

## Semantic Role Labelling, cont.

Martha Palmer  
University of Colorado

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## Returning to *Jin broke the projector*

- Frame for *break*:

Frameset **break.01** "break, cause to not be whole":  
Arg0: breaker  
Arg1: thing broken  
Arg2: instrument  
Arg3: pieces



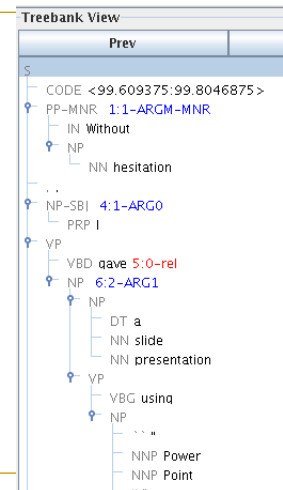
## Full example

**Jin** broke **the projector** before class because he didn't want to hear Jena talk.

- Given relation *break*:
  - Arg0: **Jin**
  - REL: **broke**
  - Arg1: **the projector**
  - ArgM-TMP: **before class**
  - ArgM-CAU: **because he didn't want to hear Jena talk.**



## Everyday annotation...



## Mapping from PropBank to VerbNet (similar mapping for PB-FrameNet)

Frameset id = <i>leave.02</i>	Sense = <i>give</i>	VerbNet class = <i>future-having 13.3</i>
Arg0	Giver	Agent/Donor*
Arg1	Thing given	Theme
Arg2	Benefactive	Recipient

\*FrameNet Label

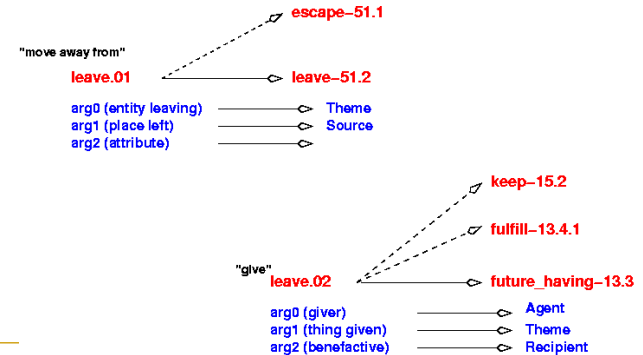
Baker, Fillmore, & Lowe, COLING/ACL-98  
Fillmore & Baker, WordNetWKSHP, 2001

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## Mapping from PB to VerbNet [verbs.colorado.edu/~semllink](http://verbs.colorado.edu/~semllink)



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## FrameNet

- Baker, Collin F., Charles J. Fillmore, and John B. Lowe. (1998) The Berkeley FrameNet project. In *Proceedings of COLING/ACL-98*, pages 86--90, Montreal.
- Fillmore, Charles J. and Collin F. Baker. (2001). Frame semantics for text understanding. In the *Proceedings of NAACL WordNet and Other Lexical Resources Workshop* Pittsburgh, June.

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## Introducing FrameNet -Thanks to Chuck Fillmore and Collin Baker

In one of its senses, the verb *observe* evokes a frame called **Compliance**: this frame concerns people's responses to norms, rules or practices.

The following sentences illustrate the use of the verb in the intended sense:

- Our family **observes** the Jewish dietary laws.
- You have to **observe** the rules or you'll be penalized.
- How do you **observe** Easter?
- Please **observe** the illuminated signs.

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## FrameNet

FrameNet records information about English words in the general vocabulary in terms of

1. the **frames** (e.g. **Compliance**) that they **evoke**,
2. the **frame elements** (semantic roles) that make up the components of the frames (in **Compliance**, Norm is one such frame element), and
3. each word's **valence** possibilities, the ways in which information about the frames is provided in the linguistic structures connected to them (with **observe**, Norm is typically the direct object).

## The FrameNet Product

The FrameNet database constitutes

- a set of **frame descriptions**
- a set of **corpus examples** annotated with respect to the frame elements of the frame evoked by each lexical unit
- **lexical entries**, including definitions and displays of the combinatory possibilities of each lexical unit, as automatically derived from the annotations
- a display of **frame-to-frame relations**, showing how some frames are elaborations of others, or are components of other frames.

## Frame Elements for Compliance

The frame elements that figure in the Compliance frame are called

- **Norm** (the rule, practice or convention)
- **Protagonist** (the person[s] reacting to the Norm)
- **Act** (something done by the Protagonist that is evaluated in terms of the Norm)
- **State\_of\_affairs** (a situation evaluated in terms of the Norm)

- You do a whole frame for just *observe*?
- No. There are other Compliance words too.

