The goal bias in the encoding of motion events*

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Abstract

This paper investigates the claim that there is a goal bias in the encoding of motion events, i.e. that there are restrictions on the distribution of path-PPs expressing the source or trajectory of a motion event that do not hold for path-PPs expressing the goal (for example, that goal-PPs are more likely than other path-PPs to occur as the only locative in a clause). On the basis of corpus-derived frequency data, we investigate two explanations which have been put forth for this bias: (i) that there is a psychological bias towards goals and purposes of human actions, and (ii) that goal-PPs have a higher information value than other path-PPs and are thus more useful in arriving at a complete conceptualization of a motion event. We show that the second hypothesis makes more accurate predictions about the presence and the extent of the goal bias with different types of motion verbs.

Keywords: construction, corpus linguistics, frequency data, gapping, goal bias, locative, motion event, motion verb, path, windowing

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* The authors would also like to point out that since the submission of this paper in 2000, they have refined their use of quantitative corpus data far beyond what is presented here; however, the basic points made in this paper still hold. The authors would like to thank Günter Radden, Klaus-Uwe Panther and Sally Rice for discussion and valuable suggestions.

1. Introduction

It has been claimed that there is a goal bias in the encoding of motion events, i.e. that there is an asymmetry between spatial PPs encoding the goal and those encoding the trajectory or the source of the moving entity. Take the following examples (cf. Verspoor, Dirven and Radden 1999: 88):

(1) a. *I climbed from my room up the ladder onto the roof.*
b. *I climbed onto the roof.*
c. *I climbed up the ladder.*
d. *??I climbed from my room.*

Example (1a) explicitly mentions all components of a path: the source (*from the room*), the trajectory (*up the ladder*), and the goal (*onto the roof*). As (1b) and (1c) show, it is possible to express just the trajectory or just the goal, but it is semantically odd or even unacceptable to express just the source (Verspoor, Dirven and Radden's acceptability judgments).

This phenomenon is an example of *gapping*, as developed in Talmy (1985, 1996). We will briefly summarize the main points of Talmy's framework here, and then rephrase the apparent constraint evident in examples (1a–d) in terms of these notions.

Talmy assumes that the conceptualization of motion events necessarily includes four components: (i) a *figure* (which we will refer to as the *theme*), i.e. an individuated object of some kind; (ii) the *motion* of this object; (iii) a *path* along which this motion takes place, consisting of an initial portion (the *source*), a medial portion (which we call *trajectory*), and a final portion (the *goal*), and (iv) a *ground*, i.e. one or more landmarks with respect to which the motion is conceptualized, and which elaborate one of the three components of the path. In addition, a motion event may include two optional components: *manner* of motion and *cause* of motion, which, however, are not relevant for the purposes of this paper.

As just mentioned, Talmy assumes that the first four components are necessarily present in the conceptualization of any motion event. This does not mean, however, that they are necessarily present in the *linguistic material* coding the conceptualization of the motion event; they may be highlighted (or *windowed for attention*), in which case they will be explicitly encoded, or they may be backgrounded (or *gapped*), in which case they will not be encoded.

Thus, we can rephrase the constraint evident in examples (1a–d) as follows: it is possible to window the trajectory or the goal by itself, gapping all other parts of the path, but it is not usually possible to window just the source, gapping trajectory and goal. If there is such a constraint or distributional preference, the question arises as to its motivation (at least in a framework like cognitive linguistics, which holds that grammar is to a large extent motivated). In the cognitive linguistic literature, two such motivations have been suggested.

The first suggestion comes from Verspoor, Dirven and Radden (1999), who, following Ikegami (1987), assume that this distributional bias is motivated by the existence of a "goal-over-source principle", i.e. a "strong hierarchy in the everyday experience of the "source-path-goal" schema: for human actions the goal is usually more important than the source and the source and goal [together] are usually more important than the path" (Verspoor, Dirven and Radden 1999: 98).

More generally, Verspoor, Dirven and Radden suggest that any human activity "involves human volition and we tend to be far more interested in the goal of the action than in the source of the action. Therefore, when human action is involved, goal is far more salient than source" (Verspoor, Dirven and Radden 1999: 98).

