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From Perception of Spatial Artefacts to Metaphorical Meaning^{*}

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Abstract

This chapter compares spatial constructs in mental imagery to spatial constructs in non-metaphorical and metaphorical language. The study is based on a psycholinguistic survey of people's mental imagery for paths and roads, and a previous corpus-linguistic investigation of *path*- and *road*-instances from the British National Corpus (the BNC) (see Johansson Falck 2010). The aim is to investigate if spatial path and road constructs in mental imagery focus on similar aspects as those in metaphorical language. The study shows that mental imagery and metaphorical language are more restricted than non-metaphorical language, and typically related to the specific anticipations for bodily action that paths and roads afford. The focus is on function, which influences both direction and manner of motion.

Key words: afford, direction, function, manner, motion, mental imagery

1. Introduction

This chapter is an interdisciplinary study of people's thinking and talking about spatial artefacts. More specifically, I compare a psycholinguistic survey of people's imaginative understandings of paths or roads with a previous cognitive linguistic analysis of the patterns of verbs used together with metaphorical and non-metaphorical *path*- and *road*-instances (see Johansson Falck 2010). The focus is on investigating how human interaction with the environment influences language and thought. I explore the hypothesis that metaphorical language including the terms *path* or *road*, by virtue of going back to simulation based activities, is guided by the same cognitive principles as mental imagery involving paths or roads. The hypothesis is motivated by Gibson's (1979) theory of affordances whereby things in the world around us are connected with their function (e.g. chairs are connected with the fact that they are meant for sitting, and cups are connected with drinking), and by ideas in cognitive linguistics and psychology that metaphorical language is guided by processes of embodied simulation (Gibbs 2006a, b; Gibbs & Matlock, 2008; Johansson Falck and Gibbs, in press).

Metaphorical *path*- and *road*-instances are typically connected with travel through space. In example (1), for instance, people *advance along a socialist path*, and in example (2), a learner is *well on the road to being a competent reader*.

- (1) Ironically, in view of Tanzania's later *advance along a socialist path*, this proved to be the first entirely commercial radio service in English-speaking Africa. [my emphasis]

- (2) The learner who is *well on the road to* being a competent reader does bring a number of things to the task, a set of skills and attributes many of which are still developing.

[my emphasis]

But why do we typically move when located in the context of a metaphorical path or road? Why do we move along, and not across, metaphorical instances of these artefacts? And why does metaphorical travel along paths or roads not include, for example, biking?

In this chapter, the patterns of verbs used together with metaphorical *path-* or *road-* instances such as those in (1) and (2) are compared with their non-metaphorical counterparts, and with people's mental imagery for paths or roads. Given that both mental imagery for paths and roads and metaphorical *path-* and *road-* instances go back to imagining what being on a path and road must be like, spatial constructs in mental imagery and spatial constructs in metaphorical language should be qualitatively similar. A consistent focus on the anticipations for bodily interaction that paths and roads afford is expected to explain why certain patterns, but not others, are found in the metaphorical data. My study is similar to Wallington's (this volume) in the sense that it compares literal lexicalisation patterns with metaphorical ones, and in that it addresses the question how patterns at the level of lexical metaphor fit into the bigger metaphorical picture.

Metaphorical *path-* or *road-*instances are generally structured in line with various motion metaphors at the levels of primary or conceptual metaphor (e.g. ACTION/CHANGE IS MOTION, LIFE/A PURPOSEFUL ACTIVITY/A RELATIONSHIP IS A JOURNEY, PURPOSES ARE DESTINATIONS, and TIME/CHANGE IS MOTION) (see Johansson Falck, in press a) and mappings at this level of abstraction have traditionally been the focus of cognitive linguistic metaphor studies (e.g. Lakoff & Johnson 1980/1999). My previous corpus investigations of non-metaphorical and

