

Background to FrameNet

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INTERNATIONAL
COMPUTER SCIENCE
INSTITUTE

Road Map

- FrameNet
- Frames
 - Frame Elements
 - Lexical Units
- FrameNet Annotation
 - Lexicographic Annotation
 - “Full-Text” Annotation
- Frame-to-Frame Relations
- FrameNet: New Developments

Road Map

- ✓ FrameNet
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 - FrameNet: New Developments

Charles J. Fillmore (aka OFL)



1929-2014

What is FrameNet?

- A unique knowledge base with information on the **mapping of meaning to form** through the theory of Frame Semantics (Fillmore 1975, 1985, Fillmore and Atkins 1986, Fillmore and Baker 2010, Fillmore 2012, Fontenelle 2003, Petruck 1996)
- A resource that provides **rich semantics** for the core English vocabulary based on manually annotated corpus evidence, including **valence descriptions** for each item analyzed

What's “in” FrameNet?

- ~ 1,200 semantic frames (including FEs)
- ~ 13,500 lexical units
- > 202,000 manually annotated examples
- > 1,800 frame-to-frame relations constituting a hierarchy of semantic frames

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What's a Frame?

A Semantic Frame is a script-like **structure of inferences**, linked by linguistic convention to the meanings of linguistic units - here, lexical items - constituting a **schematic representation** of a situation, object, event, or relation providing the background structure against which words are **understood**. Each frame identifies a set of **frame elements** – participants in the frame.

Semantic Frames in FrameNet

- Situation: Being_attached, Being_necessary, Being_strong, Being_wet, etc.
- Event: Apply_heat, Borrowing, Catching_fire, Cooking_creation, Hiring, Replacing, etc.
- Object: Buildings, Containers, Intoxicants, Offenses, People_by_origin, etc .
- Relations: Locative_relation, Spacial_co-location, Interior_profile_relation, Similarity, etc.

What's “in” a Frame?

- **Frame Definition**

a prose description of a **situation** involving various participants and other conceptual roles, each of which constitutes a frame element

- **Frame Elements (FEs):**

semantic roles as the basic unit of a frame, defined specifically to each frame

- **Lexical Units (LUs):**

pairing of a lemma and a frame, i.e. “word” in one of its senses; LU **evokes** a frame

Apply_heat: Definition

A **Cook** applies heat to **Food**, where the **Temperature_setting** of the heat and **Duration** of application may be specified.

A **Heating_instrument**, generally indicated by a locative phrase, may also be expressed. Some cooking methods involve the use of a **Medium** (e.g. milk or water) by which heat is transferred to the **Food**.

This frame focuses on the process of handling the ingredients, rather than the end result (See **Cooking_creation**).

Apply_heat: Frame Elements

Cook

Food

Temperature_setting

Duration

Heating_instrument

Medium

Lila **FRIED** the eggs in a copper pan.

Frame Elements: Coreness

- Core: uniquely defines a frame
Commerce: BUYER, SELLER, MONEY, GOODS
- Peripheral: for aspects of events in general
e.g. TIME, PLACE, MANNER
- Extrathematic: situate an event against the backdrop of another state of affairs; conceptually do not belong to the frame in which they occur
– e.g. ITERATION, RECIPIENT
Sue **BAKED** the cookies [twice _{ITERATION}].
Sue **BAKED** the cookies [for me _{RECIPIENT}].

Frame Elements

Triple of Information

Frame Element

- semantic role

Grammatical Function

- External, Object, Dependent

Phrase Type

- full range of PTs for language

Apply_heat: Lexical Units

bake.v, baking.n barbecue.v, blanch.v, boil.v, braise.v, braising.n, broil.v, brown.v, char.v, coddle.v, cook.v, deep fry.v, fry.v, frying.n, grill.v, microwave.v, parboil.v, plank.v, poach.v, roast.v, saute.v, scald.v, scorch.v, sear.v, searing.n, simmer.v, singe.v, steam.v, steep.v, stew.v, toast.v

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Lexicographic Annotation

- What?
 - Dependents of **one TARGET** per example sentence
 - constituents that instantiate Frame Elements (semantic roles), including prepositions
 - Null Instantiated Core FEs
- Why?
 - show **TARGET** word (= LU) use in language
 - determine valence description of each **TARGET**
 - account for non-instantiated FEs
 - FN began as a computational **lexicography** project

Null Instantiation

- Constructional Null Instantiation (CNI)
 - construction licenses omission
 - imperative, agentless passive
- Definite Null Instantiation (DNI)
 - lexically specific, understood from discourse, knowledge of missing material required for determining referent
 - Frank **RETALIATED** after the bar incident. **OFFENDER DNI**
- Indefinite Null Instantiation (INI)
 - lexically specific, intransitive use of transitive verbs (e.g. eat, drink, sew, **bake**), knowledge of category of missing material, even if not mentioned in previous discourse or context

Lexicographic Annotation: Apply_heat.bake.v

→ BAKE the soufflés for 12 minutes .CNIINI
BAKE spanakopitta for about 40 minutes , then increase the heat for another 5 minutes to crisp the top .CNIINI
BAKE the elioti for about 45 minutes or until the base sounds hollow when tapped .CNIINI
BAKE the tart on a preheated baking sheet at 350°F (180°C) gas mark 4 for 40-45 min until the filling is creamily set .CNI

COOK

CNI

HEATING_INSTRUMENT INI

FE: BAKE [the soufflé_{FOOD}] [for 12 minutes_{DURATION}]

GF: Object Dep

PT: NP PP_{for}

Second Layer Annotation: Apply_heat.bake.v

BAKE the aubergines in a preheated 180°C/350°F/Gas 4 oven for half an hour or until limp and lightly browned .CNI
180°C/350°F/Gas
→ Cover and BAKE in a preheated 200°C/400°F/Gas 8 oven for 15-20 minutes .DNIDNI
200°C/400°F/Gas 8

Cover and **BAKE** [in a preheated 200°C/400°F/Gas 8 oven $H_{\text{HEATING_INSTRUMENT}}$] for 15-20 minutes.

