German *her*, *hin*, *hin- und her*, and *herum*: Meaning and Justification of Direction and Change of Direction in Perceptual Space

Antje Roßdeutscher
Institut für Maschinelle Sprachverarbeitung
Universität Stuttgart

`antje@ims.uni-suttgart.de`

Abstract

The paper presents a case study in the compositionality of particle-motion-verbs. Part of the investigation is the interaction between indexical elements contributed by *hin-* (there, thither) vs. *her-* (here, hither) and the deictic motion verbs *kommen* (come) vs. *gehen* (go). The investigation will lead to a distinction between the notion indexical in the sense of 'direct reference to the utterance situation' on the one hand and 'perspectival' as an attitudinal notion on the other. Both dimensions of context dependency are formalised in DRT-based lexical entries applied in a construction algorithm for multiple presupposition construction along syntactically driven principles. These principles are also shown operative in *hin- und her*-α and *herum*-α–descriptions of motion, both lacking reference to the utterance situation. The latter phenomenon is due to a general principle of self-location.

1   Introduction

German has a pair of particles *hin* and *her* specifying direction of motion which are interpreted w.r.t. the utterance location. They come close to English 'thither' and 'hither', respectively, which, however, seem oldfashioned or out of use. A German speaker naturally marks a motion of someone approaching him adding the particle *her-* to the motion verb, as in *Warum rennt der Hund her?* (Why does the dog run here?). He will also mark motion in the opposite direction adding *hin-*. If he is in the rear of the motion rather than in its front, we will ask e.g. *Wo rennt der Hund hin?* (Where does the does run (to)?). The first important question in this paper is whether *hinrennen* and *herrennen* can be reconstructed as compositional from the contribution of *hin-* or *her-* on the one hand and *rennen* (run) on the other. I will tackle the problem by making the idea of self-location in the front or rear of the directed motion operative. The puzzle seems harder with the double-particle construction *hin- und herrennen* as in *Warum rennt der Hund hin- und her?*, which translates as 'running back and forth'. In this complex verb *her-* does not

refer to the utterance location and *hin-* does not indicate either where the speaker is. In one prominent use *hin- und her-* indicates iteration of changing direction which pragmatically implies running without a goal. German has another double particle construction with the latter meaning, i.e. *herumrennen*, with the particle *um* next to *her*. For *um* we can assume that it contributes change of direction as well in some way or other.

Concerning the issue of compositionlity a first glance already reveals that we need at last a semantics for the particles contributing direction, i.e. *hin-* and *her-*, as well as for *um-*, and for the contribution of the motion verbs.[1] But given that we can make the semantics of the particles precise as they occur in, say, *hinrennen* and *herrennen*, is their semantic contribution the same in the case of *hin- und herrennen*? — Hardly so, it seems, because *herrennen* is interpreted with respect to the speaker's self-location whereas the coordinated *hin- und herrennen* is not. *Hin und her-* are interpreted as direction and counter-direction in the motion sequence independent of the speaker's self-location. So the indexical particles come in different colours, and the question arises what makes them change their colour. This will be the leading question in section 2. *Hin-* and *her-* are sensitive to the utterance situation. There are verbs also known as context sensitive in this way, i.e. *come* and *go*, German *kommen* and *gehen*. Is the meaning of a combination of a context sensitive verb and a context sensitive particle predictable from their parts? This will be discussed in section 3. Section 4 will be devoted to *herum-* double particle constructions.

1.1   Background assumptions

The particles, we said, specify direction or change of direction. What is it, then, that the direction or change of direction is specified of? Per hypothesis this is the rectilinear path described with the help of manner-of-motion-verbs like *rennen* and *fahren* or deictic motion verbs like *kommen* and *gehen*. This hypothesis is a background assumption from more general research on space in Natural Language, see Kamp and Roßdeutscher (2005).

1.1.1   motion verbs

We believe that space as seen through the eyes of natural language has a simple geometry. Spatial directions are as much as possible conceived in such a way that all directions expressed in natural languages are conceptualised as following one of the three axes of *Primary Perceptual Space* (PPS), a notion adopted by Lang (1989). The principal determinants of PPS are the vertical axis VERT(ICAL) and the horizontal plane HOR(RIZONTAL), which is perpendicular to VERT. Events as they are described by motion verbs are rectilinear motions which follow one of the three axes of PPS. This assumption of the *Primacy of Orthogonality* relies on two empirical hypotheses on lexicalisation patterns in languages like German or English. First, there are no simple change-

---

[1] I do not claim, that the occurrences of the verbs as a whole or their complex parts are always composed 'online' according to some rules. But even if they are listed in the lexicon an answer to my question to which extent the interpretation of the constructions is rule based will help us to understand the lexicon better.

of-location-verbs that describe only motions that are neither along the VERT(ICAL) nor in the HOR(IZONTAL). Second, there are no simple change-of-location-verbs that describe only motions that are not rectilinear. *Walk, run* and *drive* describe motion in the horizontal, whereas *fall, sink, rise* along the vertical axis. But there are no verbs that lexicalise angular motion alone. You cannot but express the angular rising of a plane into the sky by using the verb *steigen* (to ascend, to rise), i.e. the same verb you use describing the straight vertical motion of, say, a balloon. We assume that the path w(eg) of a movement e (which is reminiscent to a path-concept of Kurt Eberle) is conceived of as a continuous 1-dimensional rectilinear region, and that the target y which moves along it is conceived as a point. This simple geometry sufficiently models what motion verbs express as the modificandum for the particle's contribution of direction and change of direction. The semantic analysis of the particle verbs will provide further evidence for the primacy of orthogonality because changes of direction in 90 degrees in the horizontal will be decisive to qualify for such changes expressed by means of the particles.

