Of *old couples* and *important committees*: modification and group member accessibility

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Group nouns

- This talk is about group nouns.
- Denote groups of individuals that are in some relationship with each other.

  (1) committee, jury, company, club, audience, family

  (2) a. a deck of cards
      b. a bunch of flowers

- Conceptually, seem to denote both atoms (groups) as well as individuals (members of the group).
- Consider only groups with humans for this talk.

Modification of group nouns

- Like other nouns, group nouns can combine with attributive modifiers.
- Attributive adjectives can predicate of the group itself.

(3) a. a large staff (at a company)
b. an important committee

- Attributive adjectives can also predicate of the members of the group.

(4) a. an old (married) couple
b. a disgruntled army

Modification, group nouns, and accessibility of members

- Focus of this talk: Group nouns differ in how accessible their members are to modifiers.

(5) a. ??The blonde committee is standing in the corner. (members inaccessible)

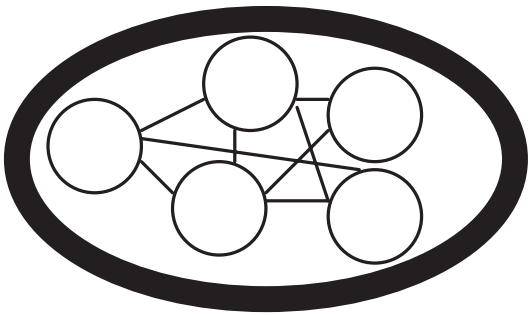
b. The blonde couple is standing in the corner. (members accessible)

(6) an anxious staff/??association

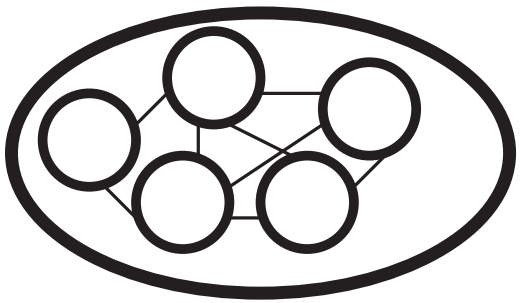
(7) a bilingual family/??orchestra

Conceptual profiling

- Different groups said to conceptually profile their members to different degrees.
- Visualization:



club



audience

Existing accounts

- Most formal accounts of group nouns don't recognize differences in the lexical semantics of groups.
- Existing accounts of group terms in formal semantics have little to say about why the accessibility of members differs between different group nouns.
- Formal accounts also ignore how modification of groups works in general, or how both the group and the members of the group can be accessible to the modifier.
- Modification presents difficult issues in formal semantics in the best of circumstances (e.g., the *red pencil*), and the semantics of groups compounds these problems.

Goals

- Provide an initial semantics for group nouns using Düsseldorf Frame Semantics.
- Convince you that different group terms do profile their members to different degrees.
- Give an explanation for this variation between different groups.

Roadmap

- Data regarding accessibility of members.
- Some background on Düsseldorf Frame Semantics and the ontology for individuals and events I adopt.
- Sketch an analysis of group nouns using frames, treating groups as atomic, and provide an initial explanation for why member accessibility differs between nouns.
- Final thoughts on bridging conceptual semantics and formal semantics.

Joosten et al. (2007)

- Joosten et al. (2007): different group nouns conceptually profile their members to different degrees. (Note: They're working on Dutch!)
- Examine via plural agreement (e.g., English verbal agreement (in some dialects) is semantic) and possessive/personal pronouns.

(8) a. The committee$_{sg}$ $\left\{ \begin{array}{l} \text{is}_{sg} \\ \text{are}_{pl} \end{array} \right\}$ meeting.

b. John and Paul $\left\{ \begin{array}{l} \text{*is} \\ \text{are} \end{array} \right\}$ meeting.

- Examine differences in corpora, finding a scale of plural concord.

Joosten's classes

(9) Type 1: Low member accessibility
ereniging 'association', *maatschappij* 'company', *firma* 'firm', *bond* 'union', *club* 'club', *partij* 'party', *organisatie* 'organisation', *comite* 'committee', *koor* 'choir', *leger* 'army', *regering* 'government', *orkest* 'orchestra', *orde* 'order'

(10) Type 2: Medium member accessibility
team 'team', *bende* 'gang', *familie* 'family', *ploeg* 'team', *staf* 'staff', *redactie* 'editorial staff ', *klas* 'class', *jury* 'jury', *panel* 'panel', *delegatie* 'delegation'

(11) Type 3: High member accessibility
duo 'duo, pair', *echtpaar* 'married couple', *kliek* 'clique', *gezin* 'family, household', *publiek* 'public', *bemanning* 'crew', *tweeling* 'twins', *trio* 'trio, threesome'

Corpus data

- Attempt to recreate Joosten et al.'s findings in English using attributive modifiers.
- Pulled adjective–noun pairs from BNC. Noun list largely based on (but not identical to) Joosten et al..

  (12) couple, public, family, staff, trio, pair, congregation, gang, household, duo, choir, jury, crew, team, class, party, army, panel, orchestra, club, delegation, committee, organization, union, government, firm, company, association, tribe

- Excluded adjectives that were not simple property adjectives.
- Coded for whether adjective applied to the group or to the individuals making up the group. 995 pairs of adjective and noun.

