Developing a Japanese Corpus Annotated for "Frames" and their "Elements" —Specifying What People Understand with MSFA—

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Today's Topic

- Introducing *Multi-layered/dimensional Semantic Frame Analysis* (MSFA: Kuroda and Isahara 2005)
  - It was developed as an annotation scheme hopefully compatible with *Berkeley FrameNet* (henceforth, BFN) (Baker, et al. 1998; Fillmore, et al. 2003; Johnson and Fillmore 2001; Lowe, et al. 1997)
- Caveats:
  - So far, MSFA has been done for Japanese: just a few sample analyses were attempted for English.
  - MSFA requires, *by its very design*, an annotator/analyst to specify *a lot of knowledge hard to access for non-native speakers*.

Omitted Topics

- MSFA is coupled with a theoretical framework called *Frame-Oriented Concept Analysis of Language* (FOCAL: Kuroda, et al. 2005; Nakamoto, et al. 2005).
  - Competitive Theory of Frame Selection (Kuroda et al. 2006, presented at DGfS) is a product of FOCAL
- But we don't have enough time to talk about FOCAL today.

Overview

- Giving some background
  - Especially why frame definitions and the annotation scheme of *Berkeley FrameNet* (BFN: Fillmore et al. 2003) were not used so far
  - Supplement it with a competitive theory of frame selection
- Presenting sample MSFAs
  - Explain how MSFA goes
  - Try to show what issues BFN will face when full-text analysis/annotation is seriously attempted.
- Summary

How to Annotate Japanese Texts for Semantic Roles with MSFA

Where Does MSFA Come from?

- When Kow Kuroda came to know about the BFN approach to semantic annotation (Johnson and Fillmore 2001; Pinkal et al. 2003) at ACL 2003, he found it really exciting, and wanted to try out the same thing for Japanese text analysis.
- But he faced some difficulties

Major Obstacles

- The following are major obstacles:
  1. At that time, the *coverage* of BFN database wasn't broad enough, and as much fine-grained as he needed.
  2. What's worse, if we decide to go with BFN frames,
     A. good understanding of English is required (for both the staff and annotators); this is too selective.
     B. There will be little chance to link annotation to entries in Japanese thesauri (e.g., *Nihongo Goi-taikei* (A (Comprehensive) Japanese Lexicon)
- While issue 1 is improved greatly in last two years, issue 2 is still a problem.

Decisions Made Two Years Ago

- To annotate Japanese texts for *deep enough* semantics is our objective. So, we decided
  - not to go along with BFN frames
  - to develop our own *scheme* for semantic annotation/ analysis such that
    - it is applicable to *given* Japanese sentences
    - it provides *deep enough* semantic analysis useful for research in *Cognitive Science of Meaning*
- The following are not our goals *per se*:
  - develop NLP applications like MT, QA system, IR
  - construct a frame database as an "extended lexicon"

Why Semantic Annotation?

- We need annotation/analysis of deep enough semantics to provide the "infrastructure" for *cognitive science of meaning*.
  - Our research is not seriously oriented for NLP tasks, even if there should be no incompatibilities.
- Rather, we addressed the following explorations:
  - Given a sentence *s*, *what kinds of frames* are needed if we wanted to achieve a "psychologically real" description *d* of what (average) people understand when *s* is heard or read?
  - and *how frames* are "put together" in description *d*?

Far from Trivial Matters

- How to deal with metaphor, metonymy, and other sorts of "figures of speech"
- How to break a sentence into "meaningful units"
  - How to deal with frame-evocation by complex, often discontinuous units?
- How to deal with anaphora?
- How to treat topic marker: is it part of a FE or not?

Short (and Hopefully Gentle) Introduction to FrameNet

What Is a (Semantic) Frame?

- A (semantic) "frame" is
  - an organization of "frame elements" (FEs), i.e., situation-specific "semantic roles" in human mind/brain
  - that represents a schematization of situation, or a generalization over "events" (or "states")
- Caveat:
  - Don't confuse semantic roles in this sense with so-called "thematic roles," or "deep cases" in the sense of Case Grammar (Fillmore 1968)

Examples

1. <Predation>=<<Predator>, <Prey>, ...>
   i. [Predator *A group of killer whales*]
   ii. [Predate.GOVENOR *attacked*]
   iii. [Prey *a humpback whale*].
2. <Bank Robbery> = <<Robber>, <Bank>, <Weapons>>
   i. [Robber *A group of masked men*]
   ii. [Rob.GOVERNOR *attacked*]
   iii. [Target *a bank branch in L.A.*].

Hierarchies of Frames and Frame Elements

- <Predation> IS-A <Harm-Causation> = <<Harm-cauaser>, <Victim>>
  - <Predator> IS-A <Harm-Causer>
  - <Prey> IS-A <Victim>
- <Bank Robbery> IS-A <Robbery> IS-A <Attacking> IS-A <Harm-Causation>
  - <Attack> = <Assailant>, <Victim>
- <Attacking> IS-A <Intentionally_act> (IS-A <Agentive_act>)
  - <Bank Robber> IS-A <Robber> IS-A <Agent>

Role-denoting Names

- Note
  - "robber," "victim," "predator," and "prey" are all *role-denoting/specifying nouns*.
- But
  - "(a group of) killer whales," "a humpback whale," "(a group of) masked men," and "a bank branch" are not; they are *entity-denoting/specifying nouns*.
- See Kuroda, Nakamoto and Isahara (2006), Gentner (2005), Gentner and Kurtz (2005) for relevant details.

