`
  - `t[i]`                        *i*th child of `t` (which could be Tree or string)
  - `t.subtrees()`              all possible subtrees in `t`
  - `t.pos()`                    list of (*word*, *postag*) in `t`

# Find all *break* sentences

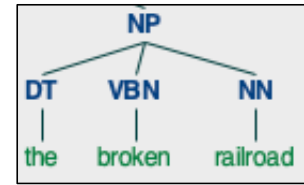
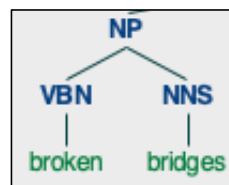
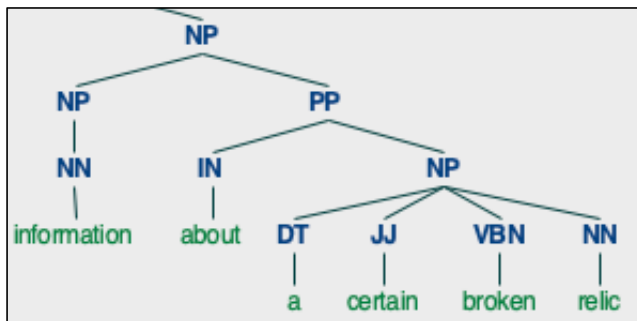
break.py

```
1 from nltk.corpus import ptb
2
3 verbforms = set(['break', 'breaks', 'broke', 'breaking', 'broken'])
4 verbtags = set(['VB', 'VBP', 'VBZ', 'VBD', 'VBG', 'VBN'])
5
6 def has_break(list):
7     for wordtag in list:
8         if wordtag[0] in verbforms and wordtag[1] in verbtags:
9             return True
10    return False
```

# Find all *break* sentences

- Example:

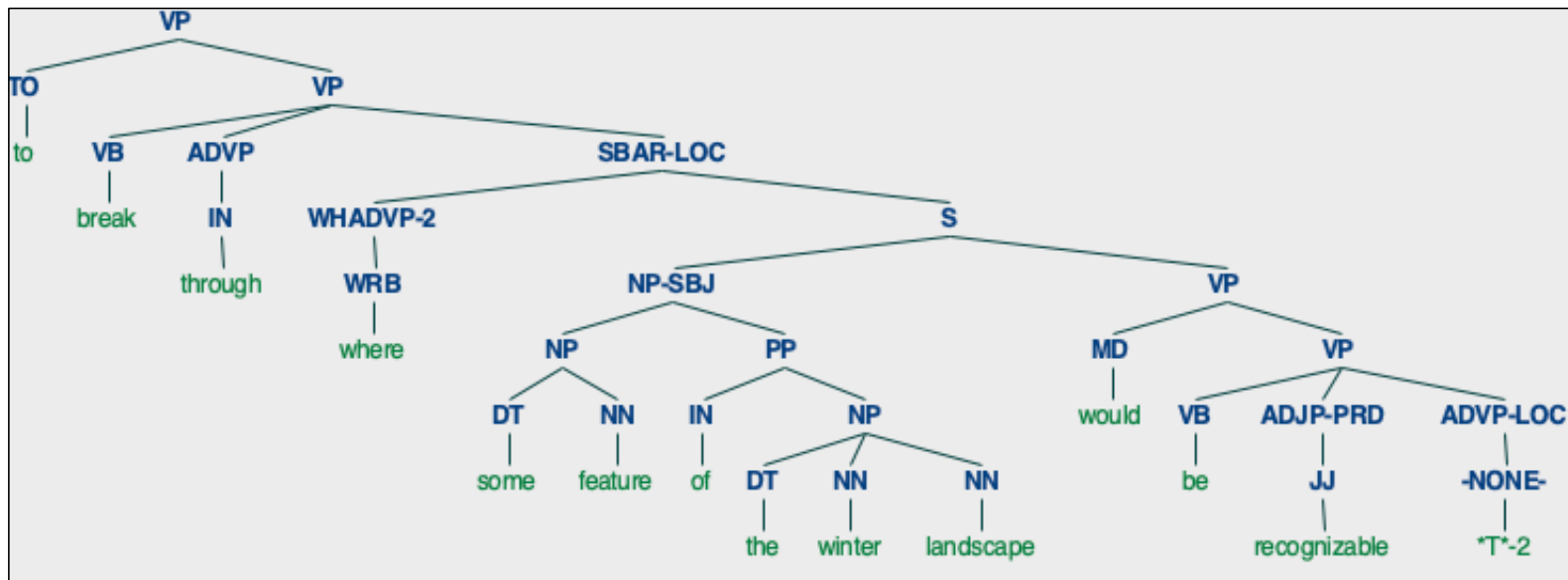
```
$ python -i break.py  
>>> break_trees = [t for t in ptb.parsed_sents() if has_break(t.pos())]  
>>> len(break_trees)  
244  
>>> break_trees[0].draw()
```



