Frames and metonymy
Shifting reference and refocusing the frame

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1. Barsalou frames

Frames according to Barsalou (1992) are essentially recursive attribute value structures with functional attributes (i.e. attributes that constitute functions that return a unique value for their argument).
According to Barsalou, frames may be the structure of human cognitive representations in general.

> Hypothesis
> Frames are the format of lexical and compositional meanings.

What's a frame?

A frame is a complex condition on its potential referent.

- The condition is in terms of attributes of the referent and their values.

- The values of the attributes may themselves carry attributes, and so on, recursively.

- Attributes are defined for certain ontological/conceptual types of possessors and assign values of a certain ontological/conceptual type. The types are elements of a type signature that forms the ontological basis of the frame.

- For a sortal frame, all assignments of values by means of attributes are recursively related to the referent. (Viewed as a directed graph, the referent forms a source node).

- Various constraints may be imposed on the structure, e.g. constraints on the value of an attribute, or on value correlations between attributes.

Frames can be represented by directed, labelled graphs,
or alternatively by attribute-value matrices.

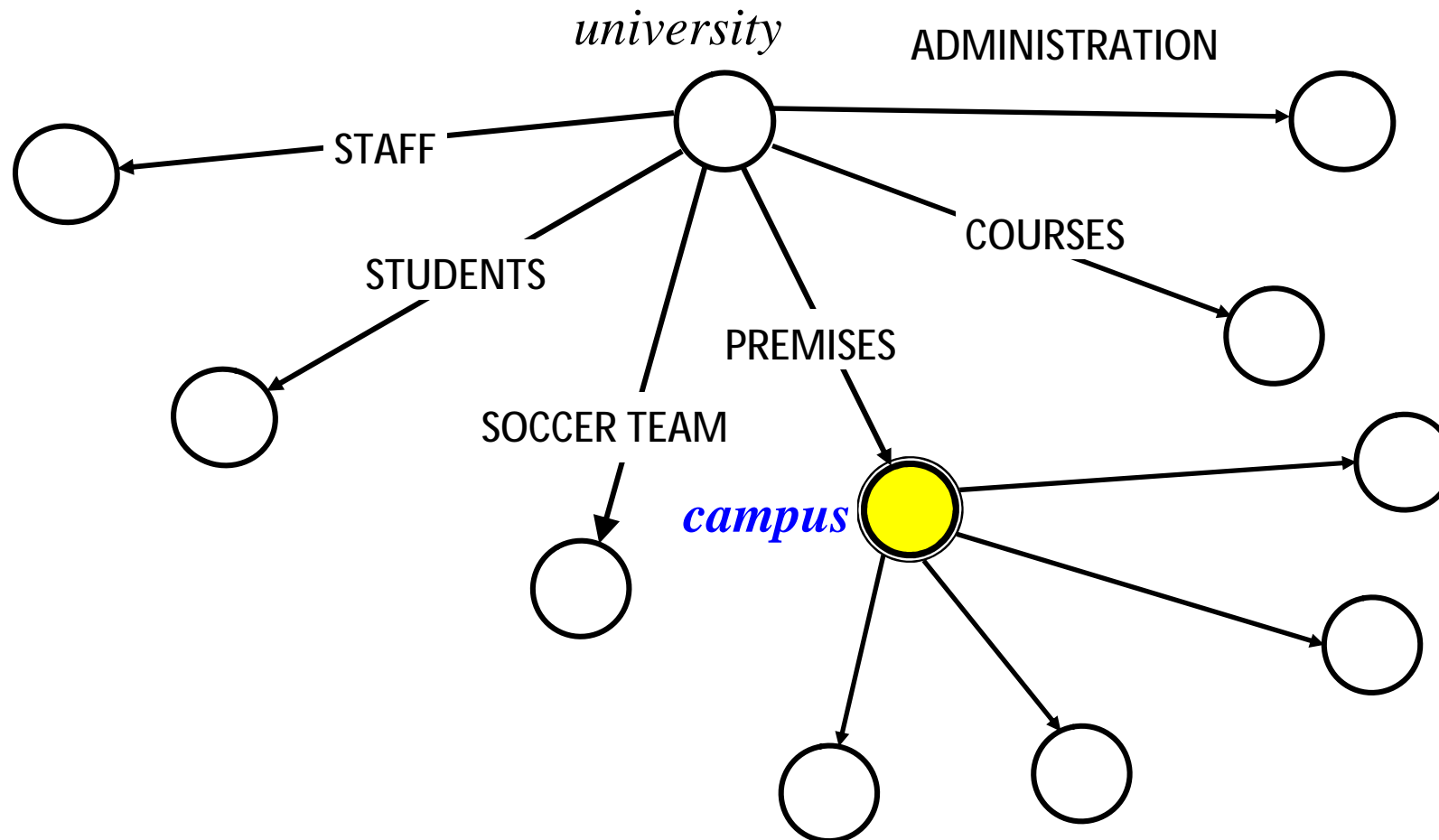Figure 1: Basic structural unit of a Barsalou frame

