In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

Semantics as Meaning Determination with Semantic-Epistemic Operations

Jens Allwood
Department of Linguistics, Göteborg University

1. Introduction

This paper develops and summarizes an approach to semantics which has so far only been available in Swedish, cf. Allwood (1989). The approach is characterized by the fact that it is cognitive, dynamic and context-sensitive. Meaning and concepts are primarily taken to be cognitive phenomena and are studied in terms of operations on information rather than as static entities. The operations are context-sensitive, so that meaning is seen as determined by operations which are sensitive to and make use of linguistic and extralinguistic context. The 1989 paper also gives an analysis of the nature of meaning and of concepts and of the relation between that analysis and classical theories of meaning. Ways of determining concepts and meanings are discussed, and a number of conceptual or cognitive operations for doing this are proposed. There is also a discussion of the linguistic counterparts of these operations and of how they can be used to determine the meaning of linguistic expressions in context. Finally, the paper presents a number of examples of how different linguistic constructions can be analyzed.

2. Background

The approach makes the following assumptions:

i. All conventionalized linguistic expressions (morphemes, words, idioms, phrases etc.) are connected with "meaning potentials", cf. Rommetveit (1974). A meaning potential is basically a person's memory of the previous uses of a particular expression and can be seen as the union of all the information the person can associate with the expression. The semantic part of this information will include both what is sometimes called "encyclopedic" and "lexical" information concerning the phenomenon the expression refers to or is otherwise associated with. Philosophical arguments for this position can be found in Quine (1953), and more linguistically flavored arguments can be found in Haiman (1980) and Langacker (1987).
ii. When used, a linguistic expression activates its meaning potential. The context-free meaning of a linguistic expression is seen as an activation potential, i.e. as a potential to activate (parts of) the meaning potential associated with a particular expression.
iii. The actual meaning of the expression is determined through cognitive operations, the function of which is to achieve compatibility between the meaning potential of a particular expression, the meaning potential of other

expressions, and the extralinguistic context. Actual determinate meanings of linguistic expressions thus result from partial activations of the meaning potentials of the expressions guided by cognitive operations.

iv. A subset of the operations can be characterized as semantic-epistemic operations, i.e. as operations which have both a linguistic expression and a conceptual-epistemic effect. It is these operations which motivate the use of the term "semantic-epistemic operation". The basis for these operations are cognitive operations such as discrimination, similarity abstraction, typification and reification**,** which exist independently of language but are expanded and elaborated by being connected with language.

v. The linguistic expressions of the semantic-epistemic operations are mostly what are known as "syncategorematic" expressions, e.g. conjunctions, prepositions, pronouns, quantifiers, some adverbs, some interjections, inflectional and derivational affixes.

vi. Another part of the vocabulary is made up of "categorematic" roots and stems (the roots and stems of nouns, verbs, adjectives, and some interjections and adverbs). The meaning potentials of such roles are claimed to serve as arguments for various semantic-epistemic operations. The interplay between the meaning potentials of categorematic roots and stems and syncategorematic operations is further claimed to be a major facet of linguistic competence, playing an important role in the production, comprehension and acquisition of language.

Below I will illustrate this by first discussing two of the eight types of semantic-epistemic operations proposed in Allwood (1989). I will then illustrate these two types of operations by examining their role in the determination of the concepts of conflict, war and peace.

In Allwood (1989), eight types of semantic-epistemic operations were proposed. Each type includes a set of operations, making up a total of about 90 operations. The operations are linguistic and/or cognitive regularizations of underlying spontaneous cognitive processes. Each operation can be seen in two modes, as a process and as an end state, with a category resulting from the operation. We might say that all the operations can be seen both as processes and as products resulting from these processes. The types are the following:

i. Basic semantic-epistemic categories
ii. Basic conceptual structure
iii. Anchoring in time and space
iv. Relations
v. Processes
vi. Roles derived from relations and processes
vii. Properties
viii. Quantity, modality and evaluation

Below I will now try to illustrate the approach by discussing two types of operations:

i. Basic semantic-epistemic categories and
ii. Roles derived from relations and processes

The operations can be jointly or successively applied to meaning potentials in a way which sometimes involves reiteration or recursion.