Corpus data

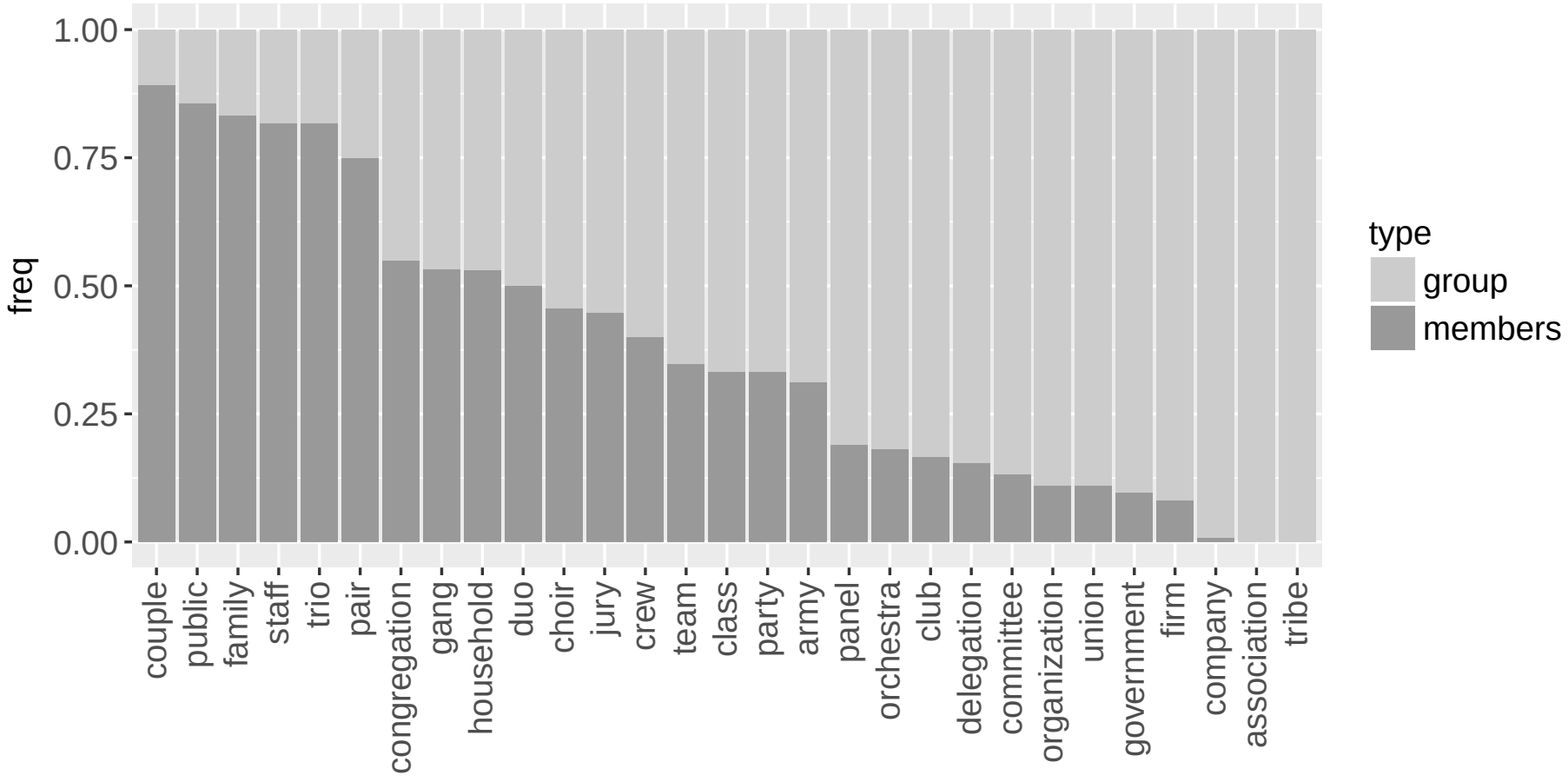


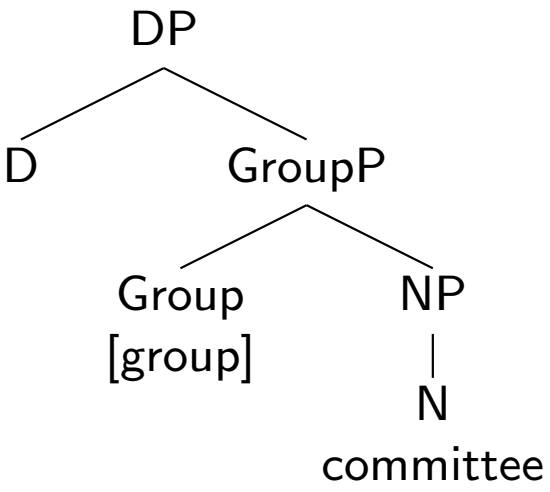
Figure: Frequency (for group nouns) of whether selected attributive adjectives specify attributes of the group or its members

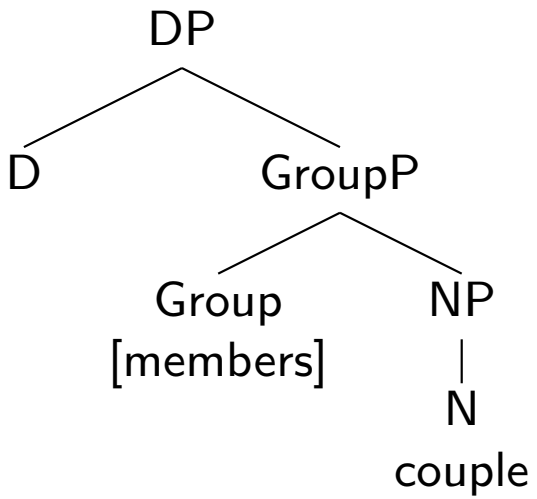
Corpus data

- Corpus data also shows variability in accessibility of members.
- This is in line with Joosten et al.'s findings in Dutch.
- Adjective–noun data not S-shaped! Cline from nouns with a high degree of member accessibility to a low degree of accessibility.
- Accessibility is not a categorial (grammatical) property!