(possessor)   ATTRIBUTE   *value*

2. Shifting reference in a frame

Focusing on the campus

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Focusing on the campus

university   ADMINISTRATION
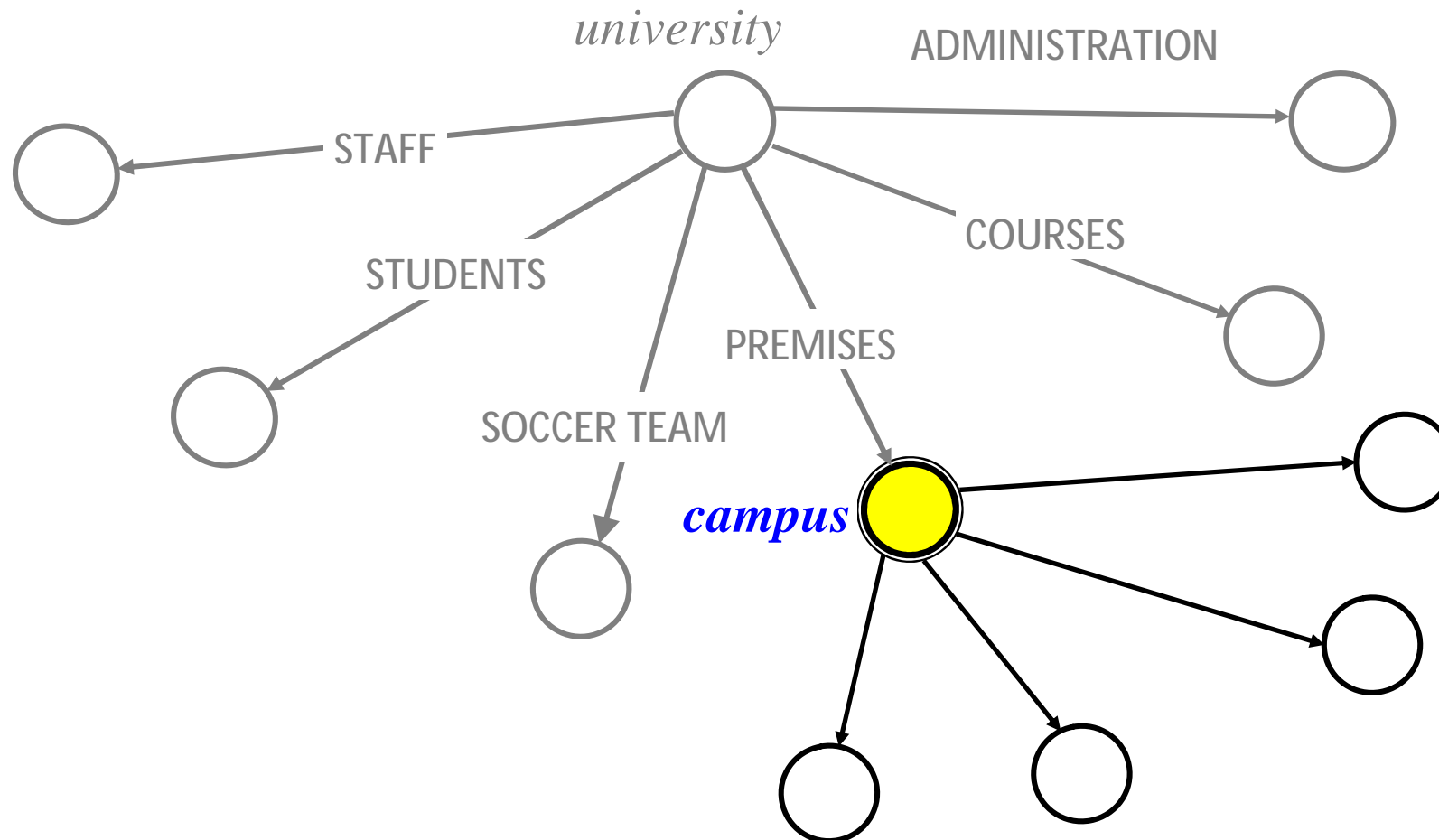
STAFF

STUDENTS

PREMISES

SOCCER TEAM

COURSES
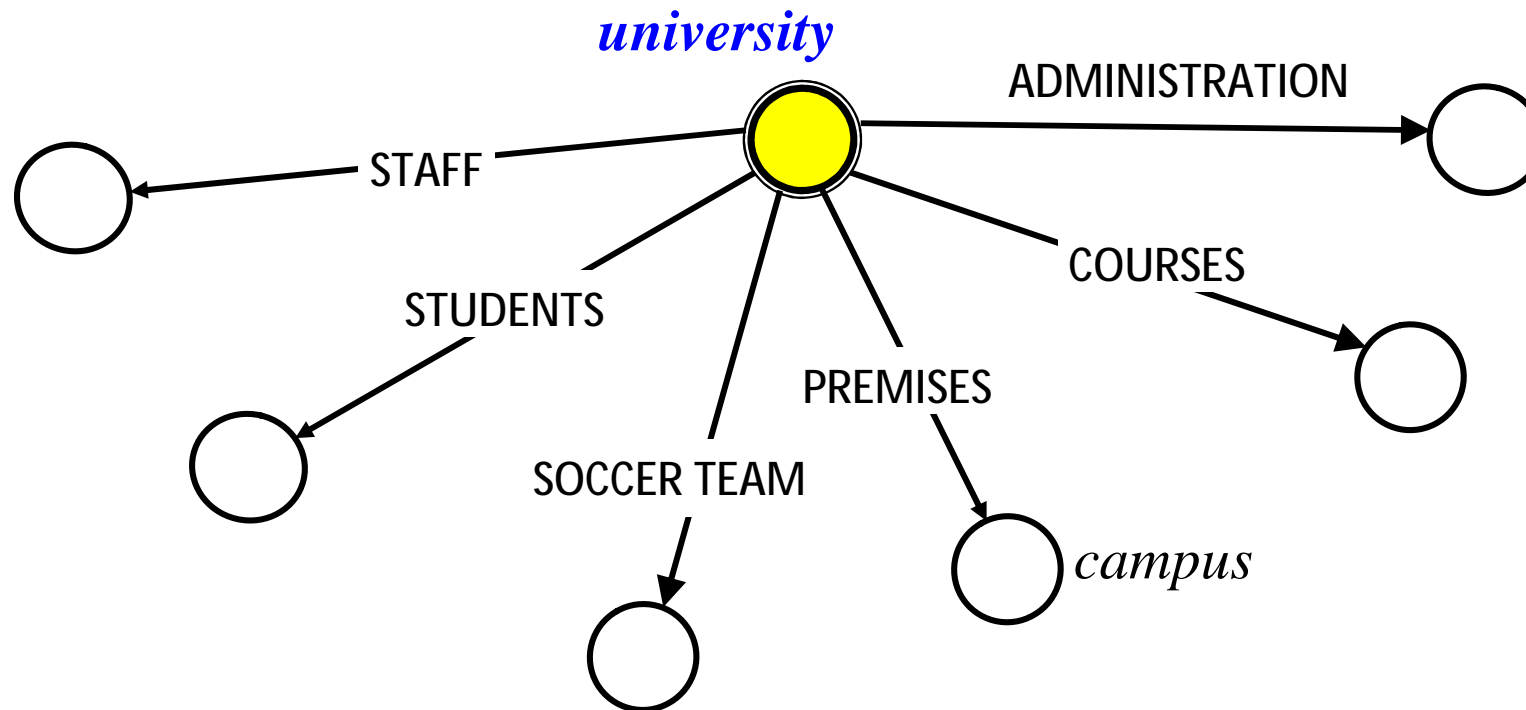
campus

Shift reference to the *campus* node > activation of attributes of the target
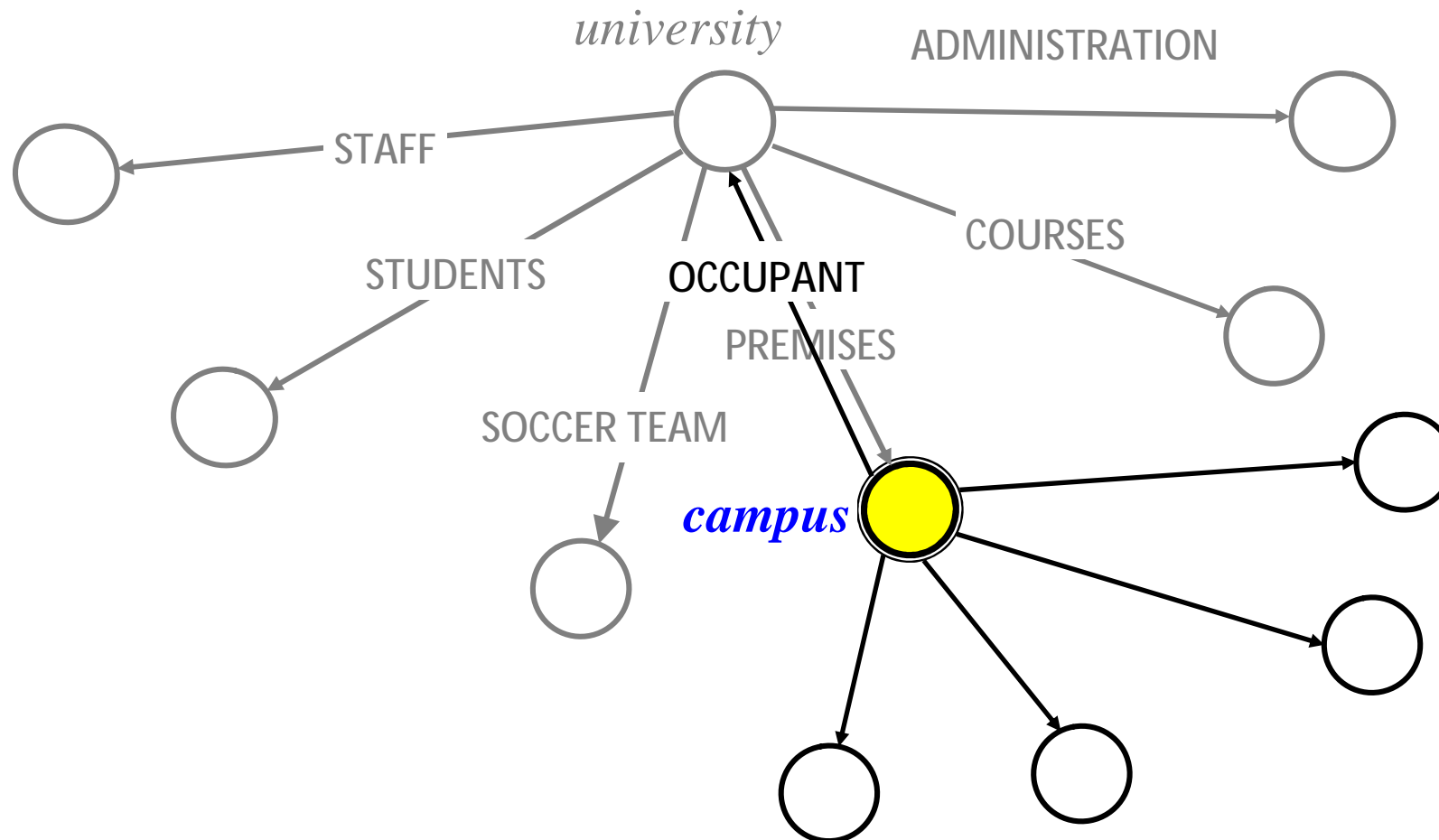
2. Shifting reference in a frame

Focusing on the campus

Deactivation of the attribute of the source (no link from target to source)
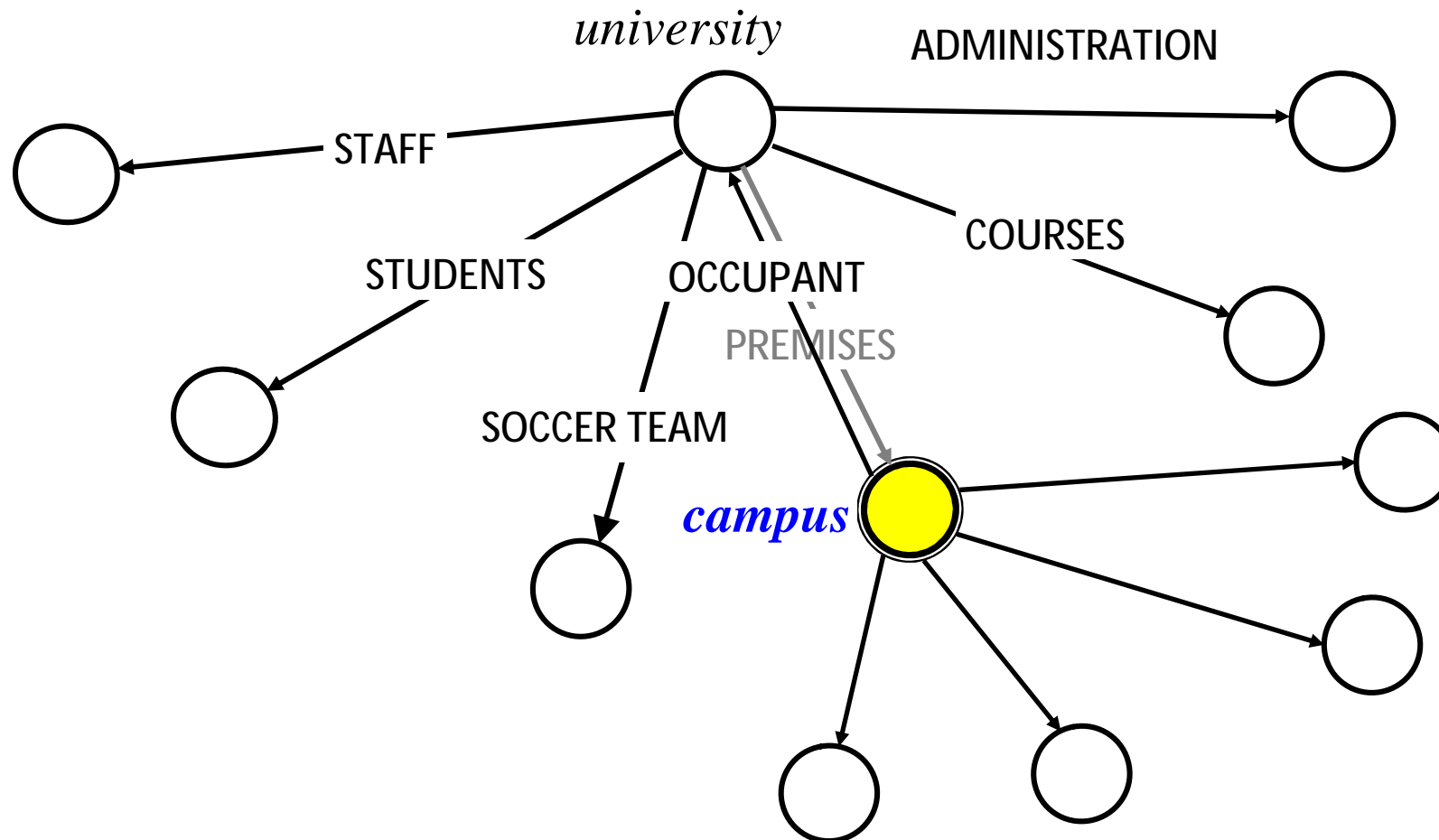
2. Shifting reference in a frame

Focusing on the campus

Re-link the source to the target by inverting the relation

2. Shifting reference in a frame

Focusing on the campus

> Re-activation attributes of the original source

Shifting the referent of the frame from R1 to the target R2, the value of one of its attributes, will

- possibly activate more attributes of the R2

The resulting target frame with referent R2 will

- possibly not fulfil the uniqueness condition for the referent of a sortal concept, because there may be no attribute which assigns R1 as its value to R2

è   If the recentered frame is to encode a sortal concept (e.g. for 'a campus'), the original frame must provide an inverse attribute connecting R2 back to R1. This is a priori only possible if the attribute involved in the shift is a bijective function.

One-step referent shifts

Shifts may consist of any number of consecutive transitions.

Language has particular semantic and morpho-grammatical means for accomplishing 1-step referent shifts. They may go with or without a shift of grammatical category and with or without morphological expression.

	– morph.	+ morph.
– category shift	metonymy *university → university$_{campus}$*	argument compounds *university → university campus*
+ category shift	metonymical conversion *hammer$_N$ → hammer$_V$* *drive$_V$ → drive$_N$*	metonymical derivation *drive$_V$ → driver$_N$*

3.   Metonymy
3.1 Notorious examples

(1)   a. *The ham sandwich is waiting for his check.*

b. *Moscow declared the Chechen rebels defeated.*

c. *Joyce is hard to understand.*

d. *We need some new faces around here.*

e. *That's a smart paper.*

f. *He was beaten up by skinheads.*

g. *The bass was lousy.*

h. *She's in the bathroom.*

i. *I'm in the phonebook.*

j. *I'll have a cup.*

3.2 Bierwisch: examples of 'conceptual shift'

(Bierwisch 1983): multiple metonymies with *university*

(2)   a.   *The university improved its ranking.*
          (= institution)

       b.   *The university will close down the Faculty of Agriculture.*
          (= administration)

       c.   *The university won the soccer game against the ministry of defense.*
          (= soccer team)

       d.   *The university starts on 3 April.*
          (= courses)

       e.   *The university is in the southern part of town.*
          (= campus)

3.3 Traditional definitions

Extensional definitions: list of 'metonymical relations'

Metonymy is characterized by certain relations between the referents of the noun in its literal meaning and in its non-literal meaning.

part	→ whole	*asshole, skinhead, redneck, new face*
equipment	→ carrier	*blue helmet, green beret*
location	→ institution	*Moscow*
meal	→ customer	*ham sandwich*
author	→ works	*Joyce*
carrier	→ content	*paper*
instrument	→ play(er)	*bass*
person	→ name	*I* ['m in the phonebook]
container	→ content	*cup*
property	→ possessor	*celebrity, liquid*
university:		
institution	> administration/soccer team/courses/premises/ etc. etc.	

Intensional definitions: same domain, contiguity

- Target and source belong to the "same domain",
  where a domain is "any kind of conception or realm of experience"
  (Langacker 2008: 44).

- Target and source are "contiguous".

  (Lakoff & Johnson 1980; Lakoff 1987; Langacker 1987, 2008; Croft 2002)

3.4 A closer look at metonymical relations: bidirectional uniqueness

- Observation:
  In all these cases, there is a 1-to-1 inverse relationship
  between the target and the source:
  For every instance of the source type there is exactly one instance of the target type
  +
  For every instance of the target type there is exactly one instance of the source type.

- THUS:
  The relations on which metonymies are based, are not arbitrary;
  they are one-to-one relations (bijections).

unique part	⇄	(natural) whole	*asshole, skinhead, redneck, new face*
unique equipment	⇄	carrier	*blue helmet, green beret*
location	⇄	institution	*Moscow*
ordered meal	⇄	ordering customer	*ham sandwich*
author	⇄	oeuvre	*Joyce*
carrier	⇄	content	*paper*
instrument	⇄	play *or* player	*bass*
person	⇄	name	*I* [*'m in the phonebook*]
container	⇄	content	*cup*
property instance	⇄	possessor	*celebrity, liquid*

Not all attributes in a frame are bijective functions.

Non-invertible attributes in the 'university frame':
e.g. YEAR OF FOUNDATION, REPUTATION, SIZE, STATE, etc.

- Metonymical relations are attributes in the frame of the source concept.

- Metonymy can be understood as a shift of the central (= referential) node of the original frame and the creation of an attribute relation from the new central node to the original one.

- A metonymical shift from one sortal concept to another one is only possible if the attribute is a bijective function.

