Roles

Sortal specialization

- ***Type*** specialization (e.g. Living being → Person)
  - New features (especially essential properties) ***affect identity***
  - ICs are added while specializing types
    - Polygon: same edges, same angles
      - Triangle: two edges, one angle
    - Living being: same DNA, etc…?
      - Zebra: same stripes?
- ***Role*** specialization (e.g. Person → Student)
  - New features ***don't affect identity***

Roles are ‘dynamic’ and ‘antirigid’

Basic Idea (Steimann 2000): Roles have temporal/modal relations with their players

- An entity can play different roles simultaneously
  - *In 2003, B. was the Italian Prime Minister, the President of the European Union, the president of the Forza Italia party, the owner of the Mediaset company, an Italian citizen, a defendant at a legal trial.*
- An entity can cease playing a role (*antirigidity*)
  - *In 1960, B. was a piano bar singer, now he is the IPM.*
- An entity can play the same role several times, simultaneously
  - *In 2003, B. had two presidencies / was president twice.*
- A role can be played by different entities, simultaneously or at different times
  - *Today, there are 4319 Italian National Research Council researchers.*
  - *In 2000, the Italian Prime Minister was D., now it is B.*

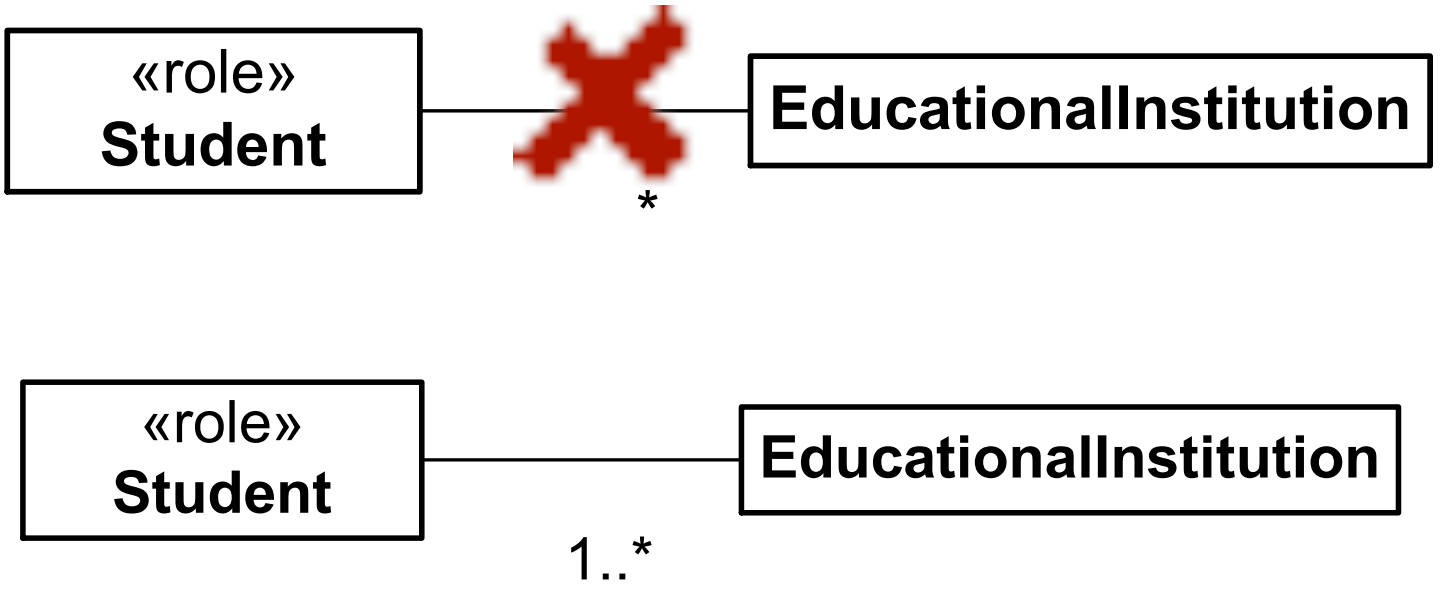
Roles have a relational nature

- Basic Idea (Sowa, Guarino&Welty)
  Roles imply patterns of relationships, i.e., they **depend**—via these patterns—on additional 'external' properties

- Which kind of dependence?