But the Story Isn't Over Yet

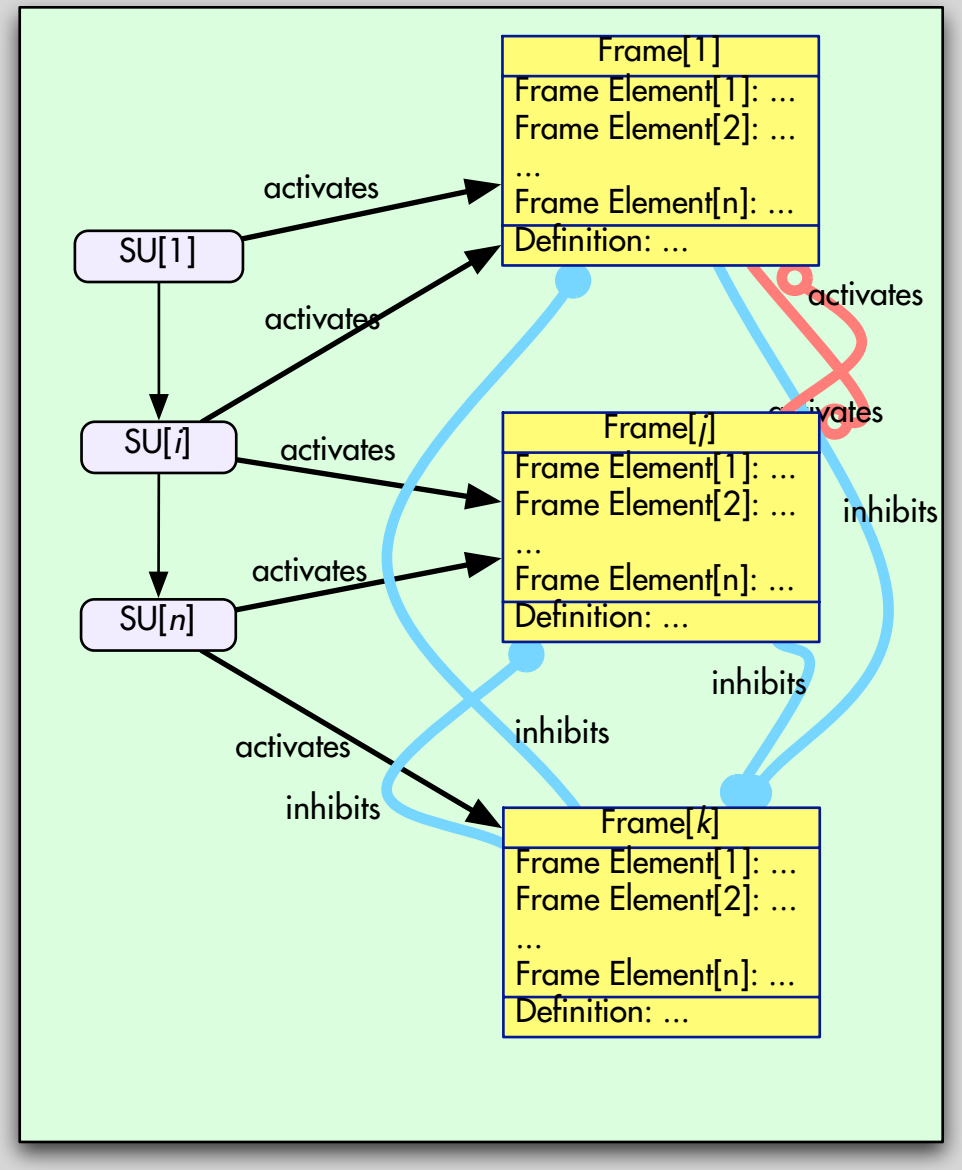
- Why is it that sentences 1 and 2 make sense, and 3 and 4 don't, unless they are "adjusted" (metaphorically or metonymically)?
  1. A group of *killer whales* attacked a humpback whale. [<Predation> situation]
  2. A group of *masked men* attacked a bank branch in L.A.. [<Bank Robbery> situation]
  3. A group of *killer whales* attacked a bank branch in L.A.. [<??> situation]
  4. A group of *masked men* attacked a humpback whale. [<??> situation]

Samples of "Adjustment" by Semantic Accommodation

- Sentence 3 can mean a <Bank Robbery> if "killer whales" are understood as nicknames for robbers
- Sentence 3 can mean a <Predation> if "masked men" are understood, somehow, to mean a group of <Predator> (e.g., killer whales, sharks,)
- Sentence 4 can mean a <Predation> if "a bank branch" is understood, somehow, to be a nickname for a whale or something of being a <Prey>
- Sentence 4 can mean a <Bank Robbery> if "a humpback whale and her baby" are understood, somehow, to mean a <Bank>

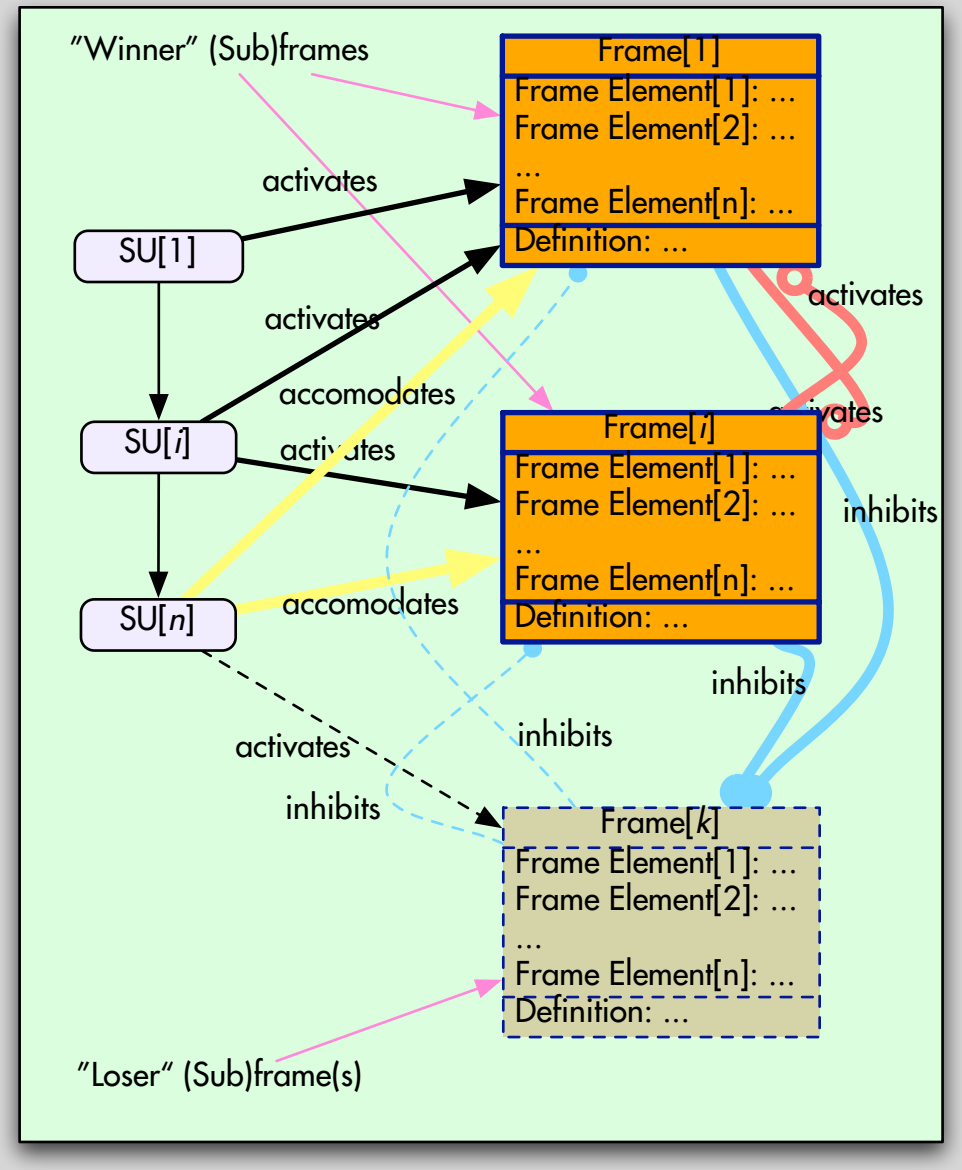
But How Come?