[200°C/400°F/Gas 8 $T_{\text{TEMPERATURE_SETTING}}$]

Lexicographic Annotation Results:

Apply_heat.bake.v

Number Annotated	Patterns				
<u>1</u> TOTAL	Container	Cook	Duration	Food	
(1)	PP[in] Dep	CNI --	PP[for] Dep	NP Ext	
<u>1</u> TOTAL	Container	Cook	Duration	Food	Temperature setting
(1)	PP[on] Dep	CNI --	PP[for] Dep	NP Obj	PP[at] Dep
<u>5</u> TOTAL	Cook	Duration	Food	Heating instrument	
(2)	CNI --	PP[for] Dep	CNI --	INI --	
(3)	CNI --	PP[for] Dep	NP Obj	INI --	
<u>3</u> TOTAL	Cook	Duration	Food	Heating instrument	Temperature setting
(1)	CNI --	PP[for] Dep	CNI --	INI --	PP[at] Dep
(1)	CNI --	PP[for] Dep	NP Obj	PP[in] Dep	2nd --
(1)	DNI --	PP[for] Dep	DNI --	PP[in] Dep	2nd --
<u>1</u> TOTAL	Cook	Food	Heating instrument		
(1)	CNI --	NP Obj	INI --		
<u>1</u> TOTAL	Cook	Food	Heating instrument	Manner	
(1)	CNI --	NP Obj	PP[in] Dep	AVP Dep	
<u>1</u> TOTAL	Duration	Heating instrument	Temperature setting		
(1)	PP[for] Dep	PP[in] Dep	2nd --		

Cooking_creation: Definition

A **Cook** creates a **Produced_food** from (raw) **Ingredients**. The **Heating_Instrument** and/or the **Container** may also be specified. This frame describes food and meal preparation.

Cooking_creation: Frame Elements

Cook

Produced_food

Ingredients

Heating_Instrument

Container

Sam **MADE** vegetable soup for dinner last night.

Cooking_creation: Lexical Units

*bake.v, baking.n, concoct.v, cook up.v,
cooking_up.n, cook.n, cooking.n, cook.v,
make.v, put together.v, whip up.v,*

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Lexicographic Annotation: Cooking_creation.bake.v

429-s20-1coll-bread

1. The bread would then be slipped in , the oven door sealed , and when the oven cooled , **the bread** would be **BAKED** .CNI

429-s20-rcoll-bread

1. It is also illegal in Norway for **a bakery** to **BAKE bread on a Saturday or Sunday** .
2. Almost all the food is grown at camp ; **they** **BAKE their own bread** and the food is not only 100% nutritious but very delicious .
3. **Rosalind** **BAKES her own bread and croissants** and will prepare an evening meal with advance notice .
4. And **she** **BAKED some bread with the millet flour that she had brought from her own garden** .

429-s20-rcoll-cake

1. Some larger stores sell special tins of all the numbers so **you** can **BAKE a cake in the shape of your child 's age** .
2. Believing in economy , **Miss Lodsworth** had already **BAKED rock and fairy cakes** and spread hundreds of sandwiches with crusts still on with Marmite and plum jam which was cheaper than strawberry .

429-s20-rcoll-minute

429-s20-rcoll-oven

550-s20-np-np

1. And **she** would **BAKE a chocolate mousse torte** .
2. And for tomorrow 's Sunday dinner , **she** was going to roast a leg of mutton and **BAKE an apple pie** .
3. **I** **BAKED some currant buns for you** . "
4. **The wife of Senator Arlen Specter** even **BAKED Ali** a double chocolate-mousse pie .

570-s20-np-ppfor

1. **Louise** had **BAKED a pie for him** and was bringing a new pair of sheets from the airing cupboard .

620-s20-np-ppother

650-s20-np-pother

660-s20-trans-simple

670-s20-pass-by

680-s20-pass

1. **In Spain** , **bread** **flavoured with cinnamon and dried fruit** are **BAKED at Easter** , and some contain hard-boiled eggs , according to Elizabeth Luard 's European Festival Food .CNI
2. **A special birthday cake** was **BAKED to mark the occasion** , which was held in Graham School .CNI

Lexicographic Annotation Results: Cooking_creation.bake.v

Number Annotated	Patterns			
1 TOTAL	Container	Cook	Produced food	
(1)	PP[in] Dep	NP Ext	NP Obj	
2 TOTAL	Cook	Ingredients	Produced food	
(1)	NP Ext	PP[with] Dep	CNI --	
(1)	NP Ext	PP[with] Dep	NP Obj	
1 TOTAL	Cook	Place	Produced food	Time
(1)	CNI --	PP[in] Dep	NP Ext	PP[at] Dep
12 TOTAL	Cook	Produced food		
(2)	CNI --	NP Ext		
(1)	CNI --	NP Obj		
(1)	DNI --	DNI --		
(1)	DNI --	NP Obj		
(7)	NP Ext	NP Obj		
2 TOTAL	Cook	Produced food	Purpose	
(1)	CNI --	NP Ext	VPto Dep	
(1)	DNI --	NP Obj	PP[for] Dep	
3 TOTAL	Cook	Produced food	Recipient	
(1)	NP Ext	NP Dep	NP Obj	
(2)	NP Ext	NP Obj	PP[for] Dep	
1 TOTAL	Cook	Produced food	Time	
(1)	NP Ext	NP Obj	PP[on] Dep	



Lexicographic Annotation Results:

Cooking_creation: bake.v

[CookThe wife of Senator Arlen Specter] even *BAKED*^{Target} [RecipientAli] [Produced_fooda double chocolate-mousse pie] .

→ [CookI] *BAKED*^{Target} [Produced_foodsome currant buns] [Recipientfor you] . "

[CookLouise] had *BAKED*^{Target} [Produced_fooda pie] [Recipientfor him] and was bringing a new pair of sheets from the airing cupboard .

FE:	[I _{COOK}]	BAKED	[some currant buns _{PRODUCED_FOOD}]	[for you _{RECIPIENT}].
GF:	External	Object		Dependent
PT:	NP	NP		PP _{for}

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Full-Text Annotation

- What is full-text annotation?
 - annotation with respect to every frame evoking element in a text
 - multiple layers of lexicographic annotation
- Why did FN *add* full-text annotation?
 - demonstrate the contribution of Frame Semantics to text understanding
 - client/user considerations