3.5 Selected examples revisited
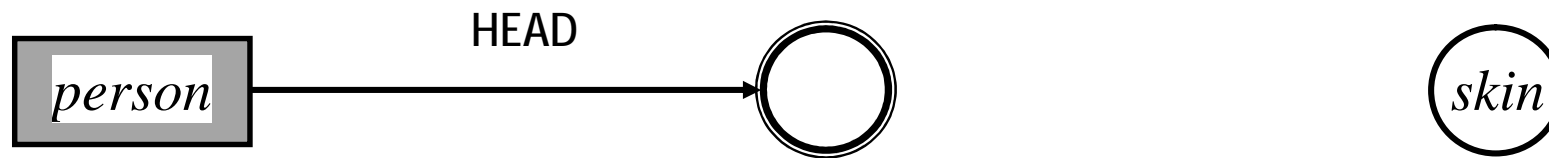
Figure 2: Frame structure for 'skinhead'

3.5 Selected examples revisited

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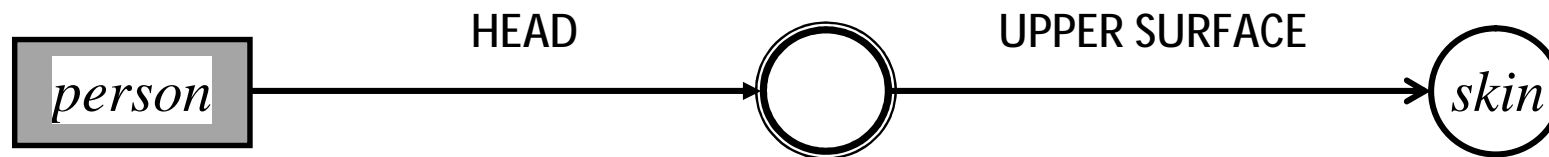
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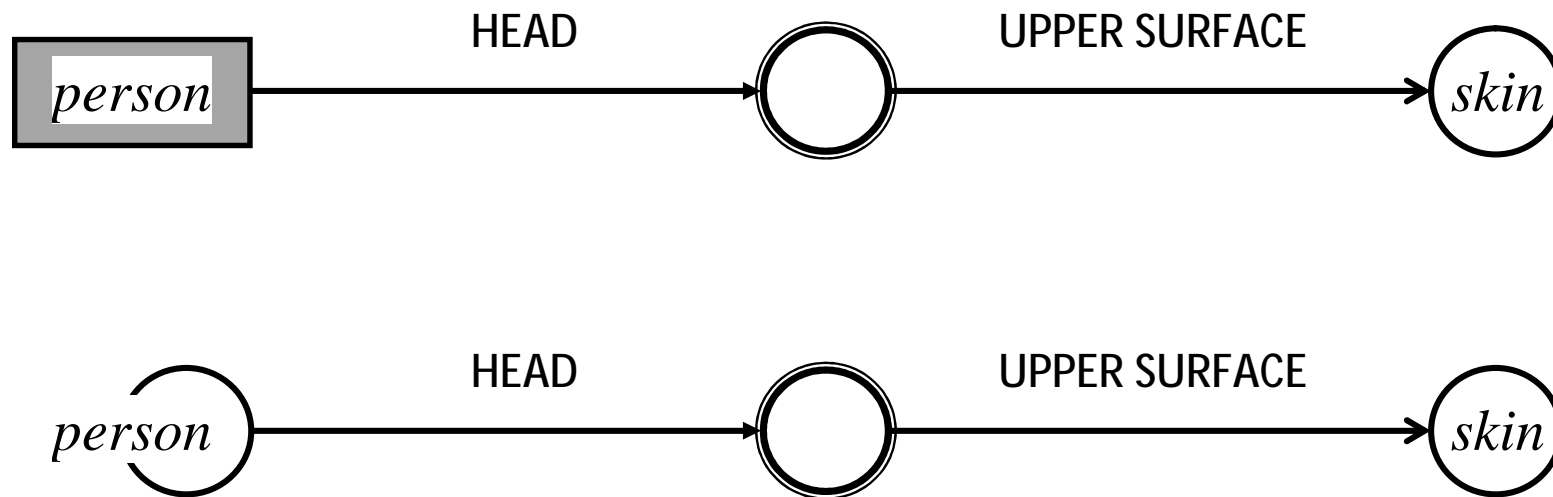
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Figure 2: Frame structure for 'skinhead'
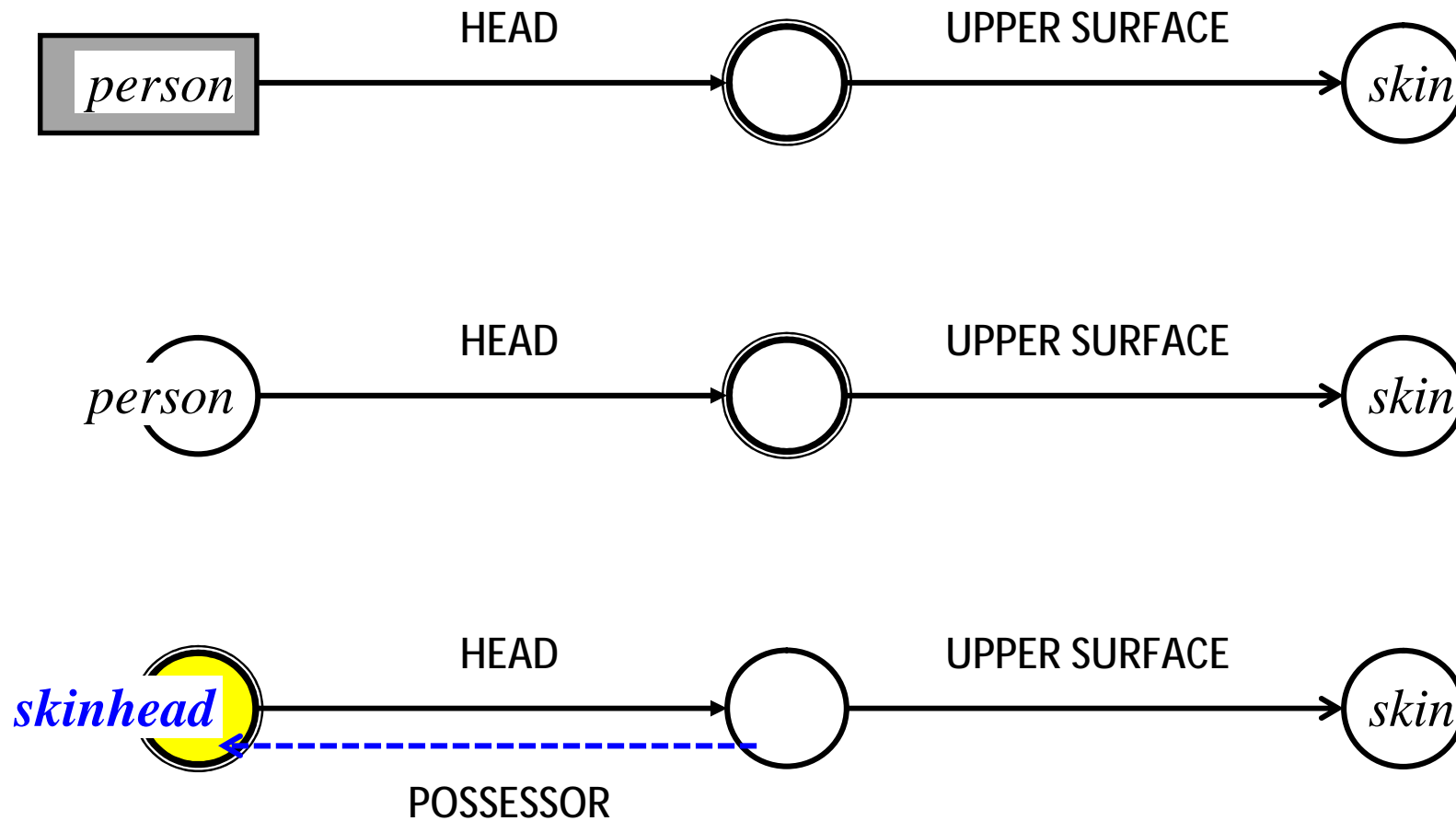
Moscow declared the Chechen rebels defeated.

The predication *declare s.o. defeated* demands for an enemy of the agent as the patient of the declaration and it requires an authority entitled for this act as the agent. The notion of 'rebel' requires a government rebelled against. World knowledge provides the information that there was a rebellion of Chechens in Chechnya, part of Russia, against the Russian government, seated in Moscow. (We also know that there are no other state-level governments seated in Moscow.)

The crucial frames involved are: declare s.o. defeated, Chechen rebels, Moscow plus (inferred) Russia and Russian government

Figure 3: Network of frames involved in *Moscow declared the Chechen rebels defeated*
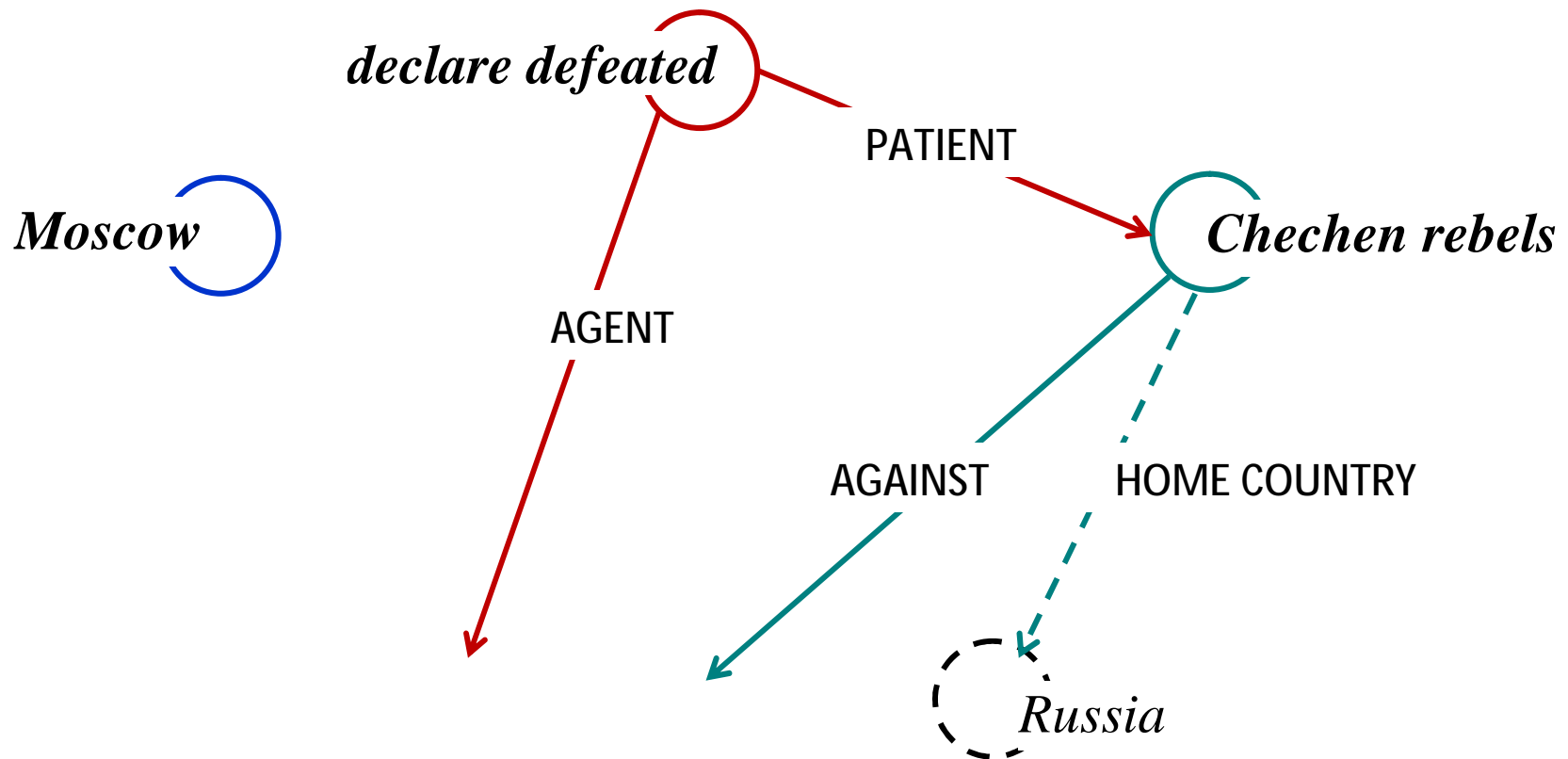
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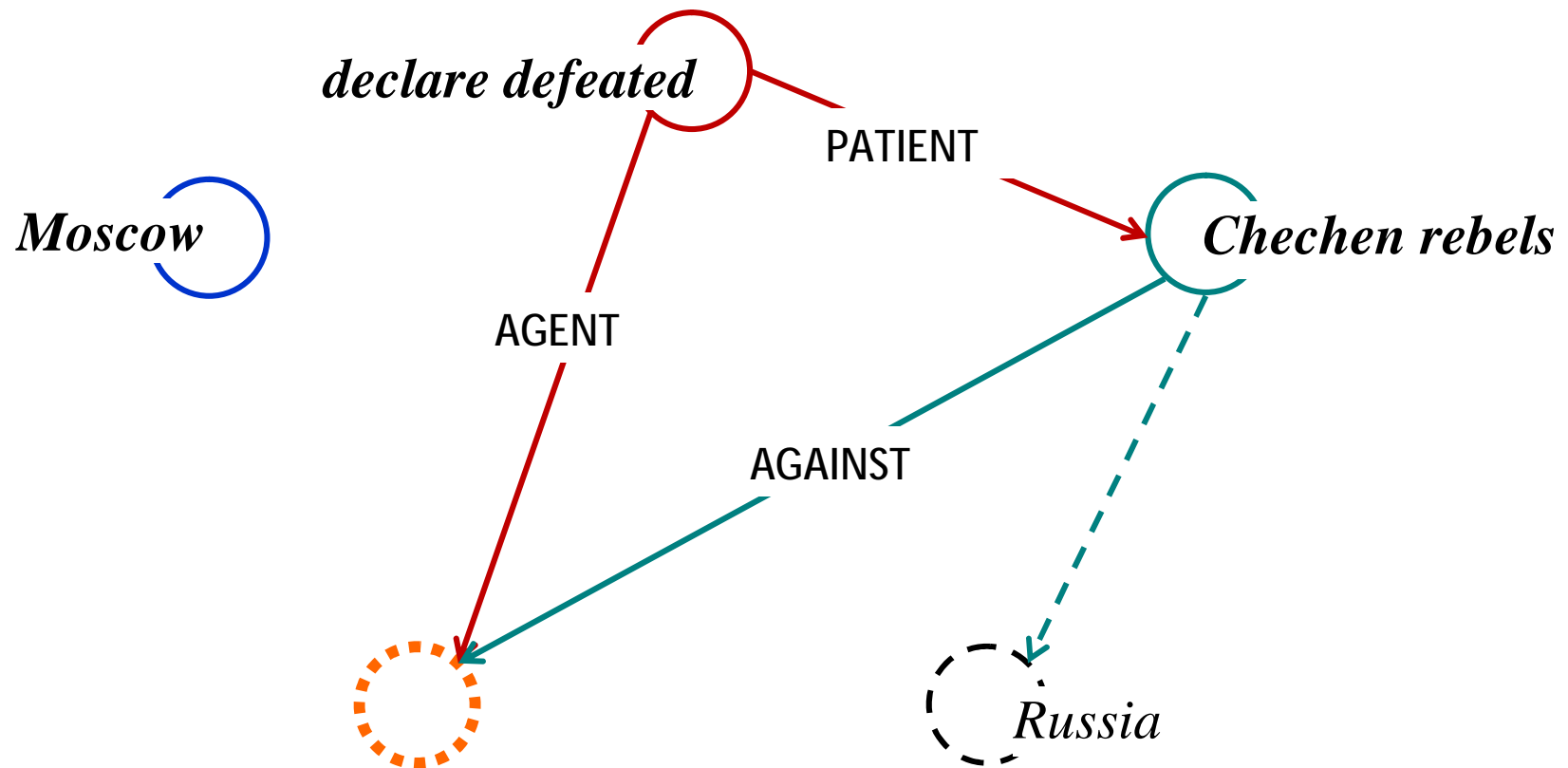
Unify the agent of declaration with the enemy of the Chechen rebels.