V - *adhere, comply, conform, follow, heed, obey, submit, ...;*

### AND NOT ONLY VERBS

N - *adherence, compliance, conformity, obedience, observance, ...;*

A - *compliant, obedient, ...;*

PP - *in compliance with, in conformity to, ...;*

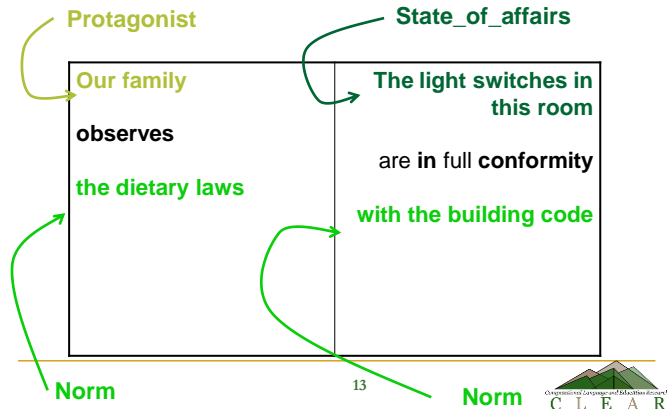
### AND NOT ONLY WORDS FOR POSITIVE RESPONSES TO NORMS

V - *break, disobey, flout, transgress, violate, ...;*

N - *breach, disobedience, transgression, violation, ...;*

PP - *in violation of, in breach of, ...*

## Tagging Compliance sentences



- Are we finished with the verb *observe*?
- No. This verb has several other meanings too.

- In the **Becoming-aware** frame we get the uses seen in *observing children at play*, *observing an ant colony*, sharing frame membership with *watch*, *attend*, *listen to*, *view* & *pay attention*.
- In a **Commenting** frame, *observe* and *observation* share frame membership with *remark* & *comment*.

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## Lexical Unit

Our unit of description is not the word (or “lemma”) but the **lexical unit** (Cruse 1986), – a pairing of a word with a sense. In our terms this is the pairing of a word with a single frame.

The lexical unit - roughly equivalent to a word in a synset - is the unit in terms of which important generalizations about lexical relations, meanings and syntactic behavior can best be formulated.

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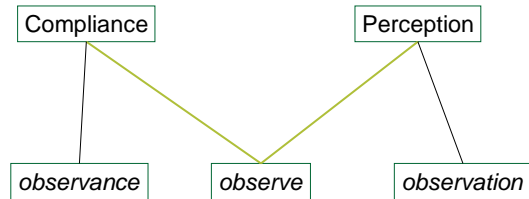
## LUs and V-N relationships

- Note that the nouns based on *observe* are
  - *observance* in the **Compliance** frame,
  - *observation* in the **Perception\_active** frame
- Similarly, the nouns based on *adhere* are
  - *adherence* in the **Compliance** frame,
  - *adhesion* in the **Attachment** frame.
- When we need to be precise we show the frame-specific sense of a lemma (the full name of an LU) with a dotted expression:
  - Compliance.*observe*, Attachment.*adhere*, etc.

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## words, frames, lexical units

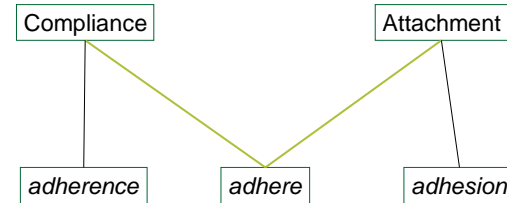


2 lexical units sharing same form:  
Compliance.*observe*,  
Perception.*observe*

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## words, frames, lexical units

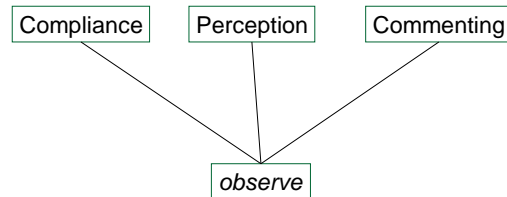


2 lexical units sharing the same form:  
Compliance.*adhere*,  
Attachment.*adhere*

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## The study of polysemy concerns membership in different frames



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## Different LU, Different Valence

**Compliance.***observe* generally has an NP as its direct object.

**Perception.***observe* has these patterns:

- NP: *Observe the clouds overhead.*
- NP+Ving: *I observed the children playing.*
- wh-clause: *Observe what I'm doing.*
- that-clause: *We observed that the process terminated after an hour.*

**Comment.***observe* occurs frequently with a quoted comment:

- *"That was brilliant," he observed snidely.*

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## Lexical-units: Wrap-up

Lexical units are the entities with respect to which we define

- meanings
- grammatical behavior
- semantic relations with other entities
- morphological relations with other entities

In short, there aren't interesting things to say about the verb *observe* in general, but only about the individual lexical units that happen to have the form *observe*.

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In recent years, through NSF subcontracts with Colorado and Penn colleagues, and through our participation in the AQUAINT program, we have begun using FrameNet techniques for analyzing full texts.

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In October 2002,  
the U.S. State Department  
*informed*  
North Korea

that  
the U.S.  
was *aware*  
of this program,  
and  
*regards*  
it  
as a *violation*  
of Pyongyang's  
nonproliferation  
*commitments*.