Corpus data

- Grammatical distinctions predict S-shaped distributions.





- Therefore: source of variability comes from other, non-grammatical sources.

- With this in mind, it'll be useful to talk about the ends of this cline by naming them using particular examples; *committee*-type nouns have a low degree of accessibility, while *couple*-type nouns have a high degree of accessibility.

Frame Semantics

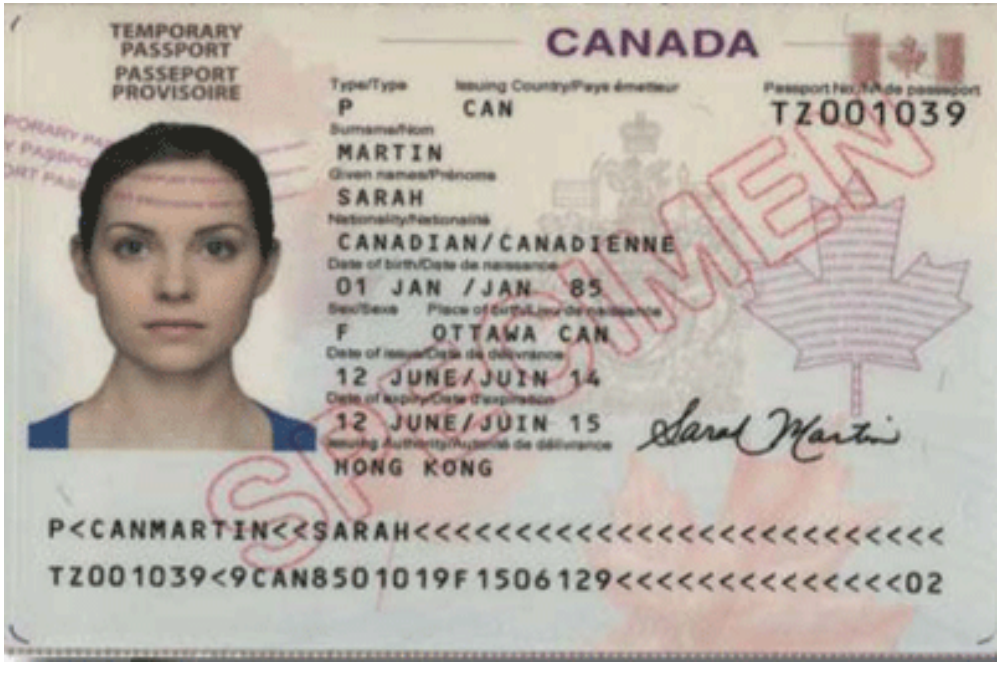
- Assume Düsseldorf Frame Semantics, a theory of meaning representation (Petersen, 2007; Löbner, 2014; Kallmeyer & Osswald, 2014).
  - Argument structure frames are familiar in linguistics from e.g., Fillmore (1968).
  - Düsseldorf frames descended from concept frames in cognitive psychology (Barsalou, 1992).

- These frames represent lexical and world knowledge (and not only argument structure) in the same representation. Decompositional.

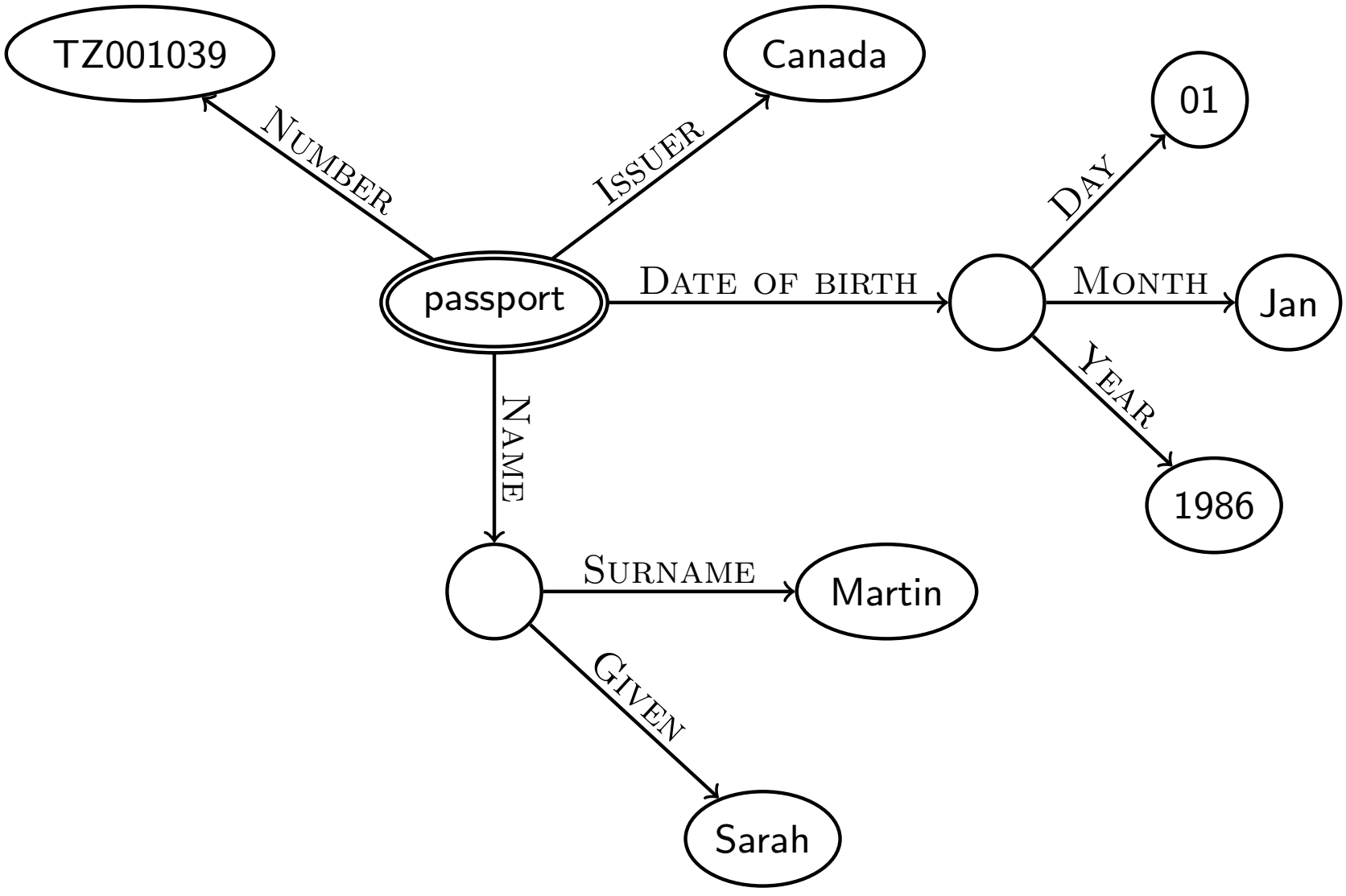
- Structure:
  - A frame is a recursive attribute–value structure. Values can have their own attributes.
  - Attributes and values are unique. An attribute is held by a frame node only once, and each attribute has only one value (for any particular input).
  - Values are typed in a type-feature hierarchy (Carpenter, 1992).