metaphorical *path*-, *road*-, and *way*-instances, however, show that metaphorical instances of these terms are not only structured in line with primary/conceptual metaphors such as these, but are also strongly influenced by our embodied experiences with the specific concepts that these terms refer to in their literal uses (Johansson Falck 2010; in press a). Similarities and differences between real-world paths, roads, and ways are reflected by the ways in which metaphorical paths, roads, and ways are described, by the kinds and frequencies of obstacles that people face on these (see Johansson Falck, in press a), and by the kinds of actions we are engaged in on or near metaphorical paths, roads, or ways (see Johansson Falck 2010). Moreover, Johansson Falck and Gibbs' (in press) comparison between the target domains that are described by means of metaphorical *path*- or *road*-instances, on the one hand, and people's mental imagery for paths and roads, on the other, suggests that people's metaphorical understandings of these artefacts are influenced by the specific ways in which paths and roads are important to us. Their perceptions of real paths or roads and their metaphorical understandings of *path* or *road* seem to be guided by the same principles. Similarities between the specific contexts for travel through space that paths and roads provide result in similarities between the target domains described by means of metaphorical *path* or *road*. Accordingly, differences between their contexts result in differences between the target domains that they describe.

In the present study, the quality of the travel in the contexts of non-metaphorical and metaphorical *path*- or *road*-instances is compared with the function of paths and roads of taking us from one place to another, and with the specific ways in which people move when they imagine themselves on a path or a road. The aim is to further explore the hypothesis that spatial constructs in mental imagery and spatial constructs in metaphorical language are guided by the same cognitive principles. Questions being asked are a) what are the paths/roads like? b) what kinds of events take place in their contexts? and c) in which direction do people travel? I expect the quality of the travel to be strongly influenced by people's perceptions of paths or roads

through affordances. Our understanding of these artefacts through their function should thus not only influence what target domains are described by means of *path* or *road* (cf. Johansson Falck and Gibbs, in press), it should also influence the speed, the manner, and the direction of the metaphorical travel. Patterns that are evident from a psycholinguistic survey of people's mental imagery for paths and roads are expected to be coherent both with the functions of paths and roads and with the results of a corpus-linguistic study of the verbs in metaphorical or non-metaphorical *path*- and *road*-instances.

2. Method and material

I compared data from a psycholinguistic survey of people's mental imagery for paths and roads (cf. Johansson Falck and Gibbs, in press) with some of the data from a corpus-linguistic investigation of the verbs used in metaphorical and non-metaphorical *path*- and *road*-instances from the British National Corpus (the BNC) (see Johansson Falck 2010).

The psycholinguistic survey focused on what types of actions, which direction of motion, and what type of properties people associate with paths or roads. Sixty-six subjects took part in the survey. They were all undergraduates at University of California, Santa Cruz (UCSC), who participated for course credits in a psychology course. First, subjects were told that their mental imagery for events in life would be tested and asked to form a mental image of one out of four different events. Sixteen subjects were asked to imagine themselves being on a path, and sixteen to imagine themselves being on a road. Seventeen subjects were told to imagine themselves moving on a path, and seventeen to imagine themselves moving on a road. Then, subjects were

told to rate on a scale from 1 to 7 how well various terms apply to their mental image of what they were doing on the path/road (e.g. *standing, parking, turning*), to their direction of motion on the path/road (e.g. whether they were moving *on, across, or along the path/road*) and to what the path/road was like (e.g. *new, long, paved, etc.*). A rating of 1 indicated that the term/phrase is not at all relevant to their mental image and a rating of 7 that the term is highly relevant to their image.

In the corpus-linguistic investigation, 1,000 random instances each of *path* and *road*, were extracted from the corpus together with a context consisting of 3–5 lines of text. These instances were then divided into metaphorical and non-metaphorical uses (including both literal and metonymic instances) by means of a slightly modified version of the *Metaphor Identification Procedure* (MIP) (Pragglejaz Group 2007) (see Johansson Falck 2010). Next, the verbs used together with *path* or *road* were analysed. Verbs that occurred more than once and verbs (e.g. *prepare*) that seemed to belong to the same semantic category as another verb (e.g. *make, construct*) were further analysed. Isolated examples that did not belong in any of these categories were left out of the analysis. Throughout the process, the goal was to identify the verb categories in the data, and not to find instances of a pre-determined set of categories. The verb categories that emerged from the data were then compiled in tables and their contexts analysed. Finally, complementary analyses of the collocations of *path* and *road* in the BNC were made to test the tendencies suggested by the usage patterns of the verbs included in *path* and *road*-instances. In this way, strong tendencies were distinguished from accidental. The corpus-linguistic investigation is corpus-based rather than corpus-driven. The reasons for using this type of approach and a more detailed account of the method are discussed in Johansson Falck (2010).