In other words, they explain the distributional bias shown in examples (1a–d) above by positing the existence of a natural psychological bias toward the goals (and purposes) of human actions. They seem to suggest that this bias is an inherent part of the make-up of the human conceptual system, i.e. they do not provide further explanation for this psychological bias itself. We will refer to this analysis as the *(psychological) salience hypothesis*.

The second explanation comes from Ungerer and Schmidt (1996). In a discussion of a particular kind of path windowing, which, following Talmy, they refer to as closed path windowing, they observe a similar bias towards the goal. They suggest that this distributional bias is motivated by the higher information value of goal-PPs: "[...] the fact of a departure taking place does not include enough information about the rest of the path to ensure that the whole motion event is realized" (Ungerer and Schmidt 1996: 225).

Their account is based on the implicit assumption, shared by Talmy as well as Verspoor, Dirven and Radden, that the interpretation of a motion verb necessarily involves the conceptualization of the complete path: "[...] the logic behind these unacceptable windowing variants seems to be this:

whereas the medial and final portions of paths allow for an inferential conceptualization of the entire path, the information contained in the initial portions is not sufficient to establish the whole ensuing path" (Ungerer and Schmidt 1996: 226).

In other words, Ungerer and Schmidt suggest that if we know the goal of a motion, we can infer enough about its trajectory (which must lead to the goal), and perhaps even its source, to arrive at a complete conceptualization of the motion event.[1]

If their assumption that every motion event must be conceptualized in its entirety is correct, then the goal bias can be given an explicit psychological (cognitive) motivation: the encoding of the relatively information-poor source raises the cognitive as well as the communicative costs; the cognitive cost because there is more inferencing to be done on the part of the hearer, and the communicative cost because the possibility that the hearer will make the right inferences is relatively low.[2] This is essentially the insight implicit in Grice's communicative maxims and made explicit in Sperber and Wilson's *Relevance Theory* (1995). We will refer to this type of explanation as the *complete-conceptualization hypothesis*.

In this paper, we will establish the nature and extent of this apparent bias on the basis of several corpus analyses. We will examine whether the kind of acceptability statements given for the examples in (1a–d) turn out to be descriptively adequate, i.e. whether they hold true for all kinds of motion verbs. We will then interpret the data in terms of the two hypotheses presented above.

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1. This idea also seems to be the implicit assumption behind Ikegami's (1987) account of the goal bias, which he characterizes as follows:

   > If we hear that something has started, we are still left with an expectation to be told that it has arrived at a certain point. Otherwise it will be felt incomplete as a description of a motion. On the other hand, if we hear that something has arrived at some place and ended its motion there, we feel quite satisfied with the description in spite of the fact that we are not told about the start of the motion (Ikegami 1987: 135).

2. Maybe this is what Ikegami means when he says that "a clause representing the source is [...] less autonomous and more uncertain than a clause representing the goal" (1987: 131).

2. Corpus analysis 1

Aims and method. Our first aim was to establish whether the distributional bias discussed above could be empirically verified at all. In order to do so we chose the word *go* as a relatively neutral (and thus presumably representative) motion verb. We extracted 1,000 instances of this verb from the North American News corpus and classified them according to the following parameters: (i) literal motion (i.e. physical motion of a theme through space) vs. non-literal motion (i.e. subjective motion, metaphorical extensions, etc.); and (ii) presence or absence of spatial prepositional phrases, which were further subcategorized into *source*, *trajectory*, *goal*, as well as any combination of these. Prepositions classified as referring to the source were *from*, *out (of)*, and *off*, prepositions classified as referring to the trajectory were, for example, *along, through,* and *by*, and prepositions classified as referring to the goal were *to, into, toward(s),* etc. PPs specifying a general location where the motion takes place were classified as referring to the trajectory, e.g. *They swam in the lake.* This decision may be open to dispute, but since the main focus in this paper is on source and goal, a different way of classifying such PPs would not substantially affect our results. Where a preposition can have different readings, each token was categorized according to the meaning it had in context. For example, *They cruised off the coast of Greece* would be classified as trajectory, whereas *They jumped off a cliff* would be classified as source.

Results. Of the 1,000 tokens 226 were discarded because they were instances either of the *going to*-future or of the idiomatic constructions *go*-verb and *go and*-verb. The results for the remaining tokens are shown in Table 1.