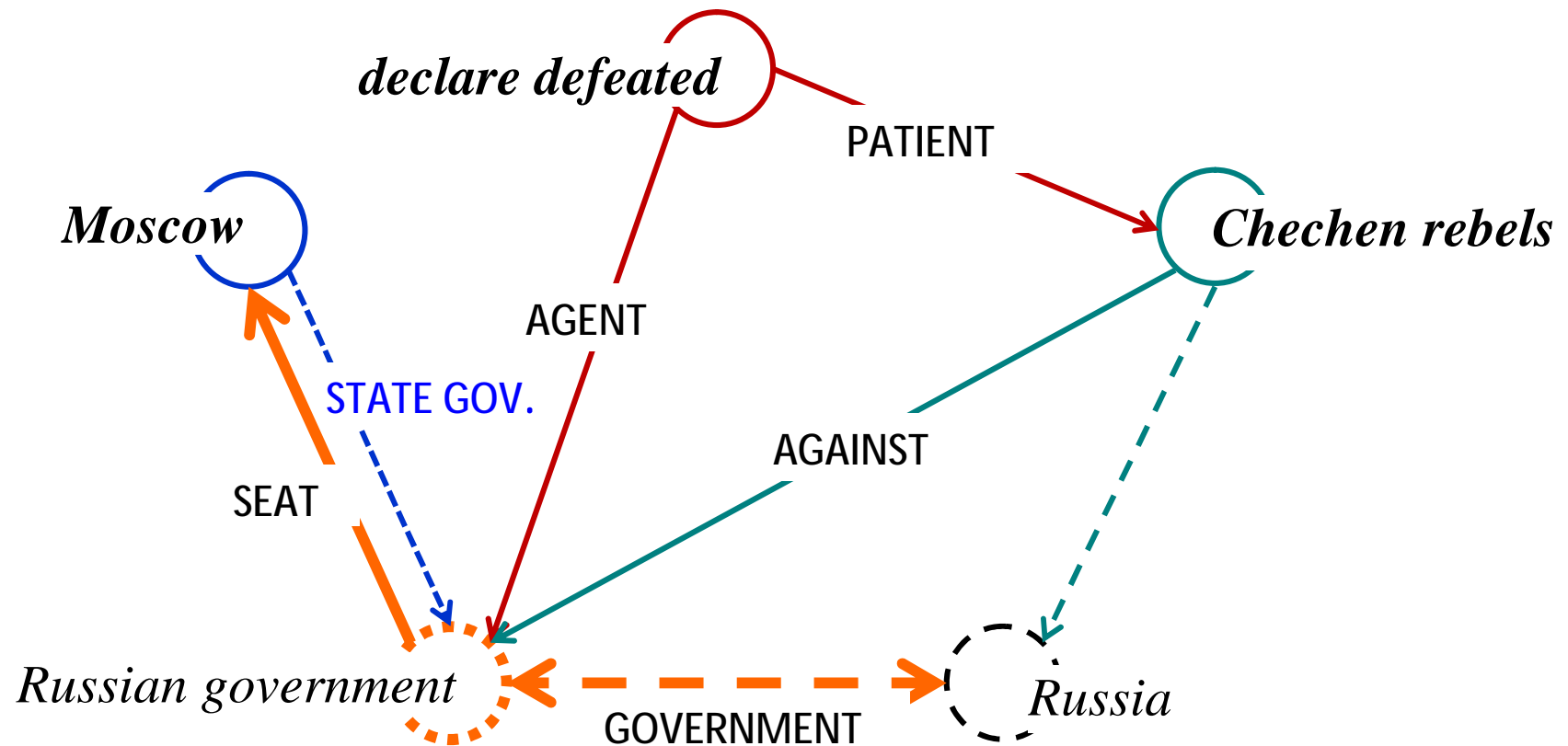Figure 3: Network of frames involved in *Moscow declared the Chechen rebels defeated*
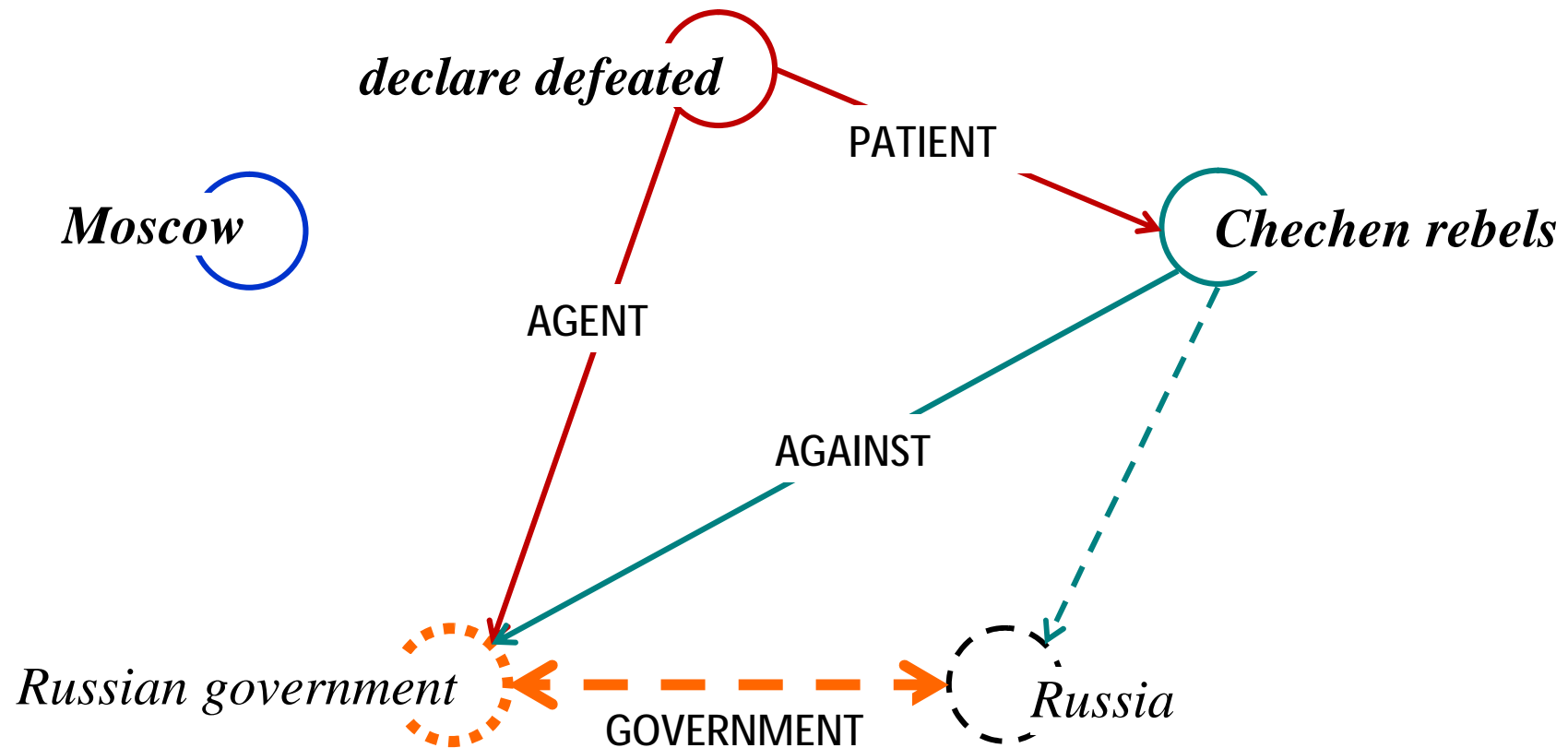
Link the home country of the Chechen rebels to their enemy,
rendering it the Russian government

Figure 3: Network of frames involved in *Moscow declared the Chechen rebels defeated*
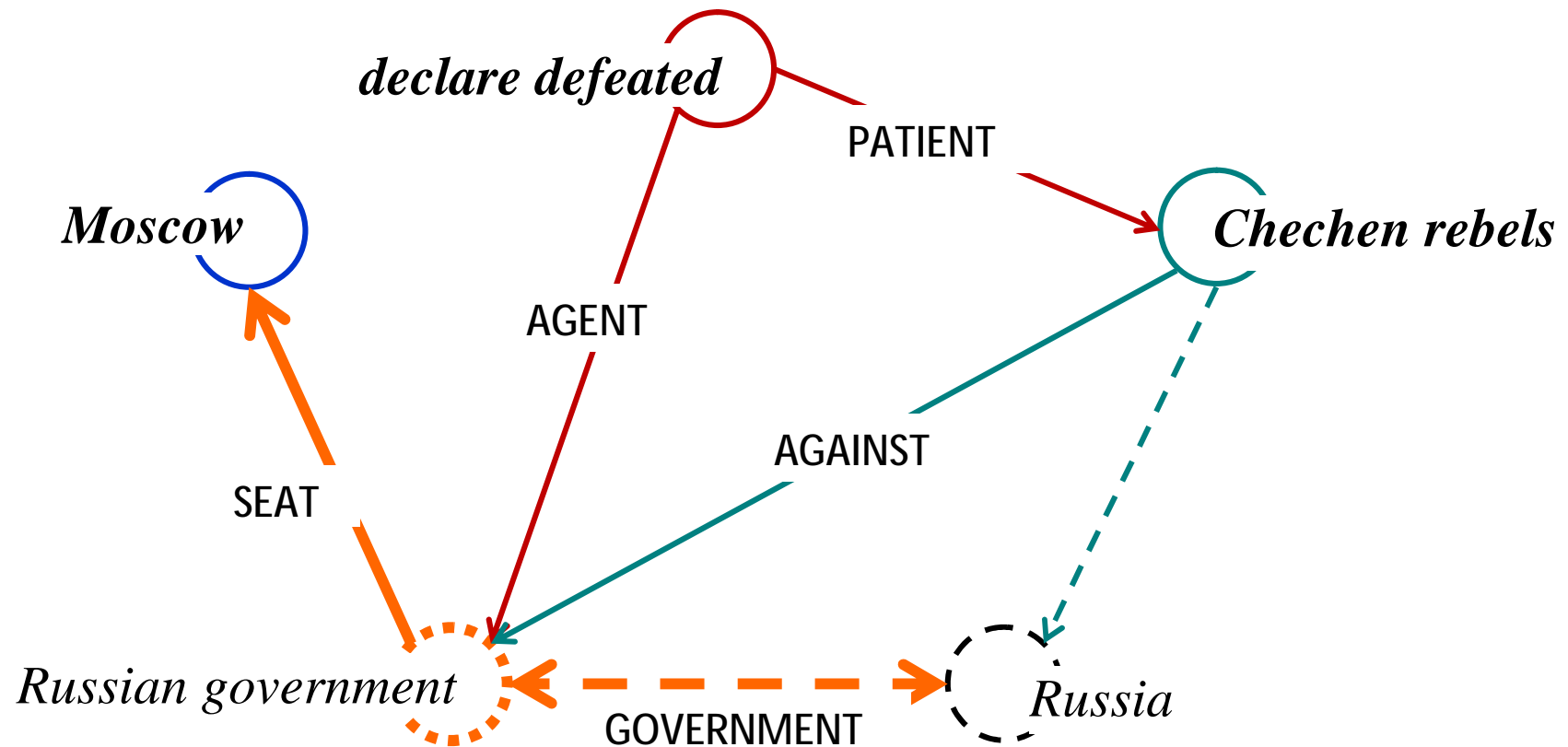
Link the Russian government to Moscow.

Figure 3: Network of frames involved in *Moscow declared the Chechen rebels defeated*

Link Moscow to the Russian government

Figure 3: Network of frames involved in *Moscow declared the Chechen rebels defeated*
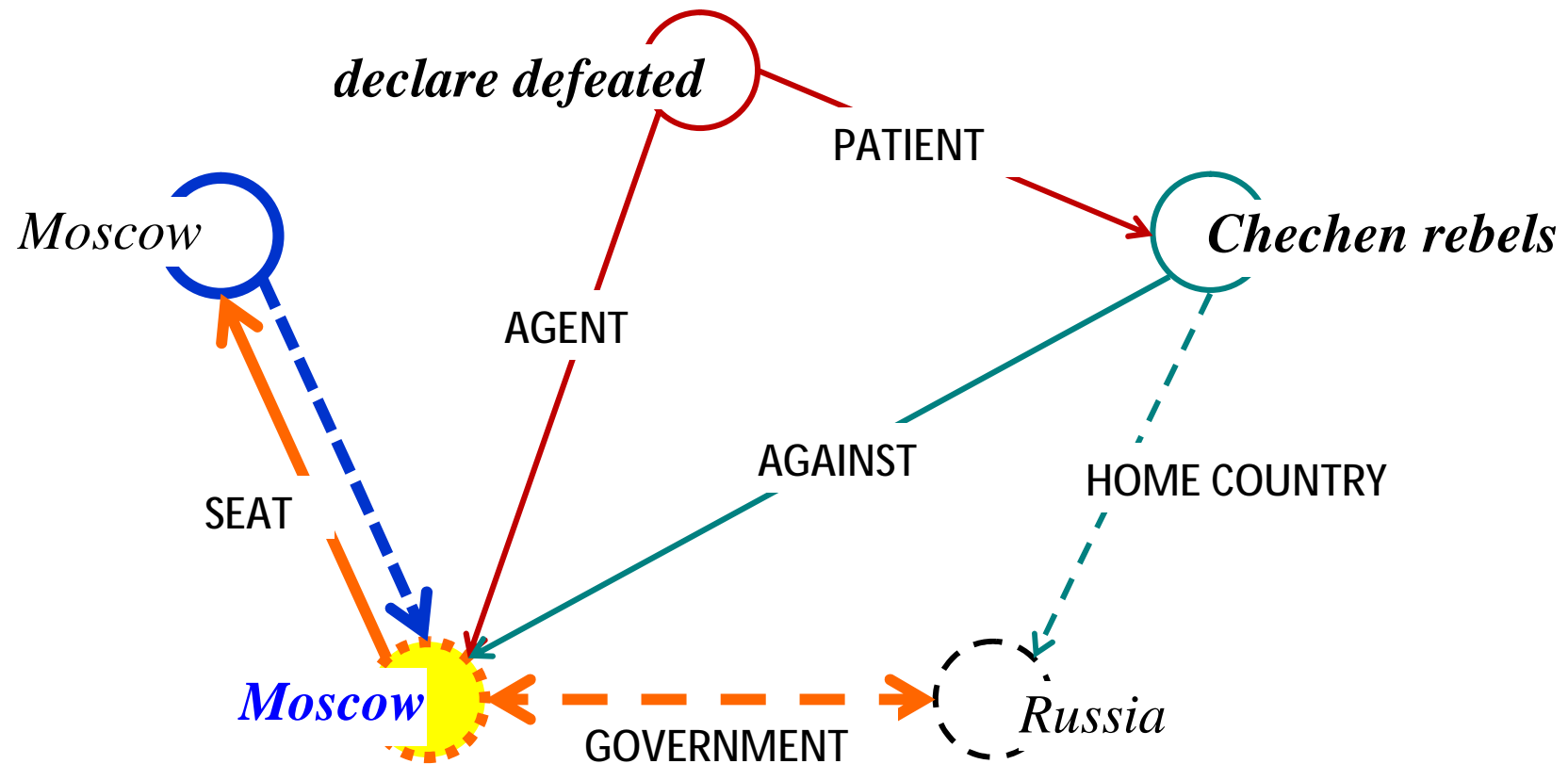
Perform metonymic shift: 'Moscow' → Russian government

The ham sandwich is waiting for his check.

