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Previous work in the semantics of group nouns has shown that different terms for groups profile their members to different degrees. However, little work has attempted to capture this difference in modification. I argue that the difference is conceptual (rather than grammatical) in nature, and propose that the circumstances surrounding the creation of the group is to blame; some groups are created via social acts of creation, while others are constructed via consideration of social circumstances. This is cashed out in a variant of Düsseldorf frame semantics.

1 Introduction

Group nouns (sometimes called committee nouns or collection nouns) are nouns that denote groups of individuals, such as committee, couple, family and organization. Adjectival modification of group nouns such as committee, family, and couple show that group nouns have a complex lexical semantics; modification shows that groups differ in the accessibility of members within the group, as in (1), as well as in whether an adjective targets a property of the group members or the group itself (see (2)). Additionally, attributions can be made about the group without the property being ascribed to the members of the group, like in (3).

(1)  a. ??The blonde committee is standing in the corner. (members inaccessible)
    b. The blonde couple is standing in the corner. (members accessible)
(2)  a. an old family
    b. an old couple
        (=age of group)
    b. an old couple
        (=age of members)
(3)  a. an old family with a lot of young parents
    b. an unimportant committee headed by important senators

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1 Sometimes nouns such as pile (pile of cards) and bunch (bunch of flowers) are included in this family of nouns. I explicitly set aside discussion of these nouns.
We pursue an analysis of group nouns that can adequately capture these facts, using notions of social acts and individuals, a move recently made by Anderson & Löbner (to appear) in the discussion of social roles such as president. Our account makes crucial use of frames (Petersen, 2007; Kallmeyer & Osswald, 2014; Löbner, 2014, a.o.) to capture the lexical semantics of these nouns. We show how different group nouns differ in their conceptual structure and modification potential.

2 Accessibility of members

The empirical point we pursue in our discussion is that group nouns differ in how accessible their members are. Joosten et al. (2007) provides initial observations regarding this, showing in Dutch that some group nouns conceptually profile their members to a higher degree than others. They show that group nouns such as those in (4) abstract away from their members to a high degree, while others such as those in (5) allow easier access to the members.

(4) committee, association, club, company
(5) couple, pair, family, team

The accessibility of members of different groups can be seen with modifiers that strongly prefer individuals such as blonde. Modifiers such as this are much more easily interpretable with groups that profile their members compared to this that do not.

(6) a. a blonde couple
b. ??a blonde committee

Corpus data backs up the intuition that members of these groups are accessible to different degrees. For a set of group-denoting nominals based partially on Joosten et al.’s (2007) list of group nouns,\footnote{Our nouns were 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, and tribe.} we extracted from the British National Corpus A+N pairs, ignoring pairs with operator adjectives (former, possible) and relational adjectives, as well as determiners and numerals tagged as adjectives in the BNC. A total of 995 pairs were tagged for whether they targeted an attribute of the group (important committee) or the members of the group (blonde couple). Figure 1 shows these results.

This initial corpus work suggests that there is no categorial difference at work between different groups terms. If there were a categorical difference, we would expect an S-shaped distribution, with some A+N combinations being attributions related to the group, others being attributions of the members, and little in between. Rather, what we find is that there is a gradient between groups that easily allow access to their members versus groups that do not allow easy access to their members. Therefore, we consider the difference between the semantics of group nouns, at least along the dimension of member accessibility, to be a conceptual rather than grammatical difference. As a shorthand to talk about the extremes on this scale, we will preserve talk of committee-type groups and couple-type groups, in order to distinguish between groups that either do not easily allow or do easily allow access to their group members, respectively.

3 Frames and social ontology

The formalization is based on Düsseldorf frames (Kallmeyer & Osswald, 2014; Löbner, 2014; Petersen, 2007). The basic idea of Düsseldorf frames is grounded in the work of Barsalou...
(1992), who argued that mental representations are represented via frames, complex symbolic feature structures. Düsseldorf frames are a formalization of Barsalou frames as attribute–value structures, familiar from work in linguistics. Attributes are represented as functions, mapping the possessor of the attribute to a value. Values are typed via typed feature structures (Carpenter, 1992). Frames are recursive in that values may also have attributes.

Building on the usual frame ontology of individuals, times, and events (see e.g. Löbner 2017), we assume a rich, multisorted ontology containing both social and non-social entities. Following Anderson & Löbner (to appear), we assume mappings between these domains: a time-dependent mapping IMPL (implementation) from social individuals \((x_s, y_s, \ldots)\) to concrete (non-social) individuals \((x_o, y_o, \ldots)\), and a relation C-CONST (constitution under circumstances) between concrete individuals and social individuals. C-CONST encodes Searle’s (1995) notion of “collective intentionality,” whereby certain individuals count as a social object in a certain context (e.g., particular pieces of green paper in the United States count as money). Concrete individuals and events represent brute facts in the sense of Searle (1995), the physical manifestations that social concepts are grounded in. Moreover, social individuals generated through collective intentionality (and here, C-CONST) have an asymmetric existence, requiring that there exist concrete/personal level individuals to physically implement the social individual.

The figure in Figure 2 diagrams this relationship between domains, with arrows representing mappings from one domain to another. \(\theta\) represents a thematic mapping between an event participant and an individual (e.g., the familiar notions such as THEME and AGENT). IMPL and C-CONST are defined as in (7) and (8), following Anderson & Löbner (to appear).

\[
\text{(7)} \quad \text{IMPL}_t(x_s) \overset{\text{def}}{=} t_{x_o,x_o} \text{ implements the social individual } x_s \text{ at time } t
\]

\[
\text{(8)} \quad \text{C-CONST}_c(x,y) \overset{\text{def}}{=} \text{under circumstances } c, x \text{ counts as } y
\]

Social events and individuals can thus be values of frames, and therefore have attributes that

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Figure 1: Frequency (for group nouns) of whether selected attributive adjectives specify attributes of the group or its members
correspond to them. Moreover, the ontology assumptions laid out here distinguish the group as a social object from its members; IMPL maps groups to the individuals implementing the group at some time, but does not equate the group with the members of the group.

4 Semantics of group nouns

We take all group nouns to have as their referent an atomic social object corresponding to the group, an individual from the domain of social individuals. Therefore, nouns at both ends of the scale, committee-type and couple-type, both refer to objects of the same type. Being social individuals, these individuals must be grounded by concrete individuals at the personal level of the ontology. Therefore, all group nouns have a IMPL attribute that maps the group to its members. We take the value of the IMPL attribute to be the mereological sum of the individuals corresponding to the members of the committee. The logical forms in (9) represent tentative frames for committee- and couple-type groups.

\[
\begin{align*}
\text{(9)} \quad \text{a. } [\text{committee}] &= \lambda x_1 \exists x_0 [\text{committee}(x_1) \land \text{IMPL}(x_1) = x_0 \land \ldots ] \quad \text{(tentative)} \\
\text{b. } [\text{couple}] &= \lambda x_1 \exists x_0 [\text{couple}(x_1) \land \text{IMPL}(x_1) = x_0 \land \ldots ] \quad \text{(tentative)}
\end{align*}
\]

Social-level events have thematic relations to event participants. Social-level individuals (groups, in this case) can be participants in these events.

\[
\begin{align*}
\text{(10)} \quad \text{a. } \text{The committee decided against the proposal.} \\
\text{b. } \exists e_x \exists x_s \left[ \text{decide}(e_x) \land \text{committee}(x_s) \land \text{AGENT}(e_x) = x_s \land \right. \\
\text{THEME}(e_x) = t y_s, \text{proposal}(y_s) \land \ldots
\end{align*}
\]

The difference between how groups profile their members is cashed out via additional specifications of the frame. First, we observe that many group nouns at the committee end of the scale are denote groups that are created by social acts; committees and clubs, for instance, are created by rules, laws, or charters. We assume a social-level event we call charter in the frame for these types of groups that represents the event that creates the group; the group is the created object (via the CREATED-OBJECT attribute) of this event.

\[
[\text{committee}] = \lambda x_1 \exists x_0 \exists e_s \left[ \text{committee}(x_1) \land \text{IMPL}(x_1) = x_0 \land \right. \\
\text{charter}(e_s) \land \text{CREATED-OBJECT}(e_s) = x_1 \land \ldots
\]

However, not all groups are announced by acts of creation. For instance, couples (as in a couple who are dating) are not usually formed through some social act of creation, but are rather created through considering certain individuals to be a couple due to circumstances. Moreover, while groups created through social acts of creation, such as committees, are not dependent on their membership being stable over time (clubs and committees can change membership, but remain the same club or committee), other groups such as couples are wholly dependent on their members; a couple cannot remain a couple if they are not dating. The examples in (12) and (13)
demonstrate these facts linguistically.

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

(13)  a. The senator left the committee, but the committee continued with its mandate.
    b. #Kevin stopped dating Kendra, but they remained a couple.

Therefore, \textit{couple}-type nouns must have a different frame structure. Groups of this type still have an IMPL attribute that maps from the group to the members, but the key difference is the inclusion of the C-CONST relation.

\begin{equation}
\begin{aligned}
\lambda x_o \exists x_s \big[&\text{couple}(x_s) \land \text{IMPL}(x_s) = x_o \land \text{C-CONST}(x_o, x_s) \land \\
\exists y_o, z_o | x_o = y_o \oplus z_o \land \text{person}(y_o) \land \text{person}(z_o) \big] \land \ldots
\end{aligned}
\end{equation}

The role of C-CONST in this frame is to set up a loose identity relationship between the group and its members. Groups are not identical to their members, but the C-CONST relation asserts that certain individuals count as a group in certain circumstances. In other words, under the right circumstances (e.g., dating, marriage, etc.) two individuals will count as a couple. This is an extension of the notion of “level-generation” in Anderson & Löbner to appear, which relates distinct levels of the social ontology to each other.