The following results emerge from this analysis: First, uses of *go* with more than one spatial PP are very rare; where they occur at all, they encode the source and the goal of the motion. Uses encoding the complete path, i.e. source-trajectory-goal, do not occur at all. Second, as predicted by the two hypotheses discussed above, there is clear evidence for a preference of goal-PPs over trajectory- and source-PPs. Goal-PPs make up the vast majority of the literal uses, and the largest single group of the non-literal uses.

Table 1. Frequencies of the types of PPs occurring with literal and non-literal uses of go (n=774)

	Literal		Non-literal	
No path adverbial	12.16%	(36)	8.37%	(40)
Source	5.40%	(16)	6.07%	(29)
Trajectory	4.05%	(12)	37.24%	(178)
Goal	77.36%	(229)	45.61%	(218)
Source-source	—	(0)	—	(0)
Source-trajectory	—	(0)	—	(0)
Source-goal	1.00%	(3)	2.10%	(10)
Trajectory-trajectory	—	(0)	—	(0)
Trajectory-goal	—	(0)	—	(0)
Goal-goal	—	(0)	0.42%	(2)
Source-trajectory-goal	—	(0)	—	(0)
Total	100.00%	(296)	100.00%	(478)

There are three kinds of exceptions to the general trend. First, cases where the source is explicitly mentioned in the preceding or subsequent discourse and is hence recoverable, as in examples like *He knows that if he goes from his home and hangs out at the nearby corner of Church and Flatbush in Brooklyn, N.Y., he could get in trouble, or worse.* In this example, the clause containing *go* only mentions the source of motion (*from his home*), but the goal (*the nearby corner*) is supplied in the next clause.

The second type of exception are cases where the goal is recoverable from world knowledge, as in examples like *The slight tremor of the plane as it went down the runway was caused by hot brakes.* Again, the goal is not explicitly mentioned, but it can easily be recovered; since we know that, for a plane, a runway only has two possible endpoints (the terminal building if the plane has just landed, or the sky if it is just taking off), and since we also know that a plane is unlikely to brake during take-off, we know that the goal must be the terminal building.

The third type of exception are cases where the goal could be said not to constitute an aspect of the motion event at all, or at least where the goal has such a low saliency that it does not actually need to be recovered as in *When his parents went out of town, he quickly cut loose* or in *One deputy glimpsed Lee going out of sight.* Here, the goal is not mentioned at all because it is not necessary for a conceptualization of the motion events described. In the first case, it simply does not matter where the trajectory of

his parents ends, and in the second case, the point is precisely that no one knows where the trajectory of *Lee* ends.

Discussion. On the whole, the results of the first corpus search can be seen as evidence for a distributional bias toward goals. For the literal uses, sentences containing a goal-PP constitute the vast majority. For the non-literal uses, such sentences do not constitute the majority but still constitute the largest single group.

However, this bias is far from absolute: sentences containing just a source-PP are rare but nevertheless they occur, and are in fact even more frequent than those containing a trajectory-PP. Let us therefore look at these exceptions to the goal bias in more detail.

The first two types of exceptions mentioned above do not posit a problem for either of the two theories discussed above: since the goal is recoverable at no great cognitive cost it makes sense that it should be possible to gap it in the encoding of the motion event. In contrast, the third type of exception posits a challenge. Note that for these uses the goal is recoverable neither from the context nor from world knowledge. In fact, it would be more accurate to say that the goal in these cases is completely irrelevant, that it is simply not a (salient) part of the event described. *Go* in these examples is used with the somewhat specialized meanings 'leave' and 'disappear'. It seems that these uses of *go* do not make reference to a goal at all, but that instead they are inherently oriented towards the source of the motion by virtue of the frame evoked by their lexical semantics. This suggests that there may be verb-inherent biases that go against the general trend. We decided to investigate this possibility in a second corpus analysis focusing on directional motion verbs.

3. Corpus analysis 2

Aims and method. In order to test our hypothesis that the specific (lexical) frame semantics of a given motion verb may interact with the apparent goal bias discovered for the "neutral" motion verb *go*, we picked six verbs that intuitively have some inherent directionality associated with them: *climb* and *flee* (which seem to be goal-oriented), *fall* and *escape* (which seem to be source-oriented), and *cruise* and *stroll* (which seem to refer to relatively aimless motion). We did not, at this point, speculate about the source of these intuitions (see Discussion below). In addition we picked four verbs

that make reference to the manner of motion rather than some direction: *fly*, *jump*, *run*, and *march*. Note that we did not pick verbs like *enter* and *exit*, i.e. 'path-conflating' verbs in Talmy's terminology, since these do not typically take spatial PPs but encode their respective path window as a direct object.