Supplementing Frame Semantics with a Theory of "Frame Selection"



- Each semantic unit SU "activates" a set of frames independently.
- Evoked frames "compete" each other either by mutual "activation" or lateral "inhibition"
- Once competition settles down, the (meaning of) SUs of the "loser" frames "accommodate" to the (meanings of) "winner" frames

Supplementing Frame Semantics with a Theory of "Frame Selection"



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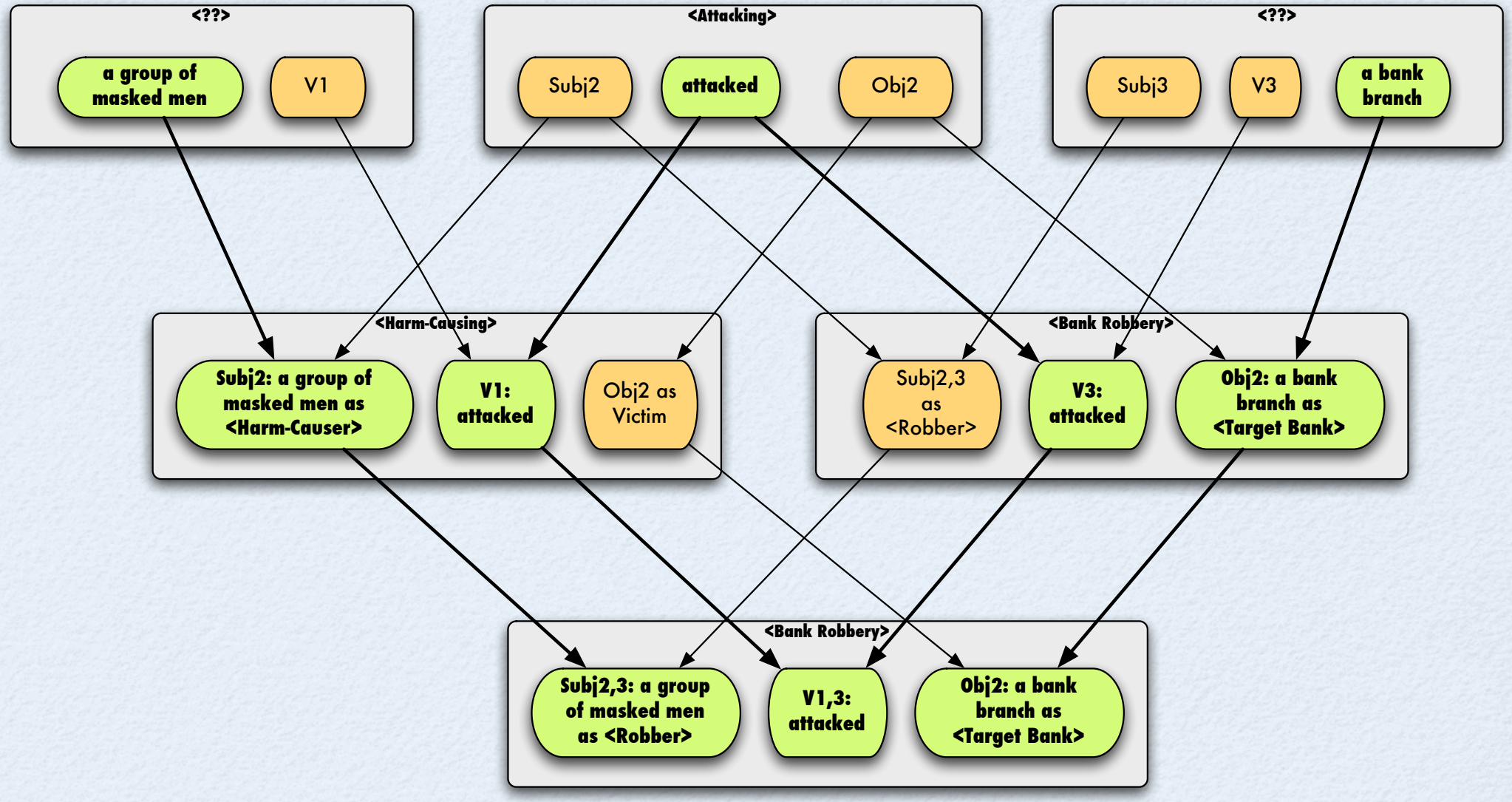
Supplementing Frame Semantics with a Theory of "Frame Selection"

- Given a sentence $s = w_1\ w_2 \cdots w_n$,
  - Each word w_i (or (possibly discontinuous) substring "$\ldots w_i \ldots w_j \ldots$") "evokes" a frame F_i independently each other, and "strengthen" or "suppress" each other.
- Competition among frames evoked takes place, and it "converges" when
  - the specifications of "loser" frames are adjusted to the specifications of the "winner" frames.
- This way, the set $\mathscr{F} = \{F_1, F_2, \ldots, F_n\}$ of evoked frames reduces into a smaller set of frames $\mathscr{F}'$.

