

‘Over reference’: a comparative study on German prefix-verbs

Antje Roßdeutscher, Gabriella Lapesa, Max Kisselew,
Sebastian Padó, Tillmann Pross,
Institute for Natural Language Processing
University of Stuttgart

1 Introduction

- In this paper, we describe the integration of distributional and conceptual perspectives on word meaning into accounts of truth-conditions. We report a case study on the meaning of German prefix-verb constructions with *über* (‘over’).
- Collaboration between
 - Formal Semantics. Research interest: Compositional theory of word-formation of prefix- and particle verbs from their roots at the syntax-semantics-interface. Minimalist Syntax meets DRT. (Roßdeutscher and Kamp [2010], Rosseutscher [2015], Pross and Roßdeutscher [2015].i.a.)
 - Distributional Semantics. Research interest: Distributional models of derivation. (cf. Kisselew et al. [2015]); focus on the distributional characterisation of meaning shifts produced by derivational processes in German prefix-verbs.
- Experiment: Hierarchical clustering of 4×10 prefix-verbs on *über* (over). We extracted vector representations for all items in our dataset (derived and simple verbs) by relying on a state-of-the-art technique (cf. Mikolov et al. [2013] continuous bag-of-words representation). The distributional semantic model on which our experiment was conducted was extracted from the SdeWac corpus (cf. Faaß and Eckart [2013]) by applying a context window of 5 words to the left and to the right of the target. To visualise the similarity in our dataset we applied a hierarchical clustering algorithm (cosine similarity, average linkage).

1.1 The four classes

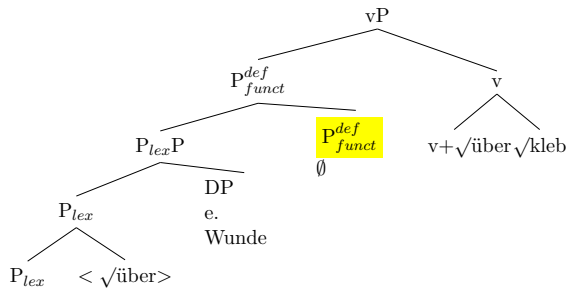
APPLication	SCALE
überdecken (cover)	überschätzen (overestimate)
überschwemmen (swamp)	übertreiben (overact, overdo)
übergießen (pour)	überfrachten (overcharge)
überschütten (deluge)	überbewerten (overrate)
übersäen (reseed)	überladen (overload)
überfluten (flood, overflow)	überstimmen (outvote)
überhäufen (heap on)	überspitzen (exaggerate)
überwachsen (overgrow)	überbuchen (overbook)
überkleben (paste over)	übersteigen (surmount)
überdachen (roof)	überhöhen (heighten, inflate)
TRANSition	ACROSS
überlassen (leave so. sth. for use)	übersehen (overlook)
übersetzen (translate)	überwachen (monitor)
überreichen (hand over)	überqueren (cross)
überweisen (transfer)	überspringen (jump over sth.)
überliefern (pass down)	überrollen (roll over sth.)
überbringen (bring)	überrennen (run over sth.)
überantworten (pass responsibility)	überfahren (ride over)
übermitteln (transfer information)	überschauen (overlook, survey)
übersenden (send over)	übergehen (pass so. over)
überreignen (convey, reassign)	überlesen (miss sth., reading)
	überkreuzen (cross)

Table 1. First list of verbs for experiments

1.2 The syntax-semantics-interface

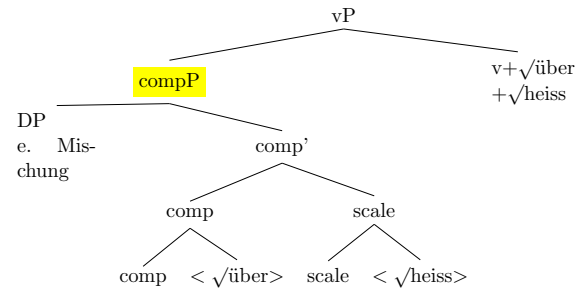
APPLICATION

- (1) *eine Wunde überkleben*
 a wound over.PREFIX.glue
 'to cover a wound by glueing s.th. over it'



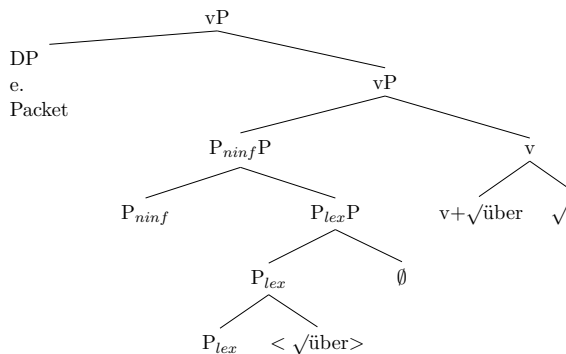
SCALE

- (2) *eine Mischung überhitzen*
 a mixture over.PREFIX.heat
 'overheat a mixture'