For each of the verbs chosen, we extracted 250 tokens of literal uses with spatial PPs from the North-American News corpus and classified them according to the type of PP (source, trajectory, goal, or any combination of these).

Results. Of the combinations of two spatial PPs, only the combination source-goal occurred with a frequency higher than one percent for any of the verbs, thus we collapsed all other combinations into a single category. Interestingly, the complete path (source-trajectory-goal) did not occur at all. The frequencies of all other types of PP are shown in Table 2.

Table 2. Frequencies for the type of PPs occurring with the literal uses of each verb

	Source	Trajectory	Goal	Source-goal	Others	Total
climb	15.6% (39)	17.6% (44)	64.0% (161)	2.0% (5)	0.4% (1)	100% (250)
flee	18.8% (47)	6.0% (15)	73.2% (183)	1.2% (3)	0.8% (2)	100% (250)
fall	36.0% (90)	15.2% (38)	47.6% (119)	1.2% (3)	—	100% (250)
escape	58.0% (145)	6.0% (15)	34.0% (85)	1.2% (3)	0.8% (2)	100% (250)
cruise	2.0% (5)	74.8% (184)	17.2% (43)	2.0% (5)	4.0% (10)	100% (250)
stroll	2.8% (7)	64.8% (162)	27.2% (68)	2.8% (7)	2.4% (6)	100% (250)
fly	8.0% (20)	28.4% (71)	54.0% (135)	9.6% (24)	—	100% (250)
jump	36.0% (90)	19.6% (49)	34.0% (85)	10.4% (26)	—	100% (250)
run	30.8% (77)	25.6% (64)	40.8% (102)	2.8% (7)	—	100% (250)
march	8.0% (20)	40.8% (102)	43.2% (108)	6.8% (17)	1.2% (3)	100% (250)

The results confirm our hypothesis that the lexical semantics of a given motion verb may strongly influence the distribution of source-, trajectory-, and goal-PPs. Roughly, our verbs fall into three groups. The first group consists of *climb, fall, flee, fly, march* and *run.* These roughly follow the pattern we already observed with *go*, in that tokens with goal-PPs constitute either the absolute majority or at least the largest group for each of these verbs, typically followed by source-PPs, with trajectory-PPs forming the smallest group in all cases except for *fly* and *march*. However, note that the

bias is significantly weaker than for *go* in the cases of *run* and *fall*, where source-PPs are almost as frequent as goal-PPs, and in the case of *march*, where trajectory-PPs are almost as frequent as goal-PPs. The second group is comprised by *jump* and *escape*, for both of which source-PPs form the largest single group, with goal-PPs forming the second-largest group. Finally, for the third group, consisting of *stroll* and *cruise*, trajectory-PPs form the absolute majority, with goal-PPs again making up most of the remainder.

Discussion. The intuitions about item-specific directional biases of individual verbs are confirmed under the assumption that a general goal bias exists in addition. We assumed that *fall* and *escape* were inherently source-oriented. For *escape,* this assumption is clearly borne out, and even though goal-PPs are more frequent than source-PPs for *fall*, the difference between the two is very small. Thus, uses like *He escaped from Alcatraz* are more frequent than uses like *He escaped to the United States*, and uses like *They jumped into the water* are more frequent than uses like *They jumped from the pickup truck.*

Likewise, the assumption that *stroll* and *cruise* both encode relatively undirected motion turns out to be correct. Uses like *He strolled around his riverfront property* are more frequent than uses like *He strolled to a nearby knoll*, and uses like *They were cruising aimlessly around* are more frequent than uses like *We cruised into Glacier Bay.*

The issues that need to be addressed are the source of these intuitions, which we assume have to do with the lexical semantics of the respective verb, and the reason why the lexical semantics interfere with the goal bias. This will be one of the central questions in the General Discussion below. Essentially, the answer depends crucially on an answer to the question whether it is in fact true, as is implicit in Talmy's and others' work, that every motion verb evokes a complete path, i.e. whether every motion event involves the conceptualization of a complete path from a source along a trajectory to a goal. Before we discuss this issue further, however, we must take up the issue of animate versus non-animate themes, which is implicitly argued to be relevant to the goal bias by Verspoor, Dirven and Radden.