Telling.inform

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## Telling.inform

Time	In 2002,
Speaker	the U.S. State Department
Target	INFORMED
Addressee	North Korea
Message	that the U.S. was aware of this program , and regards it as a violation of Pyongyang's nonproliferation commitments



## Inform

- The meaning of *inform* that we wish to describe belongs to a **Telling** frame; here the emphasis is on getting information to an addressee, and is thus distinct from **Statement**.
  - The **Telling** frame is shared by *inform, tell, notify, etc.*, **Statement** is shared by *say, announce, state, etc.*
- The meaning of *inform* in the **Telling** frame is distinct from the sense it has as a member of the **Reporting** frame, where it occurs as part of a phrasal verb, *inform on*. Other members of this frame are *report (they reported me to the authorities), tell on, rat on, fink on*.

## Licensed Omission

- The syntactic possibilities of the verb *inform* give us a chance to introduce a concept that will be developed in some detail later on: **null instantiation**.
- The Content FE of this verb can be omitted - as in
  - *They already informed me.*

This omission is only licensed when the intended Content is already known in the context. This variety of zero anaphora will play an important role in the final section of this presentation.

In October 2002,  
the U.S. State Department  
*informed*  
North Korea  
that  
the U.S. ←  
was *aware* ..... Awareness.aware  
of this program, ←  
and  
*regards*  
it  
as a *violation*  
of Pyongyang's  
nonproliferation  
*commitments.*

## Awareness.aware

Cognizer	the U.S.
TARGET	was AWARE
Content	of this program

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that  
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of this program,  
and  
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it  
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nonproliferation  
*commitments.*

Categorization.regard



## Categorization.regard

Cognizer	the U.S.
TARGET	REGARDS
Item	it
Category	as a violation of Pyongyang's nonproliferation commitments



In October 2002,  
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that  
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and  
*regards*  
it  
as a *violation*  
of Pyongyang's  
nonproliferation  
*commitments.*

Compliance.violation



## Compliance.violation

Act	it
Target	a VIOLATION
Norm	of Pyongyang's nonproliferation commitments





In October 2002,  
 the U.S. State Department  
*informed*  
 North Korea  
 that  
 the U.S.  
 was *aware*  
 of this program,  
 and  
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Commitment.commitment

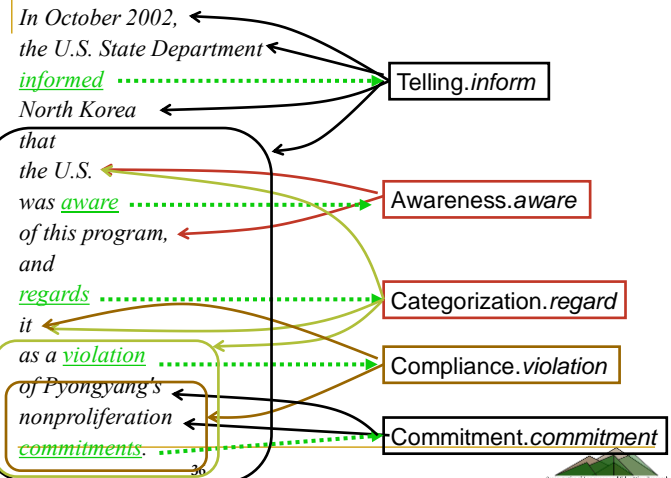
## Commitment.commitment

Speaker	Pyongyang's
Message	nonproliferation
Target	COMMITMENTS.

## Support Verbs and Polysemy

*Commitment* also occurs in the Institutionalization frame: *committing a person to a mental hospital*. That meaning does not welcome the support verb *make*.

The verb *commit* itself is a support verb for crimes and sins: *to commit murder* is the same as *to murder*. But this use of *commit* has *commission*, not *commitment*, as its nominalization!




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## Lexicon-Building

- The main work of FN has been building a lexicon, including the activities of
  - describing frames and choosing names for their components,
  - selecting words that belong in each frame,

*for example*  
 FRAME: Compliance  
 FRAME ELEMENTS:  
 Protagonist  
 Norm  
 State\_of\_affairs  
 Act

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## Lexicon-Building

- The main work of FN has been building a lexicon, including the activities of
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  - using corpus examples as evidence for the behavior of individual words in a frame,

*Verbs: comply, conform, observe, ..., violate, break, ...*  
*Nouns: compliance, observance, ..., violation, breach, ...*  
*Adjectives: compliant, observant, obedient, ...*  
*Phrases: in compliance with, in violation of, ...*



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  - annotating selected sentences in ways that show how frame information is present in them,
  - automatically deriving descriptions of each word's behavior from

Our main corpus is the 100M word British National Corpus, supplemented by U. S. Newswire text available through the Linguistics Data Consortium, plus, more recently, an initial release of the American National Corpus and some texts provided by government funders.


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We've seen some of these



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  - selecting words that belong in each frame,
  - extracting corpus examples as evidence for the behavior of individual words in a frame,
  - annotating selected sentences in ways that show how frame information is present in them, and
  - automatically deriving descriptions of each word's behavior from such annotations.

For example, we will record that the Norm shows up as a simple direct object with *observe* and *follow*, but is introduced by *with* in the case of *comply*, by *to* in the case of *conform*, etc. (*comply with*, *conform to*, ...)

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