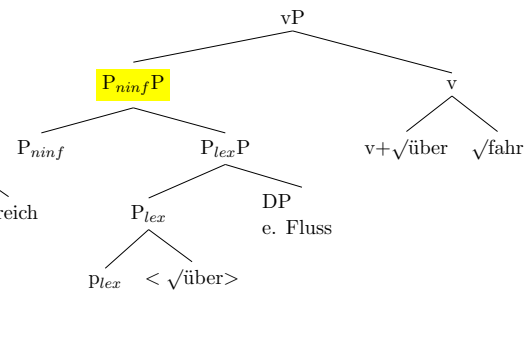
TRANSITION

- (3) *ein Paket überreichen*
 a package over.PREFIX.hand
 'to hand over a package'

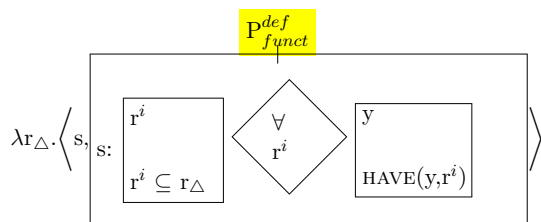


ACROSS

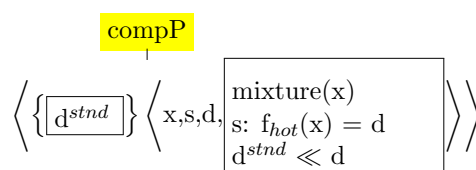
- (4) *einen Fluss überfahren*
 a river over.PREFIX.sail
 'to cross a river by boat'



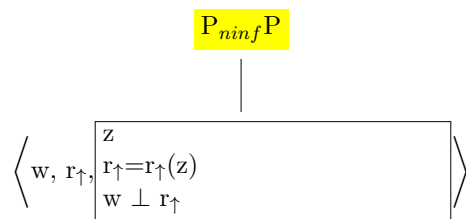
1.3 Some details of the semantics-construction



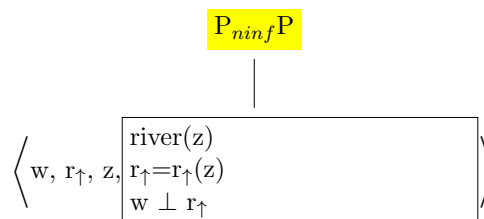
- all parts of the wound are applied with s.th.



- mixture is hotter than the required or desired standard



- path w of package reaches other side of a gap z



- path w over river reaches the other side of the river

APPLICATION	SCALE
$\sqrt{\text{über}}$ 2D-region: r_{Δ} r_{Δ} — 'above'-region of entity z, i.e. top-surface of entity z, <u>top</u> w.r.t. Perceptual Space	$\sqrt{\text{über}}$ presupposition: contextual standard degree of comparison d^{std} assertion: reached degree d', exceeding d^{std} ($d^{\text{std}} \ll d'$)
TRANSITION	ACROSS
$\sqrt{\text{über}}$ 3D-region: r_{\uparrow} r_{\uparrow} — 'above-cylinder' of <u>implicit</u> entity z bottom-face of r_{\uparrow} = top-surface of the Ground separating recipient from source; <u>top</u> w.r.t. Perceptual Space	$\sqrt{\text{über}}$ 3D-region: r_{\uparrow} r_{\uparrow} — 'above-cylinder' of entity z bottom-face of r_{\uparrow} = top-face of Ground object z; <u>top</u> w.r.t. Perceptual Space

Table 2. contribution of $\sqrt{\text{über}}$

2 Structural properties of the classes

- The structural descriptions predict properties that characterise the 4 classes as mutually exclusive.

2.1 Scalar reading

- verbal constructions with scalar $\sqrt{\text{über}}$ -readings accept scale modifiers (cf. Kennedy and McNally [2005]) and measure phrases contributing difference values (cf. (5a))
- license measures of path adverbs, *weit* (far), measure phrases (*um 10 Teilnehmer* (about 10 participants) but no adverbs modified by such measure phrases (cf. 5b)
- no *with*-phrases (cf. (5c))

- (5) a. *der Kurs ist leicht / stark / ein bisschen überbewertet*
 the class is slightly / strongly / a little-bit over.PREFIX.be.PREFIX.value.v.PRTCL
 'the class is slightly / strongly / a little bit overvalued'
- b. *der Kurs ist $\sqrt{\text{um 10 Teilnehmer}}$ / $\sqrt{\text{weit}}$ / **um 10 Teilnehmer weit* /
 the class is about 10 participants / far / about 10 participants far /
überbucht
 over.PREFIX-book.v.PRTCL
 'the class is overbooked by participants'*
- c. *der Kurs ist *mit Teilnehmern überbucht*
 the class is with participants over.PREFIX-book.v.PRTCLPL