Full-Text Annotation

39. A series of **DISASTROUS**Catastrophe **DECISIONS**Deciding at the **BEGINNING**Temporal subregion of the **20th CENTURY**Calendric unit **BEGAN**Activity start to **SOUND**Make noise a **DEATH**Death knell for the Ottoman **EMPIRE**Political locales . The Turks **LOST**Finish competition a **SHORT**Duration description **WAR**Hostile encounter with **Italy** , and were **FORCED**Causation to **RELINQUISH**Surrendering possession the **Dodecanese ISLANDS**Natural features to the **ITALIANS**People by origin . **Greece** took this opportunity to absorb the **ISLANDS**Natural features of the **NORTHERN**Part_orientational and **EASTERN**Part_orientational **Aegean** and to add **Macedonia** to its mainland **TERRITORIES**Political locales .
40. **FOLLOWING**Relative time this **DEBACLE**Catastrophe , the **OTTOMANS**People by origin then allied themselves to **Germany** in the World **WAR**Hostile encounter I , **LOSING**Earnings and losses **MORE**Increment **TERRITORY**Political locales with the **DEFEAT**Beat opponent of the **GERMANS**People by origin in that **WAR**Hostile encounter . **Greece** was **HANDED**Giving a **STRIP**Shapes of land along the **WESTERN**Part_orientational **COAST**Relational natural features of **Asia Minor** , which for over 2,000 **YEARS**Measure duration had **HAD**Possession a substantial **GREEK**Origin **POPULATION**Aggregate . **Greece** moved in to **ADMINISTER**Leadership the land , but a **NEW**Age **INFLUENCE**Objective influence **UPSET**Preventing any **GRAND**Dimension dreams of **MAKING**Cause_change this **REGION**Locale a **PART**Part_whole of greater **Greece** .
41. **IN**Temporal collocation **1923** , **Turkey** broke away from the **TIRED**Biological urge **OTTOMAN**People by origin **RULERS**Leadership , and **Kemal Ataturk** **ROSE**Motion directional to **POWER**Leadership on a **WAVE**Quantified mass of **POPULAR**Desirability support . He **PROMISED**Commitment a **MODERN**Stage of progress **STATE**Leadership for his **PEOPLE**People , but as the situation **BECAME**Becoming volatile , civil **STRIFE**Hostile encounter **BROKE**Process start **OUT**Process start **IN**Interior profile relation **TURKISH**Origin **CITIES**Political locales , and those **CONSIDERED**Categorization **GREEK**People by origin were **VICTIMS**Undergoing of **THREATS**Commitment and violence . Many **HAD**Required event to **LEAVE**Departing their birthplaces , **FLEEING**Fleeing **TO**Goal **Lesvos** , **Chios** , and **Samos** , the Greek-ruled **ISLANDS**Natural features just **OFFSHORE**Locative relation . **THOUSANDS**Quantified mass of **PEOPLE**People **ARRIVED**Arriving with little **MORE**Increment than the **CLOTHES**Clothing they **WORE**Wearing , **PUTTING**Placing great strain on the resources of the **ISLANDS**Natural features . **FINALLY**Time_vector , **Greece** was **OUSTED**Removing from its **NEW**Age **TERRITORY**Political locales **IN**Interior profile relation **Asia Minor** , which **BECAME**Becoming **PART**Part_whole of the **NEW**Age **TURKISH**Origin **STATE**Political locales .
42. **Greece** **ATTEMPTED**Attempt to **STAY**State_continue out of World **WAR**Hostile encounter II , but **Mussolini** **SAW**Categorization **Greece** as an **IDEAL**Usefulness addition to his **ITALIAN**Origin **EMPIRE**Political locales . His **FORCES**Military made a series of **ATTACKS**Attack from their **BASES**Locale by use **IN**Interior profile relation the **Dodecanese ISLANDS**Natural features , **INCLUDING**Inclusion sinking a **GREEK**Origin **NAVAL**Military **VESSEL**Vehicle **IN**Interior profile relation the **HARBOR**Locale by use of **Tinos TOWN**Political locales , but they only **SUCCEEDED**Success or failure in **STRENGTHENING**Cause_change_of_strength the resolve of the **POPULATION**Aggregate **AGAINST**Taking_sides them . **LATER**Time_vector the **GERMANS**People by origin **CAME**Arriving in **FORCE**Military and occupied **MANY**Quantified mass of the **ISLANDS**Natural features .
43. **AFTER**Time_vector the **WAR**Hostile encounter , **IN**Temporal collocation **1949** , the **Dodecanese ISLANDS**Natural features **FINALLY**Time_vector **BECAME**Becoming **PART**Part_whole of the **GREEK**Origin **NATION**Political locales . But the **COUNTRY**Political locales was politically **FRAGMENTED**Cause_to_fragment , with **ARGUMENTS**Quarreling between monarchists and republicans , right and left , and tension escalated into civil **WAR**Hostile encounter . The **STRUGGLE**Hostile encounter bypassed most of the **ISLANDS**Natural features , **ALTHOUGH**Concessive **THERE**Existence **WAS**Existence fierce **FIGHTING**Hostile encounter **ON**Spatial contact **Samos** . Even **AFTER**Time_vector the **FIGHTING**Hostile encounter **STOPPED**Process_stop **MORE**Increment than a **DECADE**Calendric unit **LATER**Time_vector , the **COUNTRY**Political locales was not stable .
44. At the same time , the massive **GROWTH**Change position on a scale in air and **ROAD**Roadways transport **SAW**Causation shipping **DECLINE**Change position on a scale in **IMPORTANCE**Importance . The **Aegean ISLANDS**Natural features , which for **CENTURIES**Measure duration had been **IMPORTANT**Importance **PORTS**Locale by use on the trading **ROUTES**Roadways , **BECAME**Becoming the **BACKWATERS**Isolated places of this **NEW**Age **TRANSPORT**Bringing **NETWORK**Network and the **ECONOMIES**Economy of **SEVERAL**Quantified mass **ISLANDS**Natural features came close to collapse .
45. **IN**Temporal collocation **1967** , the **MILITARY**Military took the reins of **POWER**Leadership **IN**Interior profile relation **Athens** , and **UNTIL**Time_vector **1974** , the `` Colonels '' held sway with a repressive and brutal **REGIME**Leadership . **MANY**Quantified mass **GREEK**People by origin islanders **CHOSE**Choosing to **LEAVE**Departing rather than live in **POVERTY**Wealthiness and **TERROR**Fear , and **MANY**Quantified mass **MADE**Intentionally create **NEW**Age **HOMES**Buildings **IN**Interior profile relation the **United States** and **Australia** . The **EXPANSION**Expansion of air **TRAVEL**Travel **BEGAN**Activity_start the **AGE**Calendric unit of mass **TOURISM**Touring , and **Greece** along with the **Aegean ISLANDS**Natural features **BECAME**Becoming **EXCITING**Stimulus focus destinations for **NORTHERN**Part_orientational **Europeans** **ESCAPING**Avoiding their **DAMP**Being wet , **COOL**Temperature **SUMMERS**Calendric unit .