Sample Analysis

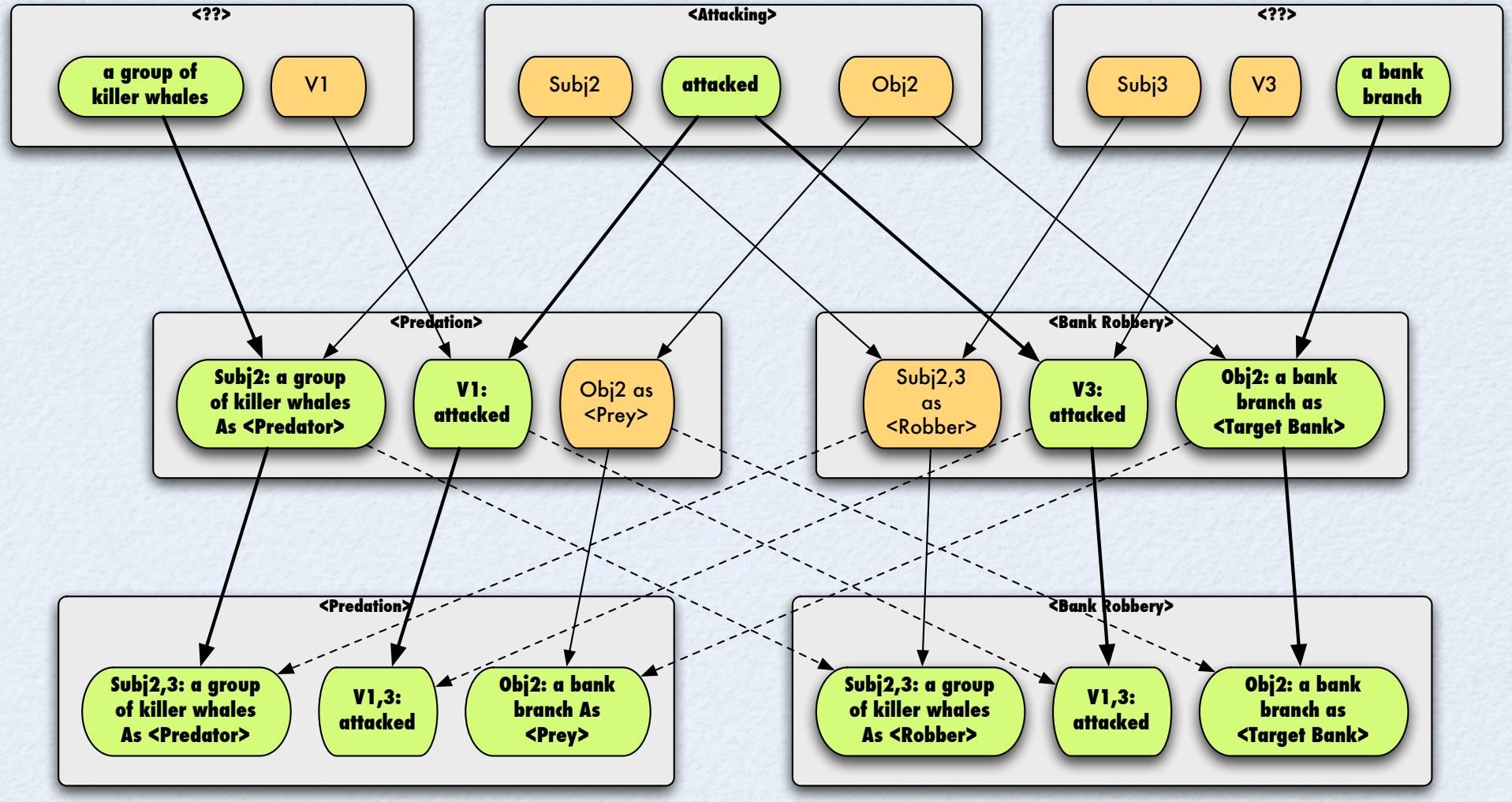
Frame Specification Flow of (2)

Feature Specification Flow



Frame Specification Flow of (3)

Feature Specification Flow (Adjustments Required)



Remarks

- Constituency plays virtually no role.
  - No effect from [NP [V NP]
- Frame specification flows, with and without bifurcation, should explain the "selectional restrictions" imposed on 1, 2, 3 and 4.
  - The origin of such restrictions are not really lexical one, as suggested by Fillmore in 70's.

Suggestion

- Complex units like the following are able to "evoke" finer-grained, specific frames:
  - "(a group of) killer whales attack ..."
  - "(a group of) masked men attacked ..."
  - "... attacked a bank branch ..."
  - "... attacked a humpback whale ..."
- Typically, this takes place when a role-denoting noun is combined with a verb.
- This fact needs to be considered in annotation tasks. MSFA does it.

MSFA Procedure (Simplified)

1. Segment a sentences S into units U_1, …, U_n.
   - This is not independent from Step 2. So, you need to go cyclic.
   - Note incidentally that it's better NOT to try to build up larger units from smaller units. This tends to lead annotators to a "false" analysis.
2. For each U_i, find a set of frames F_1, …, F_m so that one of their "frame elements" is *realized* by U_i.
3. Specify relationships among all the frames.

Guiding Principles of MSFA

- "Be meticulous"
  - Every word (or morpheme if morphological analysis is necessary) needs to realize at least one "frame element" of a frame.
  - You are not allowed to ignore a minor element by saying "its meaning is *uninteresting*." If this "excuse" is allowed, your analysis will get arbitrary very soon.
- "Be greedy"
  - To every word, you need to assign as many semantic roles as possible if they are not incompatible

How MSFA Goes
-Sample Analysis-

Sample MSFA

- The following is a text taken from *Kyoto University Corpus* (Kurohashi and Nagao 1994):

1. 「ホワイトハウスの内側」という本が十四日，米国で発売される.
2. 歴代大統領と関係者をこきおろしており，話題になるのは間違いない.
3. 「ワシントン・ポスト」紙などで長年，調査報道をしてきたロナルド・ケストラー氏の新著.
4. 例えば次のような内容だ.
5. ...