Example

- Non-linguistic example of a frame: a passport
- Attribute–value structure:
  - Set of functional attributes (Surname, Given name, Date of birth, Photograph)
  - Each has exactly one value (*Martin*, *Sarah*, *01 January 1985*)
- Recursive: (some) values themselves are also structured as frames
  - Date of birth: Day, Month, Year
  - Photograph: Subject, Width, Height



Frame Semantics: Frame Diagrams



Frame Semantics: AVMs

$$\begin{bmatrix} \textit{passport} & \\ \textsc{Issuer} & \text{Canada} \\ \textsc{Number} & \text{TZ001039} \\ \textsc{Name} & \begin{bmatrix} \textsc{Surname} & \text{Martin} \\ \textsc{Given} & \text{Sarah} \end{bmatrix} \\ \textsc{Date of birth} & \begin{bmatrix} \textsc{Day} & 01 \\ \textsc{Month} & \text{Jan} \\ \textsc{Year} & 1985 \end{bmatrix} \end{bmatrix}$$

Frame Semantics: FOPL

$$\exists x \left[\begin{array}{ll} \textbf{passport}(x) & \wedge \\ \textsc{Issuer}(x) = \textbf{Canada} & \wedge \\ \textsc{Number}(x) = \text{“TZ001039”} & \wedge \\ \textsc{Surname}(\textsc{Name}(x)) = \text{“Martin”} & \wedge \\ \textsc{Given}(\textsc{Name}(x)) = \text{“Sarah”} & \wedge \\ \textsc{Day}(\textsc{DOB}(x)) = 01 & \wedge \\ \textsc{Month}(\textsc{DOB}(x)) = \text{“Jan”} & \wedge \\ \textsc{Year}(\textsc{DOB}(x)) = 1985 & \end{array} \right]$$

Social ontology

- A social ontology provides for social entities: persons and institutions, roles, offices, functions, actions by social agents (e.g. voters, politicians, police, parents, spouses, teachers, and such).
- Entities in the social ontology are (ultimately) implemented by entities in a physical ontology (e.g., "brute facts," Searle (1995)).
  - Persons are implemented by human animals.
  - Social acts are implemented by doings that (under appropriate circumstances) count as particular social acts (Searle, 1995).
- The social ontology of our world is in itself multi-level.
  - For example, persons are social entities that may take in social roles (a higher level).
  - Committees can organize into committees, judges and representatives and presidents and laws organize into governments, and so on.
  - Ultimately, a social ontology is grounded by and dependent on the physical ontology.

Levels of action

- Ontological distinction between events that are at the social level and the individual level.
- A social office, like 'president of France', is defined at a non-basic, abstract level of social ontology: there is an incumbent of the office, a person.
- Certain types of acts are considered acts by the office and not by a person. Modifiers can diagnose this:

(13) a. (As president/#privately), the president vetoed the bill.
b. (#As president/privately), the president combed their hair.
c. (As president/privately), the president visited Canada.

- Being an abstract institution, the office cannot execute the act. Official acts have to be implemented by the person in office.
- What office-holders do when they implement an official act is **not** the official act because the official act is an act by the office, not by its incumbent.