The sentence invokes a restaurant scenario, triggered by the mention of a ham sandwich and the predication *is waiting for his check* which selects for somebody who ordered something, a customer. The customer being specified by *the ham sandwich* must be retrievable on the basis of this specification. Crucially, frames for an order in a restaurant are such that one and the same item can only be ordered by one customer or customer party. Therefore, there is a 1-1 relation between ordered items and customers (or customer parties). This is what enables the metonymy.

There are five frames involved: wait-for, check, ham sandwich, order and customer; the latter two are inferred from world knowledge.
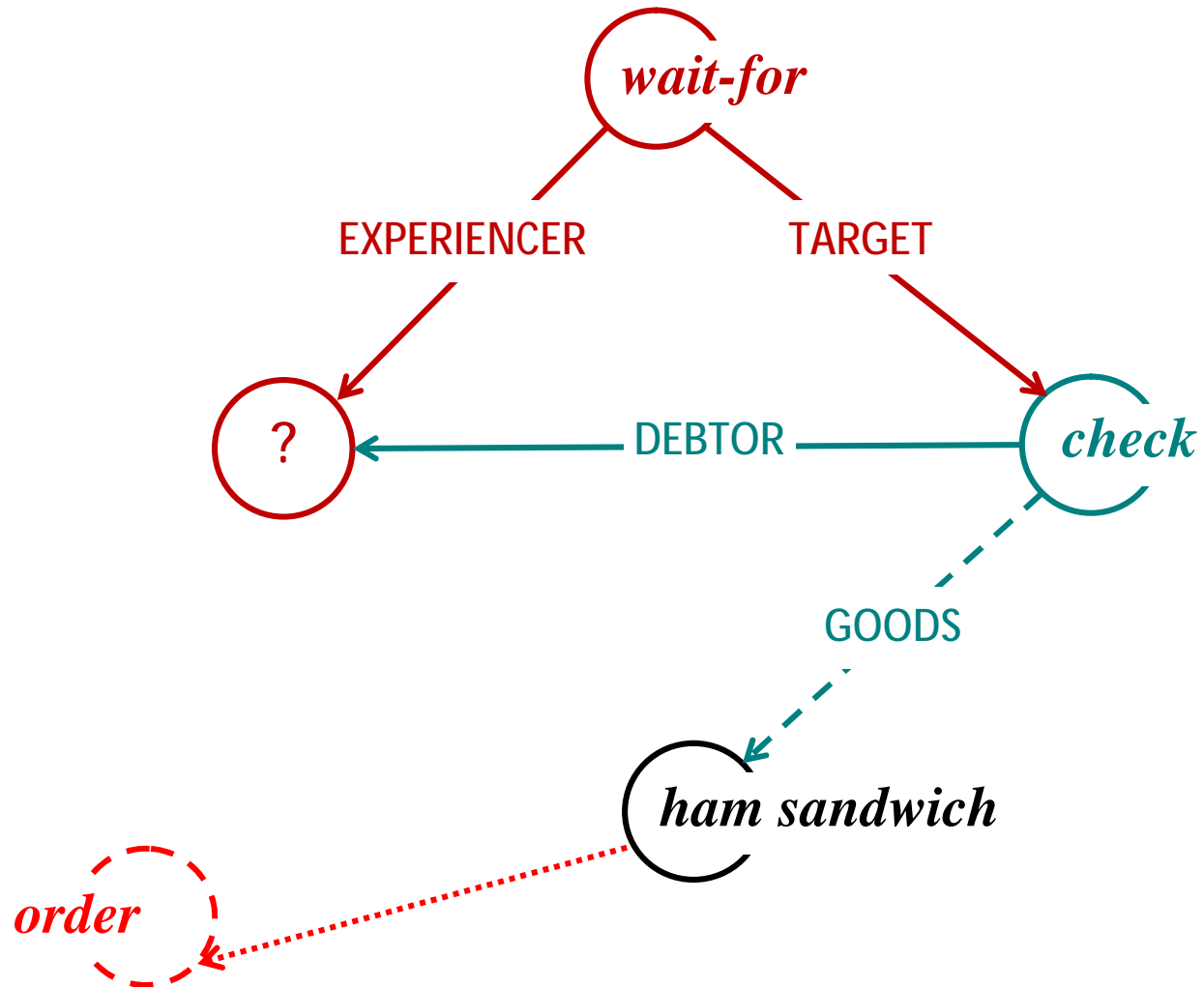
Figure 4: "The ham sandwich"
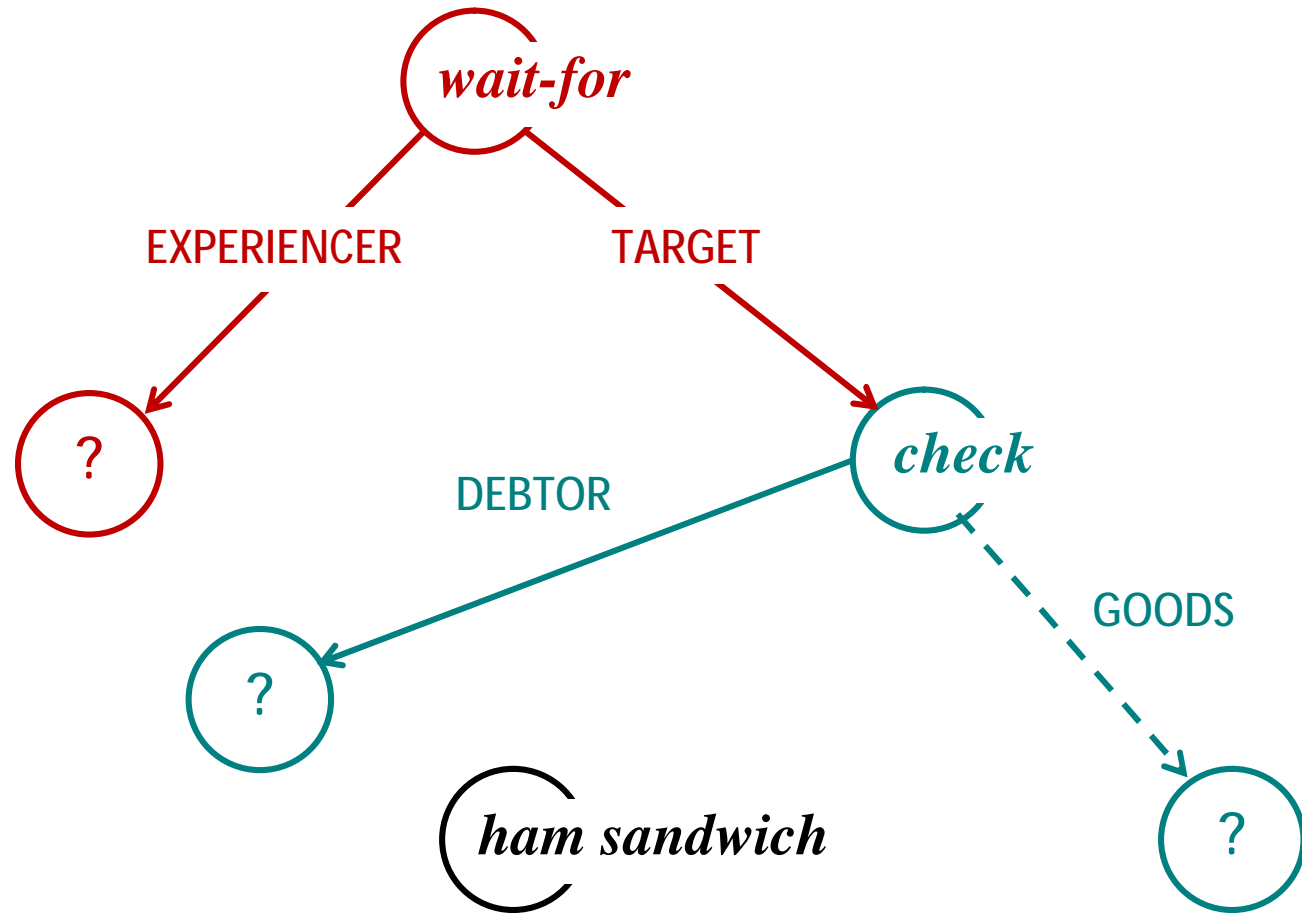
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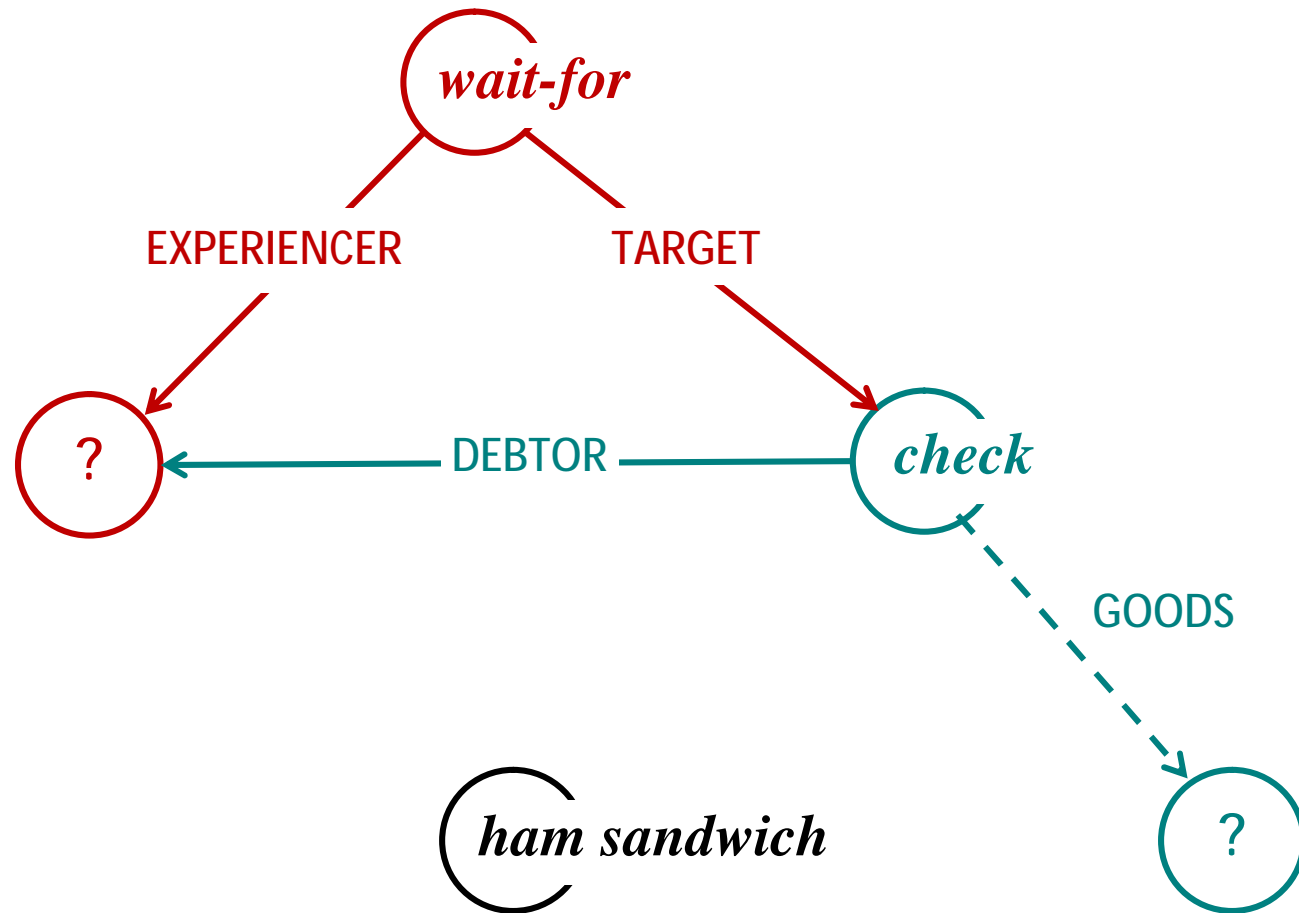
Unify debtor of check with experiencer of waiting