2.2 Application readings

- the complex predicates license *with*-phrases but only those that can be understood as describing the sums of the stuff or things that are being applied (cf. (6a)).
- no scale modifier or path measure-phrases (cf. (6b))

- (6) a. *eine Wunde mit Pflaster überkleben*
 the wound with band-aids over.PREFIX.glue
 'to cover the wound with band-aids'
- b. *eine Wunde *leicht / *weit überkleben*
 the wound slightly / *wide over.PREFIX.glue

2.3 Across-readings

- these predicates describe changes of location which consist reaching the other side of some above-region. A special case of this are verbs of visual perception. Here the conception is that the agent is looking beyond the thing she was meant to see; the 'above'-cylinder is the space above the thing.
- 'ground-promotion'. The Ground argument of the preposition $\sqrt{\text{über}}$ in (7a) is the direct object of the verb *überfahren* in (7b)
- no PPs licensed, no P-elements in functional position, i.e. particles (cf. (7d) in contrast to particle+PP constructions (7c))
- license instrumental *with*-phrases (cf. (7e)), license measure phrases (cf. (7f))

- (7) a. *über einen Fluss fahren*
over a river ride.v
'drive across a river'
- b. *einen Fluss überfahren*
a river over.PREFIX.
'cross a river'
- c. *über einen Fluss hinüber.PRTC. fahren*
over a river hin.DEIC.PRTC. ride
'cross a river'
- d. **über einen Fluss / *über einen Fluss hinüber.PRTC. überfahren*
over a river / over a river hin.DEIC.PRTC. over.PREFIX.drive
'cross a river'
- e. *einen Fluss mit einem Boot überfahren*
a river with a boat over.ride
'cross a river with a boat'
- f. *einen Fluss dreihundert Meter weit überfahren*
a river three-hundred meters wide over.ride
'cross a river three-hundred meters far'

2.4 Generalised transition-reading

- the complex predicates describe abstract change, change of possession or change w.r.t. other domains, such a different languages
- like other Generalised transition verbs *über*-verbs of this category often select datives or undergo dative alternation (c.f. (8a))
- TRANS-predicates license directional PPs describing change of state (cf. (8b), 8a))
- no measure of path-PPs (cf. (8c)); no *with*-phrases describing hidden variables. (We refrain from examples).

- (8) a. *jemandem_{dat} ein Paket überreichen;* *(*jemandem_{dat} einen Text*
 s.o._{dat} a package over.PRXF.hand; s.o._{dat} a text
 übersetzen
 over.PRXF.set.v
 'to give s.o. a package'; 'to translate s.o. a text'
- b. *ein Paket an jemanden überreichen;* *einen Text in das Deutsche*
 ein package to s.o. over.PRXF.hand; a text into German
 übersetzen
 over.set.v
 'to hand over a package to someone'; 'translate a text into German'
- c. **ein Paket weit übersenden,* **Information weit übermitteln*
 ein package far over.PRXF.send; information over.send.V
 'to send a package far'; 'to transmit information far'

3 Is there a unique cognitive concept of $\sqrt{\text{über}}$?

- For the $\sqrt{\text{über}}$ prefix verbs of classes APPL, ACROSS, and TRANS $\sqrt{\text{über}}$ contributes the information that at one point in the course of the described process the Figure is in the 'above'-region of the Ground.
 - (i) in the case of APPL the region is the region above the 'top-face' of the Ground object (e.g. the wound) to which the cover is applied and this is where the Figure (e.g. the band-aids) ends up.
 - (ii) in the case of ACROSS and TRANS *über*-verbs the 'above-region' is the 'above-cylinder' at the Ground separating the initial location of the Figure from its final location.
 - but in (i) the "path of the Figure" is conceptualised as parallel to the VERTICAL (in the direction of gravity) and the Figure's position above the Ground object is the final, — in (ii) the path of the Figure is perpendicular to VERTICAL and its position in the 'above-cylinder' is transitory.
- the clue concept that seems common to these three classes of *über*-verbs is that of 'exceeding' (EXCEED).
- For APPL verbs the figure ends up exceeding the Ground in covering all of it, which typically means that the Figure 'exceeds' the rim of the top-surface of the Ground;
- for ACROSS- and TRANS-verbs the Figure ends up in a position that exceeds the 'above-region' that it has passed through in the course of the process described by the *über*-verbs.
- EXCEED is also applicable to the semantics of SCALE-*über*-verbs. Here the 'Figure' (better described as the theme) ends up with a degree above the relevant scalar dimension that exceeds the norm.
- Two questions:
 - 1. To what extent can the different interpretations of EXCEED be regarded as giving us a common core to the four classes of *über*-verbs?
 - 2. To what extent is, in each of the four classes, the EXCEED aspect due to $\sqrt{\text{über}}$?