## 5 Modification and predication

We take attributive adjectives to specify a value or constrain values of an attribute within a frame. For instance, an adjective such as \textit{young} constrains the permissible range of values for an \textit{AGE} attribute to those values that count as young.\(^4\) Modifiers can select for particular types of entities within a frame, e.g., social entities or concrete entities; for instance, \textit{young} and \textit{blonde} denote frame attributes with domains of concrete entities.

\begin{align}
\lambda x_o \exists x_s [ &\text{young}(x_s) = \text{young} ] \\
\lambda x_o \exists x_s [ &\text{blonde}(x_s) = \text{blonde} ]
\end{align}

Modification is unification of the adjective frame with the noun frame. With \textit{couple}-type groups, unification of the adjective with the noun results in the adjective targeting the value of the IMPL attribute (see (16)). A rule extends the attribute to members of the plurality (e.g., (17)).

\begin{align}
\lambda x_o \exists x_s [ &\text{young couple}(x_s) = \text{young} \land \ldots ] \\
\text{If } x_o \text{ is not atomic, } &\text{AGE}(x_o) = \text{young} \leftrightarrow \forall y_o | y_o \subseteq x_o \land \text{person}(y_o) \land \text{AGE}(y_o) = \text{young}
\end{align}

Social entities (the groups themselves) may also have frame attributes associated with them. Adjectives such as \textit{advisory} (\textit{advisory committee}), \textit{important} (\textit{important committee}) and \textit{old} may target attributes of the social entity. In doing so, they avoid predicating of the members of the group, and rather specify values of attributes of the group.

\begin{align}
\lambda x_o \exists x_s [ &\text{advisory committee}(x_s) = \text{PURPOSE}(x_s) = e \land \text{advise}(e) ] \\
\lambda x_o \exists x_s [ &\text{old family}(x_s) = \text{old} \land \text{IMPL}(x_s) = x_o \land \ldots ]
\end{align}

Differences in modification potential of different group nouns arise not from the modifiers, but from the nouns themselves. As discussed previously, groups differ in their creation conditions;
some groups are created through social acts of creation, while others are created by categorization of some individuals as another individual via C-CONST. It is this latter relation that makes members more accessible in couple-type groups. The reason for this, it seems, is that adding this relation allows for a metonymy between the group and the members of the group to be constructed, a weak type of identity between the group and the members. Metonyms are familiar from examples such as France won the World Cup, where France is equated with the French football team. As Löbner (2013) and Schulzak (2014) observe, a basic condition for metonymy (within frame semantics) is bidirectional functionality, where an attribute maps to a value which has an attribute linking back to the original value. Although the C-CONST is not functional (it is relational), its inclusion in a frame provides for bidirectionality between the group and the members of the group, thus forming a metonymy. No metonymic relationship holds between groups and their members for other types of groups, such as committees.

6 Conclusion

Modification of group nouns provides evidence for two levels of meaning represented within their lexical semantics: a level pertaining to the group as a social construction, and a level pertaining to the members of the group. By enriching the semantic ontology with social individuals, we are able to model this distinction between groups and their members in a simple and elegant way. This work shows how puzzles in the semantics of groups, such as accessibility of members, can be solved via closer investigation of the conceptual structure of groups and importing this conceptual information into the formal semantic representation.

References

The interplay between conceptual and referential aspects of meaning

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One of the defining traits of language is its capacity to mediate between concepts in our mind, which encapsulate generalizations, and the things they refer to in a given communicative act, with all their idiosyncratic properties. This talk examines the interplay between conceptual and referential aspects of meaning in relation to semantic composition, proposing a dual route to composition and supporting it with data from nominal modification [McNally and Boleda, 2017]. If time allows, I will further discuss data from a study on short-term meaning shift that also shows sensitivity to referential aspects (work under review).

References


∗Joint work with Louise McNally, Raquel Fernández, and Marco Del Tredici.
The analysis of so-called “taste-discourse” reveals both the relativist and contextualist presuppositions of meaningful discourse as well as its public scope and ambitions. Such can be taken to show the inherent limitations of both objectivist formal semantics and subjectivist conceptual semantics as well as the need of a public domain where meaning can be situated and negotiated.

1 Propositions

**Capital Propositions** There is this idea of a world we live in, which is the object of our inquiries, of science, of knowledge, of our thoughts, theories, and assertions. Our findings about this world, scientific as well as empirical, are stated in what can no better be called than propositions. (In the spoken version of this paper I refer to these as “capital propositions”.) Propositions typically are true or false (possibly neither, but impossibly both), depending on whether the world is or is not as it is stated to be.

We use declarative sentences to state these propositions, to present what the world is like, the obtaining of states of affairs, objects having or not having properties, and standing or not standing in relations, and logical constructions out of those. The possibility to do so is all relative, of course, to the language we speak, its concepts, logic and ontology.¹ On the assumption, on a given occasion, that there is such a shared language, we can, on that occasion, assume it to be objectively clear — and that means: contextually but publicly determinate — what a particular proposition is, that is, what situation is said to obtain, or what objects are said to have what properties, etc.²

¹I would like to thank Liz Coppock and Max Kölbl for substantial inspiration.

²Propositions can be of all kinds. We have, of course, mathematical propositions (like, e.g., “the Pythagorean Theorem”), and we have the propositions of the natural sciences. But there is also the proposition that Saddam Hoessein disposed of weapons of mass destruction, that nepotism caused the decline of the Roman Empire, or the proposition that there are good accommodation facilities near the Octogon in Budapest, or the proposition that Simon and me wouldn’t have hit that deer if we had left earlier that morning.
Philosophers of language and science can be called “invariantists” if they are interested in propositions, in truths about this world, in a language that is established and agreed upon, and, therefore, not in, e.g., talk of tastes, impressions, and representations. That’s why Aristotle, Frege, Russell, and Wittgenstein, to name a few, have, in their claimed capacity as a scientist, shunned vague and ambiguous and other such discourse to begin with. To understand a proposition is to know how things are if it is true. So not knowing how things are if it’s true, is not understanding a proposition. I believe this makes sense.

**Emphatic Propositions**  There is also this idea of the world we live in as it is present to us, a Lebenswelt, the yield and shared product of our senses, culture and thought. We articulate this world, both privately and socially, in what I do not know a better general term for than the colloquial *propositions*. (In spoken language I refer to these as “emphatic propositions”.)

We also use declarative sentences to stage these *propositions*, to determine the way the world is, to declare how things are, how things are defined, viewed, handled and classified. They may consist in categorizations, characterizations, or evaluations of things, but also in declarations of plans or prospects, the presentation of procedures, rules and regulations, or in the definition of terms used in a subsequent legal document.³ In staging *propositions* we use our language to define this world and we may, thereby, also dictate the use of our language itself.⁴

*Propositions* invite us to attune to a world as staged, both in our verbal as well as our non-verbal proceedings. To understand a *proposition* is to know how to adapt to it, how to align with its implications, which are public, and social, by nature. It consists in joining a Lebensform. *Propositions* typically are agreed or disagreed with (possibly neither, but impossibly both), depending on whether our experiences and interests, our guts, plans and feelings align with a world as it is staged to be.

Philosophers of language and mind may be called “relativists,” if they have an interest in men being (or not even being) the measure of things. There is no way of finding truth beyond agreement to truth. (Herakleitos, Husserl, Sapir, among many others.) Of course you cannot sincerely believe that the earth is flat, but not because it is not true but because you have been properly taught that you cannot maintain that belief. I believe that this makes sense, too.

**Verbal Propositions**  The two sorts of propositions are not systematically differentiated, and their distinction is not rigid either. After all, it’s one and the same world we live in, or so we assume. Typically, *propositions*, once agreed upon, turn into propositions, judged true.⁵ Typically, too, *propositions* can be motivated by presenting them as *propositions*, about a public good for instance.⁶ Typically, too, a purported proposition can be declassified as a *proposition* to classify our evidence.⁷ Typically, too, we cannot even *state* a proposition without assuming agreement on the meanings of the terms employed.⁸

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³So we have very mundane *propositions* like “That is a cow,” “This is your desk,” and “You turn left at the next corner,” or “We are going to sleep early tonight.” But also *propositions* like “This is queer,” “That music is funky,” and “These papers are state of the art” and more general *propositions* like that one loves one’s neighbour, that a king is generous, or that penguins don’t fly. And we have the *propositions* of social and cultural behavior, including statements of (some) rules of our grammar and of course, moral and constitutional *propositions* (such as, e.g., the Eighth Commandment, or the First Amendment).

⁴The languages we speak, cf., a previous footnote, differ widely in the extent to which they do not at all, or very discriminatively and even obligatorily, mark the various uses that could be distinguished.

⁵After a general has declared the *proposition* that we are going to attack tomorrow, an obedient soldier may report this to his mates as the *proposition* that we are going to attack tomorrow.

⁶“I tell you, this just IS THE RIGHT WAY to solve this problem / to reach this place / to behave in this society.”

⁷Empirical hypotheses (PROPOSITIONS) can be construed, alternatively, as *propositions* for viewing nature.

⁸In order to even assert a proposition that Saddam Hoessein disposed of weapons of mass destruction, it has to be assumed to be clear who Saddam Hoessein is, and what it means, in the context of the assertion, to
PROPOSITIONS and propositions can thus be exchanged and are often mistaken for each other. Aristotle’s empirical generalizations (PROPOSITIONS) about classical Greek tragedies have later been construed as constitutive definitions (propositions). The definition of, say, a “validity” in a logical textbook can be seen as either a definition of what a validity truly is, or as a definition of what, henceforth, and for the time being, will count as such. The general statement that “We will attack tomorrow.” can be construed as either a statement of fact, or a proposal for action, or perhaps even indifferently. Generic sentences can generally be read as providing descriptive generalizations as well as expressing rules of thumb or thought. A confusion of the two may also be observed in certain relativist philosophical discussions.