Social ontology: Anderson & Löbner (2018)

- In Anderson & Löbner 2018, we develop an extension to the Düsseldorf frame ontology.
- Domains of individuals and events partitioned into social and non-social (variously: basic, concrete, personal) individuals and events.
- Articulating the ontology is a strategy in formal semantics:
  - Mass/count: Link (1983)
  - Individual kinds: Carlson (1977); Chierchia (1998)
    Eventuality kinds: Landman & Morzycki (2003) for event kinds, Anderson & Morzycki (2015) for state kinds
  - Roles and capacities: de Swart et al. (2007); Zobel (2017)

Social ontology visualization

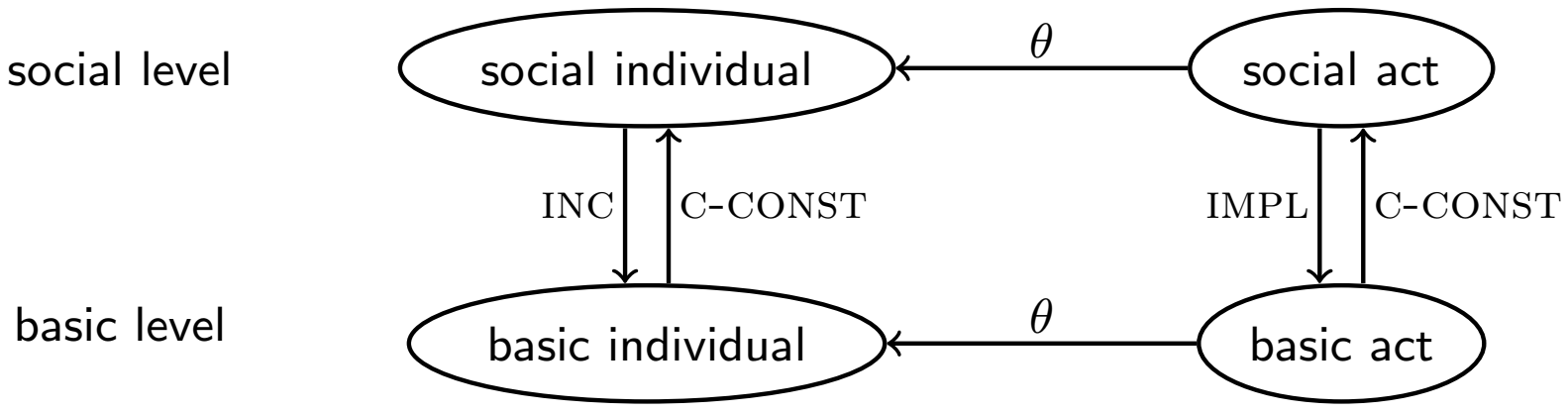


Figure: Diagram of social ontology and mappings between ontological sorts

Social ontology

- "Downward" mapping from social level to another level.

(14) a. $\text{INC}_t(x_s) \stackrel{\text{def}}{=} \iota x_o.x_o$ implements the social individual x_s at time t

b. $\text{IMPL}_t(e_s) \stackrel{\text{def}}{=} \iota e_o.x_o$ implements the social act e_s at time t

- "Upward" mapping from a level (not necessarily social) to a social level. (See also Löbner submitted.)

(15) $\text{C-CONST}_c(x) \stackrel{\text{def}}{=} \iota y_s$. under circumstances c, x counts as y

- Also stipulate that social individuals/events must be grounded by basic individuals/events; its necessary that there be a downward path from the social level to the basic level.

Groups are atomic

- View groups as atomic, social individuals. Essentially a realist perspective, at least with respect to the natural language metaphysics: groups exist.
- View of groups as atoms natural within frame semantics. Just a value.
- Use the ontology developed in Anderson & Löbner 2018.
- Adopt a version of Düsseldorf frames as the basic representational format.
- Note: subscript variables with s for social-level individuals and events, and o for basic-level individuals and events. x, y for individuals, e for events
- $x_s, y_s, e_s, x_o, y_o, e_o, \ldots$

Tentative frame structure for group nouns

- Minimally, all group nouns have frame structures with both a social-level object corresponding to the group, as well as a basic-level entity corresponding to the individuals making up the group.

- Downward INC mapping maps groups to their members.

(16) a. $[\![\textit{committee}]\!] = \lambda x_s \exists x_o [\textbf{committee}(x_s) \wedge \text{INC}_i(x_s) = x_o \wedge \ldots]$
b. $[\![\textit{couple}]\!] = \lambda x_s \exists x_o [\textbf{couple}(x_s) \wedge \text{INC}_i(x_s) = x_o \wedge \ldots]$

- This is a pretty straightforward frame-based implementation of e.g. Barker 1992, which make use of a mapping from groups to individuals.

- Frame structure provides a way of hanging these two pieces together.

Modification

- Modifiers (at least property adjectives) can be thought of as specifying the value of a frame attribute.

  (17) $[\![\textit{old}]\!] = \lambda x[\textsc{age}(x) = \textbf{old}]$

- Unification of adjective frame with nominal frame.

  (18) $[\![\textit{company}]\!] = \lambda x_s[\textbf{company}(x_s) \wedge \ldots]$

  (19) $[\![\textit{old company}]\!] = \lambda x_s[\textbf{company}(x_s) \wedge \textsc{age}(x_s) = \textbf{old} \wedge \ldots]$

- As the nominal frame provides for multiple targets for unification (group and members), potential ambiguity in whether the adjective applies at the group or member level. No typeshifts involved.

- Minor rub: when the modifier applies at the member level, a distributive rule is necessary to distribute the property to individual members.

Social-level entities as event participants

- Social-level events have thematic relations to event participants.
- Social-level individuals (inc. groups) can be participants in social-level events.

(20) The committee decided against the proposal.

(21) $$\exists e_s \exists x_s \left[\begin{array}{c} \textbf{decision}(e_s) \wedge \textbf{committee}(x_s) \wedge \textsc{agent}(e_s) = x_s \wedge \\ \textsc{theme}(e_s) = \iota y_s.\textbf{proposal}(y_s) \wedge \ldots \end{array} \right]$$

Non-entailments between groups and members

- Frame plus social ontology predicts assymetrical entailments between acts by groups and acts by members of the group.