4 Morals for a Cognitive Semantics approach

- Intuitively, relevant concepts of from Cognitive Semantics (cf. Langacker [1987], Lindner [1983] i.a.) for the semantic design of *über*-verbs are
 - container, inside, outside, path, goal
- the challenge: can we describe significant parts of the semantics of these verbs in terms of these concepts?
- part of this challenge for the *über*-verbs of our four classes: a correct composition based description in terms of these concepts and of the different ways in which EXCEED is part of the meaning of the verbs in each of these classes.
- For APPL-verbs this will involve the concepts 'inside', 'outside' and 'boundary' of a 2D-region associated with the reference object.
- For ACROSS-verbs (and also for TRANS-verbs) we need the concept of a container (the 'above'-cylinder) and motion along a path going through this container (entering it at one side and leaving it at the other).
- for SCALE-verbs we need the concepts of a scalar ordering and of a norm or standard value or region on that scale.
- There are two issues that such semantic analyses of lexical items raise:
 - 1. Are the concepts that Cognitive Semantics has identified the ones we need; and, if not, can Cognitive Semantics deliver the full range of concepts we need?
 - 2. How, assuming they are sufficient, are they to be put together in the semantic description of particular verbs?

5 Distributional Semantics and the relationship between simple and complex verbs

- One natural target for a distributional account for semantics: use clustering techniques to categorize classes of items. Here in particular categorise the class of verbs given in Table 1.
- the result: the manual classification into APPL, ACROSS, TRANS and SCALE was recovered by fair accuracy with one exception to be described below (s. page 9).
- Figure 3 gives the result of the clustering experiment in the form of a Dendrogram
- Other goals for distributional investigation: the relation between *über*-verbs and their base verbs:
 - What is the correlation (e.g. in terms of cos-distance) between the 'base' verb V and the corresponding *über*-verb?
 - How does the similarity between two *über*-verbs $\textit{über-V}_1$ and $\textit{über-V}_2$ compare to the similarity between the base verbs V_1 and V_2 ?
- (N.B. Some of the verbs in Table 1 don't have corresponding base-verbs. In our most recent experimental effort these have been replaced by *über*-verbs with base verbs or other prefix- or particle verbs with the same verbal kernel.)
- Table 4 gives a sketchily impression of some expected nearest neighbourhood results for some of the *über*-verbs from the list in Table 1.

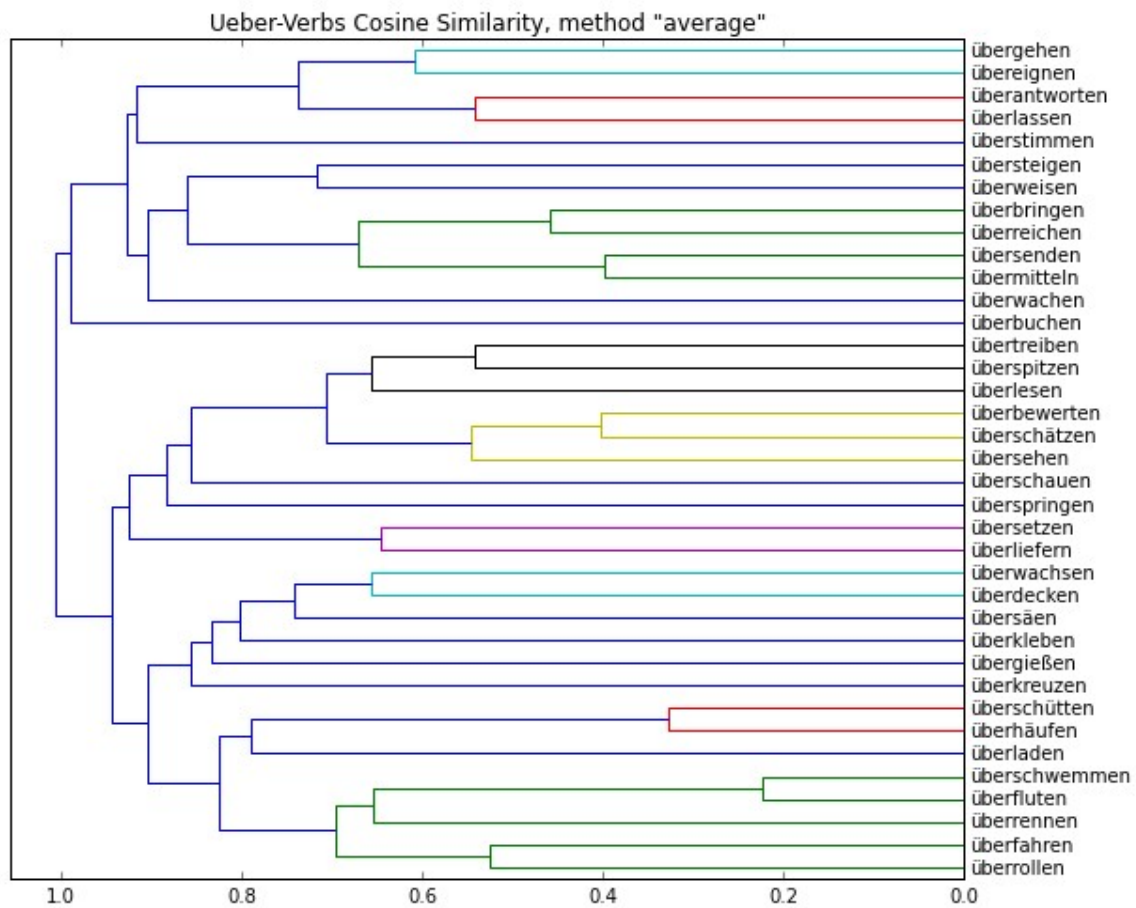


Figure 3.