2 Relativism

If something is called “a dinosaur” this is normally recognized as a proposition, even though the thing referred to may be a collection of bones, a description of a genome, or a digital reconstruction created by the producers of Jurassic Park. If someone is said to be “queer” or “an expert”, or “funky”, or if a piece of reasoning is called “valid”, it is not directly clear that we face a proposition. If asked whether someone really is queer, an expert, funky, or valid, people may resort to locutions like “that qualifies as something we call ‘queer’, or ‘expert’, or ‘funky’, or ‘valid’.” Things become even more opaque when stuff is qualified as “good”, or “bad”, or “ugly”. Such predications belong to evaluative discourse, which has become a subject of lively discussion in recent philosophical and linguistic literature.

Faultless Disagreement “Evaluative language”, like personal-taste talk, moral speech, and aesthetic discourse raises the challenge of what Max Kölbel has dubbed “faultless disagreement” (Kölbel 2004). A couple of world-mates may entertain contradictory propositions without any one of them being at fault. The two may literally contradict each other—“The cake is tasty.”/“No, it is not.”/“Yes, it is.”—while perhaps no one can be blamed for being wrong. The puzzle is that, of course, neither do we want to simply agree that both are right.

Various kinds of relativism, or other sorts of indexicalism or contextualism have arisen. It is no uncommon assumption in the discussions about such discourse that the disagreements really concern propositions or propositional contents, that their truth is at stake, but that, apparently, their truth is perspective-, or judge-, or assessment-relative.

There is, of course, nothing formally wrong with such parametrization, which is familiar in model-theoretic semantics in general. However, there is a marked difference between the usual types of parametrization and the current one. Semantic parameters can be properly conceived of as instantiating the kinds of objects, world, time, events, . . . , that are being described or characterized, or even as contributing proper constituents of the propositions that are expressed. Judges, perspectives, etc., do nothing likewise. They are not, usually, to be taken to

“dispose of” and to be “a weapon of mass destruction.” Some such agreement is presupposed.

9It will not do here to try and give an overview of the field of possible positions and takes on the issue, but I may have to mention the following prominent actors: Coppock 2018; Glanzberg 2007; Kölbel 2004; Lasersohn 2005; MacFarlane 2014; Moltmann 2010; Stephenson 2007; Stojanovic 2007.

10E.g., “The relativism I am considering does not claim that the content expressed varies with context of utterance, but rather that the truth-value of the content itself is relative. (…) [T]he same proposition can be evaluated differently in different perspectives.” (Kölbel 2004, p. 72)

11Such parameterization yields mathematically speaking impeccable objects, viz., functions from a type of contexts (indices, judges, perspectives, assessments, standards, . . . ) to whatever constitutes the formal semantic renderings of contents (sets of possible worlds, structured meanings, representations perhaps, . . . ).
belong to the things characterized, or to figure as a constituent of the propositions expressed. Neither should they be taken to provide for the denotations of the (evaluative) predicates involved, because in the cases under discussion precisely these denotations are at issue. Leaving (the determination of) these denotations to such judges would actually amount to handing out the determination of these contents to these judges, and trivialize their contents, as the following example may serve to illustrate.

Consider Alexis Ricksmann, whose taste for sushi ranges from Yech! in the morning to Yummie! late afternoon, and back again, every day. And consider the proposition that a specific specimen of sushi is tasty. Following the relativists, we can plot her assessment of the proposition as a sphere of perspectives on that proposition, orbiting around it and gradually rendering it from false, to true, and vice versa, as many days as Alexis is interested in sushi, and in a fashion as continuous as time is. But, one may wonder, what is, here, this so-called proposition that these perspectives are orbiting around? It is not the proposition that the sushi is tasty according to her own standards and judgements, i.e., it is not about the stuff she calls tasty, because these standards and judgements are all the time changing and so is the stuff so-called. The only thing that comes close enough really is just the sentence that “The sushi is tasty,” or the possible valuations of it: Alexis judges the sentence true when and only when she judges it true. This, however, seems to leave something out, but apparently it is not a proposition, which we do not know how to identify or define.13

**Relative Propositions** The case of Alexis seems to lead to triviality, because we do not find, besides a sentence, any proposition which she as a judge valued or judged differently through the parts of the day. John MacFarlane, in his handbook contribution on Relativism, already raised the issue: “How can we make philosophical sense of the idea that the accuracy of an assertion or belief is assessment-relative? Do we really understand what such proposals say?” (MacFarlane 2012, p. 133) One might ask even more specifically: “Do we really understand what such propositions are?” Peter Lasersohn wondered, in the same spirit: “[T]here is no fact of the matter (…) so the disagreement cannot be about that. Nor is the disagreement about the context, or the interpretation of the words (…). What, then, are the speakers disagreeing about?” (Lasersohn 2005, p. 683)

The first thing to observe then, about the cases at hand, is that if there is anything at issue, it is not a proposition that is under discussion. The predicate tasty being under discussion, there is no proposition that the sushi is or is not (that kind of) tasty. So it is actually not the truth-value of a proposition that changes with the judge, perspective, or context of assessment, but it is the proposition itself that the sushi is tasty that changes. The tasty that the sushi is, when it is tasty, is different from the tasty that the sushi isn’t, when it is not. Obviously, one might add, because since the judged denotations of the predicate are different, so apparently are the associated properties. Observe as well that, in the cases at hand, there is no proposition that the sushi is both or neither of these kinds of tasty. There is simply no such proposition under discussion because, again, there is no agreed upon property that the sushi is stated to have.

**Truth**, we may say, is assessment relative, not because truth is a relative predicate, but

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12 Cf., among various others, Lasersohn 2005, §2 for, obvious, arguments against this.

13 This kind of relativism thus seems to be driven to the nominalist dictum that to be a ∈ is to be called “a ψ”. Such a trivialization can be seen to result from thinking of the meaning of an expression, formally, as a function from the contexts in which it has a meaning, to the meaning that the expression in those contexts has. Formally, this is a so-called “lifting” function $(\lambda c(\lambda c c))$, which can be seen to be vacuous because it is a permutation of the identity function $(\lambda c(\lambda c c))$, which is $(\lambda c c)$.
because a proposition is assessment relative. And actually such may hold in principle for all propositions. If the standards change in terms of which a proposition is defined, then so does the proposition.\footnote{So, while we may say that the solar system no longer hosts nine planets, this should not be meant to say that the system has changed, and lost some planets. Rather, it subtly says that the proposition that the solar system hosts nine planets according to the standards back then, is different from the proposition that the solar system hosts nine planets according to the current standards. The first is true, and the second is not—which may serve to show that these are two different propositions indeed. Likewise, a logic teacher may observe in class that \( \neg \neg p \) no longer implies \( p \), after having introduced the students to intuitionist logic. But of course this should not be taken to say that the relation of logical implication has changed. A relation is what it is. The implication relation that does hold between \( \neg \neg p \) and \( p \) is different from the one that doesn’t hold between them. Can it be more obvious?}

3 Agreement

Faulty Disagreement  Turning back to the issue of faultless disagreement, we can put things as follows. Assume that you state that “This piece of cake is tasty,” and suppose that I react with: “No, it is not.” Let us suppose we agree on the cake, and even on its taste.\footnote{The reason and relevance for doing so may invite to a lengthy discussion, way beyond the scope of this paper.} There are two propositions on the table: That the cake be categorized as belonging to the tasty things, and that it belong to the non-tasty things. My idea of tasty is such that the cake is tasty, whence my proposition. (The proposition that it is tasty\(_{\text{according to my standard}}\) is true.) Your idea of tasty is such that it is not, whence your opposing proposition. (The proposition that it is tasty\(_{\text{according to your standards}}\) is false.) (We can agree there is no agreed upon standard idea of tasty, so there is no proposition that it is tasty\(_{\text{according to the standard}}\).) As indicated, there is no proposition that we disagree about.\footnote{There is surely no proposition that it is tasty\(_{\text{according to no standard}}\).} We cannot, upon pain of contradiction, agree with both propositions. So what do we do? We can agree to disagree, and nobody will be wronged or hurt. We can also advance an agreement, if we succeed in synchronizing on a standard solid enough to yield a proposition that the cake is tasty\(_{\text{agree to that standard}}\).

What is at stake here is not whether or not one judges some proposition to be true, because there is nothing of the kind that can be true. There is disagreement about a proposition, which, as we have outlined above, is a characteristic property of propositions. The sushi or cake is not so much stated to be tasty, but it is staged to be so. The issue is whether or not one agrees it to be so. And while there may be various reasons for doing or not doing so, finding out the truth is not one of them.\footnote{These observations apply to all kinds of discourse with some detectable evaluative component. In stead of “This piece of cake is tasty,” the opening-line might as well read: “This person is a star,” “This reviewer is an expert,” “This piece of furniture is Rococo,” “That type of behavior is rational,” or “This inference is valid.” Consider, e.g., the location that “that \( \neg \neg P \) implies \( P \).” It is a proposition about (logical) implication and negation. If one already has a concept of implication and negation, the sentence expresses a proposition. In particular, if one’s (current) understanding is ‘classical’, the obtaining proposition is true, but if one’s (current) understanding is ‘intuitionist’, the obtaining proposition is false. If one has no fixed concept of the two, there is no proposition, but merely a proposition, and so if one is a student, one should better agree.}

Faultless Agreement  It should be emphasized here that no matter whether a predicate \( P \) is regularly classified as one of taste, or as an objective one, agreement on its application cannot merely be the arbitrary result of some ad hoc negotiation. Its uses have to eventually fit in with both the interlocutor’s individual pictures of the world, their findings, guts and feelings, as well with current and public practices, facts and expectations. Moreover, against
such conceptual and public backgrounds, there may be various practical, logical and social implications of agreeing to classify something as \( P \) ("tasty", "expert", "necessary", \ldots).