- No entailments from members to group, because they are different individuals within the frame.

(22) a. John and Paul are important.
b. John and Paul are on the committee.
c. (*does not entail*) The committee is important.

(23) $[\![\textit{committee}]\!] = \lambda x_s \exists x_o [\textbf{committee}(x_s) \wedge \text{INC}_i(x_s) = x_o \wedge \ldots]$

Entailments between groups and members

- Social ontology predicts acts by members of the committee when the committee acts.

- Social level events need basic events to implement them.

  (24) a. The committee met.
  b. John and Paul met.

- Doesn't predict that it's the same event type.

  (25) a. The committee voted to ban dangerous pesticides.
  b. ??John and Paul voted to ban dangerous pesticides.
  c. John and Paul (as members of the committee) did something.

- (See notion of elaboration in Anderson & Löbner 2018.)

Founding of groups

- Groups differ in how they originate.
- Some groups are "founded." They are associated with a creation event that brings the group into existence at some time. But, other groups are merely composed.
- This can be shown linguistically:

(26) a. The committee/club was founded in March, but ...
b. ??The couple began in March, but ...

Founding of groups

- Founded groups may have members that vary over time, while others do not allow their members to vary.

(27) a. The senator left the committee, but the committee continued with its mandate.
b. Barack Obama, Franklin Roosevelt, and George Washington were all part of the same club in Philadelphia.

(28) a. *Kevin stopped dating Kendra, but they remained a couple.
b. The show had the same audience each night. (=same individuals)
c. *Barack Obama, Franklin Roosevelt, and George Washington were all in the same audience.

Founding of groups

- Group founding is modeled within a frame as a **found** social-level event.
- This is not the verb *found*, but an abstract event for group creation.
- **found** events (minimally) have as an attribute CREATED-GROUP, valued by the group individual that is created by the event.

(29) $$[\![\textit{committee}]\!] = \lambda x_s \exists x_o \exists e_s \left[\begin{array}{c} \textbf{committee}(x_s) \wedge \text{INC}(x_s) = x_o \wedge \\ \textbf{found}(e_s) \wedge \text{CREATED-GROUP}(e_s) = x_s \wedge \ldots \end{array} \right]$$

Founding of groups

- *Couple*-type nouns must have a different frame structure.
- Groups of this type still have an INC attribute that maps from the group to the members.
- Key difference is the inclusion of the C-CONST mapping.
- Models that groups like (*dating*) *couple* or *audience* have their group generated by being classified as a group due to the situation (circumstances) they are found in (x is considered to be y in circumstances c).
- These groups are not founded.

(30) $[\![\textit{couple}]\!] =$

$$\lambda x_s \exists x_o \left[\begin{array}{l} \textbf{couple}(x_s) \wedge \text{INC}(x_s) = x_o \wedge \text{C-CONST}(x_o) = x_s \wedge \\ \exists y_o, z_o [x_o = y_o \oplus z_o \wedge \textbf{person}(y_o) \wedge \textbf{person}(z_o)] \wedge \ \ldots \end{array} \right]$$

Detour: Metonymy

- Some expressions do not have their literal meaning, but are used to refer to a related thing.

  (31) Croatia lost to France.
  = Croatia's football team lost to France's football team.

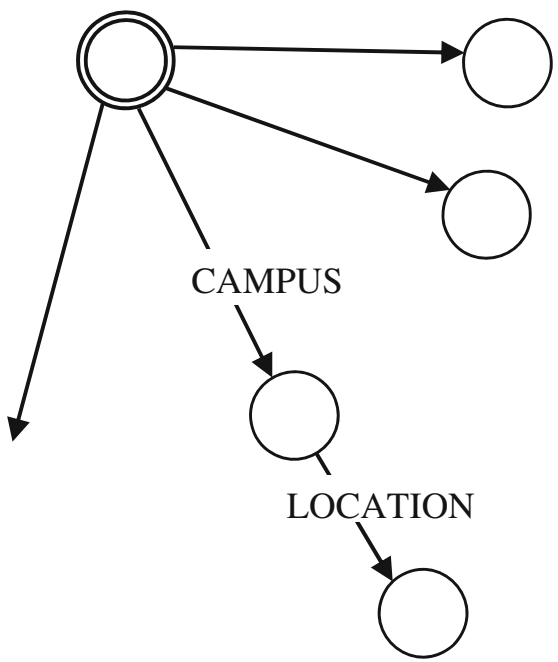
- Metonymy between a nation (*Croatia*, *France*) and their football team.

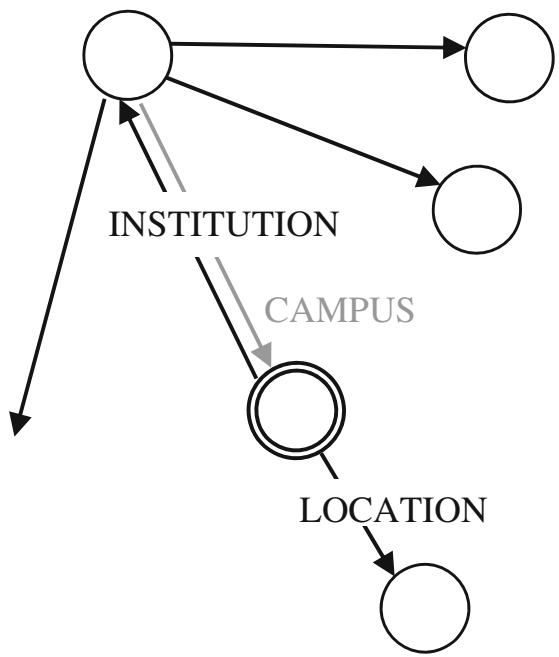
- Quite pervasive.