Sample MSFA

- The English translations of the text:
  1. *A book titled "Inside the White House" will go on sale in the U.S. on January 14.*
  2. *The book will definitely be a much-talked-about, severely criticizing the past U.S. Presidents and their aides.*
  3. *The title came as latest work of Ronald Kesler, an expert reporter and investigator at the "Washington Post" and other media.*
  4. *The book, for instance, reveals the following episodes.*
  5. *...*

Sample MSFA (for Japanese)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	F-ID	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
2	F-to-F relations	elaborates F2; constitutes F3		constitutes F5; presumes F5; elaborates F4		presupposes F3	presupposes F5; constitutes F5; presumes F7	presupposes F6; constitues F8; elaborates F9		presupposes F5	presupposes F9		constitutes F3,F5	
3	Frame idenfitier	作品への題名つけ	命名	執筆	制作	出版	商品販売	購入	消費	読書	楽しみ	米国での大統領による為政	秘密の暴露	報告
4	*													報告者
5	*					目的		GOVERNOR	GOVERNOR	手段				報告内容 [start1,end]
6	*							目的	手段	GOVERNOR	手段			
7	*								目的	目的	GOVERNOR			
8	*					小売り業者	販売者	販売者	提供者 [ternary]					
9	*					客	客	購入者	消費者	読者	楽しむ者			
10	*	題名付与者 [secondary]	命名者[+aux]			出版社			提供者 [secondary]					
11	*	題名付与者 [primary]	命名者	執筆者	作者	協力者?			提供者 [primary]				暴露者	
12	*			目的1									GOVERNOR	
13	「	MARKER[1,2]	MARKER[1,2]	特徴		出版物.特徴	商品.特徴	商品.特徴	消費物.特徴	読み物.特徴	楽しみ.特徴			報告内容 [start2,end]
14	ホワイトハウス	題名	名称									大統領官邸	標的	
15	の												MARKER	
16	内側												秘密: EVOKED	
17	」	MARKER[2,2]	MARKER[2,2]											
18	と	EVOKER1	EVOKER1											
19	題	GOVERNOR	GOVERNOR	EVOKER1										
20	する	EXTENDER	EXTENDER	EVOKER2										
21	本	作品	命名対象	書物: EVOKER3	作品	出版物	商品	商品	消費物	読み物	楽しみ.源			
22	が					MARKER	MARKER							
23	十四					日時:日付	日時:日付							
24	日													
25	、													
26	米国					場所	場所							
27	で					MARKER	MARKER							
28	発売			目的2		GOVERNOR	GOVERNOR						手段	
29	され					EXTENDER1	EXTENDER1							
30	る					EXTENDER2	EXTENDER2							
31	。													

Sample MSFA (for English)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Frame ID	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
2	F-to-F relations	elaborates F2; constitutes F3		constitutes F5; presumes F5; elaborates F4		presupposes F3	presupposes F4; constitutes F5; presumes F7	presupposes F6; elaborates F9		presupposes F5	presupposes F9		constittues F3,F5	
3	Frame	Title Giving	Name Giving	Writing	Authoring	Publishing	Selling	Purchasing	Consuming	Reading	Having Fun	Presidential Government in the U.S.	Disclosure	Reporting
4	*													Reporter
5	*					Purpose		**GOVERNOR**	**GOVERNOR**	Means				Report[start 1,end]
6	*							Purpose	Means	**GOVERNOR**	Means			
7	*								Purpose	Purpose	**GOVERNOR**			
8	*					Retailer	Seller	Seller	Provider3					
9	*					Customer	Customer	Purchaser	Consumer	Reader	Enjoyer			
10	*	Title Giver[secondary]	Name Giver[2]		Supporter	Publisher	Provider		Provider2					
11	*	Title Giver[primary]	Name Giver[1]	Writer	Author	Supporter?			Provider1				Revealer	
12	*			Purpose1							Domain=Topic		**GOVERNOR**	
13	A	Work	Object	Book	Work[+Piece]	Publication	Goods	Goods	Commodity	Book	Fun Source			Report[start 2,end]
14	book													
15	titled	**GOVERNOR**	**GOVERNOR**	Book.attribute	Work.attribute	Publication.attribute	Goods.attributes	Goods.attributes	Commodity.attribtute	Book.attribute	Fun Source.attribute			
16	"	MARKER[1,2]	MARKER[1,2]											
17	The	Title	Name										Secrets: **EVOKER**	
18	Inside													
19	White											Presidential Office: **EVOKER**	Target	
20	House													
21	"	MARKER[2,2]	MARKER[2,2]											
22	will					EXTENDER2	EXTENDER2							
23	go					EXTENDER1	EXTENDER1							
24	on			Purpose2		**GOVERNOR[+composite]**	**GOVERNOR[+composite]**						Means	
25	sale													
26	in					MARKER	MARKER							
27	the					Place	Place							
28	U.S.													
29	on					MARKER	MARKER							
30	January					Time: Date	Time: Date							
31	14													
32	.													

Sample MSFA (for Japanese)