Figure 4: "The ham sandwich"

wait-for

EXPERIENCER   TARGET

? ←——— DEBTOR ———— *check*
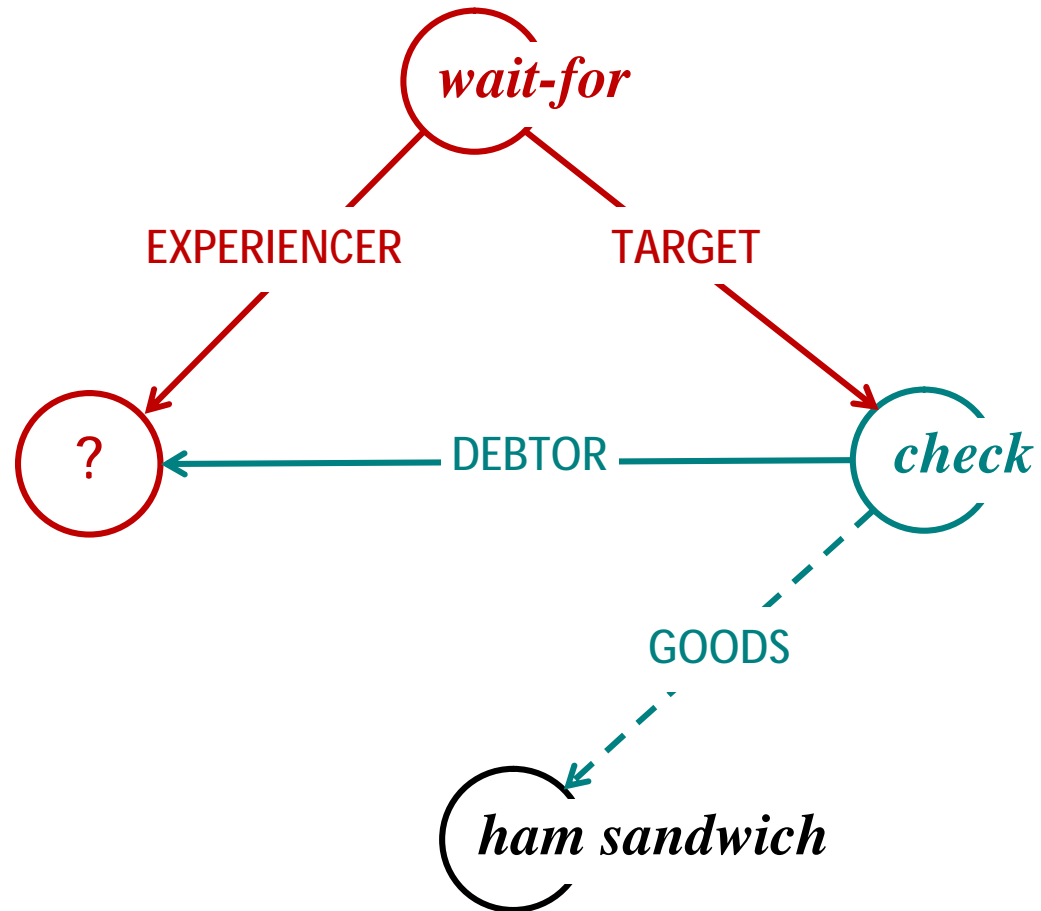
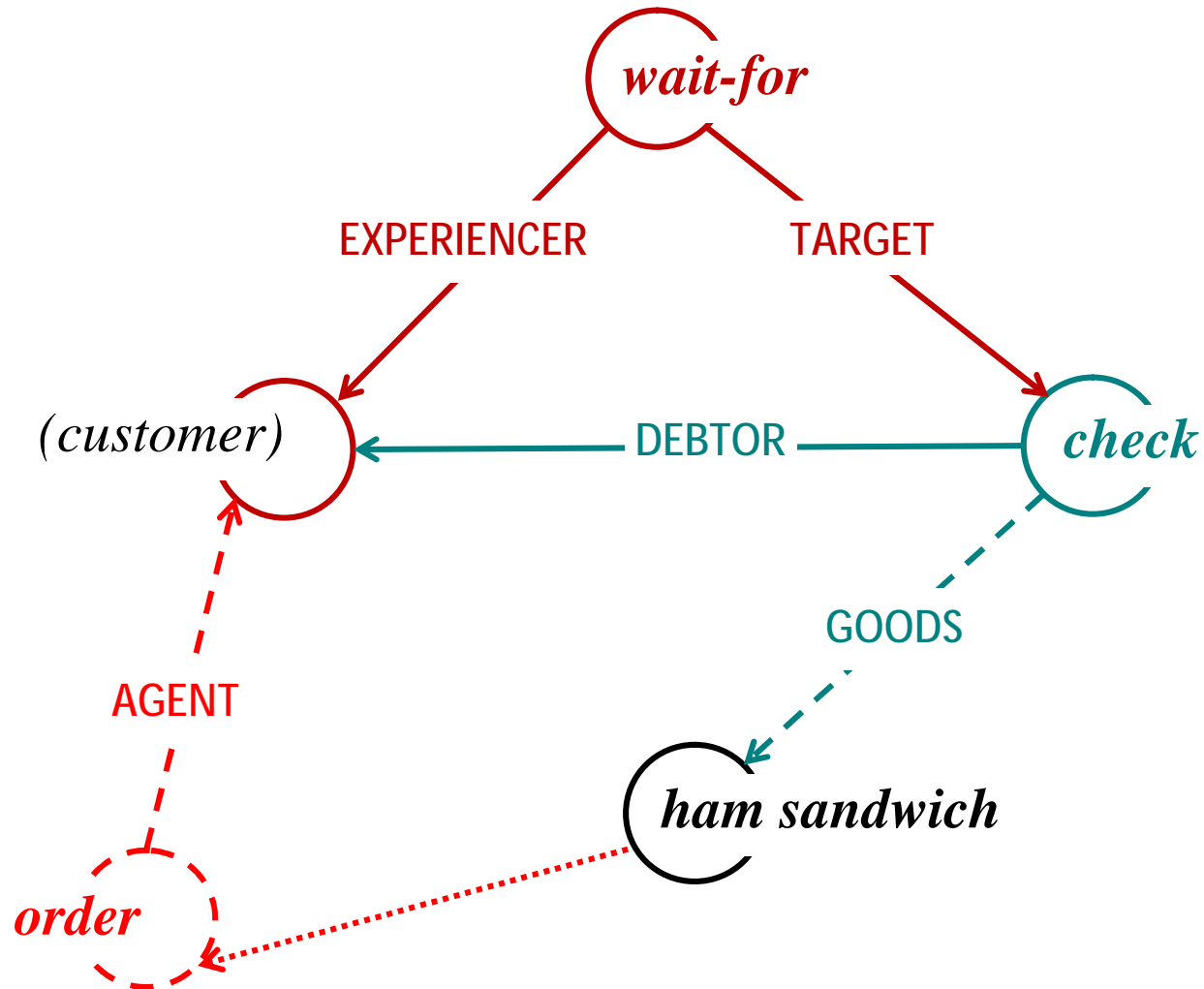GOODS

ham sandwich

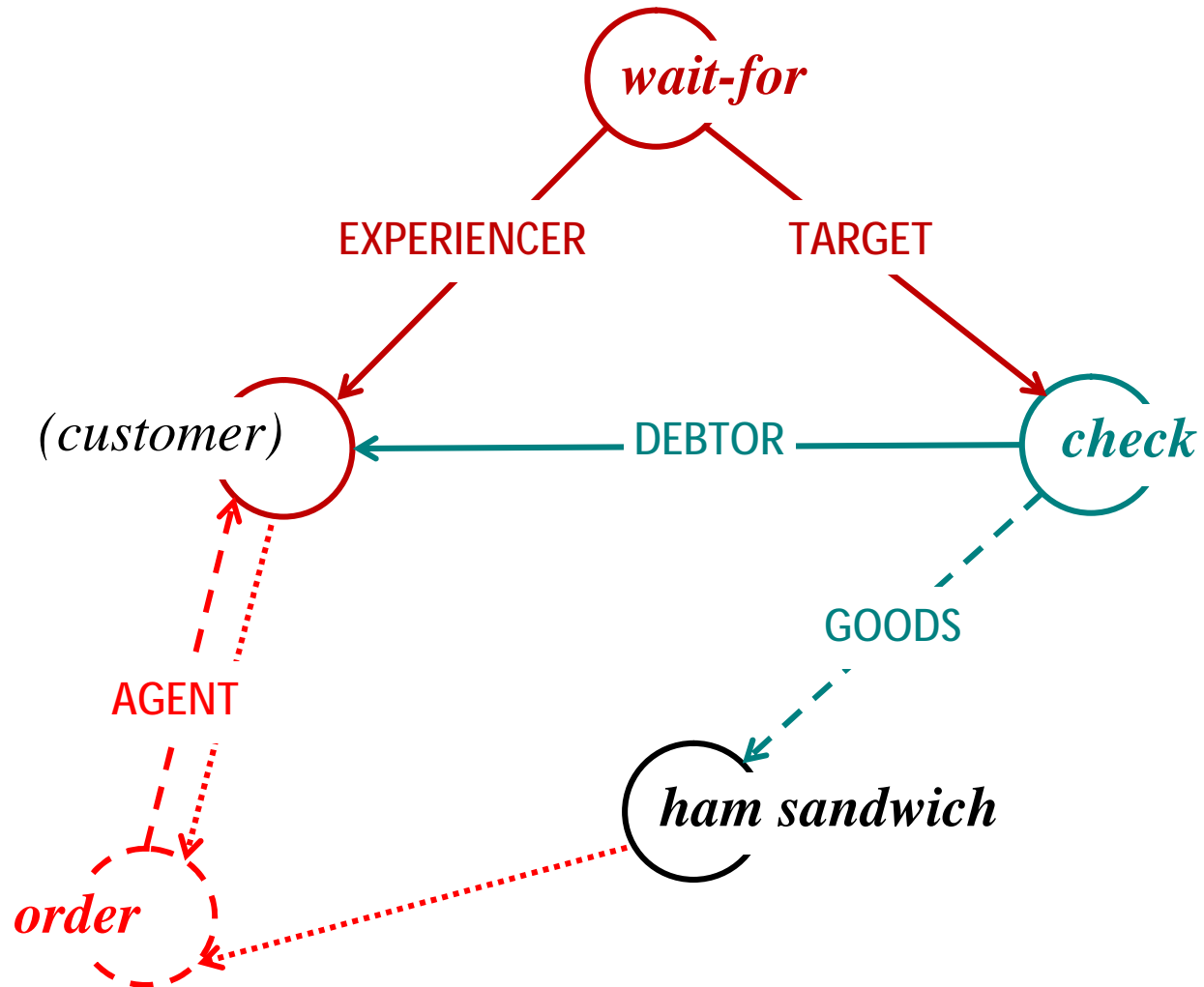**Unify the ham sandwich with the goods the check is for**

Figure 4: "The ham sandwich"

Link the ham sandwich to the event of ordering it
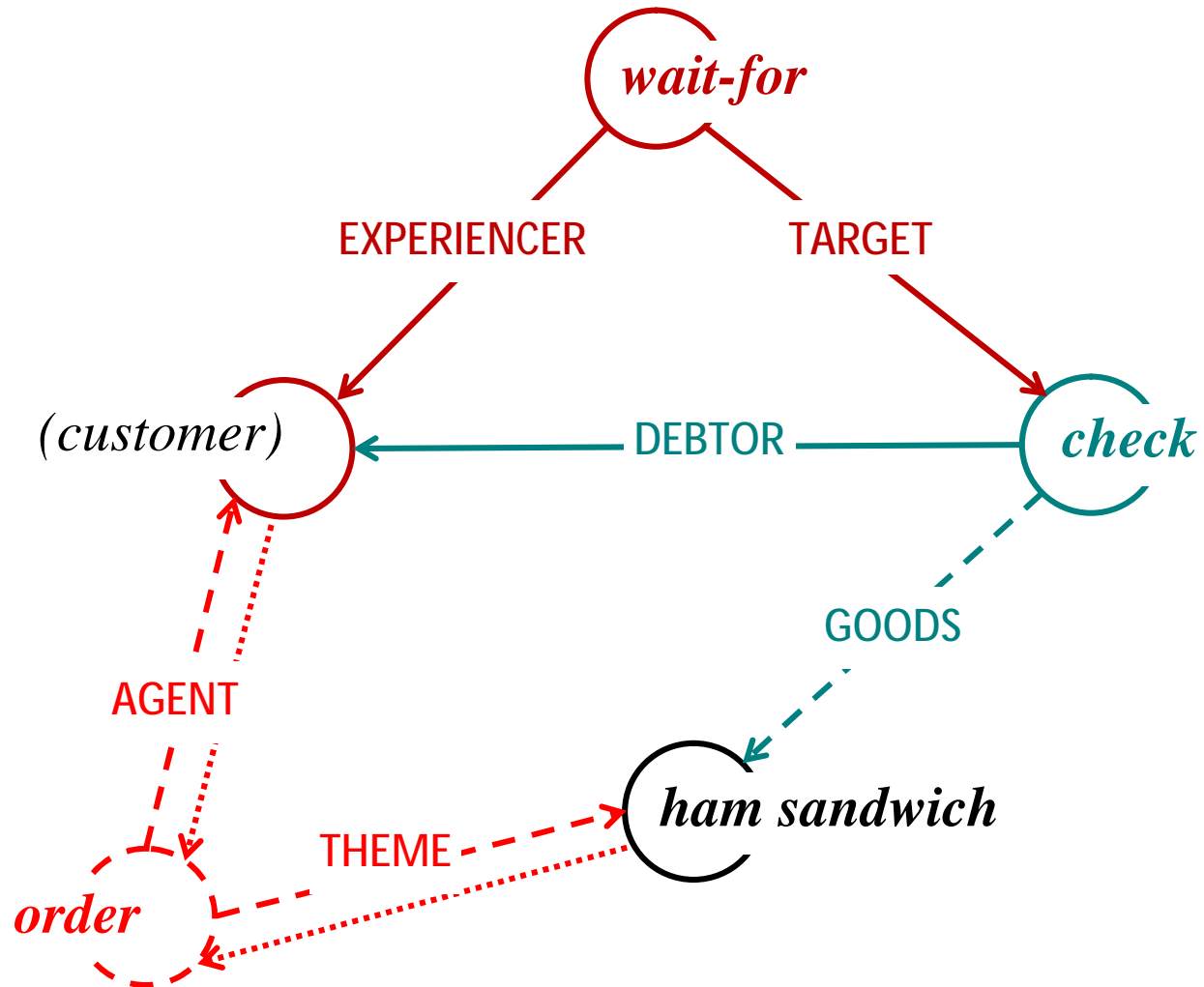
Figure 4: "The ham sandwich"