To avoid confusion, however, let me first briefly comment on the types which are not illustrated in this paper. Under the heading of "basic conceptual structure",

one can find, for example, operations of typification, part-whole structure and instantiation.These can be used together with basic categorization operations to elaborate and give a concept further structure. Under the headings "relations", "processes" and properties", one can find operations which can be used together with the basic category operations of "relations", "processes" and "properties" to further specify these categories. Operational types (iii), (vi) and (viii) are, in a similar way, used to further elaborate and structure concepts in the contexts where this is relevant.

3. Basic semantic-epistemic categories

Language provides support for the conceptual structuring of the world in many ways. One of them is by providing support for a fundamental classification of real phenomena. Below, I will present six categories which have turned out to be useful in conceptual-semantic analysis of many languages. They have also often been pointed out by philosophers engaged in conceptual analysis, cf. Aristotle (1938), Kant (1975), Husserl (1913), Barwise and Perry (1983).

The six categories are not, in the present approach, primarily assumed to be ontological. Instead, they are assumed to be semantic-epistemic, i.e. conceptual categories supported by linguistic mechanisms. Whether they also have an ontological status is left open. The categories are the following:

i. Entity e.g. substances like *water*, concrete objects like *trees*, abstract objects/substances like *freedom*, collective objects like *police*, holistic objects like *nature*
ii. Property e.g. *blue* or *strong*
iii. Relation e.g. *between* or *and*
iv. Process e.g. *run* or *give*
v. State e.g. the state of *being strong* or the state *that X is between Y and Z*
vi. (Course of) events e.g. single events like *X closed the door*, and courses of events like *building a house*

The relations between the categories can be depicted as in the following figure:

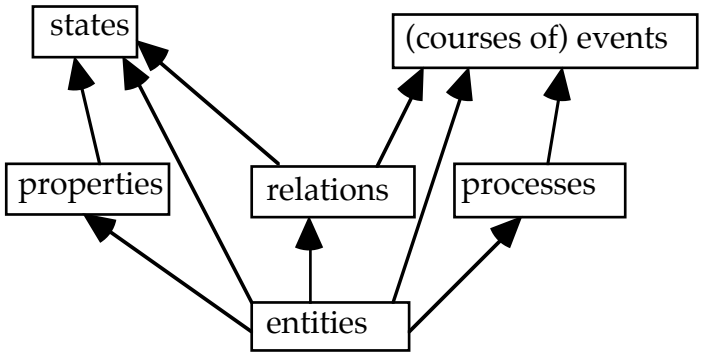

Figure 1. Relations between semantic-epistemic categories.

The different types of entities are regarded as the base of the categories. They serve as bearers (or arguments) of properties, relations and processes. When entities are combined with properties or relations, the result is a state. When they are combined with processes or dynamic relations, the result is an event or a course of events. The arrows going directly from entities to states or courses of events are there, since, as

we shall see below, it is possible, by a process of repeated abstraction and reification, to linguistically create entities which encapsulate states or courses of events.

From a linguistic point of view, it is convenient to divide the categories into basic and derived, simple and complex in the following manner:

1. Basic categories

A: **Simple**

Entity:	objects	e.g. tree
	substances	e.g. water
	collections	e.g. police
	holistic	e.g. nature
Property:		e.g. blue, strong
Relation:	static	e.g. in, and
	dynamic	e.g. give, hug (Dynamic relations are also classified as processes.)
Process:		e.g. run, give

B: **Complex**

State:	e.g. X is blue
(course of events)	e.g. X closed the door, X built a house

2. Derived categories

Entity:	blueness, strength, inclusion, running
Property:	watery, natural, included, running
Relation:	bluer than, being in love with
Process:	to water, strengthen, include

The derived categories are linguistically derived from the basic categories by iterative (recursive) morphological or syntactic processes. Structurally this means that the semantic-epistemic categories themselves should be seen as operations which can be applied to sensory (cognitive) input to support a basic linguistic level of categorization of cognitive and sensory data.

It is not assumed that such categorization must always be supported by language, or that it must take place at all. Perception can involve non-linguistically organized experience and even non-conceptual experience. The term "basic" here primarily refers to the fact that, linguistically, we are dealing with morphologically simple roots rather than derived or compounded stems. It is not assumed that such roots always correspond to cognitively basic structures. They can be associated with one or more different processes and products of typification, e.g. prototypes, stereotypes or ideal types (cf. Allwood 1989), but do not need to be. Thus, rather than seeing prototype formation (cf. Berlin and Kay 1969, Rosch 1977 or Lakoff 1987) as the fundamental mode of cognitive organization, it is seen as one of the important types of cognitive operations which are compatible with language.