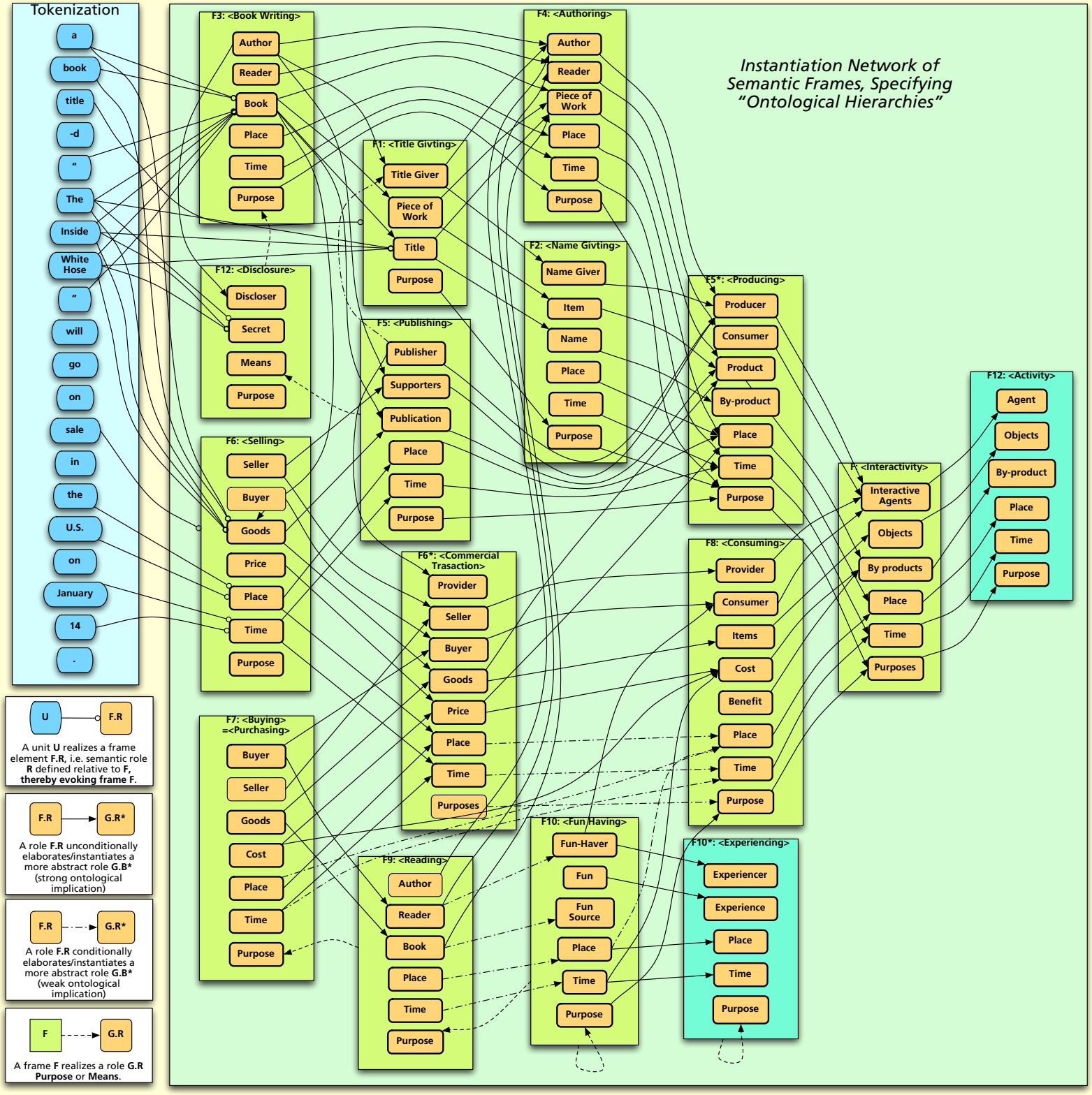
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	F-ID	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13
2	F-to-F relations	elaborates F2; constitutes F3		constitutes F5; presumes F5; elaborates F4		presupposes F3	presupposes F5; constitutes F5; presumes F7	presupposes F6; constitues F8; elaborates F9		presupposes F5	presupposes F9		constitutes F3,F5	
3	Frame idenfitier	Title Giving	Name Giving	Writing	Authoring	Publishing	Selling	Purchasing	Consuming	Reading	Having Fun	Presidential Government in the U.S.	Disclosure	Reporting
4	*													Reporter
5	*					Purpose		**GOVERNOR**	**GOVERNOR**	Means				Report[start1 ,end]
6	*							Purpose	Means	**GOVERNOR**	Means			
7	*								Purpose	Purpose	**GOVERNOR**			
8	*					Retailer	Seller	Provider	Provider[tern ary]					
9	*					Customer	Customer	Purchaser	Cosumer	Reader	Enjoyer			
10	*	Title Giver[seconda ry]	Name Giver[second ary]			Publisher			Provieder[sec ondary]					
11	*	Title Giver[primary]	Name Giver[primary]	Writer	Author	Supporter?			Provider[pri mary]				Revealer	
12	*			Purpose1									**GOVERNOR**	
13	「	MARKER[1,2]	MARKER[1,2]	Book.attribu te	Work.attrib ute	Publication.a ttribute	Goods.attribu te	Goods.attribu te	Commodity. attribute	Book.attribut e	Fun.attribute			Report[start2 ,end]
14	ホワイトハウス	Title	Name									Presidential Office: **EVOKER**	Target	
15	の												MARKER	
16	内側												Secrets: **EVOKER**	
17	」	MARKER[2,2]	MARKER[2,2]											
18	と	EVOKER1	EVOKER1											
19	題	**GOVERNOR**	**GOVERNOR**		EVOKER1									
20	する	EXTENDER	EXTENDER		EVOKER2									
21	本	A Piece of Work	Object	Book (as a Piece of Work)	Work	Publicationk	Goods	Goods	Commodity	Book (as Information Carrier)	Fun Source			
22	が					MARKER	MARKER							
23	十四					Time: Date	Time: Date							
24	日													
25	、													
26	米国					Place	Place							
27	で					MARKER	MARKER							
28	発売			Purpose2		**GOVERNOR**	**GOVERNOR**						Means	
29	され					EXTENDER1	EXTENDER1							
30	る					EXTENDER2	EXTENDER2							
31	。													

Remarks

- MSFA is used:
  - to identify and specify as many frames as possible; each column, with a "Frame ID" (local variable) and a "Frame Name" (global variable) specifies a frame
  - to specify explicitly how frames are interrelated using Frame-to-Frame Relations (global) on the second row
- Conventions
  - The relative order of columns is not significant.
  - "Null instantiations" are indicated by * if they are position-neutral, and by ** if they are position-specific

What MSFA Does?

- MSFA above specifies, for example:
  - *Author*, as a role-denoting noun, designates an Agent-class role specific to <Authoring>.
  - *Writer*, as a role-denoting noun, designates an Agent-class role specific to <Writing>, a subclass of <Authoring>
  - etc
- This implicitly describes frame hierarchies and role/FE hierarchies like …


Tokenization
a
book
title
-d
"
The
Inside
White Hose
"
will
go
on
sale
in
the
U.S.
on
January
14
.
Instantiation Network of Semantic Frames, Specifying "Ontological Hierarchies"
F3: <Book Writing>
Author
Reader
Book
Place
Time
Purpose
F4: <Authoring>
Author
Reader
Piece of Work
Place
Time
Purpose
F1: <Title Givting>
Title Giver
Piece of Work
Title
Purpose
F2: <Name Givting>
Name Giver
Item
Name
Place
Time
Purpose
F12: <Disclosure>
Discloser
Secret
Means
Purpose
F5: <Publishing>
Publisher
Supporters
Publication
Place
Time
Purpose
F5*: <Producing>
Producer
Consumer
Product
By-product
Place
Time
Purpose
F12: <Activity>
Agent
Objects
By-product
Place
Time
Purpose
F6: <Selling>
Seller
Buyer
Goods
Price
Place
Time
Purpose
F6*: <Commercial Trasaction>
Provider
Seller
Buyer
Goods
Price
Place
Time
Purposes
F8: <Consuming>
Provider
Consumer
Items
Cost
Benefit
Place
Time
Purpose
F: <Interactivity>
Interactive Agents
Objects
By products
Place
Time
Purposes
F7: <Buying> =<Purchasing>
Buyer
Seller
Goods
Cost
Place
Time
Purpose
F9: <Reading>
Author
Reader
Book
Place
Time
Purpose
F10: <Fun Having>
Fun-Haver
Fun
Fun Source
Place
Time
Purpose
F10*: <Experiencing>
Experiencer
Experience
Place
Time
Purpose
U
F.R
A unit U realizes a frame element F.R, i.e. semantic role R defined relative to F, thereby evoking frame F.
F.R
G.R*
A role F.R unconditionally elaborates/instantiates a more abstract role G.B* (strong ontological implication)
F.R
G.R*
A role F.R conditionally elaborates/instantiates a more abstract role G.B* (weak ontological implication)
F
G.R
A frame F realizes a role G.R Purpose or Means.