A lexical entry for the German motion verb *fahren* (drive) has the following form:

$$\text{fahr(en):} \quad \left\langle e, \begin{array}{|c|} \hline \underline{y}\ w \\ \hline weg(e)=w\ \text{MOVE}(e,\underline{y}) \\ \text{DRIVE}(e,\underline{y})\ w \perp \text{VERT} \\ \hline \end{array} \right\rangle$$

There is a binding condition for the referential argument e and and for an argument slot $\underline{y}$ for the theme, such that *fahren* specifies a two-place relation DRIVE of a motion type between the theme y and the event e. The path of the (rectilinear) motion w is specified as perpendicular to the vertical of PPS. (As we look exclusively at motion in the horizontal we will skip the latter condition in the semantic representations.)

1.1.2 FRONT and REAR of a motion, *her-* and *hin-*

While traversing its path the moving target y determines for each time t two half-planes of the HORizontal; namely the FRONT of the motion e and the REAR of the motion. So the following axiom is part of the geometry that serves as the model for space as expressed in motion descriptions.

$$\begin{array}{|c|} \hline e\ y\ t \\ \hline \text{MOVE}(e,y,t) \\ \hline \end{array} \Rightarrow \begin{array}{|c|} \hline \\ \text{HOR} = \text{FRONT}(e,y,t) \cup \text{REAR}(e,y,t) \\ \\ \hline \end{array}$$

Let us assume that there is an observer of the motion. For each time t the observer can estimate whether the target y is approaching or whether it is disappearing. In other words: the observer either locates himself in the front of the motion, justifying the choice of *her* or else she localises herself in the rear of the motion. This justifies *hin*. That characterisation leaves open whether or not the observer locates herself at some point on the (estimated) path. It is only when endpoints of the motion come into play that the question whether the observer locates herself in the FRONT (or in the REAR) on the path becomes decisive for the lexical contribution of *hin-* and *her-*, see section 2. The direction as required by *hin-* and *her-* is sufficiently determined by the self-location of

the observer in the respective half-planes, FRONT(e,t) or REAR(e,t) defined for some particular t during the motion e.

Think of someone walking in the fields seeing at some time t a dog running towards him. As said in the introduction he will speak to himself or to someone walking by his side in terms (1).a. If the dog is running away from him he may utter (1).b.

(1)   a. Warum rennt der Hund her?   b. Wo rennt der Hund hin?
        why run the dog [hither]   where run the dog [thither]
        'why is the dog running here?'   'where(to) is the dog running?'

If the man localises himself in the front of the movement it is unnatural for him to say *der Hund rennt irgendwo <u>hin</u>* (lit. the dog is running somewhere thither). He will also definitely not use *her-* if he is in the rear of the movement. Or think of the man having his dog close ordering him to stay put. He will say *Du rennst nirgendwohin!* (You are running nowhere!). But if the dog is somewhere distant and should not join the man he will shout *Du rennst nicht her!* (You are not running here!). In the former case the speaker localises himself in the rear of the motion whereas in the latter in the front of the motion.

With the notion of the REAR(e_α) and the FRONT(e_α) of the motion we have the conceptual and formal clue for presenting the contribution of *hin-* and *her-*, see (2): If some observer is present, his self-location is a spatial reference point r_0. We make the element of self-location of the observer explicit in the subscript 'i(ndex)', and a temporal index n(ow): $r_{0,i,n}$.[2] I present the contribution as a pair of presupposition and assertion. The event variable is free in (2).

        a. *her*:   b. *hin*:

$$(2)\quad \left\langle \left\{ \boxed{r_{0,i,n}} \right\}, \boxed{r_{0,i,n} \subseteq \text{FRONT}(e_\alpha)} \right\rangle \qquad \left\langle \left\{ \boxed{r_{0,i,n}}\ \boxed{r_{1,n}} \right\}, \boxed{\begin{array}{l} r_{1,n} \neq r_{0,i,n} \\ r_{1,n} \subseteq \text{FRONT}(e_\alpha) \\ r_{0,i,n} \subseteq \text{REAR}(e_\alpha) \end{array}} \right\rangle$$

her- is <u>indexical</u>. It requires that a reference point is resolved or accommodated in the front of the motion the description of which it is a part. *hin* is anti-indexical and requires a reference point r_1 in the front of the described motion, where r_1 is different from its indexical counterpart which is in the rear of the motion.[3] Both the indexical $r_{0,i,n}$ in the rear and the anti-indexial $r_{1,n}$ in the front must be justified in context.

In (3) the presupposed anti-indexical reference point r_1 is provided by the linguistic context. The man sees the dog running now and again to some particular spot in the field. He speaks to himself or to someone in his company, thereby introducing a description for the particular spot in the first sentence. The presupposed anti-indexical

---

[2]We have already alluded to the fact that the reference point need not be the self-location of the speaker $r_{0,i,n}$ but might actually also be some arbitrary reference point r_0, see next section.

[3]In the context of motion verbs we could strengthen the entry of *hin* adding a further condition: $r_{1,n} \subseteq w$, weg(w,e_α). But this would not generalise to other verbal contexts that specify direction but no path, say, *vor sich hinreden* (to maunder) or *hin- und herwackeln* (to wiggle to and fro). This is why I leave the entry as is.

reference point r_1 is then resolved as anaphoric with respect to the explicitly introduced reference point in context.

(3)   Da muss ein Kaninchenloch sein. Warum rennt der Hund sonst hin?
        'There must be a rabbit hole. Why else does the dog run [hin]'

2   *hin- und her-rennen*

Warum rennt der Hund hin- und her? is interpreted as a squence of motion in some direction and its counter-direction and the reference points are interpreted as arbitrary, independent of the utterance place. This is not in line with the assumptions made in section 1 but the case can be accounted for. Let us, paving the way towards a solution of the puzzle, look at a description of a sequence of events of the dog's running first to the rabbit hole and then towards the speaker again. Let's also assume that the sequence occurs before the utterance time. The description may have the form (4).