Semantic-epistemic category operations can be applied either to categories on the basic level or to categories on a derived level to form new derived categories. From a conceptual-semantic point of view, this is achieved by a combination of general cognitive processes of instantiation, abstraction and reification with the

operations which correspond to the semantic-epistemic categories and with additional semantic-epistemic operations based on similarity or causality. Compare, for example,, *watery*, which has been formed by similarity-based property extraction from the substance water, or *blacken*, which has been formed to allow an association of a causative or inchoative relational process with "being black" as a resulting state.

The nature of the linguistic processes is not the same in all languages. In Swedish, for example,, *blacken* would correspond, on the one hand, to *svärta* (cause to become black) and, on the other hand, to *svartna* (to become black). In English, to maintain this distinction would require the use of syntactic rather than morphological means, e.g. "cause to become black" and "become black" , respectively. In Chinese, most derivations that in English or Swedish are done with the help of morphology would be done by compounding or syntax.

4. Roles derived from relations and processes

Language does not only support the formation of basic semantic-epistemic categories, it also supports the act of relating entities through static or dynamic relations (processes). In principle, each expression of a static or dynamic relationship between entities, when it is used, highlights properties of the entities which are required for the relation to be applicable and make sense. Simultaneously, compatible properties of the relation and the entities involved are highlighted. The properties which by a particular process or relation are required for a specific argument can be called the role constituting properties. Since there is no a priori limit to how fine-grained these properties may be, there are, in principle, as many roles as there are different relational expressions. It is, however, possible to generalize and to create a list of role types. (This list can be short or long.) In Fillmore (1970), a fairly short list was proposed, while Allwood (1989) suggested a slightly longer list, which is presented below. The roles are grouped together if they have a common component. Since they also have differentiating components, they can be separated whenever there is a need for this.

A. Cause - motive - reason - origin
B. Result - function - product - effect
C. Direction - purpose - goal
D. Need (of agent, instrument, process, patient)
E. Object - material
F. Agent (agent types in e.g. perception, cognition, emotion or different types of movement)
G. Potential (of e.g. agent, instrument or process, such as dispositions)
H. Resource (resource agent, resource source)
I. Patient - other participants (who potentially can become agents)
J. Instrument
K. Manner - organization
L. Surrounding (except time and space), e.g. physical, social, generic and unspecified

The list is not exhaustive but includes some of the most important role types. Since the role designations are somewhat general and vague, explicit definitions are needed to make the roles mutually exclusive. The roles can be used to distinguish different kinds of processes from each other, e.g. the criterion of intentional control (i.e.

possible agency) can be used to distinguish activities that require intentional control from other processes. We can picture the roles as in Figure 2.

Each relation/process highlights a specific set of roles. For example,, in the sentence *John loves Mary*, the relation *love* puts *John* in the agent role (having the agent relation to *love*) and *Mary* in the patient role. The arguments (mostly entities) which the relation is applied to occupy these roles with respect to the relation/process. Since the same real course of events can be the source of several different linguistic relational descriptions, one and the same entity, depending on the choice of relational description, can occupy several conceptual roles. Compare the following examples:

(1) John (agent) hired a car (object) from Bill (source)
(2) Bill (agent) rented a car (object) to John (patient/goal)

As we can see, the role designations of John and Bill vary depending on which linguistic relational description we choose.