In the initial corpus-linguistic analysis, not only *path*- and *road*-instances were studied, but also *way*-instances. Moreover, both verbs that provide information about what somebody or something is doing on the path, road, or way and what the path, road, or way does were analysed. Here, however, only instances that are relevant to the study of the speed, the manner, and the direction of travel in the context of a spatial artefact are discussed. Hence *way*-instances, which are not typically connected with a concrete artefact, but with motion through space (see Johansson Falck, in press a) are not dealt with. Similarly, fictive motion verbs which do not refer to the travel of the figure but to the fictive motion of the artefact are excluded from the study, as are target domain verbs, which do not originate from the context of a source-domain artefact.

In the following sections, the psycholinguistic and corpus-linguistic data are discussed. Throughout the discussion, the focus is on the speed, the direction, and the manner of travel through space in metaphorical and non-metaphorical *path*- or *road*-contexts.

3. Mental imagery for paths or roads

Table 1 is a summary of how well verbs connected with non-motion (i.e. *standing*), ending one's motion (i.e. *stopping*), and motion (i.e. *moving*) apply to what the subjects imagined that they were doing on the path or road. The ratings by subjects who imagined themselves being on a path or road are shown in rows 1–2, and those by subjects who imagined themselves moving on the path or road are shown in rows 3–4.

Table 1. Summary of the ratings of how relevant various verbs are to what subjects are doing on a path or road

	Mental image	Verbs that subjects were asked to rate		
	You are on a ...	<i>standing</i>	<i>stopping</i>	<i>moving</i>
1	path	5.1	3.5	5.9
2	road	2.8	2.4	5.5
	You are moving on a ...			
3	path	4.8	2.4	6.5
4	road	1.8	2.1	6.8

The average ratings of how well the verbs apply to what the subjects were doing consistently show that their mental imagery for paths or roads is connected with travel through space. *Moving* was considered more relevant to what the subjects were doing on the path or road than were both *standing* and *stopping*. The average ratings of *moving* are between 5.5 and 6.8, the average ratings of *stopping* between 2.1 and 3.5, and those of *standing* between 1.8 and 5.1. Interestingly enough, *moving* was not only considered highly relevant by subjects who were specifically asked to form a mental image of *moving* on a path or road (lines 3–4), but also by subjects who were asked to imagine themselves *being* on either one of these artefacts. The mean ratings by the former subjects were between 6.5 and 6.8 (lines 3–4), and by the latter between 5.5 and 5.9 (lines 1–2). The results, however, also suggest that there are important differences between paths and roads. Travel through space along roads is typically uninterrupted; neither *standing* nor *stopping* is particularly relevant to what subjects imagined themselves doing on the road. The mean ratings of these verbs are between 1.1 and 2.8. Subjects who picture themselves in a path-context, however, seem to think that they sometimes stand, and sometimes move. The mean ratings of *standing* by these subjects are between 4.8 and 5.1. Even though paths are strongly connected with travel through space, this type of travel is not as efficient as that on a road.

We may conclude that not only people's perceptions of real paths and roads afford motion, so do their imaginative understandings of these artefacts (cf. Gibson 1979). Both paths and roads are intimately connected with travel through space, but travel in road-contexts is more efficient than travel in path-contexts.

The mean ratings of the manner verbs that the subject were asked to rate (summarised in Table 2) show similar patterns. The focus on motion rather than end of motion is evident also from a comparison between *parking*, *driving*, *cycling*, *turning*, *treading*, and *walking*. Of these verbs *parking* has the lowest average ratings. Its mean ratings range between 1.1 and 1.6., which can be compared with the ratings for *driving*, which range between 1.1 and 6.2, *cycling* between 1.2 and 2.5, *turning* between 2.7 and 4.2, *treading* between 1.1 and 2.8, and *walking* between 1.9 and 6.5. Moreover, the closer connection between roads and efficient travel through space than paths is also suggested by the fact that *driving* is the most relevant manner verb to subjects who imagined themselves on a road, and *walking* the most relevant manner verb to subjects who pictured themselves in a path-context. *Cycling* and *treading* were not relevant in any of the contexts that subjects were asked to imagine themselves in. *Turning* was in between being relevant and not at all relevant to subjects who imagined themselves on a path and slightly relevant to subjects who imagined themselves moving on a road.