Advertisements make us believe that the advertised cookies really are tasty, because that’s a good reason for buying them, while, surely, the cookies should at the same time not conflict too much with our initial concept of tasty. If one is successfully qualified as an ‘expert’, one’s opinion is taken more seriously, so congratulations, but take care. If a logical law qualifies as valid, it can be used to draw conclusions. It may need no comments that without the cognitive, practical and social implications of the terms employed, PROPOSITIONS would be entirely nominal or verbal, i.e., meaningless.

**Formal Modeling**  The findings in this note may have some implications for the enterprise of semantics, the study of meaning. Traditional truth-conditional semantics can be said to be, deliberately, blind to the relativist, cognitive and conceptual, aspects of meaning. More dynamic approaches, including that of inquisitive semantics, and perhaps outlook semantics, relativize the core notion of TRUTH but thereby arguably invite the challenge of becoming entirely trivial, i.e., nominalist. Various versions of cognitive grammar and conceptual semantics, on the other hand, barring some promising but isolated exceptions, fail the public dimension of meaning, and its contribution to the public good.

It will not do, here, to even try and sketch an alternative, but I believe one can formalize the ideas presented in this paper by some suitable appropriation of Elizabeth Coppock’s “Outlook-based Semantics.” (Coppock 2018) Building on Max Kölbl’s philosophical conception of perspectives (Kölbl 2004), that system adequately formalizes a conception of outlooks, which are somewhat similar to our conception of propositions. However, following Kölbl it seems, Coppock apparently assumes that a rigid distinction can be made between worlds and outlooks, corresponding to one between objective predicates and predicates of taste. While such an assumption is most commonly made, it seems to me to be eventually untenable. While PROPOSITIONS and PREDICATIONS must be determinate, contextually that is, there seems to be no reason, ground nor need, for granting them independent objective existence.

**References**


1 Verb semantics, frames and events

This paper explores the links between Event Semantics (Davidson 1967, Parsons 1990, Maienborn & Schäfer 2011 and many others) and Frame Semantics (Barsalou 1992 Petersen 2007 Löbner 2014 and others) on the example of force verbs. Force verbs are interesting in this respect, because they have a rich lexical structure. This structure needs to be represented in detail if effects of language composition are to be modelled, such as the preposition or adverb selection by force verbs, illustrated in (1) and (2).

(1) a. (i) Joanne schlägt auf den Nagel.
   Joanne hits on the nail
   (ii) *Joanne schlägt an dem Nagel.
   Joanne hits on the nail

b. (i) Joanne zieht an der Wurzel.
   Joanne pulls on the root
   (ii) *Joanne zieht auf der Wurzel.
   Joanne pulls on the root

(2) a. Joanne berührt Mary leicht an der Schulter.
   Joanne touches Mary lightly on the shoulder

b. *Joanne berührt Mary hart an der Schulter.
   Joanne touches Mary hard on the shoulder

In the following, I will first give an overview of the lexical components of force verbs, cf. Section 2, and then show in Section 3 how the effects observed in the sentences in (1) and (2) can accurately be modelled in Event Semantics, based on a detailed representation of the rich lexical semantics of force verbs. In Section 4, I will model the same sentences in Frame Semantics and focus on the links between the two frameworks, as well as their respective advantages and disadvantages.
2 The lexical semantics of force verbs

Force verbs are defined as “any verb of which the root can occur in a sentence that describes a situation in which an object A exerts a physical force through contact on another object B without necessarily implying a change in the properties of B, yet while allowing for that change” (Goldschmidt 2018: 114).

This definition includes the verbs in sentences (1) and (2) above: schlagen (to hit), ziehen (to pull) and berühren (to touch) all describe situations of force exertion through contact. They all allow for a change of state or position of the object on which the force is exerted, but they do not require it.

Force verbs can be further classified according to their directional, aspectual and intensity specifications. The verbs schlagen and berühren both describe a situation in which the force is directed towards the object on which it is applied. Compare this to ziehen, which describes the exertion of a force away from the object on which it is applied. Verbs like schlagen and berühren thus differ from verbs like ziehen with respect to directionality. Berühren differs from schlagen and ziehen with respect to the force magnitude. While schlagen and ziehen are lexically unspecified with respect to a specific magnitude (and get their high force magnitude reading through a process of implicature, cf. Goldschmidt et al. 2017, Goldschmidt 2018), berühren is lexically specified for a low force magnitude and can thus not be used to express a high amount of force. Schlagen and ziehen also differ from each other with respect to aspect or the duration of the force exertion. While schlagen describes a momentary or punctual contact through which the force is exerted, ziehen describes a continuous force exertion.

These lexical distinctions can influence a verb’s compositional behaviour. The ungrammaticality of the sentences in (1-a-ii), (1-b-ii) and (2-b) are due to incompatible directional and intensity requirements of the verbs and prepositions/adverbs. I will now show how force verbs can be modelled in Event Semantics.

3 Force verbs in Event Semantics

Event Semantics as developed by Davidson (1967) and elaborated on by Parsons (1990) and many others analyses verbs as predicates over an underlying event variable. Adverbs and prepositional phrases are seen as providing extra information about that event. However, even if one were to assign a force component to the event, such an analysis is not enough to capture the distinctions between force verbs.

In order to accurately model the directional, aspectual and intensity distinctions illustrated above, a more detailed representation of the force component is necessary. This can be achieved by incorporating insights from vector-based models such as that of Zwarts & Winter (2000) into a force dynamic approach like that by Wolff (2007). I propose that the force that the force exerter (terminology following Goldschmidt (2018)) exerts on the force recipient is modelled via (force) vectors. At each moment during the run time of the event, a unique force vector represents the force that is exerted on the force recipient at that moment: \( \rho(t) \). Non-zero force vectors have a magnitude, an origin and a direction. Zero force vectors have no magnitude or direction, but an origin; zero force vectors are thus points.

The sequence of force vectors that represent the force exerted at each moment during the event form a path. For example, if the force exerter is moving towards the force recipient (e.g. the phase before contact is made in situations described by schlagen as in (1-a-ii)), a sequence of zero force vectors are generated, each with a different origin. This sequence of points, or
path, allows tracing the movement of the force exerted. Force vectors, both zero and non-zero, thus do double duty: they represent the magnitude and direction of the force exerted on the force recipient, and they represent the movement or spatial position of the force exertor via their origin.

The different directional, aspectual and intensity components of force verbs can now accurately be modelled by posing conditions on the magnitude or direction of the force vectors, or on the quantity of non-zero force vectors. This allows for a detailed representation of the semantics of force verbs, cf. (3), (4) and (5), taken from Goldschmidt (2018: 153/154, ex(32,33,36)).

\begin{align*}
(3) & \quad \text{SCHLAGEN} = \lambda e. \exists p \left[ p = \text{PATH}(e) \land \text{PUNCTUAL}(p) \land \text{INTR}(p, \text{FORCE RECIPIENT}(e)) \right] \\
(4) & \quad \text{ZIEHEN} = \lambda e. \exists p \left[ p = \text{PATH}(e) \land \text{CONTINUOUS}(p) \land \text{EXTR}(p, \text{FORCE RECIPIENT}(e)) \right] \\
(5) & \quad \text{BERÜHREN} = \lambda e. \exists p \left[ p = \text{PATH}(e) \land \text{INTR}(p, \text{FORCE RECIPIENT}(e)) \land \text{NON-INTENSIVE}(p) \right]
\end{align*}

The verb schlagen is punctual, i.e. it expresses only a momentary contact (one non-zero force vector), and internally directed (the force vectors point towards the force recipient). Ziehen is continuous, i.e. it expresses a continuous force exertion (only non-zero force vectors), and externally directed (the force vectors point away from the force recipient). Berühren is internally directed and non-intensive, i.e. the non-zero force vectors need to have a magnitude below a certain average for comparison.

Please note that not the event, but the path is said to be continuous/momentary, internal/external or non-intensive. By analysing prepositions and adverbs as predicates over paths, their force dynamic requirements can be analysed in the same way as those of the verbs. The ungrammaticality of the sentences in (1-a-ii), (1-b-ii) and (2-b) can now be explained by incompatible force vector requirements. Schlagen requires internally directed force vectors, an (on) requires externally directed force vectors. This is the other way around for ziehen and auf (on). And berühren requires force vectors with a magnitude below a certain average for comparison (and above zero), while hart (hard) requires force vectors with a magnitude above a certain average.

By modelling the rich lexical semantics of force verbs in such great detail, the ungrammaticality of the sentences in (1-a-ii), (1-b-ii) and (2-b) can satisfactorily be explained within the framework of Event Semantics. I will now show how the same lexical structure can be modelled in Frame Semantics.

4 Force verbs in Frame Semantics

In Frame Semantics as originated by Barsalou (1992) and further developed by a.o. Petersen (2007) and Löbner (2014), meaning is modelled by making explicit the underlying conceptual structure. A bike, for example, has the attribute \text{COLOUR} which can take as its values e.g. \text{blue}, \text{red} or \text{black}. This is visualised as a connected graph, with the values represented as nodes and the attributes as labelled arcs.

Force verbs can be represented in a similar way, cf. Figure 1, based on Goldschmidt’s Figure 7.11 (Goldschmidt 2018: 198), which is a representation of the sentence in (2-a).

The frame takes the verb berühren (to touch) as its central node, marked by the double circle and referring to the set of all berühren-events. The agent is Joanne and the patient is Mary (the fact that only Mary’s shoulder is touched is abreviated here by making Mary’s shoulder the patient). The verb is characterised by a force component and a movement component,
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Figure 1: The frame representation of Joanne berührt Maria leicht an der Schulter (Joanne touches Mary lightly on the shoulder).
represented as sets of force transmission and movement events respectively. The force component models the force that is exerted on the force recipient and assigns the argument roles FORCE EXERTER and FORCE RECIPIENT (Joanne and Mary/Mary’s shoulder respectively). The movement component models the movement of the force exercer towards the force recipient. It assigns the argument roles FIGURE, the moving entity, Joanne or some part of her in this case, and GROUND, the entity with respect to which the movement is described, Mary or her shoulder in this case.