APPL	SCALE
<p>überhäufen überdecken überdachen</p> <p>übersäen</p> <p>übersteigen</p> <p>überwachsen überkleben</p>	<p>übertreiben überspitzen überhöhen</p> <p>überschätzen überbewerten</p> <p>überfrachten überladen</p> <p>überbuchen überstimmen</p>
<p>überschütten übergießen überschwemmen überfluten</p>	<p>überreichen</p> <p>überbringen übersenden</p> <p>übersehen überschauen</p> <p>überprüfen</p> <p>überrollen überrennen überfahren</p> <p>übergehen</p>
TRANS	ACROSS
<p>übersetzen überliefern</p> <p>überlassen überantworten übereignen</p>	<p>*überwachen* überschauen übersehen überlesen</p> <p>überkreuzen</p> <p>überspringen überrollen überrennen überfahren</p> <p>überqueren</p>

Table 3. unexpected clustering results

5.1 Nearest neighbours of simple and derived verbs

5.1.1 Supportive results

- Since the distributional model we employed for the clustering experiments does not have interpretable dimensions, we extracted the 10 most similar words to base and derived verb as an approximation of the most salient meaning dimensions.
- In quite a number of cases we find considerable similarity between the vectors for base verbs and *über*-verbs. An example is the pair $\langle kleben, überkleben \rangle$. (9) shows the most similar words for each, (9a) the 10 most similar verbs for *kleben* and (9b) for *überkleben*. (9c) and (9d) show the 10 most similar nouns for *kleben* and *überkleben*. A superficial inspection reveals considerable similarity. (For instance 4 of the 10 most similar verbs of *kleben* also occur in the most similar verbs of *überkleben* and moreover *kleben* is among these.)
- The verbal nearest neighbours of the simple verb *kleben* in (9a) and of the prefix-verb *überkleben* in (9b) correspond fairly well with standard interpretations of Distributional Semantics like the one by Baroni et al. [2014]: they provide a set of linguistic expressions that are conceptually similar, connected by narrative chains of, say cutting things and gluing them together; or being related by derivation.
- This also holds for the nearest nominal neighbours in (9d) and (9c) respectively.
- (9b) not only reproduces the simple *kleben* as similar, but also other verbs derived from \sqrt{kleb} and also some with the same prefix $\sqrt{über}$, e.g. *übermalen* (to cover with paint) with belongs to the same APPLICATION class.
- As expected for instances of the APPLICATION class, the direct object which is pasted over (e.g. a sticker or label), (c.f. 9d)) figures prominently in *über*-construction, but not as nearest neighbours of the base verb (compare (9c)). Simple verbs typically have the applied material as nearest neighbours.

- (9) a. ***kleben.V*** *aufkleben.V* *ausschneiden.V* *festkleben.V* *bekleben.V* *tropfen.V*
 glue.V on.PRTC.glue.V out.PRTC.cut fix.glue.V PRFX.glue.V drip.V
verkleben.V *bemalen.V* *abwischen.V* *ankleben.V*
 together.PREFIX.glue be.PREFIX.paint off.PRTC.wipe.V on.PRCT.glue.V
anmalen.V
 on.PRCT.paint.V
 'glue' 'glue on' 'cut out' 'glue fix' 'apply with glue' 'drip' 'glue-together' 'paint'
 wipe off' 'glue on' 'apply paint'
- b. ***überkleben.V*** *kleben.V* *bekleben.V* *bedrucken.V* *aufkleben.V*
 over.PREFIX.paste.V glue.V PRFX.glue.V PRFX.print.V on.PREFIX.glue.V
bemalen.V *ausschneiden.V* *beschriften.V* *übermalen.V*
 PRFX.paint.V PRFX.write.V over.PREFIX.paint.V
 'glue.V' 'glue s.th. on' 'print s.th.on' 'glue s.th. on' 'paint s.th. on' 'cut out'
 'label' 'cover with paint'
- c. ***kleben.V*** *Filzstift.N* *Klebeband.N* *Tesafilm.N* *Pappe.N* *Aufkleber.N*
 glue.V pencil.N adhesive-tape.N adhesive-tape.N card-board.N sticker.N
Kleber.N *Karton.N* *Tonpapier.N* *Innenseite.N* *Klebestreifen.N*
 glue.N card-board.N paper.N inside.N stripe.N
- d. ***überkleben.V*** *Aufkleber.N* *Aufschrift.N* *Schriftzug.N* *Plakat.N* *Filzstift.N*
 paste-over.V sticker.N label.N logo.N poster.N pencil.N
Aufdruck.N *Sticker.N* *Konterfei.N* *Klebeband.N* *Wahlplakat.N* *N*
 imprint.N sticker.N face.N tape.N election-poster