Dependence

- Between particulars
  - ***Existential dependence*** (specific/generic) *(*also *constant dependence)*
    - Hole/host, person/brain, person/heart
  - Internal vs. external dependence
    - Region/boundary....
  - Historical dependence
    - Person/parent
  - Causal dependence
    - Heat/fire
- Between universals
  - ***Definitional dependence***
    - *P* depends on *Q* iff *Q* is involved in the **definition** of *P [Fine 1995]*.
    - *External* definitional dependence [Masolo et al. 2004]: +D/-D

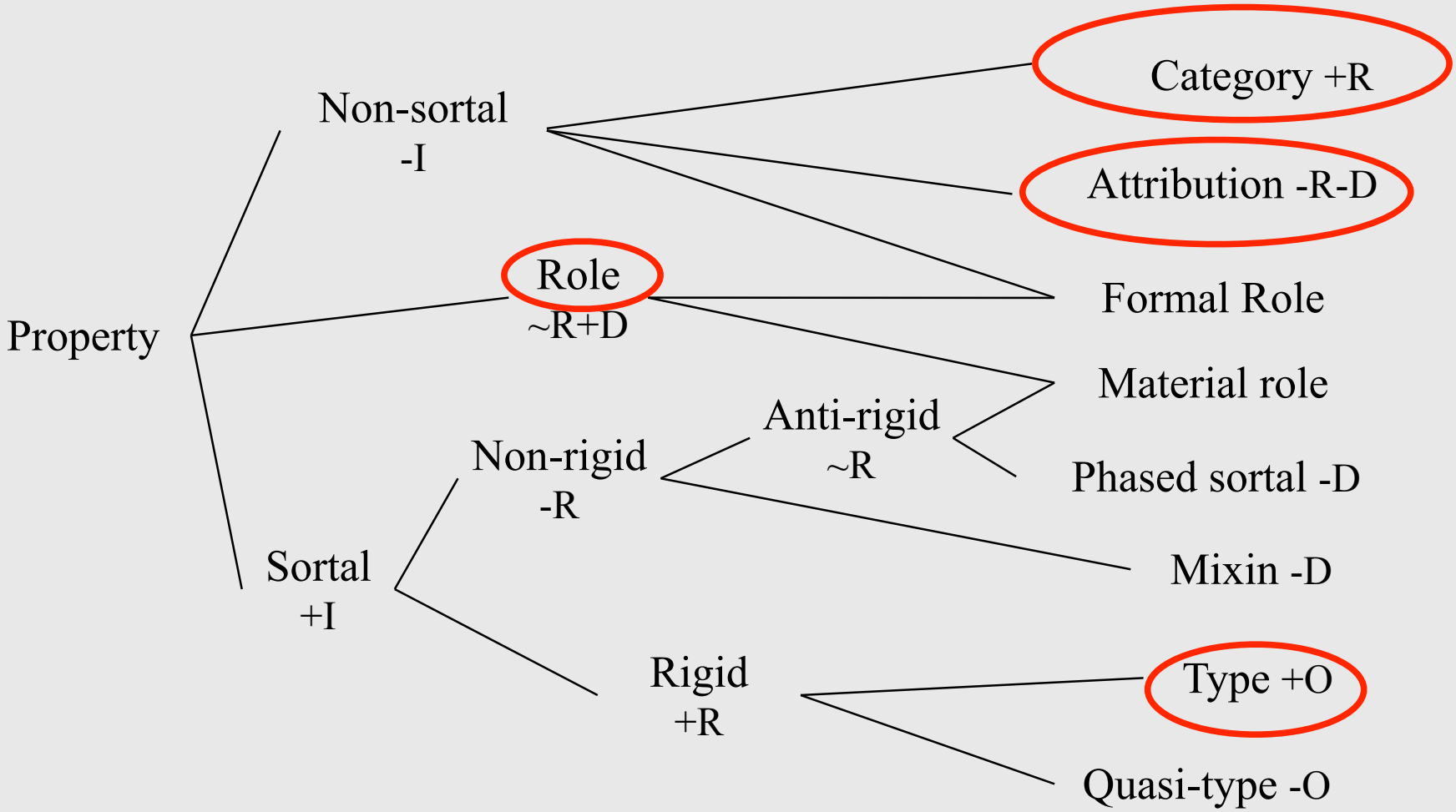

«role»
Student
*
EducationalInstitution
«role»
Student
1..*
EducationalInstitution