(4)   Der Hund rannte hin und rannte her.
        'The dog ran there (e_1) and ran here (e_2)'

The description of the sequence $e_1 \prec e_2$ is a sequence of descriptions of rectilinear motions. Its dynamic semantics is as follows. e_1 has r_{11} as its goal. Following entry (2) the *hin-* description presupposes some reference point $r_{11,n1} \neq r_{01,i,n1}$, such that $r_{11,n1} \subseteq \text{FRONT}(e_1)$ and $r_{01,i,n1} \subseteq \text{REAR}(e_1)$. $r_{11,n1}$ is the 'place reached within the story' made of e_1 and e_2; it is a specific place (and the context is more natural if there is an explicit antecedent in the context). The *her-* description of e_2 requires according to (2) a reference point $r_{02,i,n2}$, which is located in $\text{FRONT}(e_2)$.

We can assume now that the spatial perspective point is stable and we yield the condition that the self-location at the beginning of the event sequence does not change. So we have two self-locations, both at the same place, i.e. $r_{01,i,n1} = r_{02,i,n2}$.

So far we have reconstructed descriptions with *hin-* und *her-* as a sequence of a theme running to some (definite) place distant from the speaker's place and then approaching again, as a special case of a sequence of motions in some direction and it's counter-direction.

Primacy of Orthogonality. What qualifies as a change to counter-direction? A full turn of 180 degrees of the moving target of course target will do, but less dramatic changes can also be felicitously described in terms of *hinrennen und herrennen* or *hin- und herrennen*. However, the change must be one in more than 90 degrees. It is only then, that $r_{01,i,n1} = r_{02,in2}$ is located both in some half-plane qualifying as $\text{REAR}(e_1)$ and some half-plane qualifying as $\text{FRONT}(e_2)$(compare Figure 1, where the arrows represent the motions e_1 and e_2 and the lines the border between FRONT and REAR of e_1 and e_2, respectively.)

That latter condition and the confirmed assumption that motion descriptions are descriptions of those motions as following one of the three axes of PPS support the outstanding role of orthogonality in motion descriptions, see sec. 1.1.
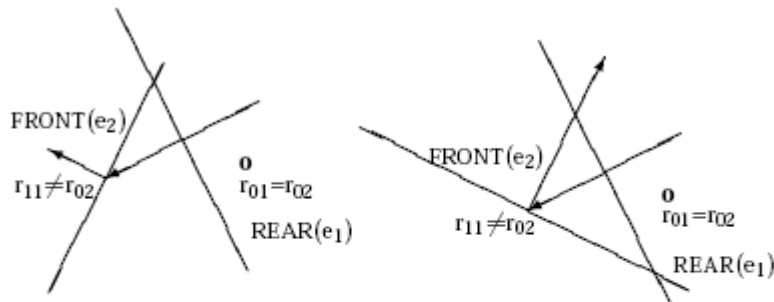
Figure 1.a No model for *hin- und her*(α). Figure 1.b Model for *hin- und her*(α).

What makes $r_{01,i,n1}$ and $r_{02,i,n2}$ loose their indexical colour in *hin-und her*-descriptions and makes them interpreted as arbitrary spatial reference points as given in $r_{01} = r_{02}$ (see Figure 1)? Crucial in this respect, I claim, is whether *hin- und her* serves as a complex modifier of *one* tensed verbal description α. If the sentence can be understood as a sequence of two descriptions, then the reference points can be interpreted as referring to the utterance place. For instance, *Der Hund rannte hin und wieder her* (He ran there and back here, again) must be reconstructed as elliptical, where the second occurrence of the verb is elided, but semantically present. But *hin- und herrennen* as in the simple *der Hund rannte hin- und her* (the dog ran back and forth) is understood as *one* event complex e such that e is a mereological sum of e_1 and e_2, displayed now and later as 'e = $e_1 \oplus e_2$'. We have *one* utterance time n, instead of two for the description of the complex e. Let's counterfactually assume that there would be one utterance time n of the description of e, but two self-locations $r_{01,i,n}$ and $r_{02,i,n}$. How would they be related to e? — $r_{01,i,n} \subseteq$ REAR(e), because $r_{01,i,n}$ is in REAR(e_1) and $r_{02,i,n} \subseteq$ FRONT(e), because it is in FRONT(e_2). So the speaker would have to split his self-location at utterance time n of the description e into two different perspectives on e, being in the front and in the rear of the complex motion e at the same time. But this is impossible. (N.B. Under this impossible assumption the anti-indexical $r_{11,i,n}$ is neither in the rear nor in the front of e, for it is in the front of e_1 and in the rear of e_2. Indeed r_{11}, the 'place where e_1 ends up', has no specific interpretation in simple *hin- und her*-descriptions, which it has in a sequence of descriptions like (4). In a single utterance description of an event complex it serves as an arbitrary point of return on the path of e.) Let us summarise what our counterfactual assumption shows: Self-location is bound to utterance time. One utterance, one self-location. Self-location can either be in the front or in the rear of the motion. If a single utterance describes a sequence of motion in some direction and counter-direction the indexicals cannot be interpreted with respect to the speaker's self-location. This prediction also covers *herum*-α double-particle constructions, which are also one utterance descriptions of event complexes, see section 4. *hin- und her*-constructions must be analysed as double particle constructions as well.