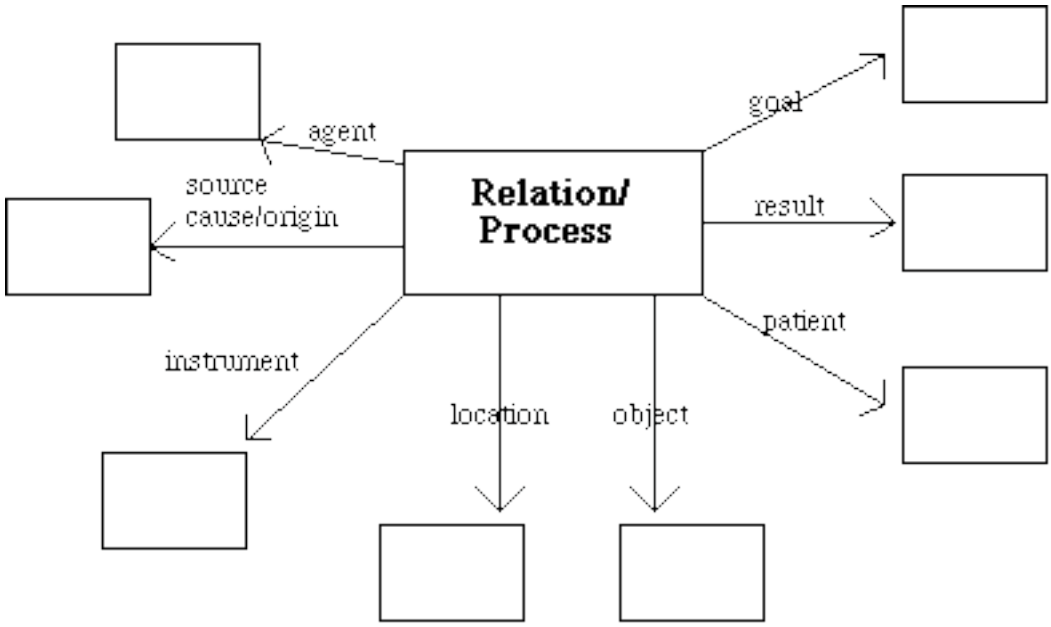

Figure 2. Roles derived from Relations and Processes.

5. An illustration

I. Roles of conflict, war and peace

Let me now try to illustrate how the basic semantic-epistemic categories and role analysis can be used in analyzing how we structure concepts through linguistic means. My illustrations will be based on an analysis of the use of the concepts conflict, war and peace, as they appear in the minutes of the Swedish Parliament 1978-79 (cf. *Riksdagens snabbprotokoll, riksmötet* 1978/79). The analysis was based on a concordance of the material and resulted in tables of the following kind. The table is only part of a more comprehensive table and only shows relational expressions requiring conflict, war, and peace to be seen as container-like entities.

In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

Table 1. Conflict, war and peace as containers providing space for other phenomena (in the minutes of the Swedish Parliament 1978-79)

		Konflikt (conflict)	krig (war)	fred (peace)
användas i	(used in) X	2		
avspänning i	(detente in) X	1		
befinna sig i	(be in) X/(be at) X	9	5	
delta i	(participate in) X	6		
dra sig ur	(pull out of) X	1		
dras in i	(*pulled into) X	1		
dödas i	(killed in) X		1	
fatta beslut i	(make decisions in) X			1
fungera i	(function in) X		1	
få vara i	(be left in) X			1
gå med i	(*join in) X	1		
gälla i	(hold in) X		1	
hamna i	(land in) X	2		
hålla utanför	(keep out of) X	1	1	
i	(in) X	5	20	3
inbegripen i	(involved in) X	1		
inblandad i	(involved in) X	1	1	
indragna i	(*pulled into) X		1	
invecklad i	(*embroiled in) X	6	1	
klara sig i	(survive in) X		1	
komma i	(*come in) X	2	1	
komma i X med	(come in X with)	23		
komma ur	(*come out of) X		1	
leva i	(live in) X	1		1
ligga i botten på	(lie at the bottom of X	1		
liv i	(life in) X		1	
lämna i	(leave in) X			1
rädda ur	(save from) X	1		
råka i	(*fall into) X	3		
skapa i	(create in) X			1
ske i	(happen in) X	1	1	
skede i	(phase of) X		1	
stå i	(*stand in) X		1	
svåranvändbar i	(hard to use in) X		1	
söka i	(search for in) X	1		
tillverka i	(manufacture in) X		1	
tvingas ut i	(forced into) X	1		
uppgift i	(task in) X		3	
utveckling i	(development in) X			1
är i	(is at) X		5	
∑		71	49	9