The dual nature of roles [Masolo et al 2004]

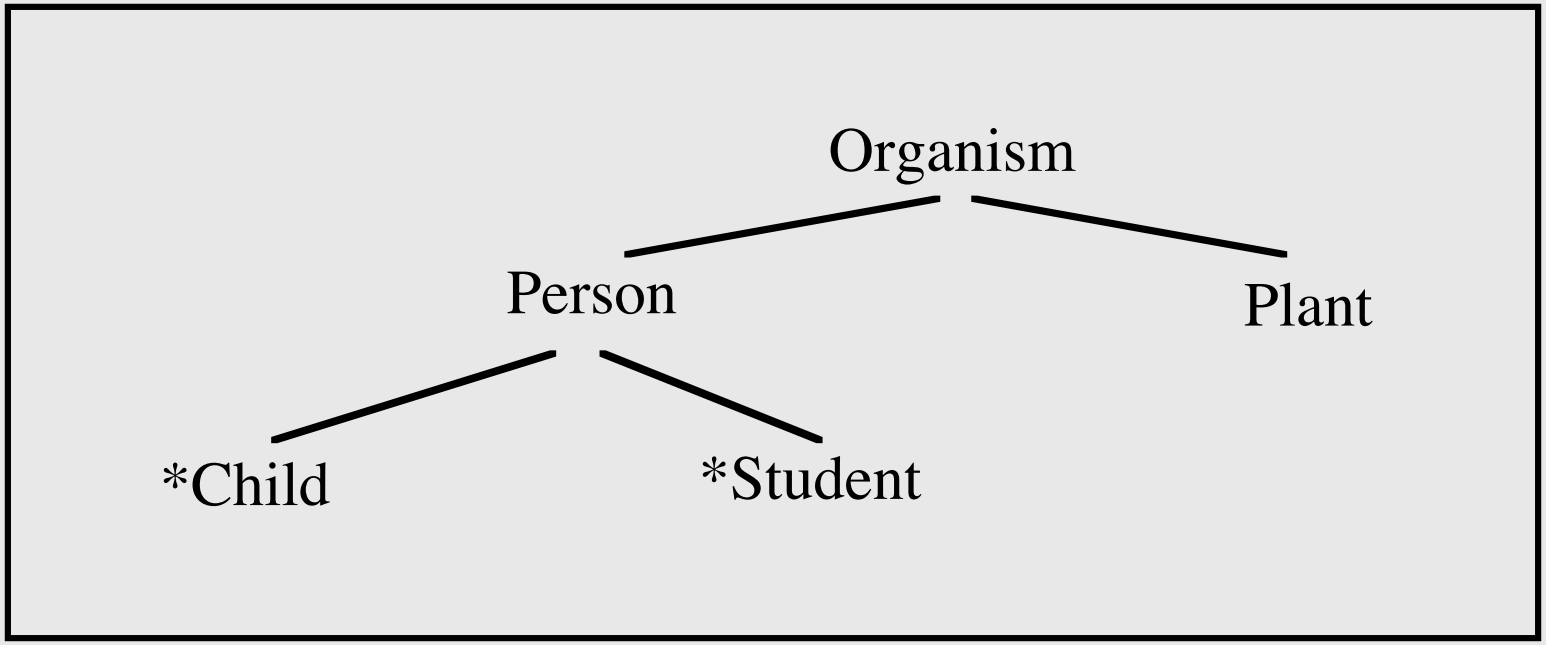
- Basic Idea (Sowa 2000)
  Roles can be 'predicated' of different entities, i.e., different entities can play the same role
- Standard representation
  Roles as properties

- Social (and dynamic) aspects of roles not accounted for
  - Roles are created and disappear; are defined by conventions; are adopted and accepted by communities of agents
- Roles need to be considered **both** as properties (also called *role sortals*) and "first-class citizens" (simply called *roles*, typically focusing on *socially-constructed* roles).