Full-Text Annotation

39. A series of **DISASTROUS**_{Catastrophe} **DECISIONS**_{Deciding at the} **BEGINNING**_{Temporal_subregion of the} **20th CENTURY**_{Calendric_unit} **BEGAN**_{Activity_start to} **SOUND**_{Make_noise a} **DEATH**_{Death knell for the Ottoman} **EMPIRE**_{Political_locales .} The Turks **LOST**_{Finish_competition a} **SHORT**_{Duration_description} **WAR**_{Hostile_encounter with} **Italy**, and were **FORCED**_{Causation to} **RELINQUISH**_{Surrendering_possession the} **Dodecanese ISLANDS**_{Natural_features to the} **ITALIANS**_{People_by_origin .} **Greece** took this opportunity to absorb the **ISLANDS**_{Natural_features of the} **NORTHERN**_{Part_orientational} and **EASTERN**_{Part_orientational} **Aegean** and to add **Macedonia** to its mainland **TERRITORIES**_{Political_locales .}

40. **FOLLOWING**_{Relative_time this} **DEBACLE**_{Catastrophe}, the **OTTOMANS**_{People_by_origin} then allied themselves to **Germany** in the World **WAR**_{Hostile_encounter I}, **LOSING**_{Earnings_and_losses} **MORE**_{Increment} **TERRITORY**_{Political_locales with the} **DEFEAT**_{Beat_opponent of} the **GERMANS**_{People_by_origin} in that **WAR**_{Hostile_encounter}. **Greece** was **HANDED**_{Giving a} **STRIP**_{Shapes_of_land along the} **WESTERN**_{Part_orientational} **COAST**_{Relational_natural_features of} **Asia Minor**, which for over 2,000 **YEARS**_{Measure_duration} had **HAD**_{Possession a} substantial **GREEK**_{Origin} **POPULATION**_{Aggregate}. **Greece** moved in to **ADMINISTER**_{Leadership} the land, but a **NEW**_{Age} **INFLUENCE**_{Objective_influence} **UPSET**_{Preventing any} **GRAND**_{Dimension} dreams of **MAKING**_{Cause_change this} **REGION**_{Locale a} **PART**_{Part_whole of} greater **Greece**.

TARGET


Named Entity
Italics

FrameNet annotation provided

Handled by named entity recognizer

No annotation provided

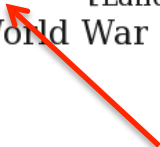
Full-Text Annotation



40. **FOLLOWING**_{Relative_time} *this* **DEBACLE**_{Catastrophe} , *the* **OTTOMANS**_{People_by_origin} *then* allied themselves to **Germany** in the World **WAR**_{Hostile_encounter} I , **LOSING**_{Earnings_and_losses} **MORE**_{Increment} **TERRITORY**_{Political_locales} with the **DEFEAT**_{Beat_opponent} of the **GERMANS**_{People_by_origin} in that **WAR**_{Hostile_encounter} . **Greece** was **HANDED**_{Giving_a} **STRIP**_{Shapes_of_land_along_the} **WESTERN**_{Part_orientational} **COAST**_{Relational_natural_features} of **Asia Minor** , which for over 2,000 **YEARS**_{Measure_duration} had **HAD**_{Possession} a substantial **GREEK**_{Origin} **POPULATION**_{Aggregate} . **Greece** moved in to **ADMINISTER**_{Leadership} the land , but a **NEW**_{Age} **INFLUENCE**_{Objective_influence} **UPSET**_{Preventing} any **GRAND**_{Dimension} dreams of **MAKING**_{Cause_change} this **REGION**_{Locale} a **PART**_{Part_whole} of greater **Greece** .

[Clear Sentences](#) [Turn Colors On](#)

[X] **FOLLOWING**^{Target} [Landmark_occasion>this debacle] , [Focal_occasion>the Ottomans then allied themselves to Germany in the World War I , losing more territory with the defeat of the Germans in that war] .



Full-Text Annotation

40. FOLLOWING^{Relative_time} *this* DEBACLE^{Catastrophe} , *the* OTTOMANS^{People_by_origin} *then allied themselves to*
Germany in the World WAR^{Hostile_encounter} *I* , LOSING^{Earnings_and_losses} MORE^{Increment}
TERRITORY^{Political_locales} *with the* DEFEAT^{Beat_opponent_of_the} GERMANS^{People_by_origin} *in that*
WAR^{Hostile_encounter} . *Greece* was HANDED^{Giving_a} STRIP^{Shapes_of_land_along_the} WESTERN^{Part_orientational}
COAST^{Relational_natural_features_of} *Asia Minor* , *which for over 2,000* YEARS^{Measure_duration} *had* HAD^{Possession_a}
substantial GREEK^{Origin} POPULATION^{Aggregate} . *Greece* moved in to ADMINISTER^{Leadership} *the land* , *but a*
NEW^{Age} INFLUENCE^{Objective_influence} UPSET^{Preventing} *any* GRAND^{Dimension} *dreams of* MAKING^{Cause_change}
this REGION^{Locale} *a* PART^{Part_whole} *of greater* *Greece* .

[Clear Sentences](#) [Turn Colors On](#)

[X] FOLLOWING^{Target} [Landmark_occasion *this debacle*] , [Focal_occasion *the Ottomans then allied themselves to Germany in the World War I* , losing more territory with the defeat of the Germans in that war] .

[X] Following this [Undesirable_Event DEBACLE^{Target}] , the Ottomans then allied themselves to Germany in the World War I , losing more territory with the defeat of the Germans in that war .[UndergoerDNI]

Full-Text Annotation

40. **FOLLOWING**_{Relative_time} *this* **DEBACLE**_{Catastrophe} , the **OTTOMANS**_{People_by_origin} then allied themselves to **Germany** in the World **WAR**_{Hostile_encounter} I , **LOSING**_{Earnings_and_losses} **MORE**_{Increment} **TERRITORY**_{Political_locales} with the **DEFEAT**_{Beat_opponent} of the **GERMANS**_{People_by_origin} in that **WAR**_{Hostile_encounter} . **Greece** was **HANDED**_{Giving_a} **STRIP**_{Shapes_of_land_along_the} **WESTERN**_{Part_orientational} **COAST**_{Relational_natural_features} of **Asia Minor** , which for over 2,000 **YEARS**_{Measure_duration} had **HAD**_{Possession_a} substantial **GREEK**_{Origin} **POPULATION**_{Aggregate} . **Greece** moved in to **ADMINISTER**_{Leadership} the land , but a **NEW**_{Age} **INFLUENCE**_{Objective_influence} **UPSET**_{Preventing} any **GRAND**_{Dimension} dreams of **MAKING**_{Cause_change} this **REGION**_{Locale} a **PART**_{Part_whole} of greater **Greece** .