In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

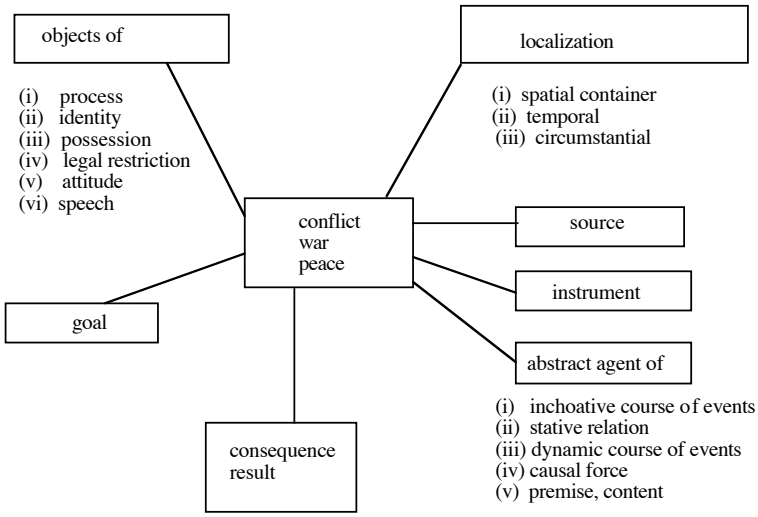

Figure 3. Role types of "conflict", "war" and "peace"

When all the usages in the material were generalized, the three concepts were found to occupy the following roles (Figure 3). These role types can be illustrated by the following examples, which are translations of the Swedish originals:

1. Abstract agent of:
   - (i) Inchoative process: Krig bryter ut (War breaks out)
   - (ii) Stative relation: Konflikten varar (The conflict lasts)
   - (iii) Course of events: Krig rasar (War rages)
   - (iv) Causal force: Krig är en orsak till armod (War is a cause of misery)
   - (v) Premise, content: Fred betyder frihet (Peace means freedom)
2. Instrument: Användandet av krig som ett politiskt argument (The use of war as a political argument)
3. Source: Fly från krig (Escape from war)
4. Localization:
   - (i) Spatial container: Vara i konflikt med (Be in conflict with)
   - (ii) Temporal: Före konflikten (Before the conflict)
   - (iii) Circumstantial: Konfliktsituation (Conflict situation)
5. Objects of
   - (i) Process: Studera konflikten (Study the conflict)
   - (ii) Identity: Detta är krig (This is war)
   - (iii) Possession: Guds fred (God's peace)
   - (iv) Legal restriction: Reglera konflikten (Regulate conflict)
   - (iv) Attitude: Älska fred (Love peace)
   - (iv) Speech: Diskutera fred (Discuss peace)
6. Goal: Arbeta för fred (Work for peace)
7. Result/consequence: Detta är en orsak till konflikt (This is a cause of conflict)

What the examples illustrate is how a particular relation or process, as expressed by the linguistic context (mostly a predication), determines the role the three concepts can assume. In a particular context, language leads us to structure the concepts in such a way that they become compatible elements of a larger unit.

II. Semantic-epistemic categorization of conflict, war and peace

What kind of semantic-epistemic categories could be reasonably assigned to the concepts of conflict, war and peace? Table 2 presents some relevant data.

In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

Table 2. Semantic-epistemic status of Conflict, War and Peace

	konflikt (conflict)	**krig (war)**	**fred (peace)**
State	konflikt råder (conflict exists)	krig råder (war exists)	fred råder (peace exists)
Event	konflikt bröt ut (conflict broke out)	krig bröt ut (war broke out)	fred inträdde (peace came into existence)
Course of Events	konflikt pågår (conflict is going on)	krig pågår (war is going on)	?fred pågår ?(peace is going on)

All three concepts can be viewed as states or events. Compare the expressions (which all have Swedish translations equivale*nt to the English expressions) a state of conflict, war or peace* and *in the event of conflict, war or peace.* When it comes to "courses of events", this category seems more natural for "conflict" and "war" than for "peace". "Conflict" and "war" are focused on various processes connected with war and conflict, while "peace" seems to be focusing on the end state resulting from processes leading to peace. Compare the following Swedish participle forms, where *fredad* ((appeased) (resultative)) and *krigande* (warring-(dynamic)) are possible but not **krigad* (warred), **konfliktad* (conflicted) or **fredande* (appeasing). The three concepts also exhibit a process/product ambiguity. Compare (A) process with (B) product.

A. Process

(1) ?Freden pågick i 5 år (The peace went on for 5 years)

(2) Kriget (konflikten) pågick i 5 år (The war (conflict) went on for 5 years)

B. Product

(1) Det uppnådda kriget (konflikten) studerades av alla parter (The war (conflict) reached was studied by all parties)

(2) Den uppnådda freden studerades av alla parter (The peace reached/achieved was studied by all parties)

It is slightly easier to imagine a situation where B(i), rather than B(ii), makes sense. Conversely, it is easier to linguistically support a conceptualization as courses of events of war and conflict than of peace, and this makes A(i) less acceptable than A(ii). In short, peace can be most easily conceived of as a state or an event. Conflict and war can most easily be conceived of as events or as courses of events, which implies that the process/product ambiguity for the three concepts is not symmetrical.