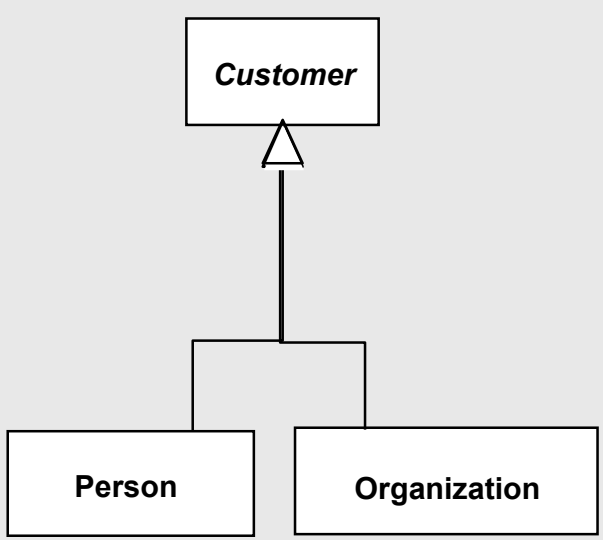
A formal ontology of properties



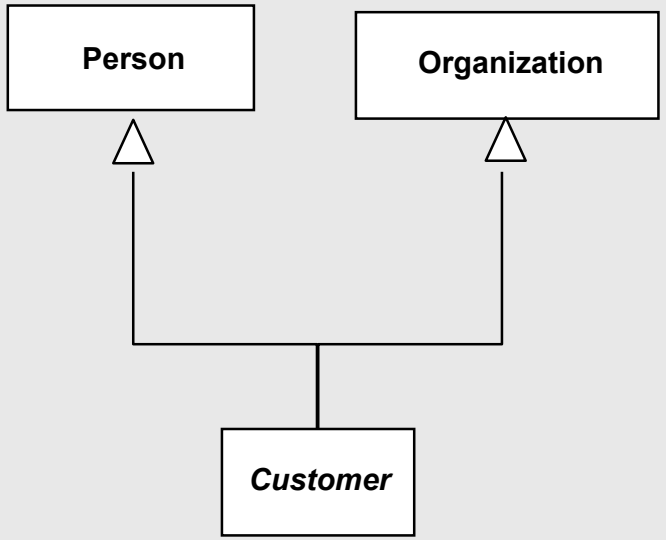
Types, Roles, and disjointness



What's the right model?