3 *her*-α vs. *hin*-α and *kommen* vs. *gehen*

On the face of it there is a correlation between indexical *her*-α descriptions and *kommen* (to come) on the one hand and anti-indexical *hin*-α -descriptions and *gehen* (to go) on the other. That correlation seems to gain substance by the fact that given our field scenario the utterance of (5) is as natural as (1).a, if not more natural.

(5)   Warum kommt der Hund? / Warum kommt der Hund her?
        'why does the dog come?' / 'Why does the dog come [here]'.

Is there any difference between *herrennen* and *kommen* or *herkommen* at all?[4] As far as the data presented there isn't and the entry of *her-* resembles the one for *kommen* in Roßdeutscher (2000). (The resemblance will be made precise in the following.) Given that resemblance we would not be surprised if *kommen* and *hin-* were incompatible. And indeed, if we substitute *rennen* with *kommen* in (6), we yield a weird context:

(6)   # Da muss ein Kaninchenloch sein. Warum kommt der Hund sonst hin?
        # 'There must be a rabbit hole. Why else does the dog come there'

But the matter is more complex: Neither have *kommen* and *herrennen* the same semantics nor are *kommen* and *hin-* incompatible. The data (7) illustrate the differences. The context is fixed as part of a conversation taking place in Stuttgart, speaking of tomorrow's party at Tübingen.

(7)   Speaker in Stuttgart:"*Morgen ist in Tübingen eine Party...*
        a.   *... Kommst du auch?*"
        b.   *... # Kommst du auch her?*"
        c.   *... Kommst/fährst/gehst du auch hin?*"
        d.   *... Kommst/fährst/gehst du auch hin und kommst/fährst dann wieder her?*"
        e.   *... Kommst/fährst/gehst du auch hin und *gehst dann wieder her?*"

The surprising data are (7).b and (7).c as opposed to (7).a. Assuming that *kommen* is indexical (which is a natural assumption) (7).a. is known as counter-evidence against both seminal theories of indexicality, Fillmore's as well as Kaplan's. See Roßdeutscher (2000) for detailed discussion[5]. Recall that Fillmore (1983) in this analysis of *come* as an indexical predicts that *come* implies that the speaker or the addressee is at the goal of the motion, either at coding time (= utterance time) or at arrival time. But neither is guaranteed here: neither is the addressee's perspective chosen nor necessarily the speaker's, because it doesn't follow from (7).a that the speaker will be at the goal tomorrow. So Fillmore's theory must be qualified or rejected. And, again assuming that *kommen* (to come) is indexical, Kaplan's theory predicting direct reference at the goal of the motion must be rejected or qualified just as well.[6] For his theory on indexicals in Kaplan (1989) excludes any shifts of indices. Denying *kommen* indexical status right away does not present itself as promising taking the weird context (6) into account, where the anti-

---

[4]We ignore differences in manner specification.

[5]The example (7).a goes back to Cinque (1973).

[6]cf. Kamp and Roßdeutscher (2004)

indexical *hin-* and *kommen* apparently conflict. Why should they conflict if not with respect to indexicality? On the other hand (7).c with *hinkommen* is as felicitous as with the manner of motion describing *hinfahren* (drive thither)[7]. Thus the solution to the puzzle must be sensitive to the difference between contexts like (6) and (7).c in the first place. The puzzle has been solved already in the theory of *kommen* in Roßdeutscher (2000): *Kommen* requires an attitude bearer in the front of the motion, a person. That contextually provided attitude bearer is ascribed the attitude of localising himself in the front of the *kommen*-motion. This solves the puzzle of the felicitous (7).c on the one hand and the infelicitous (6) on the other: While there are naturally attitude bearers at the party venue the perspectives of whom justify *kommen*'s requirements,[8] there aren't any attitude bearers at rabbit holes, unless this is explicitly mentioned. Consequently the speaker who describes the motion cannot choose a perspectival description of motion in (6). The speaker in (7) has that option because an attitude bearer can be justified in the front of the motion at the party venue (at the goal) in (7).a, c, d, e for the first motion and he himself is an attitude bearer at the goal of the second motion in (7).d. This option to select *kommen* also obtains in (1).a, and (5). The speaker opts for a non-perspectival motion description in the former and for a perspectival one in the latter. Selecting *kommen* and thereby rejecting *fahren* or *rennen* means making a choice.

This, however, is not so in the selection of *her-* and non-selection of *hin* in *herrennen* in (1) or *herkommen* in (5) (as opposed to *hinrennen* in (1), nor in the selection of *herfahren* or *herkommen* in the description of the second motion in (7).d. The speaker has no choice. The selection is determined by what is actually the case in the utterance situation: The speaker is in the FRONT (at the goal) of the motion and he localises himself there. This actual self-location of the speaker at the indexical 'here' and 'now' of the utterance situation ($r_{0,i,n}$ in (2)) determines the use. And by the same token the region of self-location $r_{0,i,n}$ is the goal-denotation interpreting *her-* in *her-α*-descriptions. No other interpretation is possible.

Different from *come* or *kommen*, *her-* is an indexical in the sense of 'direct reference' claimed for indexicals in general by Kaplan (1989). This strict notion of indexicality as 'direct reference' can be observed in (7).b. In this context (as in any other) *her-* can only refer to the utterance place. *her-* can neither be justified as the self-location of some party-goer at arrival time nor as the prospective self-location of the speaker as it is possible with *kommen* (compare fn. 8). Counterfactual contexts as the following provide further evidence for the directly referential behaviour of *her-α* as opposed to the perspectival *kommen*.

(8)   Speaker in Stuttgart:

    a.   "Wenn ich in Reutlingen wäre, würdest du auch kommen."
         'If I were in Reutlingen, you would come, too.'
    b.   "Wenn ich in Reutlingen wäre, würdest du auch herkommen".
         'If I were in Reutlingen, you would come here, too'.