[Clear Sentences](#) [Turn Colors On](#)

[X] **FOLLOWING**^{Target} [Landmark_occasionthis debacle] , [Focal_occasionthe Ottomans then allied themselves to Germany in the World War I , losing more territory with the defeat of the Germans in that war] .

[X] Following this [Undesirable_Event**DEBACLE**^{Target}] , the Ottomans then allied themselves to Germany in the World War I , losing more territory with the defeat of the Germans in that war .[UndergoerDNI]

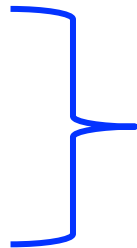
[X] Following this debacle , the [Person**OTTOMANS**^{Target}] then allied themselves to Germany in the World War I , losing more territory with the defeat of the Germans in that war .

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Frame-to-Frame Relations in FN

- Inheritance
- Using
- Subframes
- Precedes
- Perspective_on
- See also
- Inchoative_of
- Causative_of



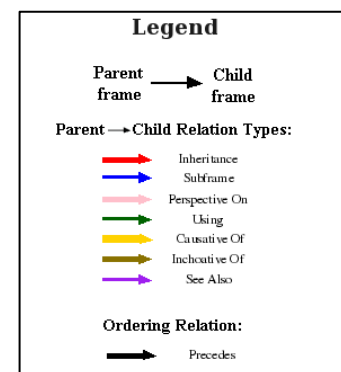
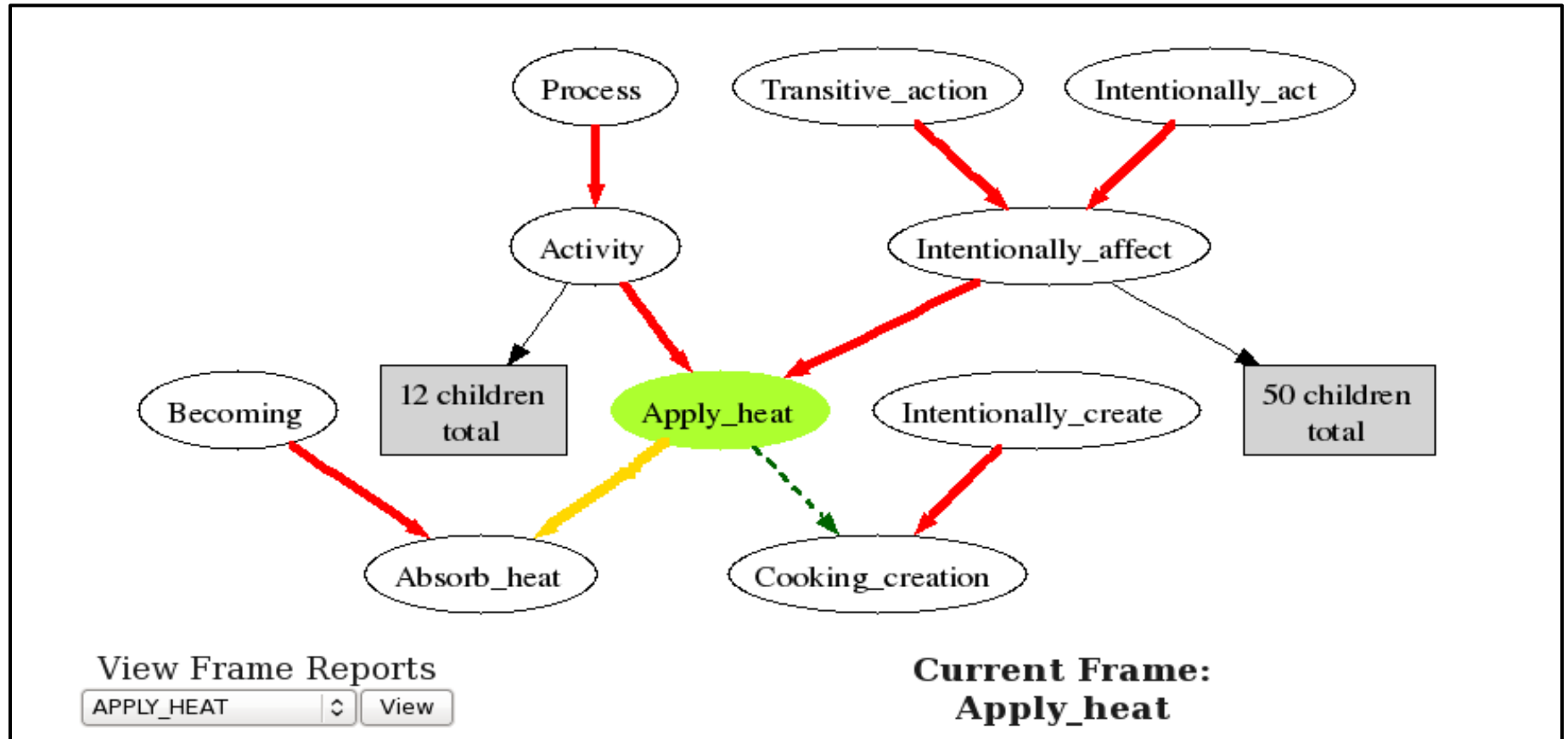
regular lexical relations

Inheritance

- Relationship between a more general frame, the **parent** frame, and a more specific one, the **child**
- Child frame **elaborates** parent frame
- **Corresponding entities**, FE, frame relation, and semantic characteristics, in both child and parent
- Child frame entity is the same as or more specific than in parent frame