Frame-to-Frame Relations

- The partial list of Frame-to-Frame relations we have defined so far is:
- "*F* elaborates *G*" (deals with Inheritance, "Is-A")
- "*F* constitutes *G*" (deals with "Part-Of" relation)
- "*F* presupposes *G*", "*F* negates *G*" (deals with "implications")
- "*F* motivates *G*" (can be used to specify <Reason>)
- "*F* realizes *G*" (can be used to specify <Purpose>)

Benefits of Multilayered Analysis

- Multilayered analysis has its own benefits.
  - it allows us to explore the details of *frame-to-frame relations*
    - Full text analysis tells much more about them
  - it allows us to explore and specify *multiple, simultaneous role realization* by a lexical material.
  - it allows us to avoid *frame conflation*
    - this happens all the time
  - by disentangling a complicated relationship among frames evoked in a sentence

Role Multiplex and Relativized Role

- In the following sentence, the role of 松葉づえ(で) is essentially ambiguous:

  (1) 研究室で友人と話していると，そこに太郎が松葉づえで入ってきた.

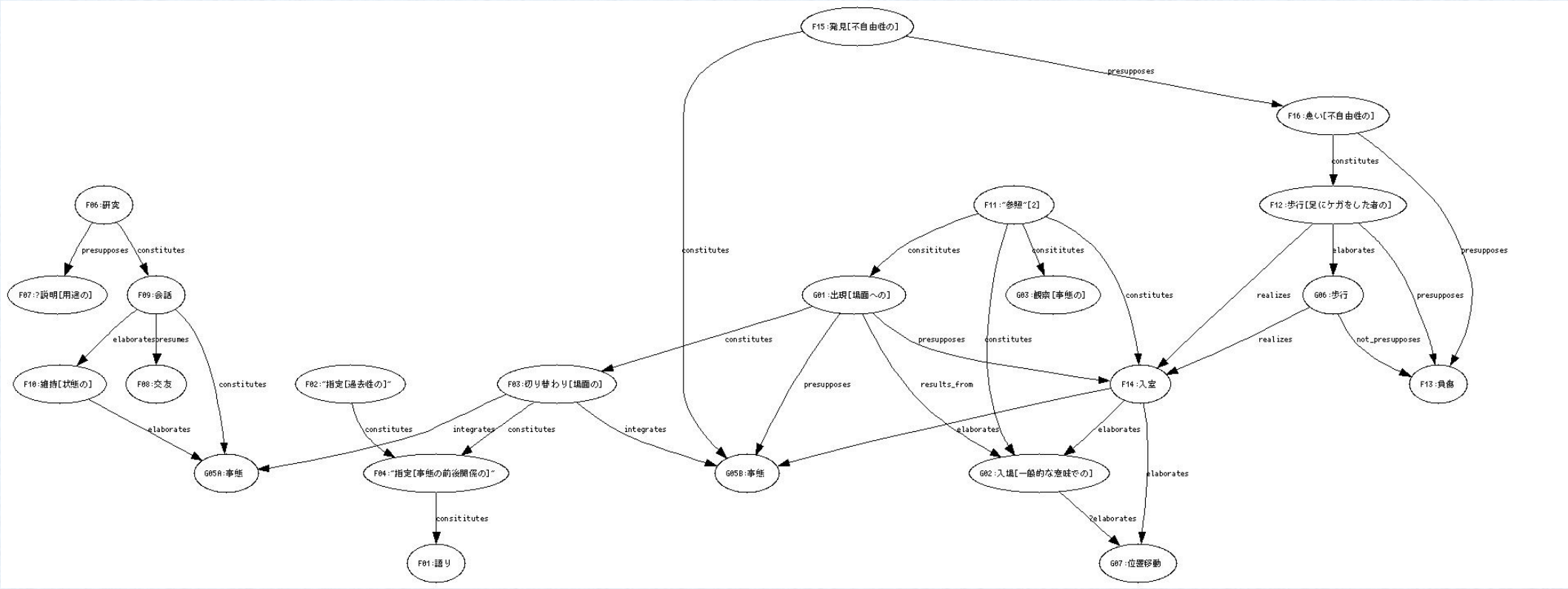
- in that it realizes at least the following two roles simultaneous and inclusively:
  - R1: <歩行者>「太郎」にとっての<歩行の道具> IS-A <Instrument>
  - R2: 観察者 (語り手とその友人にとっての<出現の際の様態> IS-A <Manner>