  (32) a. The university has closed down the faculty of arts. (institution)
  b. The university starts again on April 15. (classes)
  c. The university lies in the eastern part of the town. (campus)

Bidirectional functionality

- Analysis of metonymy in Düsseldorf Frame Semantics: metonymy is a shift in the referential node of a frame (Löbner, 2013).
- Licensed by bidirectional functionality (1 to 1 correspondence) between nodes.
- *University* can shift to *university campus* because a university has one campus, and a campus belongs to one university.





Explaining variation in accessibility

- For composed groups, membership across time is stable.
- For founded groups, membership not necessarily stable.
- Variation in accessibility is related to the degree to which a metonymy holds.
  - Metonymy between group and members holds for *couple*-type groups, due to presence of both downward and upward mappings.
  - For *committee*-type groups, (i) no upward C-CONST mapping, or (ii) the value of the INC attribute is non-stable across contexts, making it difficult to establish a metonymy.
- Variation due to ease of establishing a one to one mapping between the members of a group and the group.
- Bidirectional functionality is independently claimed to be important for other frame operations (Löbner (2013); Schulzek (2014), word formation and referential shifts).

Building bridges?

- Bach (1986), natural language metaphysics: "What do people talk as if there is?"
- Motivate primitives in our theories on philosophical and psychological grounds. Internal cognitive reality is what should drive our analyses, not externalist considerations. Semantics as cognitive science.
- Formal semanticists should pay more attention to the lexical semantics of terms, and how different classes manifest.
- Reach a full understanding only by studying the implicit parameters, and the concepts words name.

Conclusion

- Provided a first pass at an analysis of group terms in Düsseldorf Frame Semantics.
- Analyzed groups as having as their referent atomic individuals. Not just any individuals, but social individuals in a social ontology with sorts for social entities and basic entities (Anderson & Löbner, 2018).
- Corpus evidence via attributive adjectives to support independent findings that groups differ in their member accessibility.
- This accessibility is not grammatical; it is conceptual in nature.
- Variation in member accessibility is related to how the creation of the group is conceptualized; groups can be founded, or constituted.
- How groups are created impacts how they relate to their members, and whether a metonymic relationship between the group and its members can be formed.

Acknowledgements

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References I

Anderson, Curt & Sebastian Löbner. 2018. Roles and the compositional semantics of role-denoting relational adjectives. In Uli Sauerland & Stephanie Solt (eds.), *Proceedings of Sinn und Bedeutung 22*, vol. 1, 91–108.

Anderson, Curt & Marcin Morzycki. 2015. Degrees as kinds. *Natural Language and Linguistic Theory* 33(3). 791–828.

Bach, Emmon. 1986. Natural language metaphysics. In *Logic, methodology, and philosophy of science*, 573–595. North Holland.

Barker, Chris. 1992. Group terms in English: Representing groups as atoms. *Journal of Semantics* 9(1). 69–93.

Barsalou, Lawrence. 1992. Frames, concepts, and conceptual fields. In Adrienne Lehrer & Eva Feder Kittay (eds.), *Frames, fields, and contrasts: New essays in semantic and lexical organization*, 21–74. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Carlson, Gregory. 1977. *Reference to kinds in English*: University of Massachusetts, Amherst dissertation.

Carpenter, Bob. 1992. *The logic of typed feature structures*. Cambridge University Press.

Chierchia, G. 1998. Reference to kinds across languages. *Natural Language Semantics* 6(4). 339–405.

Fillmore, Charles J. 1968. The case for case. In E. Bach & R. Harms (eds.), *Universals in linguistic theory*, Holt, Rinehart and Winston.

Joosten, Frank, Gert De Sutter, Denis Drieghe, Stef Grondelaers, Robert J. Hartsuiker & Dirk Speelman. 2007. Dutch collective nouns and conceptual profiling. *Linguistics* 45(1). 85–132.

Kallmeyer, Laura & Rainer Osswald. 2014. Syntax-driven semantic frame composition in lexicalized tree adjoining grammars. *Journal of Language Modelling* 1(2). 267–330.

References II

Landman, Meredith & Marcin Morzycki. 2003. Event-kinds and the representation of manner. In Nancy Mae Antrim, Grant Goodall, Martha Schulte-Nafeh & Samiian Vida (eds.), *Western Conference on Linguistics* (*WECOL*) *2002*, vol. 14, 136–147. Fresno: California State University.

Link, Godehard. 1983. The logical analysis of plurals and mass terms: A lattice-theoretical approach. In P. Portner & B. Partee (eds.), *Formal semantics: The essential readings*, Blackwell.

Löbner, Sebastian. 2013. *Understanding semantics*. Routledge.

Löbner, Sebastian. 2014. Evidence for frames from human language. In Thomas Gamerschlag, Doris Gerland, Rainer Osswald & Wiebke Petersen (eds.), *Frames and concept types*, 23–67. Springer.

Löbner, Sebastian. submitted. Cascades. unpublished manuscript, Heinrich-Heine-Universität Düsseldorf.

Petersen, Wiebke. 2007. Representation of concepts as frames. *The Baltic International Yearbook of Cognition, Logic and Communication* 2. 151–170.