Link the ordering of the ham sandwich to the debtor as the orderer (= customer)
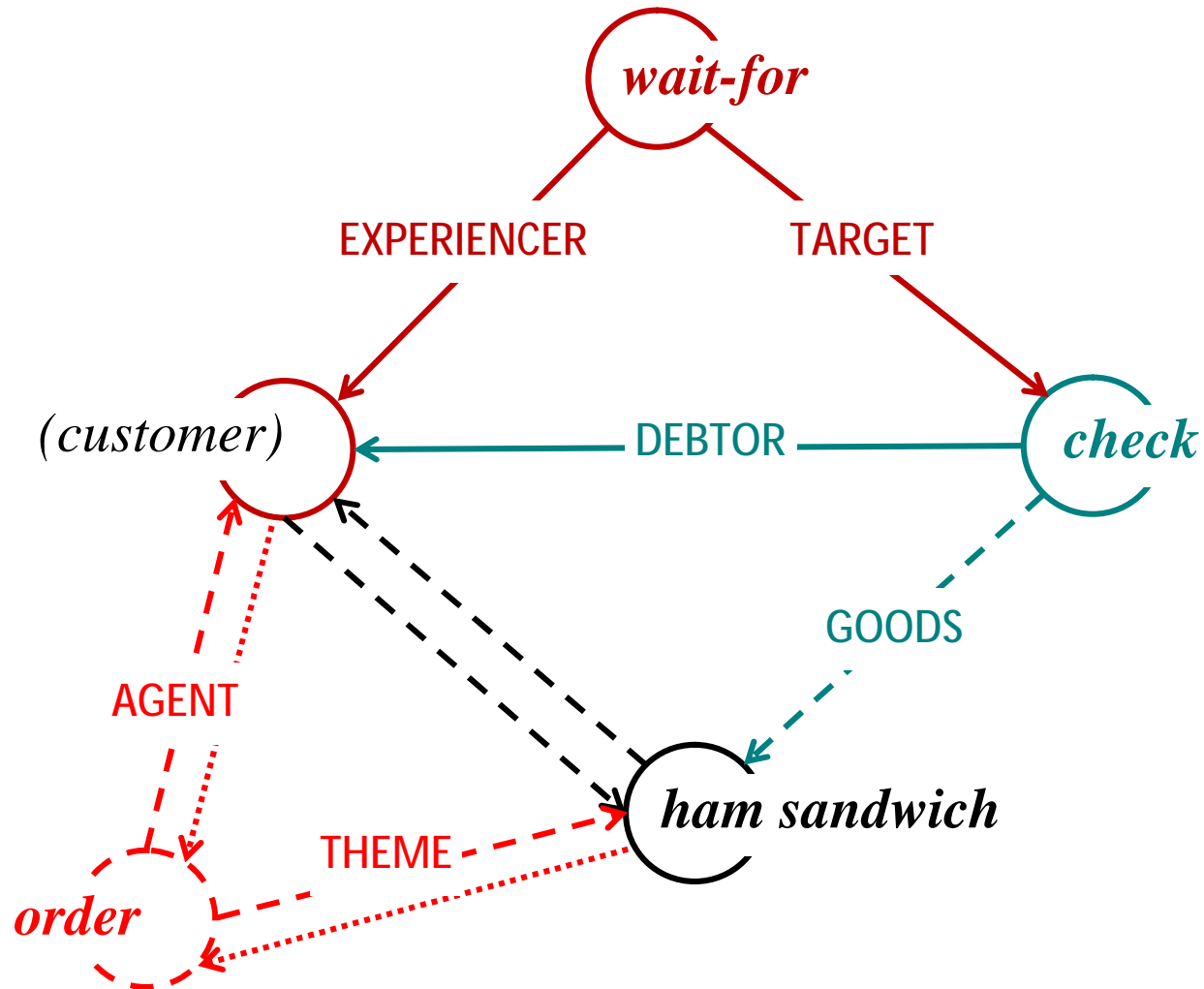
Figure 4: "The ham sandwich"

Link the customer to the ordering
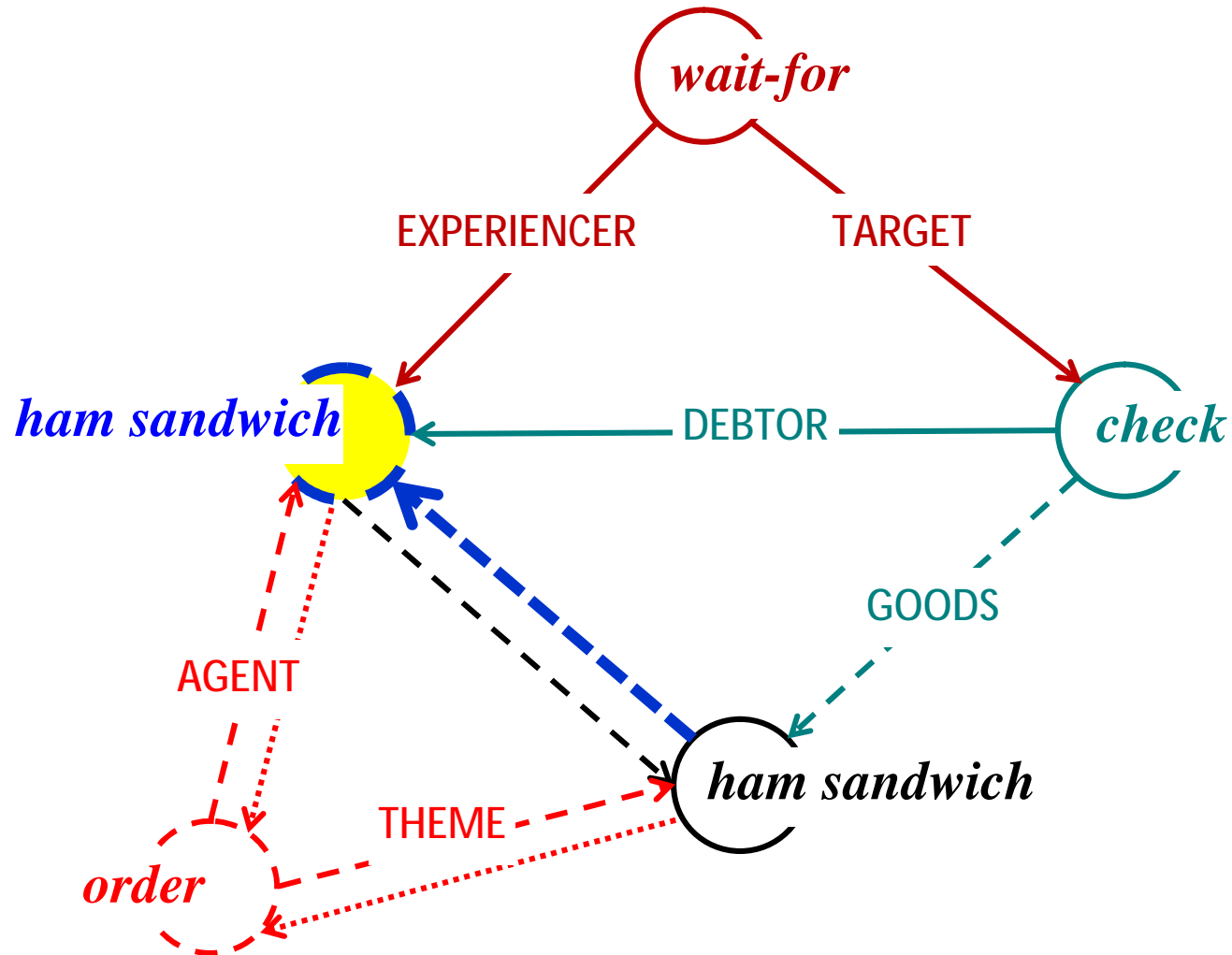
Figure 4: "The ham sandwich"

Link the ordering to the ham sandwich
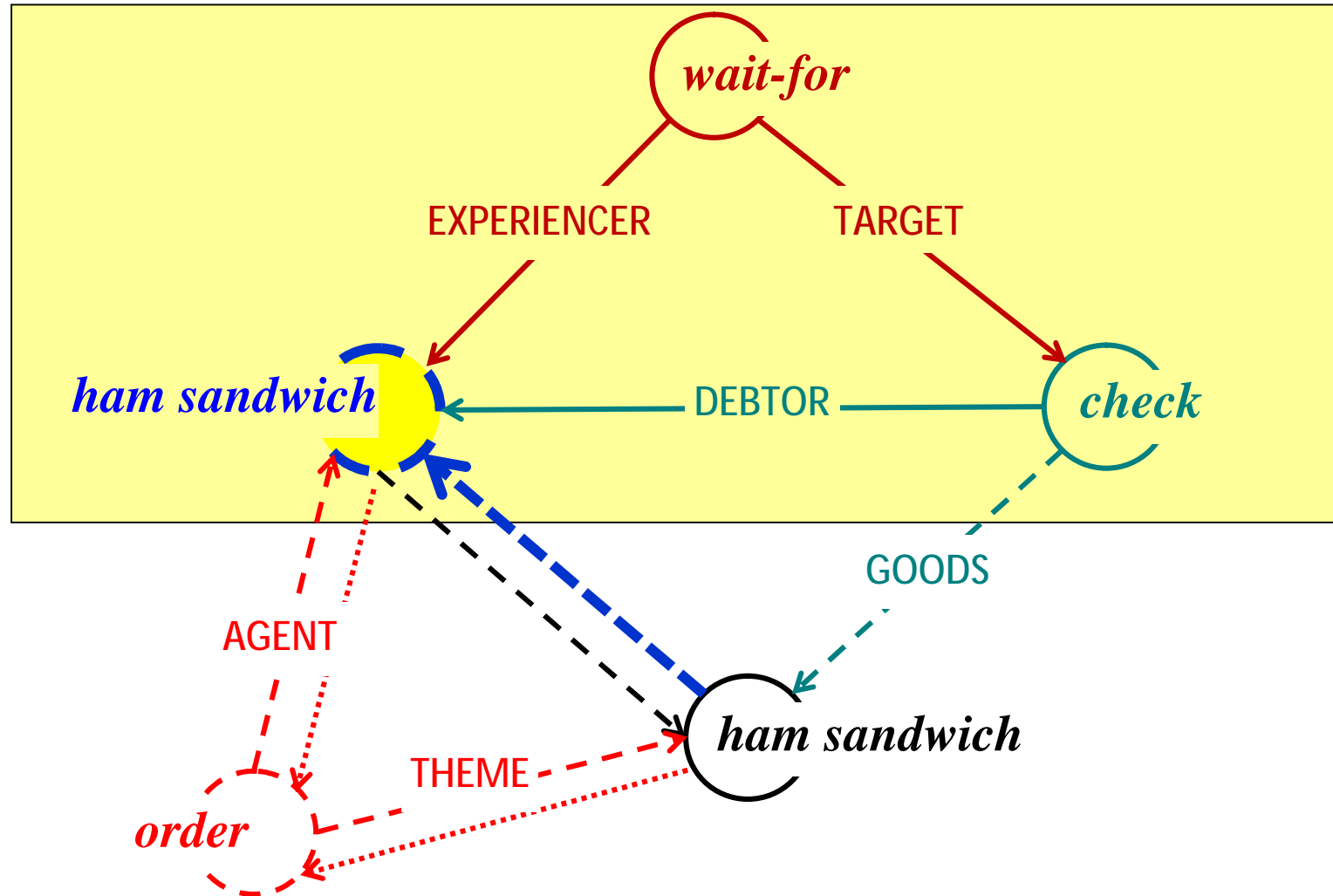
Figure 4: "The ham sandwich"

This amounts to a bidirectional link between customer and ham sandwich

Figure 4: "The ham sandwich"

Perform the metonymic shift: 'ham sandwich' → customer who ordered it

Figure 4: "The ham sandwich"

The core predication

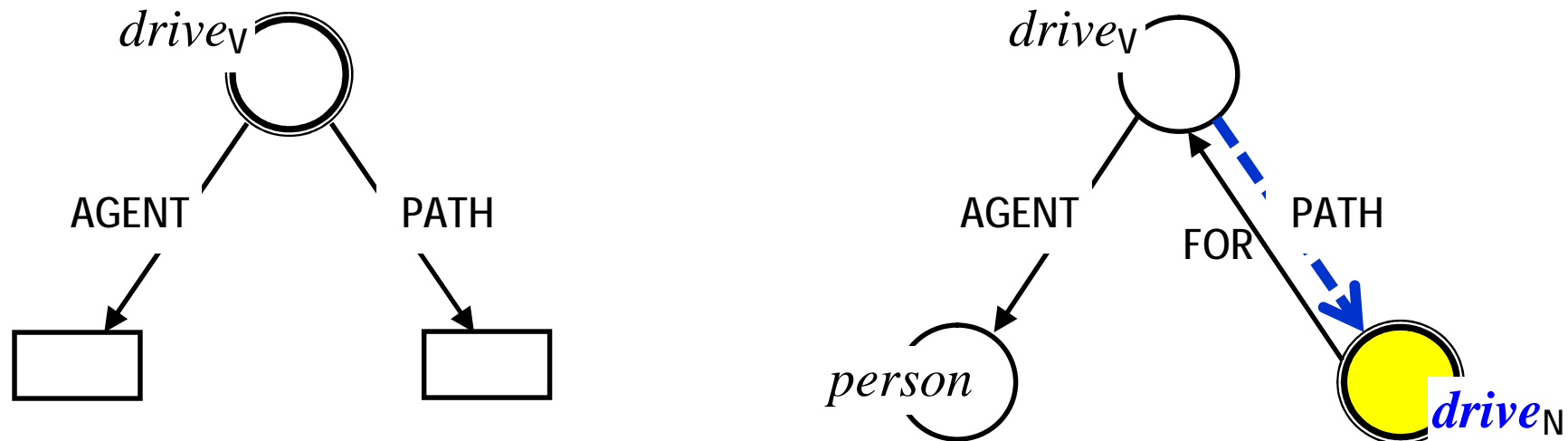# 4. Metonymical shifts in word-formation processes
4.1 Conversion and deverbal nouns

Notational convention: open-argument nodes are represented by rectangles.