Please note that the force component and movement component at this stage are modelled as two separate components. The double duty of the force vectors as explained in Section 3 above becomes visible further down in the frame structure. The force component has an attribute FORCE VECTOR, which takes as value the set of all force vectors, and the movement component has an attribute PATH which takes as value the set of all paths. Force vectors are characterised via the attributes MAGNITUDE, DIRECTION and ORIGIN, the specific values of which restrict the set of force vectors. The origin is a position on the path, hence the node POSITION refers to specific positions on the path. The direction of a force vector is internal, i.e. towards the force recipient/Mary. This is made explicit by the attribute DIRECTIONAL REFERENCE. Finally, the fact that Joanne touched Mary lightly is expressed by the value $\text{average}_{<}$. The magnitude of the (set of) force vector(s) is below a certain average for comparison (but above zero).

By modelling force verbs and the sentences they appear in within Frame Semantics, the rich conceptual structure of force verbs becomes visible at one glance. Furthermore, the (co-)dependencies are immediately visible in this connected graph structure, such as the fact that Mary is both the force recipient and the ground, as well as the patient of the overall event. In order to accurately model the aspectual distinctions between e.g. ziehen and schlagen, however, a more elaborate system than that presented here is needed (as in e.g. Gamerschlag et al. 2014).

5 Events, frames, or both?

In Sections 1 and 2, I have argued that the rich lexical structure of force verbs needs to be modelled in detail to account for the ungrammaticality of the sentences in (1-a-ii), (1-b-ii) and (2-b). In Section 3, the meaning components of force verbs are modelled in an enriched Event Semantics framework, where the origin, magnitude and direction of force vectors represent the force-related distinctions as well as allow tracing the movement of the force exercer. In Section 4 I have presented an analysis of force verbs in Frame Semantics, where the rich conceptual structure is represented in a connected graph that immediately makes visible the relations between the meaning components of force verbs.

While force verbs can be accurately modelled in both frameworks, they both have their specific advantages and disadvantages. In Event Semantics, the specific notions of forces, paths, events and so on can be precisely defined as the model-theoretic building blocks that are the input to the analysis. These then reappear in the lexical entries for the verbs as in (3), (4) and (5), but the relations between them are lost in this representation. In order to recover them, one needs to “unpack” the lexical entries to retrieve the model-theoretic building blocks (as done in Goldschmidt 2018). In Frame Semantics, the relations between the meaning components of force verbs are immediately visible, as shown in Figure 1. But some of the model-theoretic building blocks are harder to represent in frames, as is the case with for example the aspectual distinctions between force verbs.
Both frameworks thus focus on different aspects of meaning: While the Event Semantics account presented here puts the focus on incorporating model-theoretic building blocks into the analysis of force verbs, the Frame Semantics account focuses on explicitly modelling the meaning components and their relations.

References


There has been growing interest in providing “semantic grounding” for linguistic expressions in natural language text. Typically, this involves anchoring a referring expression or verbal predicate to the appropriate segments in an image that denote an object or an action, respectively. While useful, such cross-modal linking is far from the situated grounding required to understand utterances, deixis, and actions, in the context of multimodal communication. Two humans engaged in dialogue share a common ground for their beliefs, perception, and situatedness. This is not the case, however, when communicating with computers or robots. I argue that situated grounding is a requirement for more natural communication between humans and computers (or robots), and is therefore critical to the success of both natural language understanding and AI. In order to achieve this goal, human-computer/robot interactions will require at least the following capabilities and competencies: robust recognition and generation of multiple modalities (language, gesture, vision, action); understanding of contextual grounding and co-situatedness; and appreciation of the consequences of behavior and actions.

In this paper, I describe an approach to modeling human-computer interactions based on creating multimodal simulations. A multimodal simulation is an embodied 3D virtual realization of both the situational environment and the co-situated agents, as well as the most salient content denoted by communicative acts in a discourse. It is built on the modeling language VoxML, which encodes objects with rich semantic typing and action affordances, and actions themselves as multimodal programs, enabling contextually salient inferences and decisions in the environment.

Since a simulation reveals the elements of the common ground in discourse between speakers, it offers a rich platform for studying the generation and interpretation of expressions, as conveyed through multiple modalities, including: language, gesture, and the visualization of objects moving and agents acting in their environment. I will present current research demonstrating multimodal human-computer interactions in a collaborative task, and discuss ongoing lines of research in using a multimodal simulation context for introducing novel concepts and situations to a computational agent.
Maier argues that what he dubs the ‘paradox of fictional names’ forces us to switch to a psychologistic interpretation of DRT. I show that it faces a challenge accounting for fictional name introduction in parafictional and metafictional statements. I argue that a workspace account solves the paradox and avoids the challenge while sticking to a common ground interpretation of DRT.

1 The paradox of fictional names

There is a long-standing debate between cognitive and formal semanticists on whether meaning is a mental construct or about our relation to the world. Even within the dynamic framework of DRT (Discourse Representation Theory) there is split between those that interpret DRS’s (Discourse Representation Structures) as representations of a Stalnakerian common ground (e.g. Heim, 1982; Groenendijk & Stokhof, 1991; van der Sandt, 1992) and those that interpret DRS’s as representations of an agent’s mental state (e.g. Geurts, 1999; Kamp, 2015. But see Hamm, Kamp & Van Lambalgen, 2006).

Maier (2017) argues that what he dubs the ‘paradox of fictional names’ forces us to switch to a psychologistic interpretation of DRT. The paradox arises in our use of fictional names (e.g. ‘Frodo’) across (in Recanati’s (2018) terminology) ‘fictional’, ‘parafictional’ and ‘metafictional’ statements. Fictional statements are statements taken directly from some fictional work (e.g. (1) from The Lord of the Rings). Parafictional statements are statements about the content of some fictional work. These can be ‘explicit’ (e.g. (2)) or ‘implicit’ (e.g. (3)) depending on whether the ‘In fiction $x’-operator is overt or covert. Metafictional statements are statements about fictional entities as fictional entities (e.g. (4)):

(1) Frodo had a very trying time that afternoon
(2) In The Lord of the Rings, Frodo is a hobbit
(3) Frodo is a hobbit
(4) Frodo is a famous fictional character
Intuitively, the name ‘Frodo’ refers uniformly across statements (1), (2), (3) and (4) which are all true in some sense. But how can we consistently accept for instance (1) in which the name ‘Frodo’ refers to a living creature, and (4) which denies Frodo’s existence?

In this paper I briefly discuss Maier’s psychologistic solution to the paradox of fictional names and argue that it faces a challenge accounting for fictional name introduction in parafictional and metafictional statements. I show that a workspace account solves the paradox and avoids the challenge while sticking to a common ground interpretation of DRT. In general, such an approach is preferable because if DRS’s are interpreted as representations of mental states, we are committed to the psychological assumption that mental states have similar structure as DRS’s. Preferably, our linguistic theory does not force us into making psychological assumptions about the structures of agents’ mental representations. A common ground interpretation of DRT only commits us to assumptions concerning the structure of the abstract concept of common ground. How that concept is implemented mentally is left unspecified.

2 Psychologistic DRT

Following Walton (1990), Maier analyses regular assertions (including parafictional and metafictional statements) as prescriptions to believe and fictional statements as prescriptions to imagine. To represent the distinction between belief and imagination, Maier develops an extension of DRT based primarily on Kamp (1990; 2015), in which DRS’s are linked to attitudes. As a test case, let’s assume an agent reads fictional statement (1) in The Lord of the Rings and subsequently hears a reliable source say parafictional statement (2) and metafictional statement (4). In Maier’s framework, a simplified representation of this agent’s mental state after the resulting updates looks as follows:

\[
\left\{ \langle \text{IMG}, \text{name}(x, \text{Frodo}), \text{trying-time}(x) \rangle, \langle \text{BEL}, \text{famous}(x), \text{fictional}(x), \text{LOTR}, \text{hobbit}(x) \rangle \right\}
\]

The agent is represented as imagining the existence of an entity named Frodo (having a trying time some afternoon). The agent believes (relative to that imagination) that the imagined entity is a famous fictional character (and that The Lord of the Rings is such that the imagined entity is a hobbit). Because the agent has different attitudes towards these propositions, the tension between ‘accepting’ both (1) and (4) is resolved.

Proper names are analysed as presupposition triggers (See Geurts, 1997); The name ‘Frodo’ in (2) and (4) triggers the presupposition that there is an \( y \) named ‘Frodo’. Assuming the name ‘Frodo’ refers uniformly, the discourse referents \( x \) and \( y \) need to be unified. However, following standard DRT-rules, the discourse referent \( x \) for Frodo is not accessible outside of the imagination-box where it is introduced. Hence, Maier assumes that doxastic attitudes can be referentially dependent on attitudes like imagination so that the name presuppositions in (2) and (4) can take \( x \) as their discourse referent.

2.1 The parafictional and metafictional challenge

Because Maier assumes fictional names in parafictional and metafictional statements are referentially dependent on some existential imagination induced by fictional statements, he only
considers discourse in which the interpretation of parafictional and metafictional statements comes after the interpretation of fictional statements. In other words, in order to talk about a fictional character, we first have to have imagined it. However, fictional names can also be introduced in parafictional statements (and only later used in metafictional or fictional statements) or similarly in metafictional statements. For instance, I can felicitously introduce the fictional names ‘Frodo’ and ‘Sherlock Holmes’ with the following statements:

(5) In *The Lord of the Rings*, a hobbit named Frodo travels to a dark and far away land

(6) Sherlock Holmes is a fictional character created by Arthur Conan Doyle

Here, the fictional names ‘Frodo’ and ‘Sherlock Holmes’ (introduced in respectively a parafictional and metafictional statement) cannot be referentially dependent on some previous act of imagination (induced by a fictional statement). As it is, Maier’s theory does not explain our interpretation of this type of discourse. In order to do so, Maier would have to assume we accommodate a kind of contentless or minimal imagination (e.g. imagining that there is a person named Sherlock Holmes) when interpreting (5) and (6). Although this is a possible strategy, I will not further explore it here because, as I show in the next section, we can solve the paradox of fictional names without resorting to a psychologistic interpretation of DRT.