adjectival modification with VBN *broken*

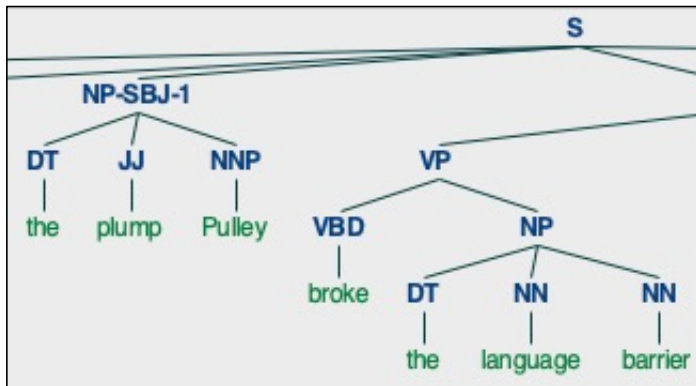
# Find all *break* sentences

*break through*/ADVP

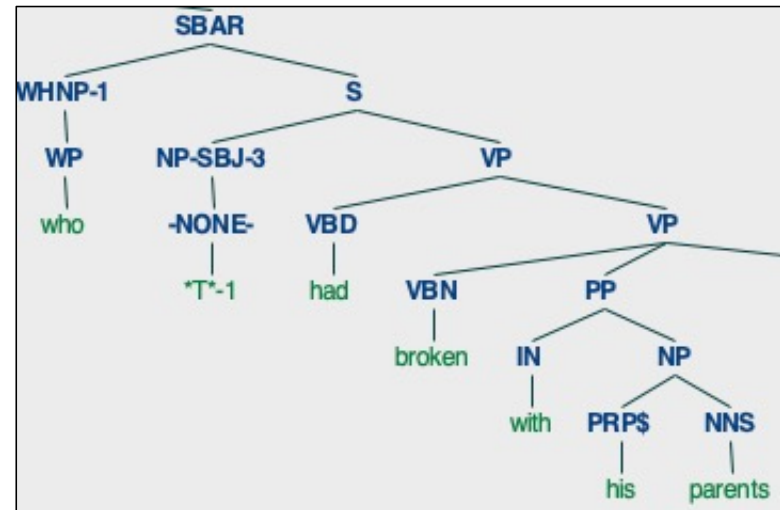


# Find all *break* sentences

*break* NP

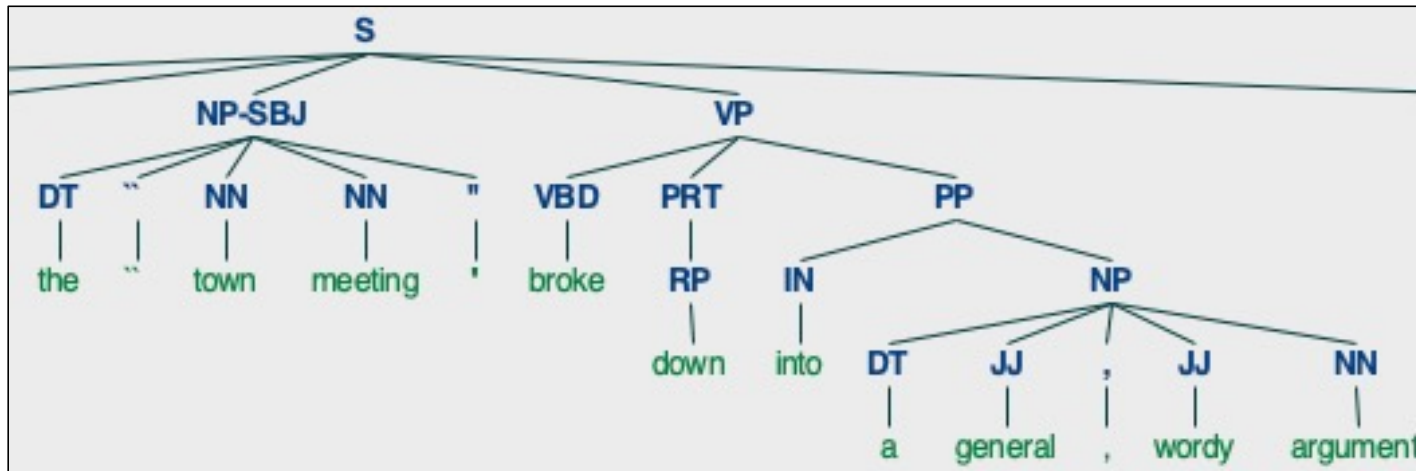


*break* PP[with]



# Find all *break* sentences

*break down*/PRT PP[into]