---

[7]We leave aside *gehen* for the moment, coming back to it soon.

[8] It is possible that the speaker is ascribing himself an attitude towards the addressee's motion to obtain at the arrival time. But this is not necessarily so, as Cinque (1973) correctly observes.

In (8).a the speaker chooses the perspective of counter-factual self-location of himself in Reutlingen, i.e. at the goal of the counterfactual motion. (The speaker might allude to the fact that whereever he was the addressee would end up.) In (8).b the counterfactual motion ends at Stuttgart, the <u>actual</u> place of the speaker's self-location. (Here she might allude to the fact that it is not because of her that the addressee pays a visit to Stuttgart or that the addressee might even avoid Stuttgart, unless the speaker is absent.) It is compatible with what I claimed that justification of *her-* and of *kommen* may be different in one and the same complex predicate *herkommen*.[9] With *hinkommen* the justification of the anti-indexical *hin-*, which presupposes an indexical anchor in context and the perspectival *kommen* are necessarily independent. (7).c is an example. The indexical reference point $r_{0,i}$ is the utterance location in the rear (at the source) of tomorrow's motion and the attitudinal state which is required by *kommen* is ascribed to one of the party-goers in its front. For good measure I will represent how the requirements are constructed and justified in a syntax driven bottom up construction algorithm, see next subsection.

Before I do this I still have to discuss how *gehen* fits in. I have said that *her-* is indexical in the sense of 'direct reference', *hin-* is anti-indexical but presupposes some indexical reference point in the REAR and that *kommen* is perspectival. It goes without saying that there is no indexical nor attitudinal requirement with manner of motion verbs like *fahren*. A speaker selecting *fahren* as opposed to *kommen* in (7).c, d, or e refrains from taking perspective. What is the impact of selecting *gehen* as opposed to *kommen* in (7).c and (7).d and why is (7).e ungrammatical? Is *gehen* indexical or anti-indexical in some sense? And if so, is it a matter of self-location of the speaker in the rear of the motion or a matter of choice of someone's perspective in the rear of the motion? Is (7).e ungrammatical because *gehen* is (anti)-indexical? There is no semantic difference in *hingehen* as opposed to *hinfahren* in (7).c, d. But this doesn't say much, because of the anti-indexical *hin*.

My explanation of why (7).e is ungrammatical is unspectacular. It is grosso modo as follows. *Gehen* is initial-oriented, whereas *her-* is final-oriented (in the sense of Fillmore (1983))[10]. We can make the notion operative in assuming that *gehen* requires

---

[9] This theoretical possibility arises in (8).b. (in contrast to (8).a where no direct reference comes into play). Beyond doubt *her-* is justified because the speaker actually self-locates himself at the utterance place Stuttgart, in the front of the (counterfactual) motion. But *kommen* might be justified by taking the perspective of some other person in Stuttgart. In the more 'technical' sense made operative in the present paper this means that the speaker ascribes to some person in the counterfactual world in Stuttgart that this person believes himself in the front of the motion. It is more plausible, however, to assume that the speaker chooses his own perspective on the counter-factual motion: he self-ascribes the belief of (actually) being at some place that would be in the front of some motion which would occur in the counterfactual world.

[10]Note that Fillmore's exclusion implication (A) in Fillmore (1983) 'The speaker is not at the goal of the motion.' for *go* or *gehen* seems to indicate indexicality for *go*, too. As evidence he presents the ungrammatical **Go here!* or **Geh her!*, and the evidence for (A) seems overwhelming. Still it is the combination of *go* and the directly referential *here* that is ungrammatical and the implication (A) might not be provided by *go* on its own. Does, for instance, the utterance of *Go! Go! Go!* imply that the speaker is not at the goal? Consider a group of soccer fans sitting behind the opponent's goal shouting encouragement for their favourite team heading for the goal. Could this scenario challenge Fillmore's rule (A)? I want to leave this question unanswered. (For this would require an extended comparison of the accounts, which we must leave for another occasion). Nevertheless I would like to express my doubts in

some reference point r_0 in the rear of the motion, see (10) below. *her-* requires its indexical reference point in the front thereby being final-oriented. Thus the contextual requirements of *gehen* and *her-* would be contradictory. As a consequence *hergehen* is an impossible word. [11]

Is *hergehen* really an impossible word? What about *hin- und hergehen* in *Der Mann ging hin- und her* (The man went back and forth)? The latter is felicitous, but note that there is no indexical colour in *hin-* or *her-* in that one utterance description of $e = e_1 \oplus e_2$. *her-* does not refer to the utterance location of the speaker. The contextual requirement of *gehen* is fulfilled: $r_{01} \subseteq$ REAR(e) because r_{01} is is in the rear of the *hin-* motion e_1, which solves the *gehen*-requirement; and $r_{02} \subseteq$ FRONT(e), because r_{02} is in the front of the *her-* description e_2. So the condition $r_{01} = r_{02}$ obtains which is decisive for the interpretation of the sentence as describing a sequence of motions in some direction and counter-direction. It is not the impossible verb *hergehen* that we face in *Der Mann ging hin- und her*, but the verbal construction *hin- und hergehen* built according to the rules we are about to formulate as constraints to apply in a bottom-up semantics construction algorithm.