Apply_heat *inherits* Intentionally_affect

FrameGrapher

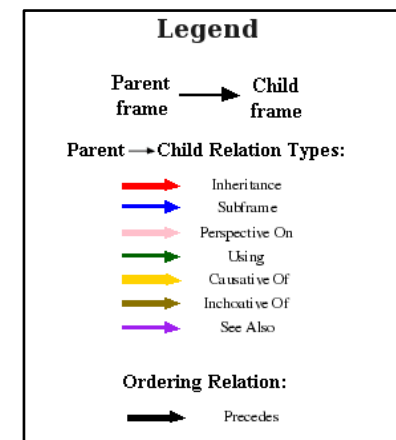
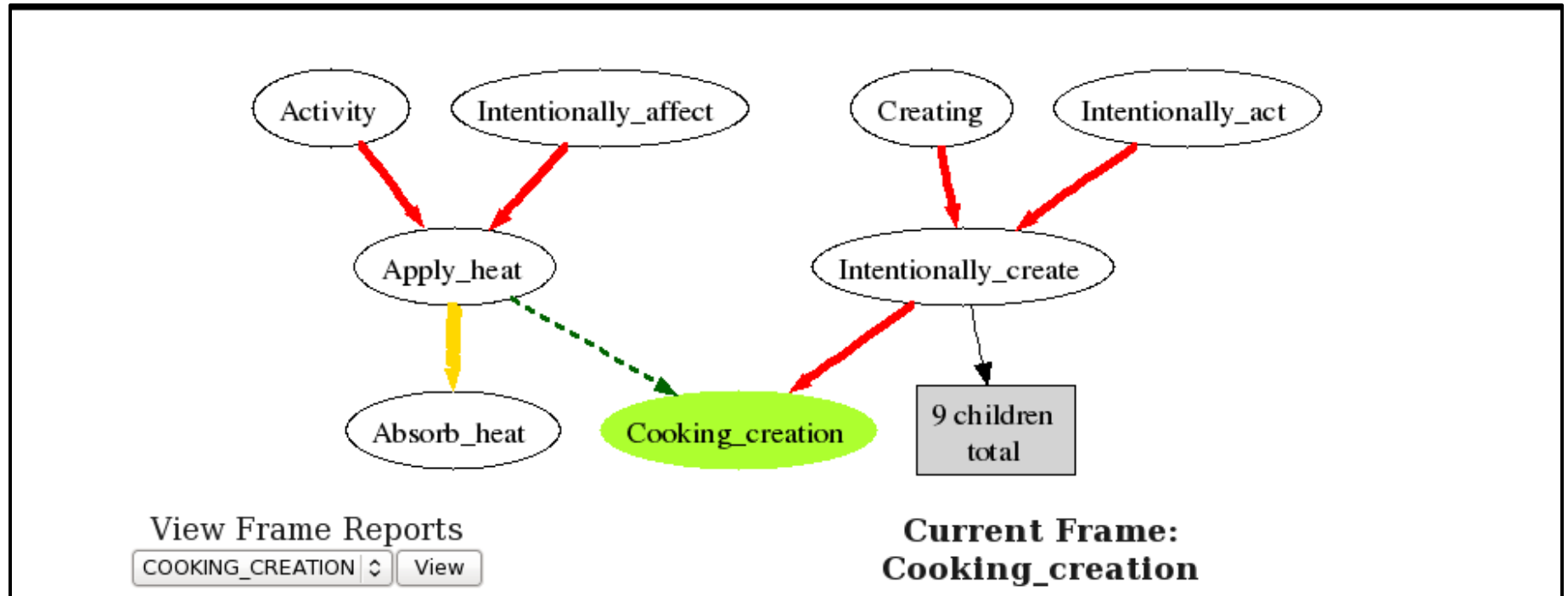


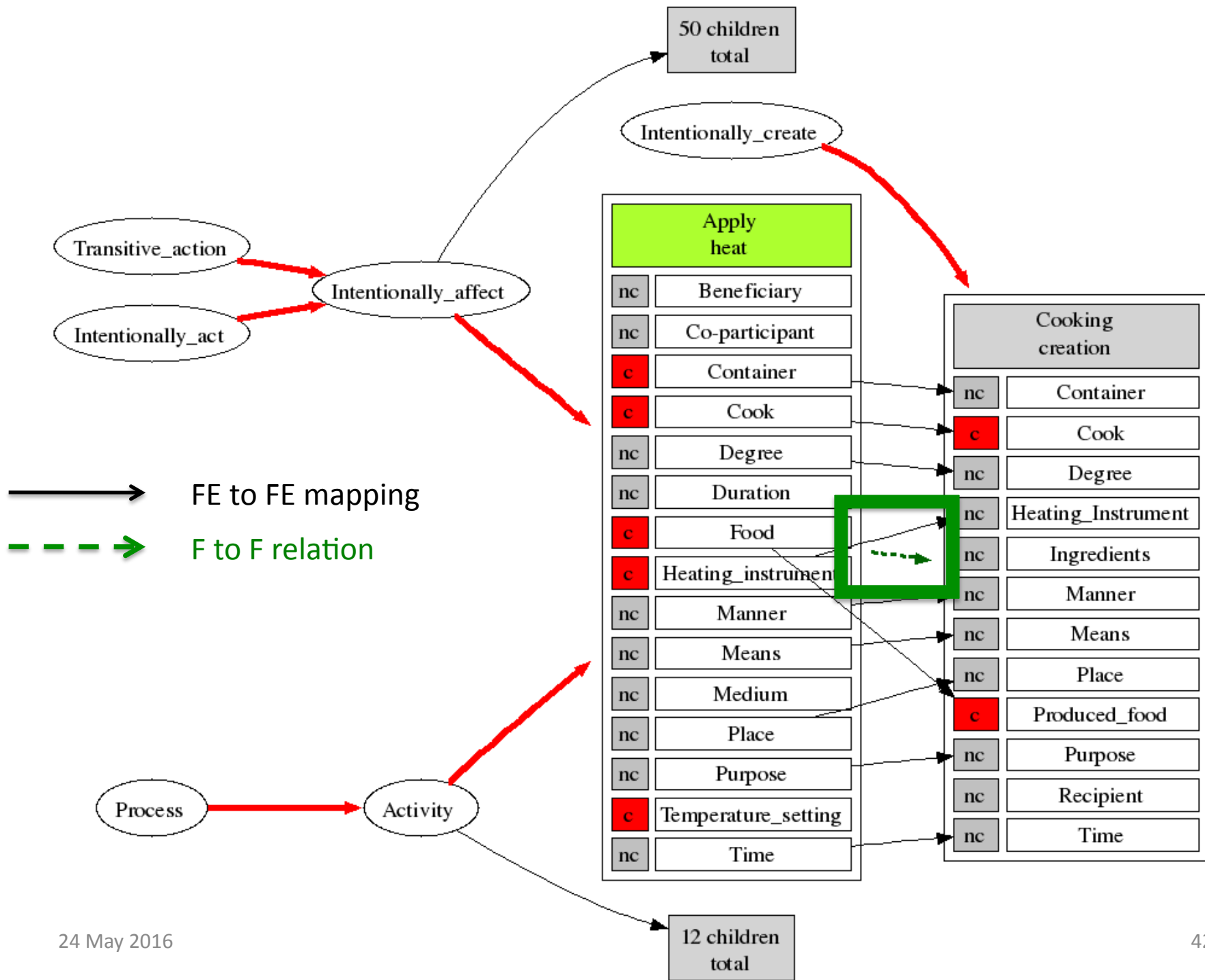
Using (weak inheritance)

- ...a relationship between a more general frame (*parent*) and a more specific frame (*child*) in which only *some* of the FEs in the parent frame have a corresponding entity in the child frame; if correspondences exist, they are more specific.