4. Corpus analysis 3

Aims and method. Recall that Verspoor, Dirven and Radden posit the existence of a goal bias in particular with respect to motion events involving human themes. The aim of this analysis was to establish whether there is indeed a difference between human and non-human themes with respect to the distribution of goal-encoding PPs. In order to test this at a general level, we chose the motion verb *move* (instead of *go*, which occurred extremely infrequently with inanimate themes). We extracted 50 literal examples each for the following types of themes: animate$_1$ ('change one's position' as in *She moved away from the window*), animate$_2$ ('change of one's residence' as in *He moved to Washington, D.C.*), vehicle as in *The train moved into the station*, and inanimate as in *Heavy rain clouds moved into the area.* As before, we calculated the relative proportions of the different types of path-PPs for animate and inanimate themes separately.

Results. The results of the analysis are shown in Table 3. Combinations of more than one PP were collapsed into a single category. A pair-wise comparison of all categories shows that the difference between each pair is significant at the 0.1% level, except for animate$_1$/inanimate, which is significant at the 1% level.[3]

Table 3. Frequencies of the types of PPs occurring with animate and inanimate themes in literal uses of move (n=774)

	Source		Trajectory		Goal		Others		Total	
Animate$_1$	14%	(7)	28%	(14)	42%	(21)	16%	(8)	100%	(50)
Animate$_2$	12%	(6)	—	(0)	76%	(38)	12%	(6)	100%	(50)
Vehicles	12%	(6)	14%	(7)	6%	(3)	68%	(34)	100%	(50)
Inanimate	—	(0)	38%	(19)	28%	(14)	34%	(17)	100%	(50)

As predicted by the salience hypothesis, the goal bias is stronger for animate themes than for inanimate themes. The latter seem to prefer trajectory-PPs. Note also that with respect to animate themes, the meaning 'change

3. The exact statistics are: animate$_1$/animate$_2$ (χ^2=19,26 (df=2), p<0.001); animate$_1$/vehicle (χ^2=33.38 (df=2), p<0.001); animate$_1$/inanimate (χ^2=12.4 (df=2), p<0.01); animate$_2$/vehicle (χ^2=56.48 (df=2), p<0.001); animate$_2$/inanimate (χ^2=41.34 (df=2), p<0.001); vehicle/inanimate (χ^2=24.29 (df=2), p<0.001).

one's residence' has a much stronger preference for goal-PPs than the meaning 'change one's position'. Vehicles have no strong preference for any single type of PP.

Discussion. Although the results seem to provide initial confirmation for the salience hypothesis, there is one finding that warrants further discussion: As mentioned, the two different senses of *move* with animate themes differ significantly with respect to the strength of the goal bias they display. This is not expected under the salience hypothesis since both senses of *move* are actions when the theme is animate. An explanation might arguably again be found in the specific frames evoked respectively by 'changing one's position' and 'changing one's residence'. Intuitively, it seems that an event of 'changing one's residence' is harder to conceptualize in the absence of information about the goal: if we hear that somebody has moved we typically want to know *where* that person has moved. An event of 'changing one's position', however, seems less dependent on information about the goal; since this type of event is less specific we can easily imagine contexts where the goal simply does not matter. If this intuition is correct and the different strength of the goal bias is indeed influenced by frame-semantic considerations, then this is clearly an argument in favor of the complete-conceptualization hypothesis: what counts as a 'complete conceptualization' depends on the specific frame associated with the verb in question, and hence a goal bias may be present to varying degrees. In our final corpus analysis, we will now attempt to substantiate this intuition.

5. Corpus analysis 4

Aims and method. In order to tease apart the two hypotheses further, we must be more explicit about the predictions that each of them makes with respect to animate and inanimate themes, respectively.