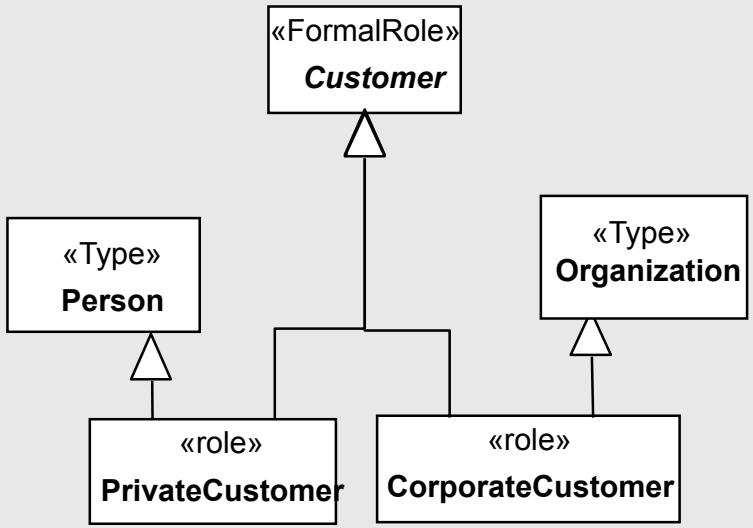
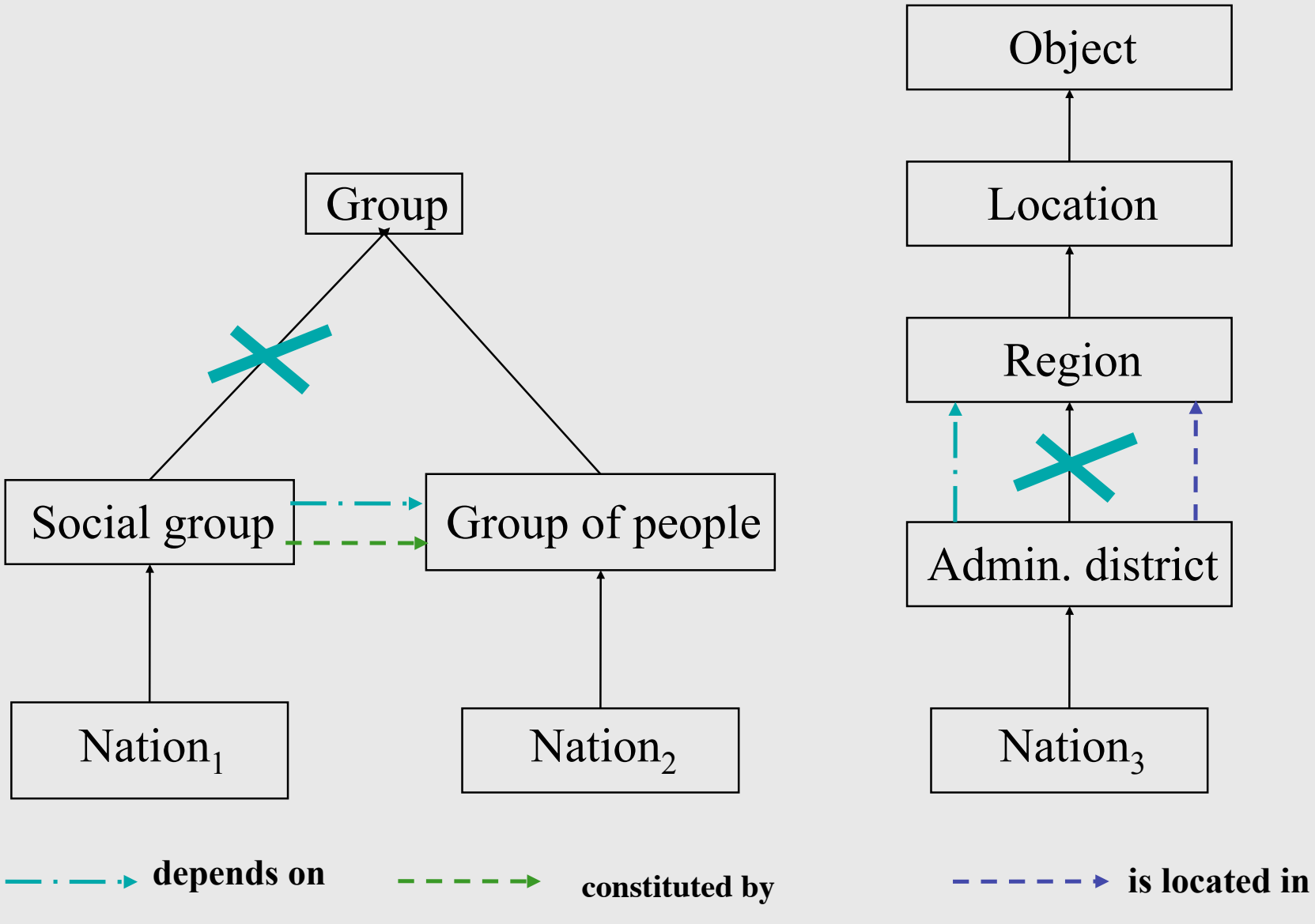


a



b

The solution [Guizzardi 2005]



The case of “Nation”