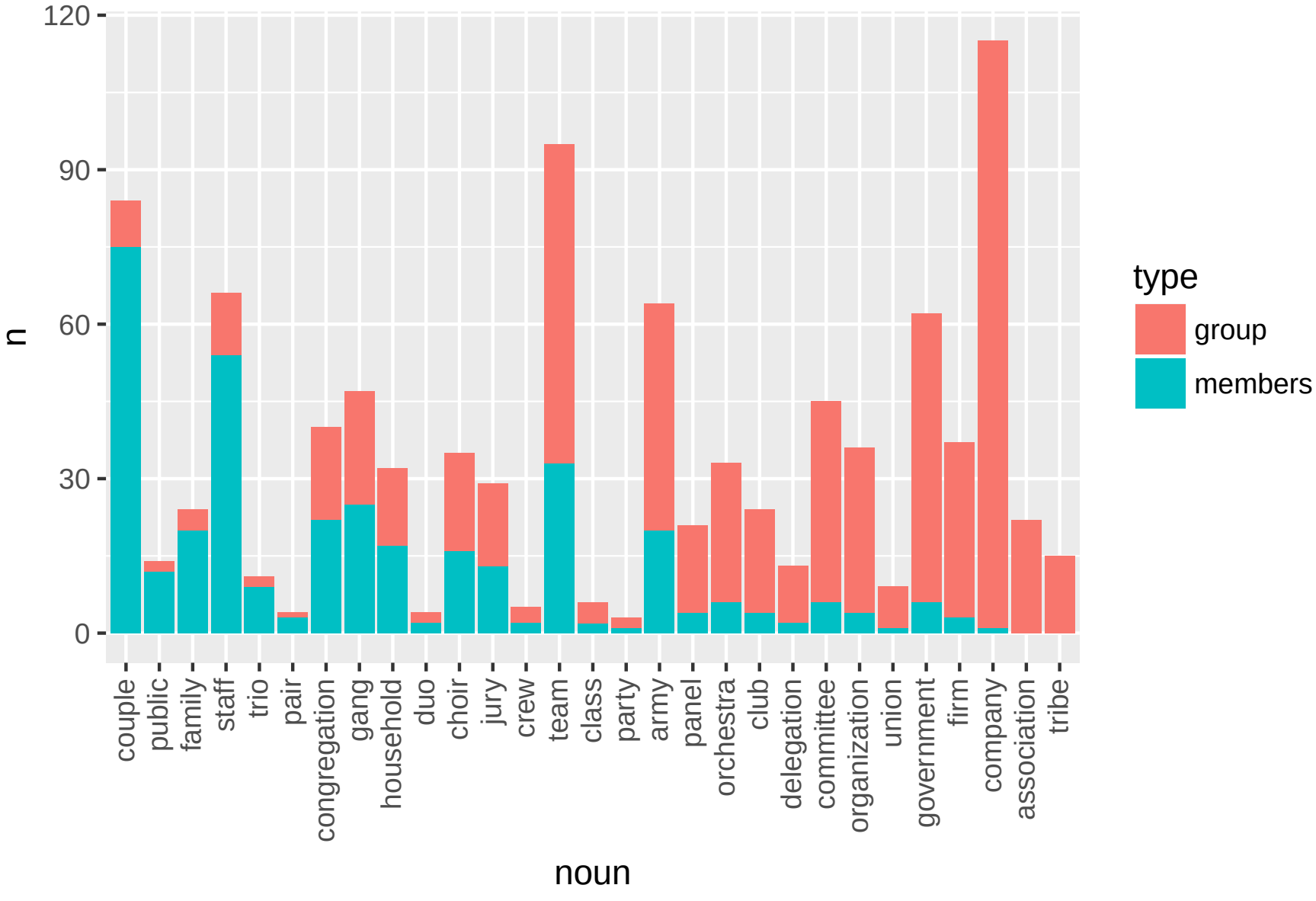
Schulzek, Daniel. 2014. A frame approach to metonymical processes in some common types of German word formation. In Thomas Gamerschlag, Doris Gerland, Rainer Osswald & Wiebke Petersen (eds.), *Frames and concept types*, 221–242. Springer.

Searle, John R. 1995. *The construction of social reality*. Simon and Schuster.

de Swart, Henriëtte, Yoad Winter & Joost Zwarts. 2007. Bare nominals and reference to capacities. *Natural Language & Linguistic Theory* 25(1). 195–222.

Zobel, Sarah. 2017. The sensitivity of natural language to the distinction between class nouns and role nouns. In *Proceedings of SALT 27*, 438–458.

Corpus data (total count)



Delimiting group nouns

- Both slightly wider and slightly narrower conception of group noun for this talk than is usually used.

- Slightly narrower: focus only on groups composed of humans.

(33) a. a bunch of flowers
b. a deck of cards

- Slightly broader: focus on non-derived nouns that have members at a conceptual level.

- Not a grammatical categorization, departing from some work in formal semantics (e.g., work where group nouns are defined by allowing bare plural NP complements). Conceptual categorization, closer to cognitive linguistics characterizations.

(34) a committee of senators

(35) a. *a couple of young people
b. *a staff of employees

Distributive rule

Need a distributive rule to apply an adjective to a sum of individuals. See (37) for one formulation.

(36) $[\![\textit{young couple}]\!] = \lambda x_s \exists x_o [\textbf{couple}(x_s) \wedge \textsc{age}(\textsc{impl}(x_s)) = \textbf{young} \wedge \ldots]$

(37) If x_o is not atomic,
$\textsc{age}(x_o) = \textbf{young} \leftrightarrow \forall y_o [y \sqsubset x_o \wedge \textbf{person}(y_o) \wedge \textsc{age}(y_o) = \textbf{young}]$