The salience hypothesis predicts that animate themes should show a stronger affinity to goal-PPs with all motion verbs that can be construed as actions. The complete-conceptualization hypothesis makes somewhat more complex predictions: first, there need not be a *general* goal bias: individual verbs may have a goal- or a source bias depending on the specific frame they evoke. Whether or not animate and inanimate themes behave differently with any particular verb depends on the type of motion event evoked by the combination of a given verb with either an animate or an inanimate

theme. In other words, a given verb may evoke different types of frames depending on the type of theme. For example, *fly* overwhelmingly evokes a JOURNEY frame with human themes, as in *They decided to cut their trip short and fly back to New York*, but it typically evokes a general MOTION THROUGH AIR frame with inanimate themes, as in *Pieces of glass were flying through the air*.

In order to test these predictions we chose five motion verbs which occur relatively frequently with both animate and inanimate themes: *fly*, *roll*, and *escape*, which intuitively encode actions with human themes and processes with inanimate themes, and *slide* and *fall*, which encode processes regardless of the type of theme. For each verb we extracted one hundred literal uses from the NAN, fifty with animate themes and fifty with inanimate ones.

Results. The salience hypothesis predicts that the verbs *fly*, *roll*, and *escape* should show a clear goal bias for animate, but not for inanimate themes, while *slide* and *fall* should not show a goal bias for either. The complete-conceptualization hypothesis predicts different types of biases based on the particular frames evoked. Consider Tables 4 through 6, which show the results for *fly*, *roll* and *escape*.

Table 4. Fly

	Source		Trajectory		Goal		Others		Total	
Animate	6%	(3)	2%	(1)	74%	(37)	18%	(9)	100%	(50)
Vehicles	20%	(10)	40%	(20)	28%	(14)	12%	(6)	100%	(50)
Inanimate	28%	(14)	42%	(21)	18%	(9)	12%	(6)	100%	(50)

(χ^2=48.19 (df=6), p<0.001, ***) — without vehicles: (χ^2=42.94 (df=3), p<0.001, ***)

Table 5. Roll

	Source		Trajectory		Goal		Others		Total	
Animate	6%	(3)	36%	(18)	38%	(19)	20%	(10)	100%	(50)
Vehicles	10%	(5)	42%	(21)	30%	(15)	18%	(9)	100%	(50)
Inanimate	8%	(4)	48%	(24)	24%	(12)	20%	(10)	100%	(50)

(χ^2= 4.03 (df=6), p=0.8, n.s.) — without vehicles: (χ^2=2,58 (df=3), p=0.46, n.s.)

Table 6. Escape

	Source		Trajectory		Goal		Others	Total
Animate	80%	(40)	2%	(1)	18%	(9)	—	100% (50)
Inanimate	66%	(33)	4%	(2)	30%	(15)	—	100% (50)

(χ^2=2,50 (df=2), p=0.28, n.s.)

Clearly the data do not bear out the prediction of the salience hypothesis; although for *fly* the goal bias is indeed stronger for animates than for vehicles or inanimates, for *roll* and for *escape* there are no significant differences at all (in the case of *escape* there is actually a trend in the opposite direction). Next consider the results for *slide* and *fall* (recall that these are not naturally construed as actions, and that there should thus be no differences between animates and inanimates according to the salience hypothesis).

Table 7. Slide

	Source		Trajectory		Goal		Others		Total
Animate	8%	(4)	38%	(19)	46%	(23)	8%	(4)	100% (50)
Inanimate	18%	(9)	32%	(16)	48%	(24)	2%	(1)	100% (50)

(χ^2=4.00 (df=3), p=0.26, n.s.)

Table 8. Fall

	Source		Trajectory		Goal		Others	Total
Animate	32%	(16)	4%	(2)	40%	(20)	24% (12)	100% (50)
Inanimate	38%	(19)	6%	(3)	34%	(17)	22% (11)	100% (50)

(χ^2=0.74 (df=3), p=0.86, n.s.)

Again there are no significant differences between animate and inanimate themes. This is theoretically compatible with the salience hypothesis but since this hypothesis was not confirmed for the first three verbs, the results for *fall* and *slide* cannot be seen as very strong evidence.

Discussion. A general goal bias for animates is *not* confirmed by these results: Process verbs (such as *fall* and *slide*) do not show a significant difference; this would be expected under both hypotheses. Verbs that can be either action-like or process-like depending on the animacy of their theme

do not provide evidence for a *general* goal bias either. Although for *fly* there is a strong goal preference for animates, but not inanimates, there is no such significant difference for *roll*, even though the distinction between animate and inanimate themes here also correlates with the doing vs. happening distinction. Finally, for *escape* there is actually a trend in the opposite direction: if anything, the goal preference here is stronger for inanimate themes.