Table 2. Summary of the ratings of how relevant various manner verbs were to subjects' mental imagery for paths or roads

	Mental image	Verbs that subjects were asked to rate					
	You are on a ...	<i>parking</i>	<i>driving</i>	<i>cycling</i>	<i>turning</i>	<i>treading</i>	<i>walking</i>
1	path	1.2	1.1	1.5	3.5	2.4	6.5
2	road	1.4	4.7	1.6	2.7	1.1	1.9
	You are moving on a ...						

3	path	1.1	1.6	1.2	2.8	2.8	6.5
4	road	1.6	6.2	2.5	4.2	1.7	1.9

Taken together the ratings of the verbs in the psycholinguistic survey suggest that people's mental imagery for paths or roads is strongly influenced by our understanding of these artefacts through affordances. When picturing themselves in the context of a path or road subjects do not imagine themselves performing just any kind of action, but they focus on actions related to what paths and roads are meant for. As is coherent with the function of paths and roads, there is a clear focus on travel through space. Moreover, each specific artefact is primarily connected with the manner of motion that it has been built for (paths with walking, and roads with driving) and with a specific degree of efficiency of travel. The road is efficient and we rarely stop. The path is not as efficient and also connected with standing.

The focus on function is also evident from the direction of people's imaginary motion through space. When subjects whose mental images include motion were asked to rate how well the phrases *along the path/road*, *on the path/road*, and *across the path/road* describe the direction of their motion, they consistently focused on the direction in which people or vehicles typically travel. A summary of these ratings is presented in Table 3. It shows that motion *along* the path/road is much more relevant to subjects' mental imagery for paths or roads than motion *across* the path/road. In all four events, the average ratings for motion *along* the path/road (4–5.6) are considerably higher than for motion *across* the path/road (1.5–2). The ratings for motion

on the path/road are also high (6.4–6.9), but these were expected given that participants were specifically asked to imagine themselves on, or moving on, the path or road. Again, the results are consistent with Gibson’s affordances (1979). Although it is certainly possible to move both *along* and *across* paths or roads, subjects tend to focus on the direction of motion that these artefacts are primarily meant for.

Table 3. A summary of the ratings of how relevant different directions of motion are to the direction in which subjects imagined themselves travelling

	Event	Direction of motion		
	You are on a ...	along	on	across
1	path	5.2	6.7	1.6
2	road	4	6.6	2
	You are moving on a ...			
3	path	5.6	6.9	1.8
4	road	4	6.4	1.5

Finally, subjects were asked to rate how relevant various properties are to the path or road that they imagined themselves on. A summary of these ratings is shown in Table 4. The ratings are largely coherent with the results above. First, the aforementioned focus on motion *along* the path or road is coherent with the high ratings for *long* in this part of the survey. Of the twelve properties that subjects were asked to rate, *long* has the absolutely highest average ratings (between 5.6 and 6.5). Second, as is likely related to the function of paths, roads, and ways of taking people or things through various types of terrain, subjects considered *clear* fairly relevant to their imagery of paths or roads. The mean ratings for *clear* in the context of subjects’ imaginary paths or roads range between 4.5 and 5.2. Given this function, paths and roads tend to be clearer than the terrain that they go through. Third, the above differences

between paths and roads are also suggested by the properties of subjects' imaginary paths or roads. Table 4 shows that the properties *wide*, *straight*, *fast*, and *paved* are more relevant to imaginary roads than to imaginary paths, and *earthen* is more relevant to imaginary paths than to imaginary roads. In addition to being *long* and *clear* the imaginary path is *earthen*, and the imaginary road is *straight* and *paved*, or *wide*, *straight*, *fast*, and *paved*. Again, the data suggests that the imaginary road is a more efficient means of transportation than the imaginary path. The properties that are considered the most relevant in the context of an imaginary path or road appear to be those that are prototypical to these specific artefacts.