3 The workspace account

I present an alternative approach to modelling fictional, parafictional and metafictional statements that sticks to a Stalnakerian common ground interpretation of DRT: The ‘workspace account’ (Semeijn, 2017). The workspace account is compatible with Matravers’ (2014) theory of fiction. Matravers argues (against the consensus view of fiction interpretation also advocated by Maier) that there is in fact no special cognitive attitude of imagination involved in fiction. He proposes a two-stage model in which our primary engagement with a narrative (i.e. entertaining its content) involves the same cognitive processes whether the narrative is fictional or not; What goes on in the head of the reader of a fictional story does not differ from what goes on in the head of the reader of a non-fictional story. The difference between fiction and non-fiction is only apparent in the second stage of narrative interpretation where we decide on whether to actually adopt as belief the propositions that we have entertained. A similar idea is developed in Kamp’s (2016) mentalistic framework. Kamp introduces a compartment ($K_{dis}$) for the neutral place where we build representations of the content of the current discourse before forming judgements about the truth of the propositions expressed by $K_{dis}$.

Likewise, in the workspace account, common ground updates are formalized as a two-step algorithm where the first step – updating a temporal common ground (i.e. the workspace) – is uniform for non-fiction and fiction. What differentiates non-fiction from fiction is whether, at the end of the (possibly multi-sentence) discourse, ‘assertive’ or ‘fictive closure’ is performed: Whether the content of the updated workspace (i.e. the propositions entertained during the discourse) is added to the common ground as actual belief (for non-fiction) or as parafictional belief (for fiction) under the relevant fiction-operator. I present a simplified representation of assertive closure of the assertion *Trump is the president of the U.S.* and of fictive closure of fictional statement (1). I assume in both cases that the common ground and workspace are empty before the first update:
So, whether I am reading *The Lord of the Rings* or *The Times*, I update the workspace with the content of the narrative. As soon as I stop entertaining the propositions of a non-fictional narrative (e.g., some article in *The Times*) I stop updating the workspace (with e.g., *Trump is the president of the U.S.*), and instead update the common ground with the propositions in the workspace: I adopt the entertained propositions as belief. As soon as I stop entertaining the propositions of a fictional narrative (e.g., *The Lord of the Rings*), I stop updating the workspace (with e.g., *Frodo had a very trying time that afternoon*) and instead update the common ground with parafictional propositions concerning *The Lord of the Rings* that are based on the propositions in the workspace (e.g., *In The Lord of the Rings, Frodo had a very trying time that afternoon*): I adopt parafictional beliefs based on the entertained propositions.

As the formalism shows, fictive closure also involves global accommodation of a discourse referent $x$ for any fictional entity that is newly introduced in a fictional statement. Thus, assuming (1) introduced the name ‘Frodo’, fictive closure of (1) also involves accommodation of a discourse referent for ‘Frodo’ in the main box. I hence incorporate the realist assumption that there exist fictional characters. Proper name conditions (e.g., $\text{name}(x, \text{Frodo})$) are separated from the other conditions in the workspace and placed in the main box. This represents the fact that the fictional character Frodo is also named ‘Frodo’ outside of *The Lord of the Rings*. Parafictional and metafictional statements (i.e., the statements that make up the content of the common ground) are about these fictional characters.

The ontological status of fictional characters is still a matter of debate.\(^1\) They can be interpreted as abstract objects (e.g., Zalta, 1983; 1988) that allow for two kinds of predication: They encode certain properties (e.g., ‘being a hobbit’) and exemplify others (e.g., ‘being fictional’). In this account, metafictional and parafictional statements are about respectively what properties fictional characters exemplify and what properties they encode.\(^2\) Alternatively, as Recanati (2018) suggests, fictional characters can be analysed as so-called ‘dot-objects’ (See e.g., Pustejovsky, 1995; Asher, 2011) which are complex entities involving several facets. In such an account, metafictional and parafictional statements predicate over different facets of the fictional character (respectively the abstract object facet and the flesh and blood facet).

### 3.1 Solving the paradox of fictional names

So, how does the workspace account solve the paradox of fictional names? Fictional statement (1) triggers fictive closure. Parafictional statement (2) and metafictional statement (4) are as-

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\(^1\)See Smeijin (forthcoming) for an overview of how different theories of fictional characters can account for anaphoric links across mixed parafictional/metafictional discourse.

\(^2\)Actually, Zalta analyses *implicit* parafictional statements as being about what properties fictional characters encode. Explicit parafictional statements are about what propositional properties (e.g., ‘being such that $p$ is true’) stories encode.
sertions and hence trigger assertive closure. Returning to our previous test case (i.e. the agent that reads (1) in *The Lord of the Rings* and subsequently hears a reliable source say (2) and (4)), a simplified representation of the common ground that results from fictive closure of (1) and assertive closure of (2) and (4) looks as follows:

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<thead>
<tr>
<th>x</th>
</tr>
</thead>
<tbody>
<tr>
<td>name(x,Frodo)</td>
</tr>
<tr>
<td>fictional(x)</td>
</tr>
<tr>
<td>LOTR</td>
</tr>
<tr>
<td>trying-time(x)</td>
</tr>
<tr>
<td>hobbit(x)</td>
</tr>
<tr>
<td>famous(x)</td>
</tr>
</tbody>
</table>

Because the discourse referent x for the fictional character Frodo is globally accessible, the name presuppositions in (2) and (4) can take x as their discourse referent. There is no tension between accepting both (1) and (4) because we ‘accept’ (1) only temporarily; We update the workspace with (1) and hence entertain (1) only for the purpose and duration of reading *The Lord of the Rings*. (4) and a parafictional belief based on (1) are accepted more permanently (as part of the common ground) but are not in conflict with each other; Both are about Frodo as a fictional character.

### 3.2 A closer look at parafictional and metafictional statements

In section 2.1, I discussed a challenge for Maier’s theory concerning fictional name introduction in parafictional and metafictional statements. In the workspace account, this type of discourse poses no challenge. Parafictional and metafictional statements are about fictional characters (rather than being referentially dependent on an existential imagination). Fictional characters really exist (i.e. as abstract objects or dot-objects). Hence the introduction of a fictional name in a parafictional or metafictional statement (as in (5) and (6)) is just like the introduction of a regular name (e.g. ‘Trump’) in a regular assertion; It involves global accommodation of a discourse referent for respectively a fictional character or for a flesh and blood individual. Hence, the workspace account avoids Maier’s difficulties with statements such as (5) and (6). We globally accommodate a discourse referent at the first introduction of a fictional name whether in a fictional, parafictional or metafictional statement.

### 4 Conclusion

I have argued that Maier’s psychologistic interpretation of DRT solves the paradox of fictional names but runs into difficulties with the parafictional and metafictional challenge. I have shown that the workspace account sticks to a common ground interpretation of DRT while solving the paradox and avoiding the challenge. In conclusion, whatever independent reasons there may be for a move to a psychologistic interpretation of DRT, modelling fiction interpretation does not force us to switch to it.
References


In this note we present the Directival Theory of Meaning – a first semi formal theory of meaning introduced by a Polish logician Kazimierz Ajdukiewicz – and we show how it can be furthered developed by means of default logic.

1 Directival Theory of Meaning

The directival theory of meaning (which we are going from now on often call simply “the DTM”) was a theory of meaning developed originally by Kazimierz Ajdukiewicz, a Polish logician and philosopher known especially for his seminal contribution to categorial grammars [1]. The theory was originally presented in two papers published in the 1930s [3, 2]. Both papers have been translated to English and published in [4]. The DTM has been a notable achievement for several reasons. It was the rst formal (or rather semi-formal) theory of meaning [5], it was the rst theory of meaning that connected the notion of meaning with language use (20 years before Wittgenstein). Most importantly for us, it was the rst conceptual (or functional) role semantics, that is semantics which explains meaning of expressions as the role they play in language.

Let us start with a quick, general description of some of the key features of the DTM. First of all, it is important to learn that the theory can be described as “semantics” only in a traditional, pre-Tarskian way. It is a theory of meanings understood as Fregean “senses”, rather than a theory of reference. In fact, the theory is purely non-referential – it uses neither the notion of reference, nor the notion of truth. As we will see later, this is one of the reasons why default logic seems to be a natural fit for the DTM.

Second of all, the DTM construes meanings as environmentally narrow (i.e., not dependent on external grounding) but socially wide (i.e., dependent on the usage in a given community). As we are going to see in Sect. 5, the theory is very flexible as it can be interpreted as a theory of idiolect, sociolect or the whole language, yet not as a theory of private language.

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The easiest way to understand the DTM is to start with a common observation about the way people react to substantial disagreements. When people use words as intended, communication is fluent; of course, it may be more or less fluent as people argue and disagree, but from our point of view it is interesting that sometimes communication comes to a complete halt. This means that sometimes an argument between two sides reaches a point where the sides start to suspect that the disagreement is, in fact, verbal. What users do in these cases is that they try to detect the suspected verbal difference by asking a few key questions about the expression in question. If the interlocutor does not answer as expected, she starts to be treated as if she used the expression with a different meaning.

Ajdukiewicz generalized this common-sense observation and assumed that every expression in a language figures in some sentences that the linguistic community expects the user to accept if she is to be treated as a member. Rules, or prescriptions, which codify these expectations are what the theory takes its name from: we call them “meaning directives”. The additional constraint that we should not forget, is that the expression has to figure in the directives in an “essential manner”. What it means in practice is that it cannot function in this expression just as a substitution of a variable.