Where there are clear differences, these are readily explained, however, by the complete-conceptualization hypothesis. Let us look at the results for *fly* (the only verb for which there is a significant difference) and for *escape* and *slide*, where the differences fail to reach significance but where $p<0,3$ and which we will thus consider to reflect trends which deserve some comment.

First, as mentioned above, *fly* with human themes strongly evokes what we might call a JOURNEY frame. This is a specific version of the motion event frame where the theme is a person who travels to some destination usually with a specific purpose; it also includes a point of departure and a travel route but these are normally of minor importance. In the JOURNEY frame, the destination is clearly the most important aspect, and it is not recoverable from the other aspects of the path. This accounts for the strong goal bias with animate themes under the complete-conceptualization hypothesis. On the other hand, *fly* with inanimate themes evokes a simple MOVING THROUGH AIR frame, here, it is typically important *what* is flying, not *where* it ends up. Thus the complete-conceptualization hypothesis accounts straightforwardly for the fact that the goal bias is less pronounced here.

Next, *escape* with animate themes evokes a GETAWAY frame, as in *Ten inmates escaped from Florida State prison*. Such a frame includes a person who is held captive in a confined space of some sort as well as an escape route and a destination; however, the destination is always simply the outside of the confined space, hence the goal is easily recoverable even when it is not mentioned. On the other hand, *escape* with inanimate themes evokes a LEAK frame in the overwhelming majority of examples, as in *Radioactivity escaped into the atmosphere*. Such a frame includes a (typically harmful) substance in some confined space, typically a container, as well as a leak (the trajectory) and a goal (the outside of the container). Here, the issue is often precisely *where* the substance (typically some gas or chemical) is *after* it has escaped. Since a LEAK frame only evokes a very unspecific container, which might be located in all kinds of environments, the

destination is not recoverable from the other aspects of the path. This difference might account for the fact that inanimate themes tend to have a stronger goal affinity than animate themes with *escape*.

Finally, recall the stronger tendency of *slide* with inanimate themes to encode the source compared to the same verb with animate themes. We have no specific explanation to offer, but note that the complete-conceptualization hypothesis at least offers a framework for such an explanation whereas the salience hypothesis does not.

6. General discussion

A complex picture has emerged with respect to the distribution of source-, trajectory-, and goal-PPs as they occur with English motion verbs. The goal-over-source principle was basically confirmed but as a tendency rather than an absolute rule. In addition, the exceptions to the principle cannot simply be seen as 'noise' in the data; they are themselves systematic and can thus shed some light on the possible motivations behind the goal-over-source principle as discussed in the Introduction.

In our opinion, Ungerer and Schmidt's suggestion, under the psychological interpretation that we have assumed above, is a plausible candidate when it comes to accounting for the data. It naturally accounts for the cases adhering to the goal-over-source principle, as it was designed to. In addition, however, it can account for the exceptions as follows.

First, the cases where the goal is recoverable from the linguistic context are straightforward enough. In order to conceptualize a motion event in its entirety the necessary path information does not have to take the form of a spatial PP.

Second, the fact that in those cases where the goal can be inferred from world knowledge it does not have to be encoded is also accounted for. If we hear a sentence like *He fell from the roof*, we can conceptualize the complete path, including the trajectory and the goal, without explicitly being told. Our knowledge about gravity will enable us to infer at no great cognitive cost that the trajectory is *down* and the goal is *the ground*.

These two types of exceptions could be accounted for by any motivation that we may suggest, since in both cases the goal is a salient part of the conceptualization and thus these cases do not really constitute exceptions to the goal-over-source principle at all. However, there is a third type of case which clearly constitutes an exception: the case of verbs like *cruise* and

stroll, which occurred mainly with trajectory-PPs, and a case like *escape*, which occurred mainly with source-PPs.