Cooking_creation *uses* Apply_heat

FrameGrapher





Subframes

- ...a relationship that characterizes the different (typically, ordered) **parts of a complex event** in terms of the sequences of states of affairs and transitions between them, each of which can itself be described as a frame.

Getting_a_job is a **subframe** of Employee_scenario

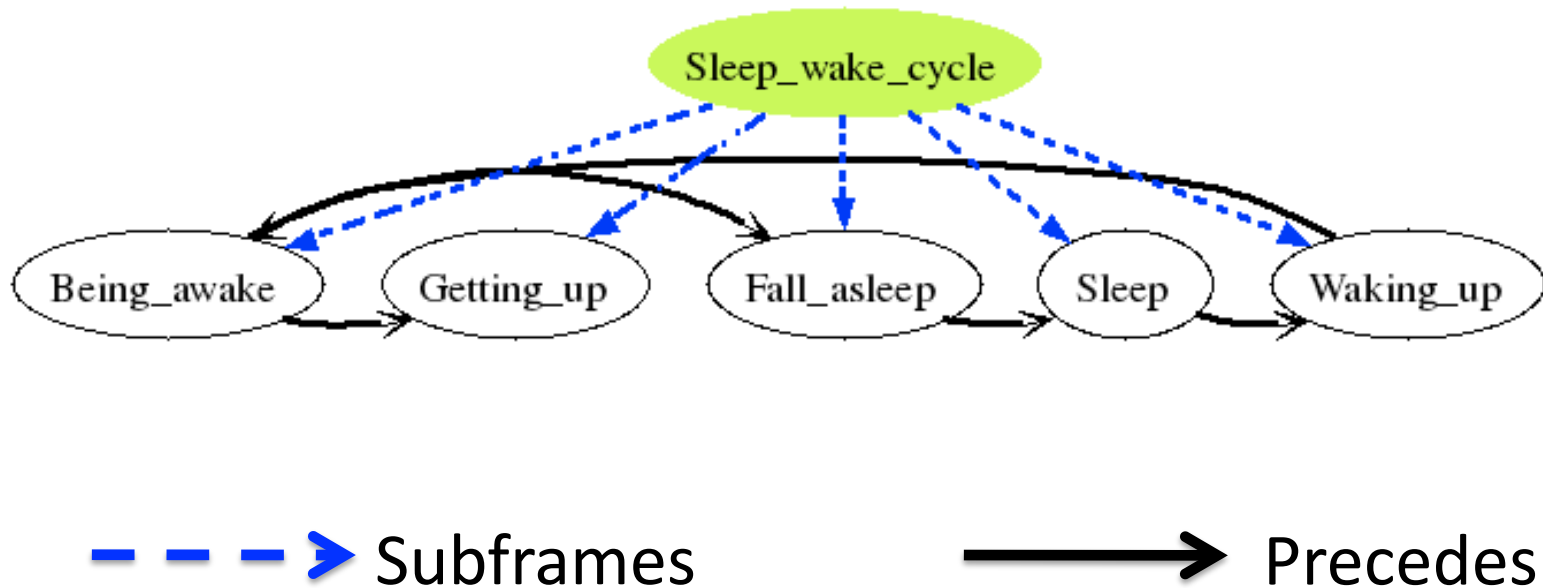
Hiring is a **subframe** of Employer_scenario

Precedes

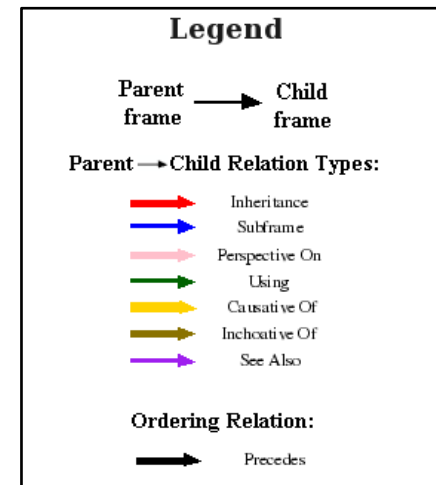
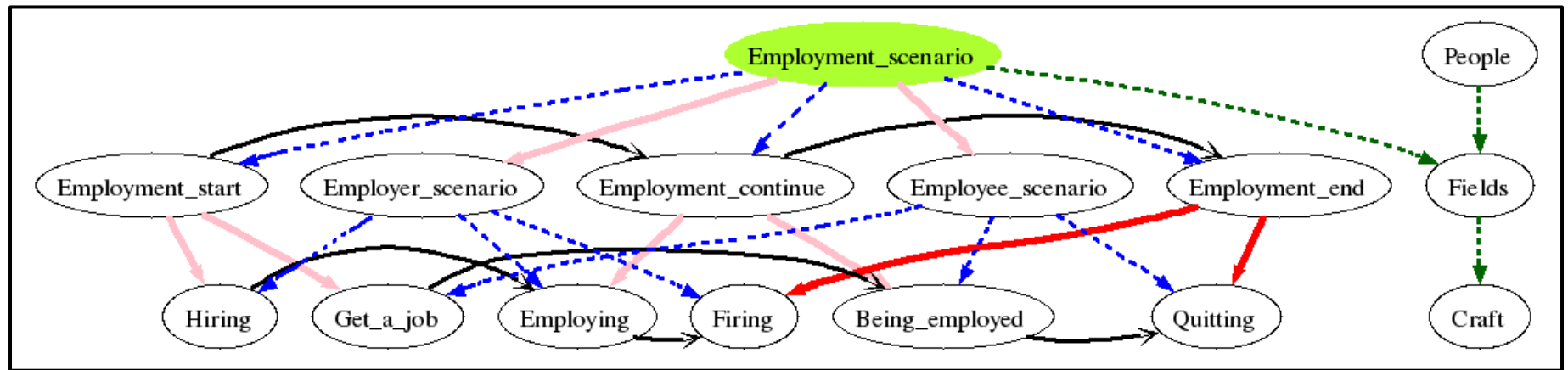
...captures the temporal ordering of subevents within a complex event. The relation holds between component subframes of a single complex frame, and provides additional information to the set of **Subframe** relations