2 Meaning directives

The general scheme of a meaning directive can be presented in a contemporary “input-output” format, where “input” refers to the circumstances the speaker encounters and “output” refers to the reaction to these circumstances. Using this format we can discern between four types of directives (the original Ajdukiewiczian account contained only the first three of them).

**Axiomatic directives**, which are the simplest type, should be understood as prescriptions which tell users of the language to accept (or reject) a certain sentence in any circumstances. In other words, they do not specify any input but require only a specific output – acceptance (or rejection) of a sentence. A very simple, non-controversial example of an axiomatic directive can be obtained by any substitution of an identity statement \( x = x \). A sentence “a table is a piece of furniture” can serve as a more complex, natural example of a directive of this type. It is important to understand that particular directives are always relative to a given language and to the community of users. The same sentence can function as a directive in one community but it can be treated as a contingent sentence in another community. Its status is fully dependent on how the community treats it. The difference between a violation of a directive that assumes unconditioned acceptance of a sentence and a simple rejection of a sentence (which can be interpreted as a difference in opinion) is that the violator is not treated seriously by the community. Contrary to the standard rejection of a commonly held opinion, the violator will not be treated as having a different (even outlandish) belief. She will be seen as speaking a different language (or using some of the expressions figuring in this sentence in a different meaning) than the rest of the community. Her rejection will be treated not only as a false or absurd claim, but as completely incomprehensible.

**Inferential directives** relate two sentences: an input sentence (it can be also a conjunction of many sentences) and an output sentence. The main idea behind this type of directives is that once the user accepted a given sentence (which the directive does not necessarily prescribe her to, this might have been the user’s choice), she has to accept the output sentence. A model example of this type of directives is the rule of introducing conjunction.

The third type of directives, **empirical directives**, introduce an extra-linguistic parameter to the mix. The idea behind them is that once the user finds herself in some specific empirical circumstances which manifest themselves in a specific internal state of the user (for example
a visual perception of a color), she has to accept the prescribed output sentence. For example, the user looking at a big patch of red should accept the sentence “This is red”.

Last but not least, **promotive directives** relate an acceptance of a sentence (input) with a motor action of the user (output). To use an example – a user who accepts the command “Stop!” is expected to suspend her movement and will be said not to understand the meaning of the expression “Stop!” if she fails to do so.

### 3 Language Matrix

Assuming that we managed to build a corpus of sentences enclosed in meaning directives, we can now proceed to the main part of the theory in which it shows us how the meaning of all non-compound expressions of a language can be extracted from the directives. In order to do that we have to build a “language matrix”. The matrix contains all of the sentences enclosed in meaning directives. Every sentence which is put into a language matrix is divided into its constituent parts using the following procedure: the first cell contains the sentence itself; the next cell contains its main connective or a predicate (in the case of an atomic sentence); the next cell contains the first argument of the connective (or an argument of the predicate). Then the same procedure applies to the first argument: we put its main connective first, then its first argument and so on. When we reach the level of atomic parts, we move on to the second argument of the main connective of the sentence we started with. The pattern is repeated as long as there is nothing more to decompose. This enables us to provide the following definition of meaning.

**Definition 1.** The meaning of a non-compound expression \( e \) in a language \( \mathcal{L} \) is an ordered pair \( \langle M, P \rangle \) consisting of the matrix \( M \) of \( \mathcal{L} \) and the set \( P \) of places \( e \) occupies in this structure.

There are two possible misunderstandings that we should avoid. First of all, it is important to differentiate two claims:

1. That for every expression \( e \) there is at least one sentence \( S \), such that the user has to accept the sentence \( S \) in some circumstances \( C \).
2. That for every circumstance \( C \) and every expression \( e \), there is a sentence \( S \) containing an expression \( e \), such that the user has to either accept or reject \( S \) in \( C \).

In the setting represented by (2), language functions as a script of sorts which tells users which linguistic action they should perform in any situation. Under this description, users function as linguistic automata and language rules determine their verbal behavior completely. It is thus crucial to remember that the DTM subscribes only to the claim (1).

Second of all, even though the DTM can be described as a holistic theory of meaning, it is only weakly holistic or a “molecularist” theory. The reason for it is that the set of sentences which is used to define the meaning of all non-compound expressions is only a finite subset of all syntactically proper sentences of a given language.

What both of these caveats mean in practice is that the DTM is a “prohibitory semantics”. According to the DTM the meaning of an expression boils down to the constraints on the usage. The theory claims that the only role meaning plays in language is that it shows the users the boundaries of language, meaning helps the users avoid the misuse of words. As long as the users stay within these boundaries, they are free to say whatever they want.

By now, the biggest aw of the theory should be rather obvious to the reader. Up to this point the theory was able to inform us only about the meaning of non-compound expressions. In order to move further we need to add compositionality to language. Unfortunately, the original version presented by Ajdukiewicz does not contain this part.
4 Towards the formalization of directives

As mentioned in Sect. 2, we distinguish four types of directives: axiomatic, inferential, empirical, promotive. Note that we can draw another demarcation line dividing the four above-mentioned types into two categories: stable and productive directives. Indeed, axiomatic, empirical and promotive directives impose some rigid restrictions on language users, i.e., they oblige them to accept or reject an expression (axiomatic and empirical directives), or to act in a particular way (promotive directives), when they encounter this expression in given circumstances, and as such they do not expand the original set of directives. On the other hand, inferential directives force a language user to perform an action (of, e.g., accepting or rejecting a sentence) provided that another action was performed by them. In this sense they can produce new directives and thus make the original set expand.

It seems quite natural to interpret axiomatic and empirical directives as binary relations linking circumstances and expressions. In the same vein, promotive directives are simply binary relations between expressions and actions.

It is important to stress the difference between (1) a (stable) directive which forces a language user to perform an action in certain circumstances, and (2) an actual action taken by the user in given conditions. To avoid obscurity, let’s consider an example. Assume that the theory of meaning for our language contains the following empirical directive: “When you see a red dress, accept the expression «Red!».” It can be represented as a binary relation of acceptance between the situation described as “seeing a red dress” and the expression “Red!”.

On the contrary, inference directives can be conceived as inference rules whose premises and conclusions comprise relations described in the previous paragraphs. As such, they are objects of a different form than relational formulas representing other kinds of directives. If $X$ is a language user, she simply applies the inference rule representing an inference directive. The following implication represents an exemplary inferential rule: “If $X$ accepted a sentence $\varphi$ in a circumstance $C$, she has to reject a sentence $\psi$ in a circumstance $C'$”. This means that if the relation of (factual) acceptance holds between $\varphi$ and $C$, then the complement of this relation holds between $\psi$ and $C'$.

Among inferential directives we distinguish those that need to be applied unconditionally and those which ought to be applied only if it does not lead to a contradiction (material). The first kind contains all logical inferential directives, i.e., those which pertain to logical constants of a logic underpinning our language.

5 DTM+Default Logic

To formalize our set of directives we will use the many-sorted language of first-order logic which caters a good balance between expressive power and facility of use.

Let $X$ be a metavariable denoting a language user. We introduce the following relational constants representing binary relations: $A$ (for obligatory acceptance), $R$ (for obligatory rejection), and $P$ (for obligatory performance of an action). Additionally, for each language user

---

1We realize that the assumption that there exists a logical system “underpinning” a language is a bit sloppy (see, e.g., [7]). A formalization that we will present in the sequel of the paper does not, however, essentially rest upon this assumption, i.e., in the formal representation of a particular set of directives we can leave a set of logical inferential directives empty if we decide that in the language there exist no logical constants.
X, we introduce the relation of contingent acceptance, rejection and performance of an action, resp., \(AX\), \(RX\), and \(PX\). We distinguish three sets of individual variables and individual constants: \(E_{\text{var}} = \{x_e, y_e, z_e, \ldots\}\) (expression-variables), \(E_{\text{cons}} = \{e_1, e_2, e_3, \ldots\}\) (expression-constants) \(C_{\text{var}} = \{x_c, y_c, z_c, \ldots\}\) (circumstance-variables), \(C_{\text{cons}} = \{C_1, C_2, C_3, \ldots\}\) (circumstance-constants) \(A_{\text{var}} = \{x_A, y_A, z_A, \ldots\}\) (for action variables), and \(A_{\text{cons}} = \{A_1, A_2, A_3, \ldots\}\) (action constants). Thus, in our setting expressions of the language, and descriptions of circumstances and of actions to be performed become first-order terms. The language of our formalization also contains the negation connective: \(\sim\) and parentheses as auxiliary symbols.

As one can easily guess, axiomatic directives after formalization take the following form: \(\forall x_e A(e_i, x_e)\), \(\forall x_c R(e_i, x_c)\), where \(e_i \in E_{\text{cons}}\). Analogically, empirical (1 and 2) and promotive (3) directives will be formalized as follows: (1) \(A(e_i, C_j)\), (2) \(R(e_i, C_j)\), (3) \(P(e_i, A_j)\), where \(e_i \in E_{\text{cons}}, C_j \in C_{\text{cons}}, \text{and } A_j \in A_{\text{cons}}\).