5.1.2 The puzzle

- The one dramatic exception to the overall agreement we found between our linguistic classification of the verbs in Table 1 and results in our clustering experiment concerns the last three verbs of the Dendrogram (*überrollen*, *überrennen*, *überfahren*). According to their linguistic properties they belong to the ACROSS-class. But the clustering experiment established as their distributionally most similar verbs the APPL-verbs *überfluten* (flood) and *überschwemmen* (swamp). How can this discrepancy be explained?
 - A first intuitive observation: *überrennen*, *überrollen* and *überfahren* are distinguished from all other ACROSS-verbs in Table 1 in their connotation of 'grave consequences'. What for those other ACROSS-verbs is naturally conceptualised as a distance or obstacle to be traversed or vanquished is for these three verbs rather something like an affected theme for which the result is catastrophic.
 - This observation gives us also some understanding why the nearest neighbours of these verbs are *überschwemmen* (swamp) and *überfluten* (flood). These two are typically used to describe events with dire consequences.
 - To get a better sense of what may be special about *überrennen* and *überrollen* it is useful to compare them with their base verbs.
 - (10) gives the 10 most similar verbs for *rennen* and *überrennen* and (11) does the same for *rollen* and *überrollen*.
 - one way to use this information is to reflect on the kind of scenarios suggested by these word. For instance among the verbal nearest neighbours of *rennen* we find other 'manner-of-motion'-verbs or sound-verbs; — the nearest neighbours of *überrennen* evoke war scenarios.
 - the nominal nearest neighbours of simple *rennen* evoke scenarios 'run from fright, through the shrubbery, to the toilet'. The likely agents are persons like "you" and "me". The nominal nearest neighbours of *überrennen* overwhelmingly suggest war scenarios (with nouns referring to notorious conquerors, sieges, fortifications).
 - Another point worth noting is that *rennen* hasn't made it into the short list of the 10 similar verbs to *überrennen*. At this point it is not clear, though, how significant this is. *zurollen* (zu.PRTC.roll) occurs among the 10 most similar verbs of *überrollen* and *fahren* among those of *überfahren*.
 - Comparing (11a) with (11b) and (11c) with (11d) we find similar discrepancies. The most similar verbs of *rollen* are manner-of-motion verbs; some of these suggest high speed, but without an implication of actual or likely accidents. Many of the most similar verbs of *überrollen* evoke accidents. A similar difference can be observed for the 10 nearest neighbours among the nouns of *rollen* and *überrollen*.
- (10) a. **rennen.** *V schnappen. V springen. V zurennen. V hüpfen. V schleichen. V*
run scatch.V jump.V towards.run.V hop.V creep.V
aufspringen. V schreien. V wegrennen. V brüllen. V losrennen. V
jump-up.V scream.V run-away.V yell.V start-to-run.V
- b. **überrennen.** *V belagern. V stürmen. V erobern. V umzingeln. V besiegen. V*
run-over.V besiege.V attack.V conquer.V surround.V defeat.V
vorrücken. V einmarschieren. V beschießen, V einkesseln. V
advance.V march-in.V shoot-at.V close-in-on-s.o.
- c. **rennen.** *V Gebüsch. N Treppe. N Türe. N Klo. N Kerl. N Schreck. N Schrei. N*
run.V scrubbery.N stairs.V door.N toilet.N guy.N scare.N scream.N
Drache. N Hintern. N Mama. N Meute. N
dragon.N bottom.N Mama.N mob.N

- d. **überrennen.** *V* *Horde.N Hunne.N Streitmacht.N Übermacht.N Truppe.N*
 over-run.V hord.N hun.N force.N superiority.N troops.N
Festung.N Barbaren.V Belagerung.N Hinterhalt.N Gefecht.N Schlacht.N
 fortress.N vandals.N besiege.N ambush.N war.N fight.N
- (11) a. **rollen.** *V* *donnern.V rasen.V gleiten.V sausen.V kullern.V wuchten.V*
 roll.V rumble.V race.V slide.V speed.V roll-around.V balance.V
rumpeln.V brausen.V rammen.V fahren.V
 rumble.V ram.V drive.run
- b. **überrollen.** *V* *rasen.V prallen.V zurollen.V überfahren.V schleudern.V*
 role-over. race.V bump.V towards-roll.V knock-down.V skid.V
auffahren.V abbremesen.V entgleisen.V überrennen.V zurasen.V
 collide-with.V decelerate.V derail.V over-run.V towards-race.V
- c. **rollen.** *V* *Lastwagen.N Kugel.N Vollgas.N Panzer.V Truck.N Asphalt.N*
 roll.V lorry.N ball.B full-throttle.N armour.N truck.N tarmac.N
Wagen.N Abfahrt.N Piste.N Stundenkilometer.N Ladefläche.N
 car.N runway.N Km-per-hour.N loading-area.N
- d. **überrollen.** *V* *Bulldozer.N Lastwagen.N Lawine.N Flutwelle.N Wucht.N*
 over-roll.V bulldozer.N Truck.N alvine.N flood-wave.N vehemency.N
Panzer.N Aufprall.N Jeep.N Vollbremsung.N Gegenfahrbahn.N
 armour.N crash.N jeep.N full-brake-application.N opposite-lane.N
Polizeiwagen.N
 police-car.N

