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# Notes on the Constraints Data Structure - 20171103

* A **Constraint** is a relation between Entity1 and Entity2 whose purpose is to provided added evidence for the semantic interpretation of Entity1.
* A **Constraint** is represented as an Entity. They are registered only as a record in the **Entity** table (with type = CN). There is no specific table for constraints. The **idEntity** is used in the **EntityRelation** table to establish the relation between the *constrained entity* and the *constrainedBy entity*. In **EntityRelation**:
  + idEntity1: idEntity of Constraint (*idConstraint*)
  + idEntity2: idEntity of constrained entity (*idConstrained*)
  + idEntity3: idEntity of constraining entity (*idConstrainedBy*)
* It is possible for a constraint to be (recursively)constrained. The chain of constraints is called *Constraint Set*. In this case, in the **EntityRelation** tablewe have:
  + idEntity1: idEntity of Constraint (*idConstraint*)
  + idEntity2: idEntity of constrained Constraint (*idConstrained*)
  + idEntity3: idEntity of constraining constraint (*idConstrainedBy*)
* There are eight types of constraints:

|  |  |  |
| --- | --- | --- |
| RelationType | Name | Semantic |
| rel\_constraint\_before | Before | A CE precedes another CE in the same Cxn |
| rel\_constraint\_constraint | Constraint | A Construction is constrained by a Constraint |
| rel\_constraint\_cxn | Construction | A CE is constrained by a Cxn |
| rel\_constraint\_element | Element | A Constraint is constrained by a FE/CE |
| rel\_constraint\_frame | Frame | An Entity is mapped to a Frame |
| rel\_constraint\_framefamily | Frame Family | A CE slot is filled by Lexical Units evoking a Frame from a Frame Family (the inheritance network of a Frame) |
| rel\_constraint\_meets | Meets | A CE precedes immediately another CE in the same Cxn |
| rel\_constraint\_semtype | SemanticType | An Entity is mapped to a Semantic (Ontological) Type |

* Currently, the following possibilities are programmed on the system:

|  |  |  |
| --- | --- | --- |
| Entity2 | Relation | Entity3 |
| FrameElement | rel\_constraint\_frame | Frame |
| FrameElement | rel\_constraint\_semtype | SemanticType |
| Construction | rel\_constraint\_constraint | Constraint1 |
| ConstructionElement | rel\_constraint\_before | ConstructionElement |
| ConstructionElement | rel\_constraint\_meets | ConstructionElement |
| ConstructionElement | rel\_constraint\_frame | Frame |
| ConstructionElement | rel\_constraint\_framefamily | Frame |
| ConstructionElement | rel\_constraint\_cxn | Construction |
| Constraint | rel\_constraint\_element | ConstructionElement |
| Constraint | rel\_constraint\_cxn | Construction |
| Constraint | rel\_constraint\_framefamily | Frame |

1. This constraint is either a CE<Qualia>CE relation or a CE<evokes>Frame relation

* Example (the number inside brackets corresponds to idEntity):

cxn: VPComp [cxn: 1000]

ce:Verb [ce: 1001]

ce:Complement [ce: 1002]

cxn:NP [cxn: 2000, cnt: 4010]

ele:N [ce: 2001, cnt:4011]

cxn:NP [cxn: 2000]

ce:N [ce: 2001]

cxn:SplitArgument [cxn:3000]

ce:Subject [ce: 3001]

cxn:NP [cxn: 2000, cnt: 4000]

ele:N [ce: 2001, cnt: 4013]

bef:Predicate [ce: 3002, cnt: 4001]

ce:Predicate [ce: 3002]

cxn:VPComp [cxn: 1000, cnt: 4002]

ele:Verb [ce: 1001, cnt: 4003]

ele:Complement [ce: 1002, cnt: 4004]

cxn:NP [cxn: 2000, cnt: 4005]

ele:N [ce: 2001, cnt:4012]

cnt:Constitutive\_qualia [cnt: 4007, cnt:4015]

ele:N [cnt:4013]

ele:N [cnt: 4012]

Here, we have three constructions:

1) NP, with one CE (N)

2) VPComp, with two CEs (Verb and Complement). The CE Complement must be a NP.

3) SplitArgument, with two CEs (Subject and Predicate). CE Subject must be a NP and it must precede CE Predicate. CE Predicate must be a VPComp. This construction has a constraint stating that a qualia\_constitutive relation must hold between the Subject Noun and the Complement Noun of VPComp.

\* It's worth noting that while some constraints are added automatically by the system (e.g. the CEs for a construction used as constraints for a CE - the constraint 'ele' at figure) others must be annotated manually by the user (e.g. the association of a construction to a CE and the constitutive qualia relation between the nouns).

The following will be recorded in the database in the **EntityRelation** table for the constructions above (here only the relations concerning constraints are shown):

|  |  |  |  |
| --- | --- | --- | --- |
| RelationType | IdEntity1 | IdEntity2 | IdEntity3 |
| rel\_constraint\_cxn | 4010 | 1002 | 2000 |
| rel\_constraint\_element | 4011 | 4010 | 2001 |
| rel\_constraint\_cxn | 4000 | 3001 | 2000 |
| rel\_constraint\_cxn | 4002 | 3002 | 1000 |
| rel\_constraint\_element | 4013 | 4000 | 2001 |
| rel\_constraint\_before | 4001 | 3001 | 3002 |
| rel\_constraint\_element | 4003 | 4002 | 1001 |
| rel\_constraint\_element | 4004 | 4002 | 1002 |
| rel\_constraint\_cxn | 4005 | 4004 | 2000 |
| rel\_constraint\_element | 4012 | 4005 | 2001 |
| rel\_constitutive\_qualia | 4015 | 4013 | 4012 |
| rel\_constraint\_constraint | 4007 | 3000 | 4015 |