3.1 Semantics construction algorithm

Semantics construction of the particle verbs in question is basically a matter of constructing and justifying the contextual requirements that stem from the particle and the verbal roots. It can be seen as a special case of constructing preliminary semantic representations which are justified in context in a second step, as familiar from Kamp (2001). What is novel is the fact that the construction is below word-level. Lack of space does not permit for going into the of word-syntactic principles which I assume underlying word-formation. I confine myself here to structures that separate the contribution of the verb and subject on the one hand and of the particle on the other. I will also simplify the semantic representation of attitude ascription to what is indispensable for the purpose of the paper. (See Genabith et al. (2006) for recent standard representations.) I also simplify the entry for the indexicals leaving out the temporal index of self-location.
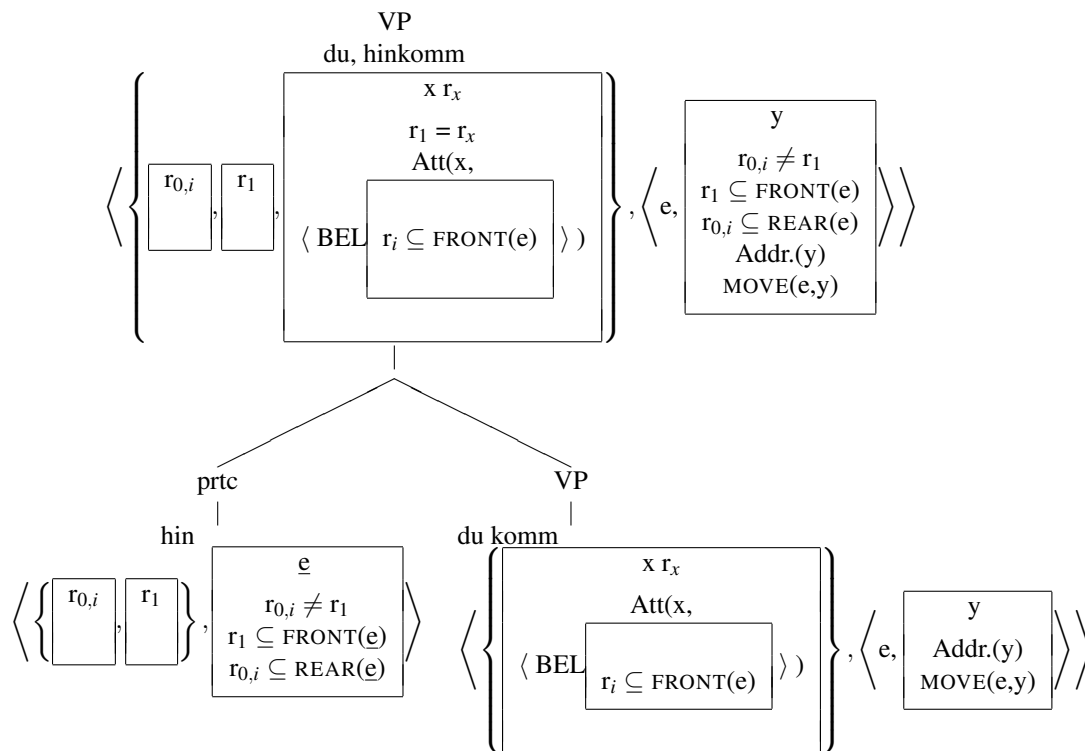
I have chosen the semantics construction of *hinkommen* with the addressee as subject (occurring in (7).b) for a demonstration of how the composition can be modelled in a unification based framework on the basis of lexical entries, see (9), to be read bottom up.

(A) as follows: Had Fillmore taken an example like *Go! Go! Go!* as evidence for rule (A), the evidence of (A) would not have been overwhelming at all. N.B. According to the present account *Go! Go! Go!* just means *Move! Move! Move!* —, forward, though. The reference points r_0 in the rear required by *go* are in the respective backs of the players.

[11] In *hingehen* the requirement of *gehen* for some reference point r_0 in the rear of the motion is fulfilled in virtue of the requirements of *hin-*.

(9)   *komm(st) (du) hin?*

$$\left\langle \left\{ \boxed{r_{0,i}}\ ,\ \boxed{r_1} \right\}\ ,\ \left\langle\ \begin{array}{c}\textbf{VP}\\ \text{du, hinkomm}\\ \boxed{\begin{array}{c} x\ r_x \\ \hline r_1 = r_x \\ \text{Att}(x, \\ \boxed{\langle\ \text{BEL}\ \boxed{r_i \subseteq \text{FRONT}(e)}\ \rangle}\ ) \end{array}} \end{array}\ ,\ \left\langle\ e,\ \boxed{\begin{array}{c} y \\ \hline r_{0,i} \neq r_1 \\ r_1 \subseteq \text{FRONT}(e) \\ r_{0,i} \subseteq \text{REAR}(e) \\ \text{Addr.}(y) \\ \text{MOVE}(e,y) \end{array}}\ \right\rangle\ \right\rangle\ \right\rangle$$

$$\left\langle \left\{ \boxed{r_{0,i}}\ ,\ \boxed{r_1} \right\}\ ,\ \begin{array}{c}\text{prtc}\\ \text{hin}\end{array}\ \boxed{\begin{array}{c} \underline{e} \\ \hline r_{0,i} \neq r_1 \\ r_1 \subseteq \text{FRONT}(\underline{e}) \\ r_{0,i} \subseteq \text{REAR}(\underline{e}) \end{array}}\ \right\rangle \qquad \left\langle \left\{ \begin{array}{c}\textbf{VP}\\ \text{du komm}\\ \boxed{\begin{array}{c} x\ r_x \\ \hline \text{Att}(x, \\ \boxed{\langle\ \text{BEL}\ \boxed{r_i \subseteq \text{FRONT}(e)}\ \rangle}\ ) \end{array}} \end{array} \right\}\ ,\ \left\langle\ e,\ \boxed{\begin{array}{c} y \\ \hline \text{Addr.}(y) \\ \text{MOVE}(e,y) \end{array}}\ \right\rangle\ \right\rangle$$

  Kommen is represented as a two-place relation between the referential argument and the subject of the sentence. The referential argument e is represented as a binding requirement that is due to be resolved at a Tense-projection, omitted here. *Kommen* does not specify any manner of motion but plain motion, represented as a prime in the representation language. Its presupposition component is presented in a DRS in curly brackets to the left of the assertion of the verbal head. As informally discussed *kommen* requires an attitude bearer x who is located at the region r_x and locates himself in the front of the motion, represented here as an attitude of belief (BEL). (The indexical r_i in the belief context, representing the attitude bearer's 'here', is bound to r_x in the main DRS, in accordance with general assumption of binding of indexical discourse referents in belief contexts). The node representation of the particle is a copy of (2).b, except that the variable $\underline{e}$ representing the event the direction of which *hin-* modifies is underlined indicating that the variable has to be bound in the course of the construction.