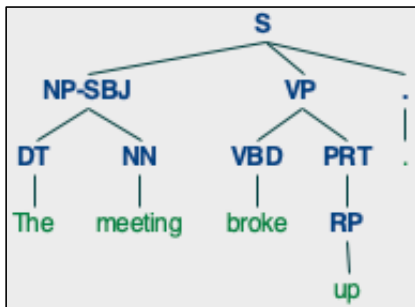


RP Particle



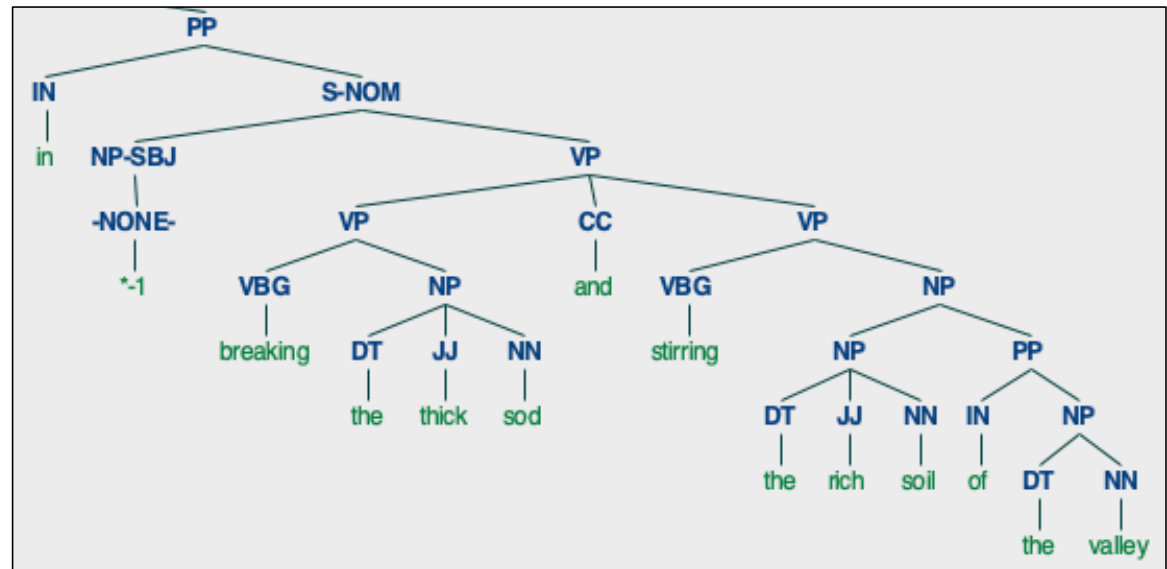
# Find all *break* sentences

*break up*/PRT



RP

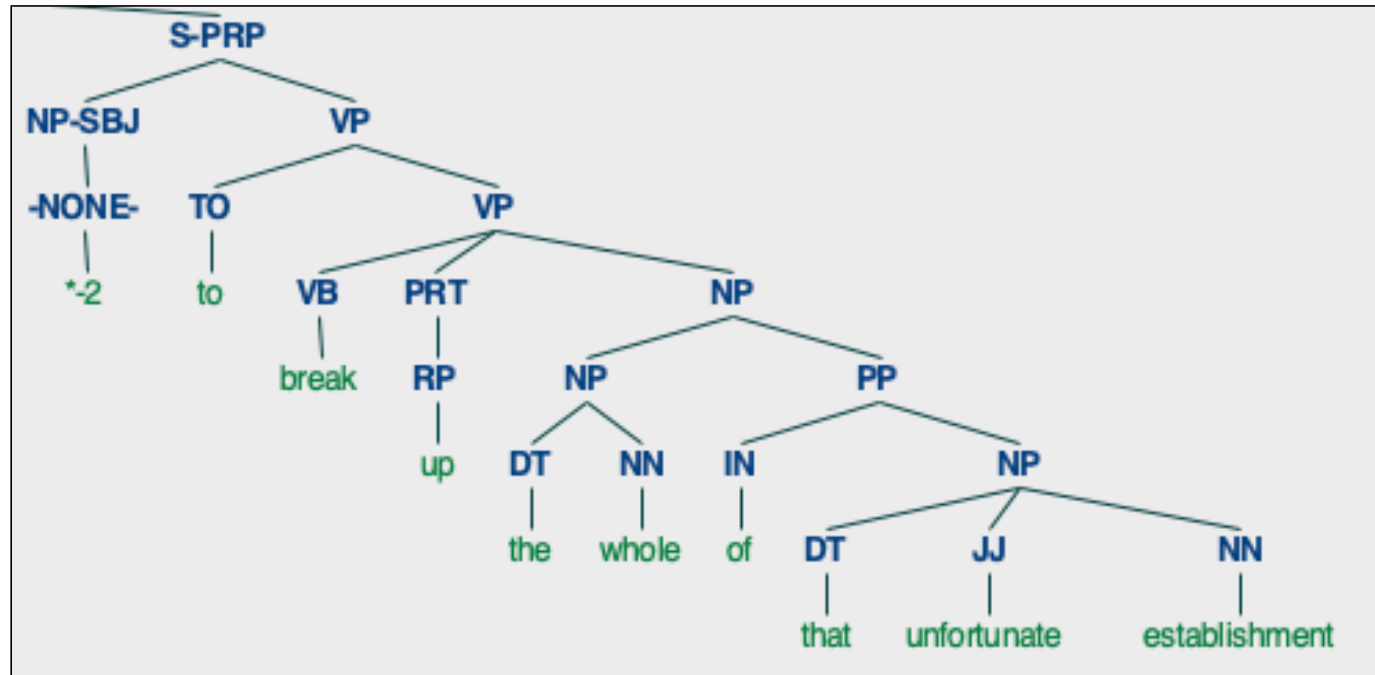
Particle



# Find all *break* sentences

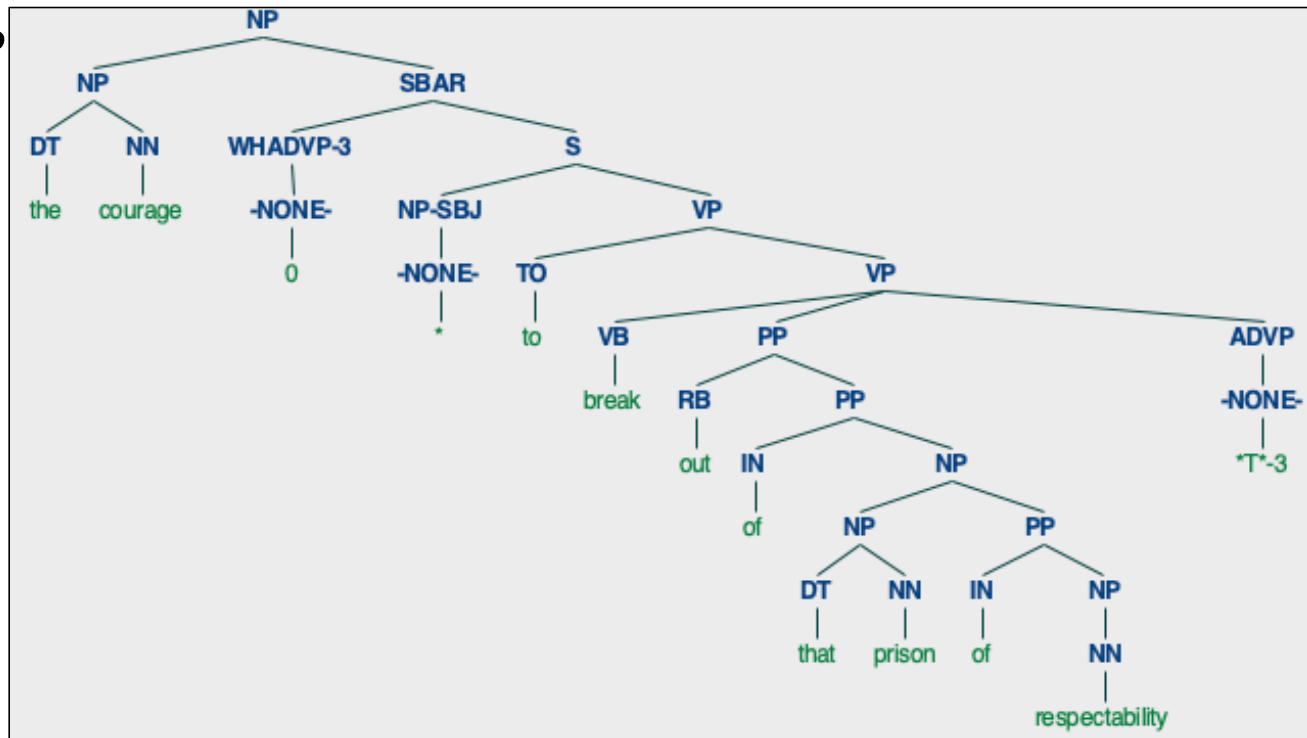
*break up*/PRT NP

RP Particle



# Find all *break* sentences

*break out of NP*



# Find all *break* verb frames

break.py

```
24# returns False if not [VP break ... ] else returns printed nodes
25def vp_break(x):
26     if not isinstance(x, str) and x.label().startswith('VP'):
27         verb = [y for y in x if not isinstance(y, str) and y.label().startswith('VB') and y[0] in verbforms]
28
29         if verb:
30             s = ''
31             for y in x:
32                 s += print_node(y, verb)
33             return s
34         else:
35             return False
36     else:
37         return False
38
```

# Find all *break* verb frames

break.py

```
12 def print_node(t, verb):  
13     if isinstance(t, str):  
14         return ' {}'.format(t)  
15     elif t == verb[0]:  
16         return ' {}/{}'.format(t[0], t.label())  
17     elif t.label() == 'PRT':  
18         return ' {}/{}'.format(t[0][0], t.label())  
19     elif t.label() == 'ADVP' and len(t) == 1 and len(t[0]) == 1:  
20         return ' {}/{}'.format(t[0][0], t.label())  
21     else:  
22         return ' {}'.format(t.label())
```


# Find all *break* verb frames

- Code:

```
$ python -i break.py
>>> for i,t in enumerate(break_trees):
...     for st in t.subtrees():
...         found = vp_break(st)
...         if found:
...             print(i, found)
... 
```