5.2 The nature of the 'grave consequences'-reading

- An aspect to the contributions made by our clustering experiment has revealed is a negative sentiment component. In retrospect this is not surprising given the importance of the notion of EXCESS that is part of many *über*-verbs. Though 'exceed' doesn't have a negative connotation as such, the notion EXCESS does. And for quite a few *über*-verbs — especially in the SCALE class, this is part of the connotation of the verb: the degree reached by the theme on the scale is 'in excess' of the norm (i.e. the standard degree of comparison), not just in that it is larger than the standard, but in that it is too large.
- The verbs discussed in the last section also raise such a connotation, if for intuitively different reasons. But surely negative connotation isn't a general property of *über*-verbs. It isn't normally for verbs in the TRANS-class nor in the classes APPL and ACROSS, or for some verbs in SCALE. Here is further work for our cooperative venture.
- It should be kept in mind in this connection that the distributional findings such as these may be highly sensitive to the corpus from which the distributional measures are extracted.
- Distributional models are derived from texts in the corpora written by authors with a certain communicative intention. A communicative intention, however, is often not explicitly realized linguistically, but appears in the form of proffered content, implicatures and associative collocations and thus constitutes part of the discourse strategy of the authors (cf. van Dijk and Kintsch [1983]).

6 Conclusion

- Certain use-based meaning components identified by distributional representations of *über*-verbs fall outside the usual scope of conceptual or referential semantics and constitute an additional dimension of word meaning. We believe that this observation is relevant for the three approaches to meaning that the workshop addresses.
- For formal semantics these findings suggest that pre-fixation is often part of discourse planning; if this is so, then the production and productivity of pre-fixation is much more important to the 'referential meaning' of prefixed verbs than has been assumed by formal semantics hitherto (and the same, presumably, holds for other forms of lexical compositionality).
- From a conceptual point of view, the expressive dimensions of the meaning of verb prefixes like *über*- may give us a better access to questions of how constraints imposed by communication help narrow down and shape the cognitive space between which the meanings of *über*-verbs (and other compound verbs) must be situated.
- For computational linguists our case study suggests that the interpretation of distributional representations is often more complex than some distributional studies seem to assume, in particular approaches that envisage a close parallel between the composition of truth-conditions and the composition of distributional representations (cf. Herbelot and Copestake [2013]).

7 Afterthought

- In the remainder of the talk I would like to draw attention to the structural properties of the 'grave consequences' reading.
 - they describe situations over which control is lost or can be lost.
 - the descriptions necessarily have the form of 'ground'-promotion: the argument of P becomes direct object:
 - the direct object is no longer appropriately characterised as Ground, but affected theme.
- (12a) is nonsense, because the river can only be understood as Ground, not as affected theme. (12b) is o.k., the cat is Ground and affected theme; (12c) is infelicitous. Proper planning of the speech-act should have led the speaker to produce (12b).

- (12) a. *ich habe einen Fluss überfahren, *aber es ist ihm nichts passiert*
I have a rived over.PREFIX.sailed.v but it is him nothing happened
'crossed a river, but nothing happened to it'
- b. *ich bin über eine Katze gefahren, ✓aber es ist ihr nichts passiert*
I am over a cat ridden, but it is it nothing happened
'I rode over a cat, but nothing happened to it'
- c. *ich habe eine Katze überfahren, #aber es ist ihr nichts passiert*
I have a cat over.PREFD.ridden, but it is her nothing happened
'I have knocked down a cat, but nothing happened to it'

7.1 Generalising over prefix-verbs with route-P-elements

- The phenomenon that the Ground argument of a route-preposition changes to an affected theme of the verbal complex can also be observed with the other two German prefixes of the route-type, *um*- (around) and *durch*- (through).

- the lantern in (13a) is the centre of *um*, i.e. a ground-argument. In (13b) the lantern is an affected theme, — of a particle construction with *um*, in which the P-element can be separated from the verb.
- the same applies to *durch* (through); (cf. (14a)). In this case the particle construction is strange, because waves do not qualify as affected themes. (However, *er hat das Band **durch**geschnitten* (he cut the ribbon) is fine).