(3)   V > N $drive_1 : V, \quad drive_{2,\,PATH} : N$

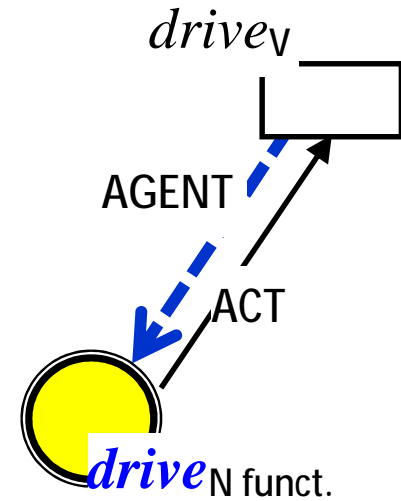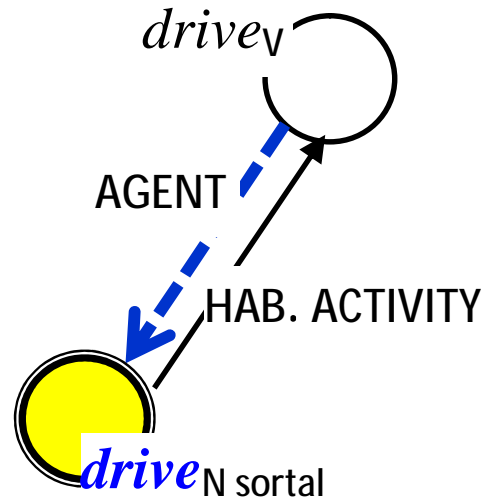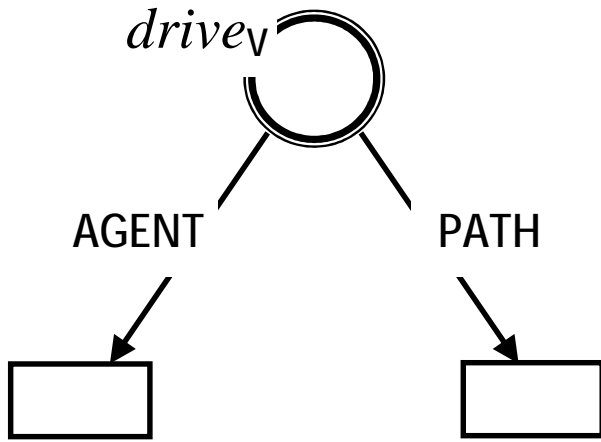Figure 4: Frames for $drive_V$ and $drive_N$

to drive   *a driver*   *the driver*
                              sortal   functional

Figure 4: Frames for *drive*_V and *drive*_N

4.2 Certain types of compounds

Bidirectional affordance links

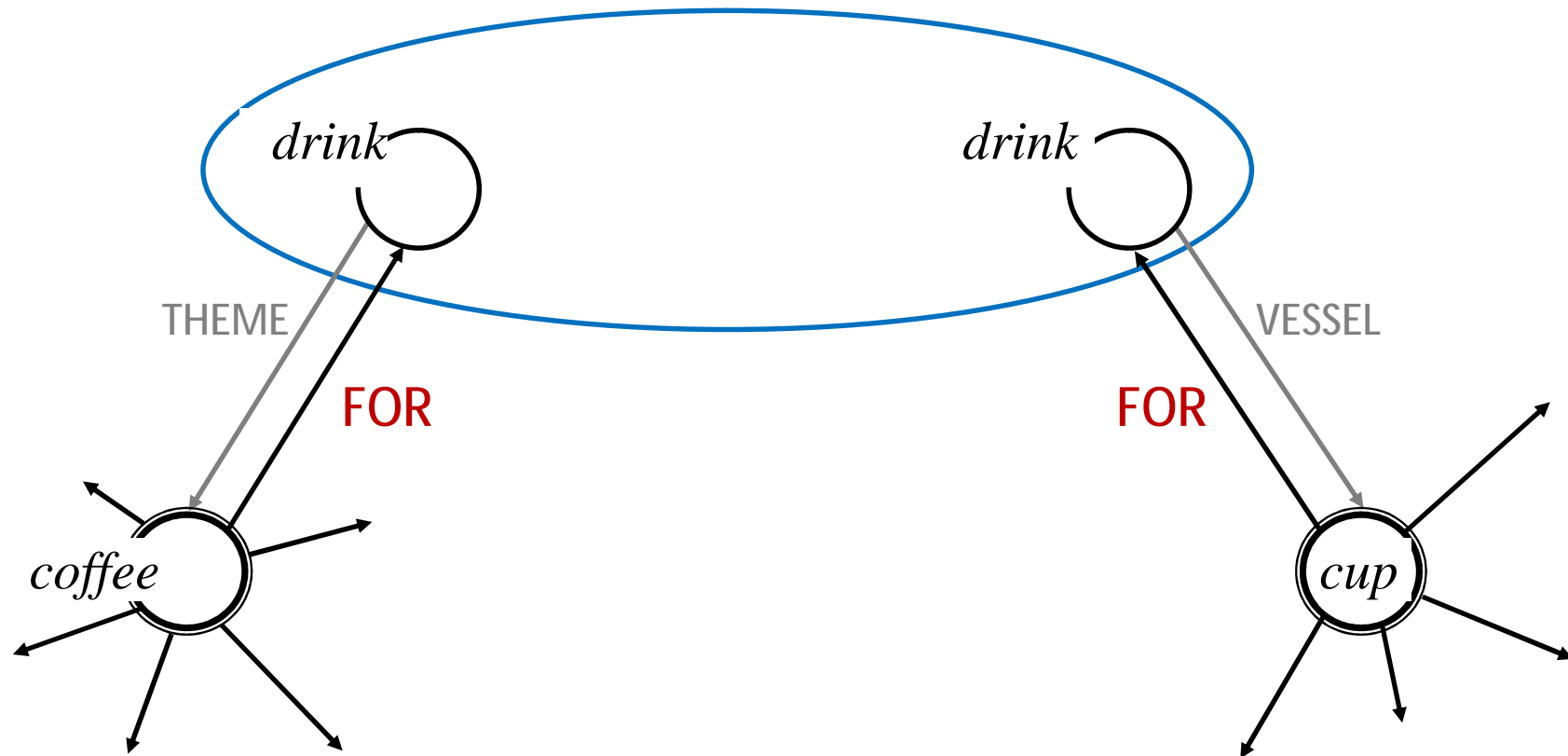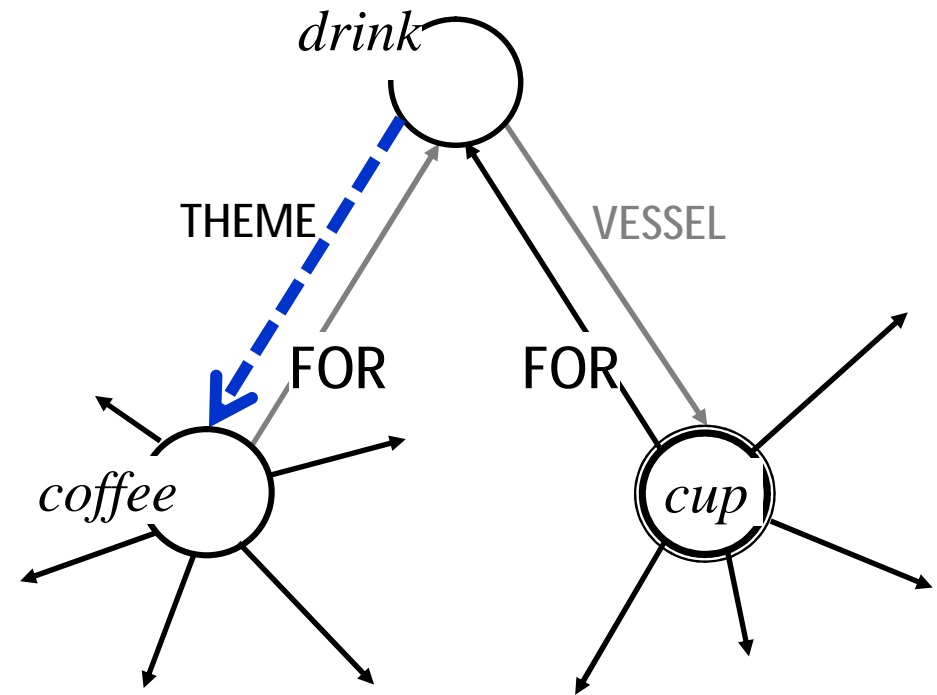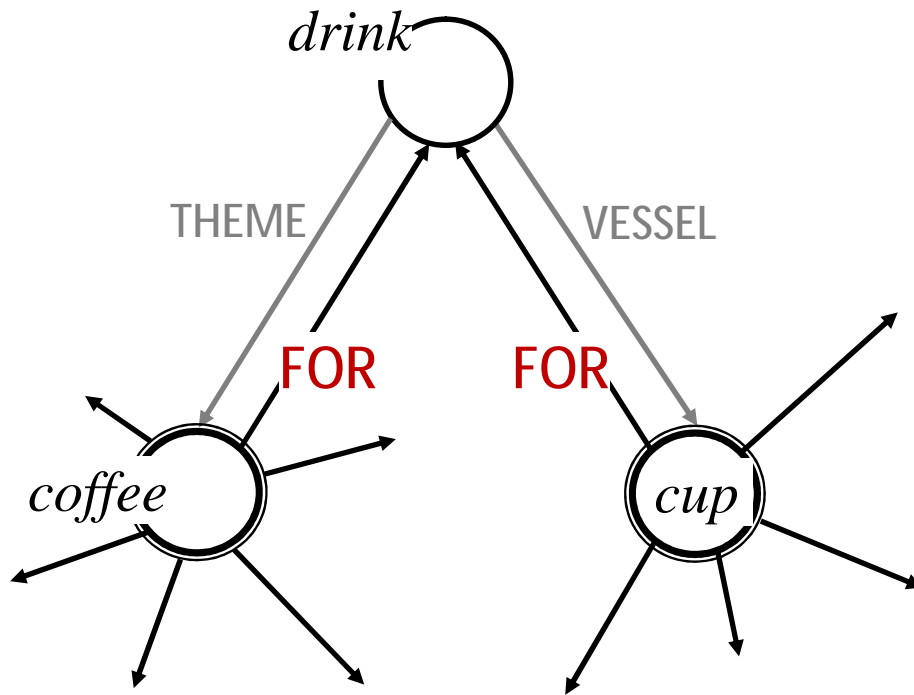Figure 5: Frames for 'coffee' and 'cup' representing drinking affordance

Figure 6: Bare unification

… and adjustment
(1) deranking of *coffee* node
(2) redirecting link to *coffee* node

5. Conclusions

- There are many semantic phenomena that involve *shifting the referent node* in a given frame.

- There are structural constraints on frame for certain types of concepts; in particular, with frames for sortal concepts the referent node is a *source*.

- Shifting the referent node as to yield a concept of a certain type is restricted by the structural constraints for that type of concept.

- In particular, if the result of the shift is to yield a sortal concept, the new referent must be able to be construed as the source node of a sortal frame.

- In this case, the shift is only possible if the linking relation is bidirectionally unique (i.e. an bijective function).

- Metonymy can be understood as the semantic result of shifting the referent node to the value of an attribute of the original referent.

- If the resulting concept is to be a sortal concept, the attribute involved in the link has to be a bijective.

- This constraint is fulfilled for the classical cases of metonymical relations, and it predicts which relations lend themselves to metonymical shifts.

- The constraint yields a more precise definition of metonymy.

- From a semantic point of view, metonymy extends to certain types of word formation, such as conversion, derivation, and certain types of compounding.

Acknowledgements

References

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