# Find all *break* verb frames

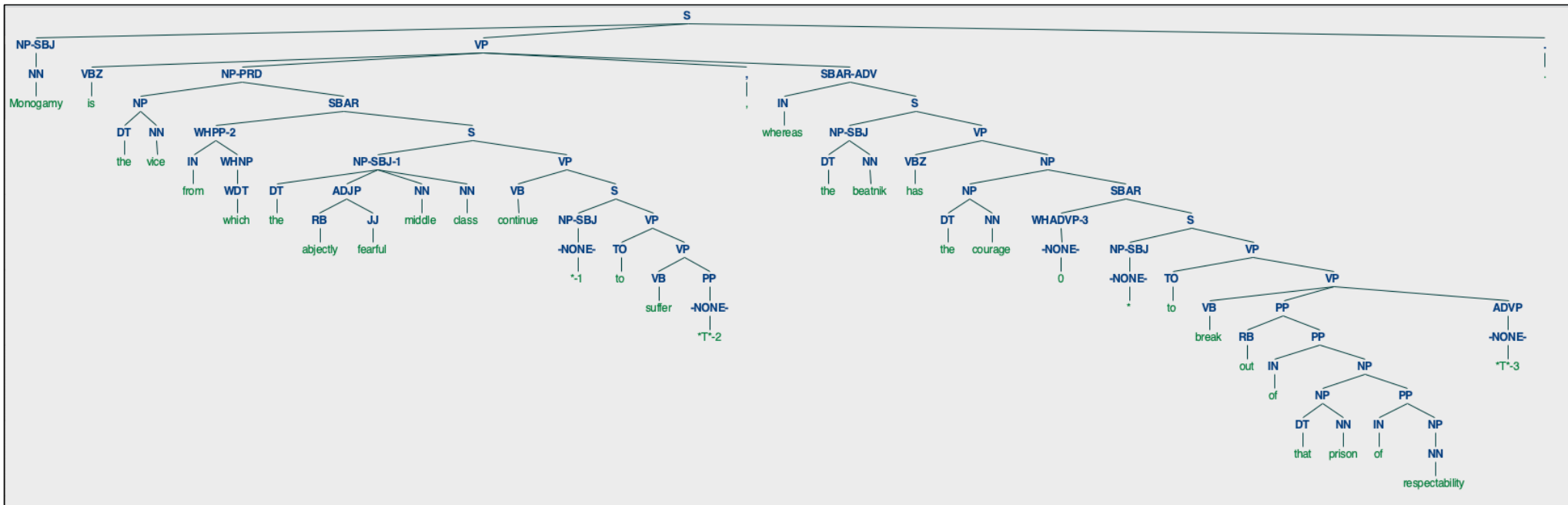
- 3 break/VB through/ADVP SBAR-LOC
- 4 broke/VBD NP
- 5 broken/VBN PP SBAR-PRP
- 6 broke/VBD down/PRT PP
- 7 broke/VBD up/PRT
- 8 breaking/VBG NP
- 9 break/VB up/PRT NP
- 10 break/VB NP
- 11 break/VBP
- 12 breaking/VBG , SBAR-ADV
- 13 broke/VBD out/PRT
- 14 broke/VBD PP
- 15 broke/VBD up/PRT NP
- 16 broken/VBN NP PP
- 17 break/VB NP
- 18 broke/VBD out/PRT NP
- 19 broke/VBD out/PRT ADVP-TMP
- 20 break/VB away/ADVP PP
- 21 break/VB S
- 22 breaks/VBZ PP
- 23 break/VB PP \*T\*-3/ADVP
- 26 broke/VBD NP PP
- 27 break/VB NP
- 28 breaks/VBZ PP
- 29 break/VB NP
- 30 breaks/VBZ up/PRT PP , PP
- 31 VBP CC break/VBP NP PP-LOC
- 32 broke/VBD NP



*what is  
this?*

# Find all *break* verb frames

```
>>> break_trees[23].draw()
```





# Find all *break* verb frames

33 `` breaks/VBZ '' CONJP VBZ SBAR-TMP  
34 broken/VBN PP ADVP  
35 break/VB down/PRT NP  
36 broke/VBD out/PRT PP-LOC ADVP-TMP  
38 break/VB ADVP-LOC  
39 broke/VBD loose/ADVP  
40 broken/VBN NP  
41 broke/VBD NP off/PRT  
42 breaking/VBG PP  
43 broke/VBD PP  
44 break/VBP NP  
45 breaking/VBG up/PRT NP PP  
46 broke/VBD NP ADVP-TMP  
47 broke/VBD NP S-ADV  
48 broke/VBD PP  
50 then/ADVP break/VB off/PRT suddenly/ADVP  
51 broke/VBD NP ADVP-TMP  
52 break/VB NP PP  
53 breaking/VBG NP  
54 broke/VBD NP  
55 broke/VBD PP , S-ADV  
56 break/VB down/PRT  
57 broke/VBD out/PRT PP-LOC SBAR-TMP  
58 broken/VBN NP  
59 break/VB NP  
60 broken/VBN NP  
61 break/VB PP PP-TMP  
62 break/VB NP  
64 break/VB PP  
65 breaking/VBG NP