As mentioned before, inference directives are formalized as inference rules. Logical rules are represented as ordinary inference rules. For the sake of example, let’s assume that in our language only two connectives have the status of logical constants, namely: negation (\(\sim\)) and conjunction (\(\land\)). Then the rule schemes expressing the appropriate inference directives containing these connectives could look as follows:

\[
\begin{align*}
(-\gamma) & \quad \gamma(-e_i, C_j) \\
& \quad \sim \gamma(e_i, C_k) \\
\land & \quad \alpha(e_i, C_k) \\
& \quad \alpha(e_i, C_k) \\
\land & \quad (\land\alpha) \\
& \quad \alpha(e_i \land e_j, C_m) \\
& \quad \alpha(e_i \land e_j, C_m) \\
\land & \quad (\land\beta) \\
& \quad \beta(e_i \land e_j, C_k) \\
& \quad \beta(e_i \land e_j, C_k) \\
\land & \quad (\land\beta) \\
& \quad \beta(e_i \land e_j, C_k) \\
& \quad \beta(e_i \land e_j, C_k) \\
\land & \quad (\land\beta) \\
& \quad \beta(e_i \land e_j, C_k) \\
& \quad \beta(e_i \land e_j, C_k),
\end{align*}
\]

where \(e_i, e_j \in E_{\text{cons}}, C_j, C_k, C_l, C_m \in C_{\text{cons}}, \gamma \in \{A, R, A_X, R_X\}, \alpha \in \{A, \sim R, A_X, \sim R_X\}\), and \(\beta \in \{\sim A, \sim R, \sim A_X, \sim R_X\}\). The set of unconditioned inference rules must be expanded by adding to the logical rules the following structural rules:

\[
\begin{align*}
(\text{OR}_1) & \quad A(e_i, C_j) \\
& \quad A_X(e_i, C_j) \\
(\text{OR}_2) & \quad R(e_i, C_j) \\
& \quad R_X(e_i, C_j) \\
(\text{OR}_3) & \quad P(e_i, C_j) \\
& \quad P_X(e_i, A_j) \\
(\text{CR}_1) & \quad A(e_i, C_j) \\
& \quad \sim R(e_i, C_j) \\
(\text{CR}_2) & \quad R(e_i, C_j) \\
& \quad \sim A(e_i, C_j),
\end{align*}
\]

where \(e_i \in E_{\text{cons}}, C_j \in C_{\text{cons}}, A_j \in A_{\text{cons}}, \text{and } X \text{ is a metavariable denoting a language user.}\) \(\text{CR}_1\), \(\text{CR}_2\), and \(\text{CR}_3\) (directive obedience rules) guarantee that directives are obeyed, whereas \(\text{CR}_1\) and \(\text{CR}_2\) can be called consistency rules since they assure that \(A\) and \(R\) are disjoint (but not necessarily exhaustive) as relations. It is important to realize that all \(e\)- and \(C\)-expressions in the above schemes are, in fact, variables ranging over the sets of respective constants. Thus, each substitution of these variables with concrete constants (remaining in accordance with the original directives) constitutes a separate rule.

All material inferential directives are modelled by means of defaults, i.e., rules of inference introduced within default logic. Default logic is a nonmonotonic logic introduced by Reiter in [8] (see also [6]). It consists of a set of defaults added to an underlying logic as additional, nonmonotonic rules of inference. A scheme of a default has the following form: \(\frac{\alpha; \beta_1; \ldots; \beta_n}{\gamma}\), where \(\alpha\) is called prerequisite, \(\beta_1, \ldots, \beta_n\) are called justifications and \(\gamma\) is called conclusion of the rule. It can be informally read as: “If \(\alpha\) holds and nothing will ever contradict either of \(\beta_1, \ldots, \beta_n\), then \(\gamma\) holds.”

Each material inferential directive, where \(\alpha\) is the premise and \(\beta\) is the conclusion of the directive, will be formalized as a normal default, i.e., a default of the form: \(\frac{\alpha; \beta}{\beta}\). For instance,
if an inference directive takes the form: “For any circumstance C, if you (have to) accept a sentence «It’s a human embryo.» in C, then you (have to) accept a sentence «It’s a human being» in C (∀C ∈ Ccons[A(«It’s a human embryo.», C) → A(«It’s a human being.», C)], it will be formalized by the following default scheme:

\[
A(\text{«It’s a human embryo.», } C) : A(\text{«It’s a human being.», } C)
\]

\[(\dagger)\]

where \(C ∈ C_{\text{cons}}\).

If we want to model “the dynamics” of the set of directives, triggered by inference rules, we need to first determine the set of all axiomatic, empirical and promotive rules, as well as the sets of actual language behaviours. Then we alternatively “run” all unconditioned and material inference rules on our initial set and obtain a so-called extension as the limit of such a procedure. For a more formal definition of extension let \(D\) denote the set of all defaults and \(Cn\) – the consequence relation determined by all unconditioned inference rules. Then an extension is a smallest set \(E\) such that:

1. \(E_0 = W\).
2. \(E_{n+1} = Cn(E_n) \cup \left\{ \gamma | \frac{\alpha : \beta_1, \ldots, \beta_n}{\gamma} \in D \text{ and } \alpha \in Cn(E_n) \text{ and } \neg \beta_1, \ldots, \neg \beta_n \notin E \right\}\).
3. \(E = \bigcup_{n=1}^{\infty} E_n\).

In this setting multiple different extensions are allowed. If, for example, our set of defaults contains \(\dagger\) together with the following default:

\[
A(\text{«It doesn’t have a fully mature nervous system.», } C) : R(\text{«It’s a human being.», } C)
\]

\[(\ddagger)\]

where \(C ∈ C_{\text{cons}}\), then our initial set of directives will yield (at least) two different extensions, one of which will comprise the empirical directive \(A(\text{«It’s a human being.», } C)\), whereas the other one – the directive \(R(\text{«It’s a human being.», } C)\).

Since the same initial set of directives can yield many different extensions, we can identify a(n extended) language matrix with the set of all directives occurring in the intersection of all yielded extensions. Directives that occur in subsequent extensions but are not elements of the intersection can possibly be interpreted as idiosyncrasies typical for idiolects, sociolects or different stages of the development of a language of interest. The last hypothesis, however, despite being a promising idea requires a more careful investigation which we intend to carry out in future research.

References

The paper explores the consequences of Barsalou’s understanding-by-simulation for event semantics and the identity of events. The first involve aspect, intention and causation. The second ties into with discourse structure and the division between additive and non-additive discourse relations.

Barsalou’s understanding by simulation can be interpreted in a number of ways. A simple explanation is that simulations place actions into space, time and into the causal order to which human simulators have become adapted. The action should start somewhere in space and then unfolds in time propelled by standard causality allowing for certain disturbances. Space does not have square circles, time does not allow loops and causes predict the consequences by physical regularities, while nothing happens without a cause. The reconstruction of an action in a simulation therefore brings many constraints to bear on the action and enriches a purely conceptual characterisation of the action. That is a form of understanding in the sense of Stefan Frank and Harm Brouwer’s microworlds in which the perception of logical structure includes experience based inference. Simulation of the actions of others is of great help in improving the accuracy of the perception of these actions. From the perspective of Bayesian interpretation, simulation is the best model of likelihood that can be imagined for the hypothesis of the other’s action and can as such be what drives the search for the best hypothesis or the improvement of the current hypothesis in action perception. Action recognition is a highly non-trivial example of distal perception, since the necessary mental part of the action (its planning, volition and control) are not directly observable. At the same time, accuracy in recognising the action of others is vital for survival and anything that optimises the recognition skill will be selected in cognitive evolution. Likewise, simulating one’s own future action is of great practical benefit, since it can reveal flaws and opportunities in one’s plan and so increase success of one’s action and thereby survival.

There is however a important third role of simulation, a role in semantics. This is best approached within a concept of meaning as in Kant’s or Twardovski’s concept of mental representation. Such mental representations can be true of the external world by the external world containing their external object or false by there being no such external object or only ones that are not represented by the representation. The representation however always has an internal object which it represents by definition and the question of truth or falsity can be reduced to one of comparing the internal object with the range of objects in reality that could be the external object of the representation. In terms of this picture, a simulation of an action is the most natural candidate for being the internal object of action concepts, both the
meanings of action verbs and the action concepts that naturally arise in making sense of the outside world.

The assumption that simulations are the internal objects of action concepts has important reflexes both on the nature of action concepts and on the nature of simulations. Action concepts must take into account the intentional side of the action, its goal, plan and control since this is what causes the action to start and what keeps it unfolding. Action concepts must further contain the causality in the execution as such. Inversely, what belongs and what does not belong to a simulation will be a matter of the concept: for any part of a simulation, there must be a component of the concept that would be simulated by that part. What is a simulation is therefore to a large extent a conceptual matter.

Simulations in perception, planning and in semantics are almost necessarily partial. The only exception to that could be the (perfect) memory of one’s own action in the past. In all other cases, important parts are not given to the perceiver, the planner or the thinker. Yet a simulation can be further completed until the point that no more detail can be added. Any partial simulation allows many such completions and partial simulations can be understood as the class of such completions. If the simulation corresponds to an external event, the external event will determine a unique full simulation. This viewpoint makes it possible to say something about action identity. Two actions are identical iff their complete simulations are identical.

This is rarely the case on conceptual grounds alone when the actions have a different lexicalization. A possible example is buying and selling. Here each part of John selling some trousers to Bill is a part of Bill buying the trousers from John. Important are the cases where a concept is described analytically. E.g an agreement on something can be analysed as a proposal to agree on that by one party together with the (properly recognised) acceptance of that proposal by the other party. Simulations of the agreement than contain the proposal and the acceptance and simulations of the proposal and the acceptance are simulations of the agreement. A case where non-conceptual grounds come in is the following. John’s going from A to B and John’s running from A to B (if the going was effected by the running). This simulation-based account of action identity seems to help with identity puzzles about events.

A central one is the distinction between additive discourse relations such as narration and list versus the non-additive ones such as elaboration, reformulation and explanation. The second group may involve identities but more often it the weaker notion of entanglement that is relevant: the simulation of either relatum crucially involves a partial simulation of the other, making the two actions non-distinct. Additivity requires full distinctness. The talk will elaborate on the semantical consequences of simulation for action concepts, including intentionality and perspective, using a couple of example verbs: give, climb, realise, propose and agree and provide a longer discussion of additivity.