The concept of "meaning potential" is illustrated by the possibility of viewing concepts like conflict, war and peace in three distinct ways, viz. as a state, as an event and as a course of events, and at another level as an entity or even as a substance, cf. below. All five possibilities are, so to speak, potential determinations of the meanings of the words in different contexts. Thus, the term "meaning potential" also signifies a way of reconceptualizing what traditionally has been called the "polysemic structure" of the meaning of a certain word.

(1) Conflict, war and peace as countable entities

(peace (*peaces/peace treaties

One (war many (wars

(conflict (conflicts

(2) (Conflict, war and peace as substances
There is more war, conflict, peace to come
A little war, conflict, peace might not hurt you

Given the appropriate linguistic contextual means, the meaning of "conflict" (or "war" or "peace") can be determined in one or another of the directions indicated. The reason for the use of the term "meaning potential" can now be more fully grasped. Meaning is viewed as having potentialities which can be drawn upon by extra- and intralinguistic context. In a given context, the "meaning potential" of a term is determined in a way which is relevant and appropriate for that context.

III. Unpacking abstraction

All three concepts (conflict, war and peace) can be seen as reified states or courses of events, i.e. abstract objects derived from underlying conceptualizations of states or courses of events which, in turn, consist of relations, processes and entities occupying certain roles in these relations or processes. The idea is illustrated in Figure 4.

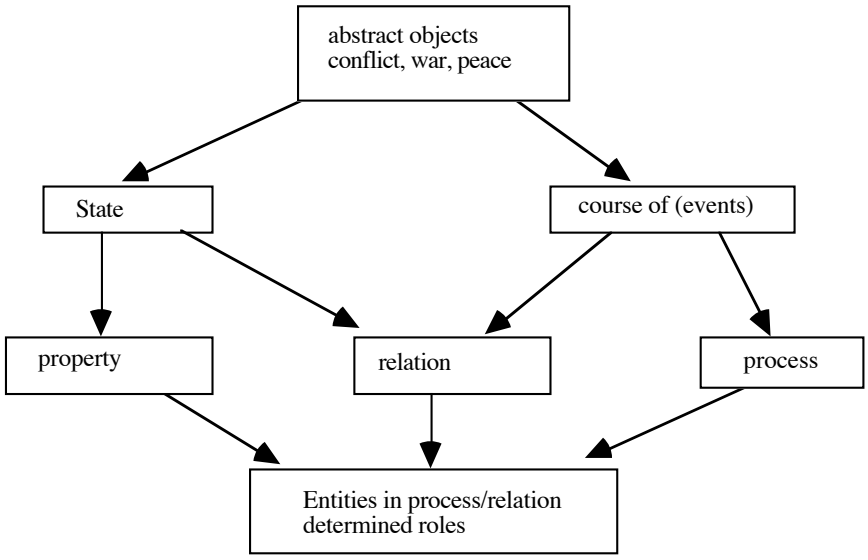

Figure 4. The internal structure of reified states and (courses of) events

On the basis of examples like blue -> blueness, strong --> strength, we might think that language, above all, provides support for processes of abstraction and reification. However, diagram 4 raises the question of whether linguistic processes also allow us to move in the other direction, using linguistic means to unpack and recover more concrete conceptual material. I believe the latter to be the case and will try to illustrate this by considering various linguistic ways in which the term conflict can be turned into a relation. This can be done either directly or indirectly. Let us first consider the direct cases. The examples are given in Swedish (taken from the minutes of the Swedish Parliament 1978-79) with English translations. In most cases they seem to work equally well in Swedish and English

In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

A. Directly

1. Via implicit relation focused by preposition mellan (between)
   Conflict(state) --> relation
   Construction: Det är X mellan A och B
   There is X between A and B
   Det är konflikt mellan A och B
   There is conflict between A and B

2. Joint venture construction
   Construction: A har X med B
   A has X with B
   A har konflikt med B
   A has conflict with B

3. Adversative construction
   Construction A har X mot B
   A has X against B
   A har konflikt mot B
   A has conflict against B

B. Indirectly (via metaphorical extension),

1. Conducting vehicle
   Construction A för X mot B
   A conducts X against/toward B
   A för krig mot B
   A conducts war against B

C. Container constructions

(i)	A är i X med B	konflikt
	A is in X with B	krig
(ii)	A kommer i X med B	konflikt
	A come into X with B	krig
(iii)	A drar sig ur X med B	konflikt
	A pulls out of X with B	krig
		fred

All three cases are possible with conflict and war, and number (iii) is also possible with peace.