Being_aware **precedes** Falling_asleep

Subframes and Precedes



FrameGrapher



Road Map

- FrameNet
- Frames
 - Frame Elements
 - Lexical Units
- FrameNet Annotation
 - Lexicographic Annotation
 - “Full-Text” Annotation
- Frame-to-Frame Relations
- ✓ FrameNet: New Developments

FrameNet: New Developments

- ✓ Annotation of Support Verbs
- Collections of (New) Frames
 - Spatial Relations
 - Force Dynamics

Annotation Conventions

- Support Constructions
 - Support Verbs
 - Plain Support Verbs
 - make a decision, take a nap, have a fit
 - Lexical Functions (Mel'čuk 1996)
 - say a prayer, submit to interrogation, break a promise
 - Support Prepositions

Intersecting Criteria

- **Bleached Semantically**
 - take a test vs. take the book (home)
 - make a decision vs. make a cake
- **Idiomaticity**
 - hit the hay vs. hit the ball
 - hit the sack vs. fold the sack
- **FE Providing**
 - He attempted a robbery
 - He prevented the robbery

Representing Support Verbs

	Bleached		Not Bleached	
	+FE	-FE	+FE	-FE
+Idiomatic	Support		Support	
-Idiomatic	Copula or Controller	Copula	Controller	Governor

FrameNet: New Developments

- Annotation of Support Verbs
- Collections of (New) Frames
 - ✓ Spatial Relations
 - Force Dynamics

Beyond Language: Spatial Relations

- Challenges statistical NLP
- Largely stopwords
- Prepositions often just dropped in NLP tasks
- Frequent preposition/case errors in MT

Beyond Language: Spatial Relations

- Entangled with cognitive models
- Prepositions famously untranslatable
- Cognitive Effects:
 - Verb framed (Spanish): *entered the cave drifting*
 - Satellite framed (English): *drifted into the cave*
 - Spanish speakers don't remember manner of motion (Slobin)

FrameNet's Approach to Spatial Relations

- Incorporate **cognitive research** (Talmy, Slobin, Langacker)
- Create frames for **image schemas**
- LUs in frames that Inherit **Locative_relation**, also **Use image schemas**
- **Semantic types** for non-relational features
- LUs marked with multiple semantic types

FrameNet's Goal

To build **models** of mental spaces and the mappings between them that are **computationally tractable**.

Inherit from Locative_relation

- Abounding_with
- Adjacency
- Containing
- Directional_locative_relation
- Distributed_position
- Expected_location_of_person
- Goal
- Gradable_proximity
- Interior_profile_relation
- Location_on_path
- Non-gradable_proximity
- Spatial_co-location
- **Spatial_contact**
- Within_distance

Spatial Relation Frames: Spatial Contact

Definition: A **Figure** is located in contact with a **Ground**. With some words that evoke this frame, the **Figure** is also asserted to be fully or partially supported by the **Ground** (*on*), while in others a support relation is either denied or unspecified (*against*). Also, some LUs assert a direction in which to find the **Figure** from the **Ground** (*atop*).

Frame Elements

Figure: The **Figure** is perceived as located relative to a certain **Ground** location. The **Figure** can be an entity or an event.

Ground: The **Ground** serves as a basis for describing the location of the **Figure**.

Figures: The **Figures** are items that mutually serve to identify the location of the other items.

Spatial Relation Frames: Spatial Contact

Lexical Units:

against.prep, atop.prep, contact.n, contact.v, off.prep, on top (of).prep, on.prep, tangent.a, touch.v, touching.a, upon.prep

Example Annotation:

He packed his tribe with **their guns** **AGAINST** **the brothers**.

The cat is **ON** **the mat**.

The wire bristles **CONTACT** **only the joint area**.

...in **the small squares which lie** **TANGENT** **to the central square**.

FrameNet: New Developments

- Annotation of Support Verbs
- Collections of (New) Frames

Spatial Relations

✓ Force Dynamics

Force Dynamics: New Frames

- Level_of_force_exertion
- Level_of_force_resistance
- Dynamism

Level_of_force_exertion

- Definition: A **Force**, **Action**, or **Exerter** is capable of exerting a force at a level that the target specifies.
- Frame Elements:
 - Force**: The **Force** that can or does exert a force of the level that the target specifies.
 - Action**: The **Action** that can or does exert a force of the level that the target specifies
 - Exerter**: The **Exerter** that can or does exert a force of the level that the target specifies.

Level_of_force_exertion

Lexical Units:

dynamic.a, dynamism.n, energetic.a, energy.n, intense.a, intensity.n, laziness.n, lazy.a, lethargic.a, lethargy.n, sluggish.a, sluggishness.n, stamina.n, vibrant.a, vigor.n, vigorous.a

Example Annotation:

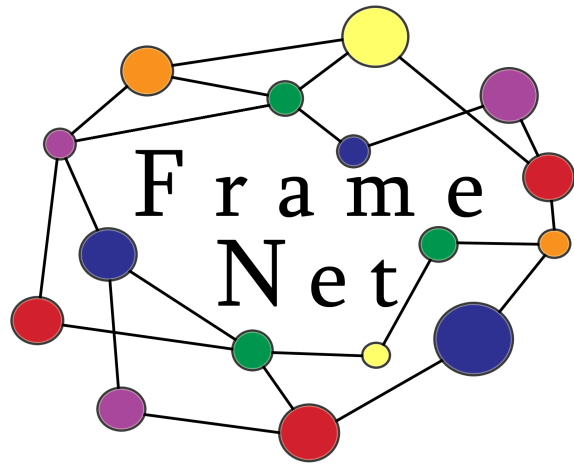
A **POWERFUL** force tore off the tree's branches.

Spartacus dealt the Roman soldier a **MIGHTY** blow.

Eugenie loved the sea and was a **STRONG** swimmer.

Force Dynamic Frames: See also!

Level_of_force_exertion, differs from **Level_of_force_resistance** in that it describes the level of **force exertion** instead of the **level of resistance**, and in that it includes three categories of Core FEs available (FORCE, ACTION, EXERTER). **Level_of_force_resistance** only has two Core FEs (RESISTING_ENTITY, OPPOSING_FORCE). Of its FEs, OPPOSING_FORCE specifies the thing that the main entity resists to the level designated in the target. Its parallel in **Level_of_force_exertion** is implied, but backgrounded so much so that it rarely appears as explicit lexical material; hence, no analogous Core FE exists. **Level_of_force_exertion** differs from **Dynamism** in individual-level cases. **Level_of_force_exertion** targets/LUs express the FE's capability, while **Dynamism** targets/LUs express the FE's tendency.



Thanks!

<http://framenet.icsi.berkeley.edu>

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