  Interpreting the merge of the adjoined particle node and the VP obeys the following principle of justification of non-heads and heads in sublexical context. I dub it "Obey head requirements!" (OHR).
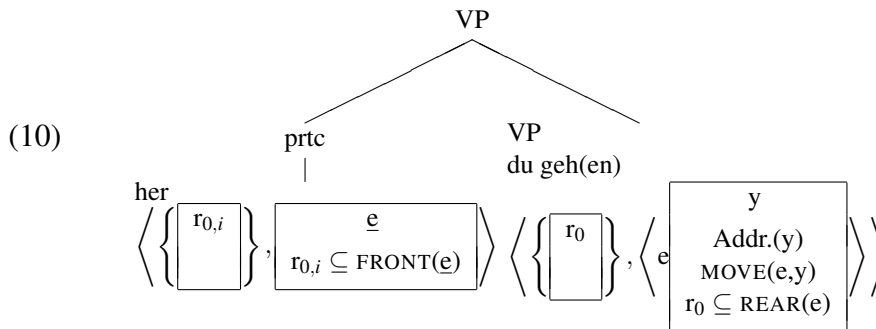
  OHR Justify the contextual requirements in the semantic representation of the non-head-node in the context of the representation of the head-node.

For *hinkommen* this means (i) substitute the binding requirement $\underline{e}$ by the referential argument e of the verb; (ii) justify the anti-indexical reference point r_1 as the region r_x of

the attitude bearer x presupposed by *komm(en)*. $r_1 = r_x$. The resulting VP representation contains already the relevant conditions of the preliminary sentence representation of (7).b. I only describe briefly how these context requirements are justified with respect to the linguistic and the situational context in (7): (i) $r_{0,i}$ is resolved as the speaker's (actual) self-location at speech time. (ii) $r_1 = r_x$ is resolved in context as the party venue in Tübingen, introduced in the previous sentence. (iii) The attitude bearer x must be accommodated and easily is so: party venues inhabit party-goers from the perspectives of whom the motion is described. So much for *hinkommen*.

In the construction of *herkommen*, $r_{0,i}$ in the representation of the particle node is resolved as r_x in the verbal node representation. We yield $r_{0,i} = r_x$. As $r_{0,i}$ must be justified indexically (directly referential) as the speaker's self-location the attitude bearer x will be resolved as the speaker, too (Compare fn. 9). This leads to incoherence of the context (7) with (7).b occurring therein.

I end this section by displaying the terminating construction of the impossible word **hergehen*.

(10)

$$\text{VP}$$

prtc   VP
            du geh(en)

her

$$\left\langle \left\{ \boxed{r_{0,i}} \right\}, \left\langle \boxed{\begin{array}{c} \underline{e} \\ \hline r_{0,i} \subseteq \text{FRONT}(\underline{e}) \end{array}} \right\rangle \right\rangle \quad \left\langle \left\{ \boxed{r_0} \right\}, \left\langle e \boxed{\begin{array}{c} y \\ \text{Addr.}(y) \\ \text{MOVE}(e,y) \\ r_0 \subseteq \text{REAR}(e) \end{array}} \right\rangle \right\rangle$$

The construction terminates because $\underline{e}$ in the particle representation must be bound by e in the verb's representation which would yield contradictory requirements $r_0 \subseteq$ FRONT(e) and $r_0 \subseteq$ REAR(e). But why can $\underline{e}$ undergoing failure of resolution not be accommodated to the effect that the modified VP describes a sequence $e' \prec e$ of motions towards the speaker and away from him again? — Because this would violate OHR. The sequence as a whole would not qualify as a *gehen*-event, for the first motion e' is final-oriented and disqualifies e as whole to be initial-oriented. This is why *her-* cannot obey the requirement of the *gehen*-head.

4   *herum-*α

In order to investigate whether *herum-* double particle constructions can be reconstructed as built according to the principles we have formulated, we must present the semantic contribution of *um*. The matter is not as straightforward as with the other particles, because there are two homonymous particles *um* in German. *um*$_1$ contributes a center and a sequence of paths around that center following tangents of the center; a second *um*$_2$ contributes opposites of some kind, in particular opposite directions. *Herum* is composed of *her-* and *um*$_1$. Think of a wheel with a center and spokes. *Um den Baum herumfahren* (to drive around the tree) describes a sequence of motions as follows: the

tree is the center; there are (fictive) spokes going into that center. A path specified by um_1 can be modeled as a sequence of rectilinear paths 'hopping from spike to spike', so to speak, (like on the rim of the wheel).[12] As mentioned in the introduction there is a reading where *herumfahren* means aimlessly driving, which is a pragmatic effect of iteration. But there is a more basic interpretation speaking of driving around a center z; the latter can be made explicit in an adjoined PP, where the internal argument of the preposition um_1 is the center z of the particle um_1, s. (11). I am concerned with the non-iterative event description which denotes a complex sequence of motions on the rim of the wheel around the center, contributed by the description of the tree in (11).