例文(1)のMSFA

Frame ID (Local)	F01	F02	F04	F03	G05a	G05b	F06	F07	F09	F10	F08	F11	F11	G01	G03	F14	G02	G07	F12	G06	F13	F15	F16
Frame-to-Frame Relations (Global)		constitutes F04	consititute s F01	constitutes F04; integrates G05a,G05b			presuppose s F07; constitutes F09		presumes F08; elaborates F10; constitutes G05a	elaborates G05a		constitutes F14,G02	consititute s G01,G03	constitutes F03; presuppose s F14,G05b; results_fro m G02		elaborates G02,G05b, G07	?elaborate s G07		presuppose s F13; realizes F14; elaborates G06	not_presup poses F13; realizes F14		presuppose s F16; constitutes G05b	presuppose s F13; constitutes F12
Frame Name (Global)	語り	~指定[過去性の]~	~指定[事態の前後関係の]~	切り替わり[場面の]	事態	事態	研究	?説明[用途の]	会話	維持[状態の]	交友	~参照~[1]	~参照~[2]	出現[場面への]	観察[事態の]	入室	入場[一般的な意味での]	位置移動	歩行[足にケガをした人の]	歩行	負傷	発見[不自由性の]	患い[不自由性の]
*	聞き手																						
*	語り手	指定者	指定者	場面[1]	参与者[1]		研究者 [potential] [1]	利用者[1]	参加者[1]	維持者[1]	交友者[1]	参照者	参照者	観察者[1]	観察者[1]							知覚者[1]	
研究	内容	事態	事態[1]		場所		GOVERNOR	目的[利用の]	場所	場所	場所	参照先	参照先	観察者 [1,2].Attr[1,2]	観察者 [1,2].Attr[1,2]								
室							場所	GOVERNOR															
で					MARKER				MARKER	MARKER	MARKER												
友人					参与者[2]		研究者 [potential] [2]	利用者[2]	参加者[2]	状態	相手: EVOKER			観察者[2]	観察者[2]							知覚者[1]	
と					MARKER				MARKER		MARKER			観察者 [1,2].Attr[2,2]	観察者 [1,2].Attr[2,2]								
話し					参与の仕方				GOVERNOR		?手段												
て									状態	GOVERNOR	MARKER												
いる																							
と			EVOKER	EVOKER																			
、			EXTEDNER	EXTDNER																			
そこ			事態[2]	場面[2]		場所						参照元	参照元	場面	場所	目的地点	場所	目的地点	到着地点	到着地点			
に						MARKER								MARKER		MARKER	MARKER	MARKER	MARKER	MARKER			
太郎						参与者	研究者 [potential] [3]	利用者[3]			相手 [potentila]			出現者	事態	入室者	入場者	位置移動者	歩行者	歩行者	負傷者	不自由者	?患者
が						MARKER								MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER
松葉づえ						参与の仕方								様態	様態	様態[入室の] OR 手段[入室の]	様態[入場の] OR 手段[入場の]	様態[入場の] OR 手段[入場の]	道具		EVOKER	様態: EVOKER	様態: EVOKER
で														MARKER	MARKER	MARKER	MARKER	MARKER	MARKER				
入っ														EVOKER	EVOKER	GOVERNOR	GOVERNOR	EVOKER	EVOKER	EVOKER		不自由性を伴う行動	不自由性を伴う行動
て																EXTENDER	EXTENDER	EXTENDER					
き																							
た		GOVERNOR				EXTEDNER																	
。	EXTENDER	EXTENDER	EXTENDER	EXTEDNER																			

http://www.kotonoba.net/~mutiyama/cgi-bin/hiki/hiki.cgi?c=view&p=msfa-matsubadzue-DE

Network of Frames



http://www.kotonoba.net/~mutiyama/cgi-bin/hiki/hiki.cgi?c=view&p=msfa-matsubadzue-DE

	出現[場面への]	観察[事態の]	入室	入場[一般的な意味での]	位置移動	歩行[足にケガをした人の]	歩行	負傷	発見[不自由性の]	患い[不自由性の]
*										
*	観察者[1]	観察者[1]							知覚者[1]	
研究	観察者[1,2].Attr[1,2]	観察者[1,2].Attr[1,2]								
室										
で										
友人	観察者[2]	観察者[2]							知覚者[1]	
と	観察者[1,2].Attr[2,2]	観察者[1,2].Attr[2,2]								
話し										
て										
いる										
と										
、										
そこ	場面	場所	目的地点	場所	目的地点	到着地点	到着地点			
に	MARKER		MARKER	MARKER	MARKER	MARKER	MARKER			
太郎	出現者	事態	入室者	入場者	位置移動者	歩行者	歩行者	負傷者	不自由者	?患者
が	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER
松葉づえ	様態	様態	様態[入室の] OR 手段[入室の]	様態[入場の] OR 手段[入場の]	様態[入場の] OR 手段[入場の]	道具		EVOKER	様態: EVOKER	様態: EVOKER
で	MARKER	MARKER	MARKER	MARKER	MARKER	MARKER				
入っ	EVOKER	EVOKER	GOVERNOR	GOVERNOR	EVOKER	EVOKER	EVOKER		不自由性を伴う行動	不自由性を伴う行動
て			EXTENDER	EXTENDER	EXTENDER					
き										
た										
。										

Web Sites that Host MSFA Samples

- FOCAL Hiki Site 1
  - http://www.kotonoba.net/~mutiyama/cgi-bin/hiki/hiki.cgi?FrontPage
  - Unrestricted access to MSFA-based sample annotation of copyright-free J-E translations
- FOCAL Hiki Site 2
  - http://www.kotonoba.net/~mutiyama/cgi-bin/hiki2/hiki.cgi?FrontPage
  - Restricted access (you need an account) to MSFA-based sample annotation of J-E newspaper article alignment data.

Dealing with Multiplicity

WSD Needs to Be Done Frame-wise

- A single "entity" referred to in a text is likely to *realize different frame elements frame-wise simultaneously*.
- For instance, *book* in the previous example realizes:
  - <Information Carrier> FE in <Reading> frame
  - <Goods> FE in <Selling/Buying> frame
  - <Piece of Work> FE in <Writing> frame
  - <Publication> FE in <Publishing> frame
- This means that word sense disambiguation *needs to be done frame-wise*, explaining why WSD isn't enough for text understanding.

How to Deal with "Markers"?

- Multiple, simultaneous realization of a set of FEs poses the following problem:
  - How to treat prepositions in languages like English and postpositions in languages like Japanese?
- This boils down to the following question:
  - Are prepositions or particles really *parts* of FEs, or just *markers* of them?
- We adopted the idea that markers can be (and need to be) separated from FEs themselves to facilitate encoding of multiple role realization.

For Future

Current Status

- So far, MSFA was applied to
  - a portion of copyright-free Japanese-English alignment data (67 sentences), open data
  - a tiny portion of *Kyoto University Corpus* (KUC) texts (3 articles, 63 sentences); semi-closed data
- Characteristics
  - MSFA assigns a sentence 20-30 frames on average (depending on the length)
  - 2157 frames (=927+1227: type count), 6846 frame elements (=3031+3815: type count) are recognized
  - But no evaluation is done yet.

What Should We Do Next?

- Our own frame definitions need to be linked to BFN ones. But, at the time being, it seems to be unrealistic to establish a mapping between BFN frames and the frames we defined with MSFA
  - granularity difference matters
- But it would be useful if we try to *share an annotation scheme* to facilitate such mappings in the future, and we want to try out best to do it.
- Putting aside the granularity issue, the major problem is with the treatment of markers like prepositions and postpositions.

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