The examples clearly show that we not only have linguistic means for abstraction and reification, but also for unpacking and recovering conceptual material underlying abstractions and reifications. In both cases, the linguistic means can be both morphological and syntactic, and they can involve conventionalized metaphorical extension, as in the above cases of linguistic expressions based on ideas of "vehicle conducting" and "containers". Semantically speaking, we can, for example, unpack the reified course of events *krig* (war) by forming *krig-are* (warrior) and *krig-a* (to make war). In fact, we seem to have a store of linguistic constructions (cf. Fillmore 1988) which can be used for various purposes of semantic-conceptual structuring.

6. Concluding Remarks

In this paper, I have tried to demonstrate an approach to semantics which is characterized by the assumption that language provides a set of tools and

mechanisms for structuring information which is maximally useful in human action and interaction. One of the ways in which this is achieved seems to be by providing regular linguistic support for a number of conceptual (semantic-epistemic) operations. These allow information to be flexibly structured in a regular and predictable way, probably in harmony with certain innate predispositions, to meet requirements of context such as those given by the currently relevant linguistic and extra-linguistic activity and purpose, the perceptual environment and the stored background information of the discourse.

The approach has been illustrated by discussing operations pertaining to certain basic semantic-epistemic categories and role relations.

The primary goal of the approach is to gain a deeper understanding of human conceptual and linguistic capacities, but I believe some of the features of the approach can also be used for purposes such as:

- conceptual analysis
- historical conceptual-semantic studies
- comparative socio-cultural analysis
- studies of the relation between grammar and lexicon
- modeling linguistic/semantic processing

Acknowledgments

I would like to thank Elisabeth Ahlsén and Joakim Nivre for comments and discussion.

References

Allwood, J. 1989. *Om begrepp - deras bestämning, analys och kommunikation* (ms). Göteborgs universitet, Institutionen för lingvistik.

Aristotle. 1938. *Categories. On Interpretation and Prior Analytics*. Translated by H.P. Cooke and H. Tredennick. London and Cambridge, Mass. Loeb Classical Library. Harvard University Press and W. Heineman Ltd.

Barwise, J., & Perry, J. 1983. *Situations and Attitudes*, Cambridge, Mass., MIT Press.

Berlin, B. and Kay, P. 1969. *Basic Color Terms*. Berkeley, University of California Press.

Fillmore, C. 1970. *Subjects, Speakers and Roles*. Ohio Working Papers in Linguistics, No. 4. The Ohio State University, Columbus, Ohio.

Fillmore, C. 1988. *The mechanisms of construction grammar*. In Papers for the Fourteenth Annual Meeting of the Berkeley Linguistics Society, pp 163 -182

Haiman, J. 1980. "Dictionaries and Encyclopedias". *Lingua* 50:329-57.

Husserl, E. 1913. *Logische Untersuchungen II*. Tübingen, Max Niemeyer Verlag. 1968. Reprinted from the 2nd revised edition, Halle, 1913.

Kant, I. 1975. *Die Drei Kritiken*. Stuttgart, Alfred Kroner Verlag.

Konkordans: Riksdagens snabbprotokoll, riksmötet 1978/79. (Concordance of the quick minutes of the Swedish Parliament 1978/79). Dept of Swedish language, Språkbanken, University of Göteborg.

Lakoff, G. 1987. *Women, Fire and Dangerous Things*. Chicago, The University of Chicago Press.

Langacker, R.W. 1987. *Foundations of Cognitive Grammar*, Vol. 1, Theoretical Prerequisites. Stanford, Stanford University Press.

Quine, W.V.O. 1953. "Two dogmas of empiricism". In *From a Logical Point of View*. Harvard, Harvard University Press.

Rommetveit, R. 1974. *On Message Structure*. London, John Wiley & Sons.

In: Jens Allwood & Peter Gärdenfors (Eds.). 1999. *Cognitive Semantics*. John Benjamins Publ. Co. pp. 1-18.

Rosch, E. 1977. “Human categorization.” In Warren (ed.) *Studies in Cross-Cultural Psychology*. London, Academic Press.