(11)   Der Mann fuhr um den Baum herum.
         'the man drove around the tree'.

It is important for our investigation to reconstruct the surplus which *herum-* adds to the description compared to *der Mann fuhr um den Baum* (the man drove around the tree) or *der Mann umfuhr den Baum* (the man avoided the tree). I have found that surplus of *herum* described in a Grammar in terms of 'coming back' in Heyse (1838), p. 843 and people I ask tend to speak in these terms of the differences. In the light of our hypothesis of the primacy of orthogonality in spatial descriptions I will have achieved my purpose if I can make sense of the idea that the complex verb involves change of direction to counter-direction as part of the predication; — not like with *hin- und her* (compare Figure 1.b), but with one more change in between. Please compare Figure 2 and Figure 3. (r_0 — r_2 display points 'on the spokes' of um_1 and the arrows motions 'from spoke to spoke'.)
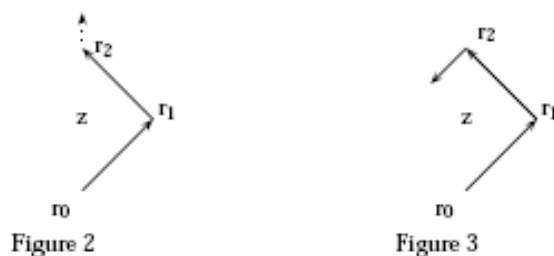

Figure 2   Figure 3

Figure 2 is a model for *um den Baum fahren* (also for *den Baum umfahren*) but not for *um den Baum herumfahren*. Figure 3 is a model for all three verbal descriptions. Please read the two non-dotted arrows in Figure 2 as contributed by um_1 in a double particle construction (where the double particle modifies a motion verb like *fahren*). According to standard morphological assumptions um_1 is the head of the double particle *herum* and *her-* is the non-head. According to ORH the requirements of *her-* must be justified with respect to the requirements of um_1, displayed here as the two motions e_1 and e_2, the first going from r_0 to r_1 and the second from r_1 to r_2. The reference point in the front of the motion required by *her* (which I refer to as r'_0) can be resolved as the source reference point r_0 contributed by um_1. But the motion <u>e'</u> in the front of which

---

[12]In constructions with um_2 as in *umherfahren* the different directions follow different spokes. There are differences in meaning between *umherfahren* and *herumfahren* which can be reconstructed in the present account. The decisive factors are (i) the difference of um_1 and um_2 in the 'wheel model', (ii) the differentiation of head vs. non-head in the double particle: *um* is the head in *herum*, *her* in *umher*.I leave the reconstruction for another occasion.

r'_0 is required to be located cannot be resolved in the context of um_1 as either e_1 or e_2 provided by um_1, because $r'_0 = r_0$ is neither in the front of e_1 nor in the front of e_2 and therefore doesn't qualify as being in the front of the sequence $e_1 \oplus e_2$. As a consequence e' has to be accommodated as a further motion e' with r_2 at its source and thereby in the rear of e'. As a result of this accommodation the requirement of *her-* is resolved, because $r'_0 = r_0$ is now in the front of e' and thereby in the front of the sequence $e_1 \oplus e_2 \oplus e'$ which specifies the complex *herumrennen*-event, as displayed in Figure 3.

5   Conclusion

The semantic analyses in this paper present partial but positive answers to the general research questions concerning context dependency and compositionality:

- Can the contextual requirements of complex predicates be reconstructed as built up from the contextual requirements of their sublexical parts in a rule based manner?

- Can we model motion descriptions and change-of-motion-descriptions on the basis of a simple geometry recurring to rectilinear motion and the primacy of orthogonality?

- Can we model the interaction of the situational and attitudinal dimensions of indexicals in a unique DRT-based semantics-construction algorithm?

Acknowledgements

References

Cinque, G. (1973). Fillmore's semantics of "come" revisited. *Lingua e Stile*, 7:575–599.

Fillmore, C. (1983). How to know whether you are coming or going. In Rauh, G., editor, *Essays on Deixis*, pages 219–222. Narr. Published in 1971.

Genabith, J. v., Kamp, H., and Reyle, U. (2006). Discourse representation theory. an updated survey. In Gabbey, D., editor, *Handbook of Philosophical Logic*. Kluwer Academic Press.

Heyse, J. C. H. (1838). *Theoretisch-praktische deutsche Grammatik*. digitalised by Google.

Kamp, H. (2001). The importance of presupposition. In Rohrer, C., Roßdeutscher, A., and Kamp, H., editors, *Linguistic Form and its Computation*. CSLI-Publications, Standord.

Kamp, H. and Roßdeutscher, A. (2004). Comments on Kaplan's "Demonstratives" and Zimmermann's "Tertiumne datur? Possessive Pronouns and the Bipartition of the Lexicon". In Kamp, H. and Partee, B., editors, *Context-Dependence in the Analysis of Linguistic Meaning*, chapter 28, pages 431–458. Elsevier.

Kamp, H. and Roßdeutscher, A. (2005). The logic and ontology of space as seen through the eyes of natural language. Lecture notes. University of Stuttgart.

Kaplan, D. (1989). Demonstratives. An Essay in the Semantics, Logic, Metaphysics, and Epistemology of Demonstratives and other Indexicals. In Almog, J., Perry, J., and Wettstein, H., editors, *Themes from Kaplan*, pages 481–563. Oxford University Press, New York, Oxford.

Lang, E. (1989). The semantics of dimensional designation of spatial objects. In *Dimensional Adjectives*. Springer.

Roßdeutscher, A. (2000). *Lexikalisch gestützte formale Textinterpretation*. Arbeitsberichte des Sonderforschungsbereichs 340, Stuttgart/Tübingen, Nr.157.