- (13) a. *eine Laterne **um**fahren,* *die **um**fahrene Laterne*
 a lantern around.PREFIX.drive,
 'to avoid the lantern during driving'
- b. *eine Laterne **um**fahren;* *die **um**gefahrene*
 a lantern around.PRTC.drive; the around.PRTCL.GE.drive.PRTCPL
 Laterne
 lantern
 'to knock down a lantern by driving'
- (14) a. *das Boot **durch**schnitt* *die Wellen, die **durch**schnittenen Wellen,*
 the boat through.PREFIX.cut the waves, the through.PREFIX.cut.v waves,
 ****durch**geschnittenen Wellen*
 'a boat cuts through the waves'

- The change from Ground to 'affected theme' is the distinctive feature of the unexpected EXCESS-readings with *überfahren*, *überrollen* and *überrennen*.
- There is — yet — no structural effect: despite the conceptualisation and interpretation of the theme as gravely affected, no syntactic effect of separation goes hand in hand with re-conceptualisation of the direct object.
- But wait — in fact few occurrences of separated pre-forms can be observed. Among them there are newspaper headings (cf. (15a))

- (15) a. *Kind beim Überschreiten der Straße **über**gefahren*
 child during cross.walk.v the street over.ptc.driven
 'third knocked down while crossing the street'
- b. *Menschen wurden verletzt und **über**gerannt*
 people were injured and over.ptc.run.v
 'third were injured and run down'
- c. *Ich habe immer Angst Leute **über**zufahren*
 I have always fright people over.to.drive.v
 'I am always afraid to knock down people during driving'

- If these findings are not per accident, what we observe 'grave consequences' reading is the semantic side of a potentially structural effect of conceptualisation.

References

- Marco Baroni, Raffaella Bernardi, and Roberto Zamparelli. Frege in space: A program of compositional distributional semantics. *LiLT*, 9:241 – 346, 2014.
- Gertrud Faaß and Kerstin Eckart. SdeWaC - a corpus of parsable sentences from the web. In I. Gurevych, C. Biemann, and T. Zesch, editors, *Proceedings of the International Conference of the German Society for Computational Linguistics and Language Technology*, 2013.
- Boris Haselbach. Ps at the interfaces. Dissertation at the University of Stuttgart. forthcoming, 2016.
- Aurelie Herbelot and Ann Copestake. Lexicalised compositionality. Unpublished manuscript, 2013.
- Hans Kamp and Antje Roßdeutscher. The logic and ontology of space as seen through the eyes of natural language. Lecture notes. University of Stuttgart, 2005. URL <http://www.ims.uni-stuttgart.de/~antje/>.
- Christopher Kennedy and Louise McNally. Scale structure and the semantic typology of gradable predicates. *Language*, 81:345–381, 2005.
- Max Kisselew, Sebastian Padó, Alexis Palmer, and Jan Šnajder. Obtaining a Better Understanding of Distributional Models of German Derivational Morphology. In *Proceedings of the 11th International Conference on Computational Semantics*, pages 58–63, London, UK, 2015. URL <http://www.aclweb.org/anthology/W/W15/W15-0108>.
- Ewald Lang. Primary perceptual space and inherent proportion schema. two interacting categorisation grids underlying the conceptualisation of spatial objects. *Journal of Semantics*, 7:121–141, 1990.
- Ronald Langacker. *Foundations of Cognitive Grammar*, volume Volume I. California: Stanford University Press, 1987.
- Susan Lindner. *A lexico-semantic analysis of English verb-particle constructions constructions*. Indiana University Linguistics Club, Bloomington, IN, 1983.
- Tomas Mikolov, Ilya Sutskever, Kai Chen, Greg S Corrado, and Jeff Dean. Distributed representations of words and phrases and their compositionality. In *Proceedings of NIPS*, pages 3111–3119, 2013.
- Tillmann Pross and Antje Roßdeutscher. Measuring out the relation between conceptual structures and truth-conditional semantics. In Kata Balogh, editor, *Selected papers from the Workshop "Bridging Formal and Conceptual Semantics"*, Düsseldorf, 2015. Düsseldorf University Press.
- Antje Rossdeutscher. Hidden universal quantification and change of argument structure in particle-verb constructions. In *Proceedings of Sinn und Bedeutung 19*, 2015.
- Antje Roßdeutscher and Hans Kamp. Syntactic and Semantic Constraints in the Formation and Interpretation of *ung*-Nouns. In A. Alexiadou and M. Rathert, editors, *The Semantics of Nominalisations across Languages and Frameworks*, Interface Explorations 22, pages 169–214. Mouton de Gruyter, Berlin, 2010.
- T. A. van Dijk and W. Kintsch. *Strategies of Discourse Comprehension*. Academic Press, Orlando, Florida, 1983.
- Joost Zwarts. Vectors as relative positions. *Journal of Semantics*, 14:57–86, 1997.