These cases are clearly different from the other two types of exceptions in that the goal is not just left implicit, but that it simply plays no role. Note that in sentences like *They were cruising up and down Main Street* or *He was strolling through the park* neither the goal nor the source can be recovered from linguistic context or world knowledge, and that in a sentence like *He escaped from Alcatraz*, neither the subsequent path nor the precise goal are recoverable. However, it is unproblematic to arrive at a complete conceptualization of the motion events described by these sentences. We can conceptualize somebody strolling or cruising without conceptualizing a source or a goal because both verbs refer to kinds of motion that are executed for their own sake, simply because they are enjoyable. Likewise, we can conceptualize someone escaping from a prison without knowing exactly where they go after they have escaped (beyond the fact that they are now outside of the prison). The conceptualization of an act of escaping crucially involves certain obstacles that have to be overcome (say, walls that have to be dug through, a stretch of water that must be crossed, etc.). Thus, there is an implicit trajectory involved, which is inferable from our knowledge about prisons, but the conceptualization of the event is complete even if we do not know the ultimate endpoint of this trajectory.

With verbs like these, Ungerer and Schmidt's hypothesis would lead us to expect that a goal bias would not be found. If the conceptualization of the motion event does not include a goal, then we do not need information about the goal. Thus, the existence of such verbs has consequences for the question what constitutes a 'complete motion event'. It becomes clear that this question cannot be answered in the abstract; it depends to a large degree on the semantics of the specific motion verb used to encode the event. It is simply not the case that every motion event is conceptualized as having a source, a trajectory, and a goal. Assuming that all these components are necessarily present in the conceptualization of a motion event even if they are not encoded linguistically is essentially a version of the objectivist fallacy that meaning is out there in the world. After all, there are no events in the 'real world'. Events are the result of a cognitive segmenting of the continuous process that constitutes our reality. There is nothing to stop us from construing a motion event as having only a source, only a trajectory, or only a goal. Verbs like *cruise*, *stroll*, and *escape* impose just this type of construal.

Thus, it seems that the goal bias simply reflects the prototype case, in which the goal provides most of the information needed to arrive at a complete conceptualization of a motion event. Where this is not the case, i.e. where a motion event can be conceptualized in its entirety without reference to a goal, the goal bias is considerably weakened or disappears altogether. We can thus explain much of the goal-over-source principle by reference to a more general cognitive principle which essentially says that an utterance must contain enough linguistic clues to arrive at a complete conceptualization of the event encoded (this is essentially a re-formulation of Grice's maxim of quantity).

This does not mean that the goal bias is necessarily a mere epiphenomenon of this more general principle. Specifically, it does not mean that Ikegami's idea of a general interest in the goals and purposes of human activity (as taken up by Verspoor, Dirven and Radden) is wrong. We have not investigated here the possibility that the goal bias is stronger in the case of the self-propelled motion of an animate agent than in the case of the externally caused motion of an inanimate object. Future research may well yield such findings, which would substantiate the salience hypothesis. Some evidence for the existence of a goal bias beyond the extent to which it can be derived from a general cognitive principle may come from a comparison of intransitive versus caused-motion uses of the types of verbs discussed here: Rohde (2001: 169), using the same corpus and the same categorization criteria used here, found that the caused-motion use of *move* occurs with a goal-PP in 66.8% of all cases compared to our 42% (see Table 3 above). The caused-motion construction requires an intentionally acting causer acting on the theme (see Goldberg 1995: 174, Stefanowitsch 2001: 296, Rohde 2001: 188f.) whereas intransitive motion does not include intentionality as an obligatory component at all. Thus the caused-motion construction is naturally concerned with human goals and purposes and should have a stronger goal bias according to the salience hypothesis. However, Rohde (2001: 187) found 43.2% of goal-PPs with caused-motion uses of *march,* almost exactly the same proportion that we found for the intransitive use of *march* in Table 2 above. Thus further research clearly needs to be done on this issue.

The general bias towards the goal even in those cases where it is not necessary for a complete conceptualization could be accounted for if we assume that there is a general motion event schema which is abstracted from linguistic and non-linguistic experience (rather than a Talmy-type motion event frame which would be a pre-linguistic universal). Such a gen-

eral schema would inherit the goal bias that can be found in most of the instances from which it was abstracted. Of course, this does not preclude the possibility of an additional motivation for the goal bias along the lines suggested by Ikegami and Verspoor, Dirven and Radden. The two explanations are not mutually exclusive. The relation between conceptual structure and linguistic structure is complex and multi-dimensional, and multiple motivations ought to be expected.

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