Table 4. Mean ratings for how relevant various properties are to subjects' mental images of paths and roads

	Properties that subjects were asked to rate											
You are on a ..	new	wide	steep	straight	clear	long	fast	paved	earth-en	diffi-cult	Busy	danger-ous
path	3.9	3.9	2.3	3.3	5	5.6	2.1	3	5.3	2.5	1.8	1.7
road	3.9	3.6	2.5	4.6	4.8	6.2	3.1	5.5	3.6	2.9	2.1	2.5
You are moving on a ...												
path	3.4	3.9	2.9	3.9	4.5	5.7	2.6	2.8	4.9	2.8	1.8	1.6
road	3.3	5.2	1.9	5	5.2	6.5	5.2	5.5	2.6	2.9	2.9	3

Given the results of the psycholinguistic survey, we should expect certain patterns in the corpus-linguistic study. As is coherent with our understanding of paths and roads through the anticipations for bodily action that they afford, both *path*- and *road*-instances should be closely connected with travel through space. That is, with travel through space along, and not across, the artefact. Moreover, roads should be connected with more efficient travel than paths. Whereas being in a *path*-context typically

implies moving along on foot and sometimes standing, we should not typically stand, stop, or travel on foot in a *road*-context, but move along in a vehicle without too many interruptions.

4. Metaphorical and non-metaphorical uses of *path* or *road*

Dictionary data and a corpus-linguistic investigation of the ways in which metaphorical and non-metaphorical *path*- and *road*-instances are described (see Johansson Falck 2010; in press a) show that these terms refer to related, but slightly different concepts. In their non-metaphorical uses, both *path* and *road* refer to an artefact. A *path* is typically an artefact along which people move on foot, and a *road* “a way that leads from one place to another, especially one with a hard surface that cars and other vehicles can use” (Macmillan English Dictionary for Advanced Learners, Second Edition (Rundell and Fox, 2007)). *Path* may also be used to refer to the direction in which someone or something is moving. Further analyses (see Johansson Falck 2010; in press a) show that both metaphorical and non-metaphorical *paths* may be *clear* and *easy* to travel along, but they are more often *narrow*, *winding*, and *difficult*. Both types of path are typically in need of preparation and there are often obstacles (e.g. *bushes*, *pebbles*, and *stumbling-blocks*) on, along, or near them. Metaphorical paths tend to be more difficult than non-metaphorical, but there are no major differences between metaphorical and non-metaphorical roads. Both types of roads are described by fewer terms than paths and there are very few obstacles on them (see Johansson Falck 2010; in press a).

In this section, the descriptions of metaphorical and non-metaphorical *path* and *road* are compared with a corpus-linguistic investigation of the patterns of verbs that refer to what people or things are doing on or near a metaphorical or non-metaphorical *path* or *road*.

The verbs that are used with metaphorical or non-metaphorical *path* or *road* (see Johansson Falck 2010) are summarised in Table 5. Column A shows the categories that the verbs fell into. Columns B–C show the verbs from the *path*-instances, and columns D–E the verbs from the *road*-instances. Metaphorical and non-metaphorical *path*- and *road*-instances (columns B and D, and columns C and E respectively) were unevenly distributed. After the material had been divided into non-ambiguous metaphorical and non-metaphorical instances and certain categories removed from the data (see Johansson Falck 2010), there were 659 non-metaphorical and 284 metaphorical *path*-instances (columns B–C), and 751 non-metaphorical and 49 metaphorical *road*-instances (columns D–E). These overall frequency differences must be taken into consideration when the frequencies of the verbs that are used together with metaphorical or non-metaphorical *path* or *road* are compared.

The verbs in my data all suggest that both metaphorical and non-metaphorical *path*- or *road*-instances go back to people's experiences with the specific artefacts that these terms refer to in their literal senses. The verbs in the *path*-data show that people move on foot (e.g. *walk*, *tread*) on both types of paths (columns B–C, 1). They *cross* (see B–C, 3), *choose* (see B–C, 11), *make* or *provide* paths (see B–C, 5), or the paths are *blocked* by, or *littered* with etc. (see B–C, 6) obstacles. Moreover, the contexts of verbs such as *find*, *trace*, or *guide* (see B–C, 7) suggest that both types of paths may be hard to find or that they are located in an area from which people have problems finding the way. Several instances refer to *seeing* or *looking* at (see B–C, 8) paths or something on the path, or to people who move along paths (see B–C, 9–10, 12). The verbs in the *road*-instances show that people *move*, *go*, and *travel*

on, or along, both kinds of road (D–E, 9), they *head* somewhere on them (D–E, 9), they may *be* on the road to something (D–E, 9), and they *reach* something by moving along these roads (D–E, 9).

However, even though both metaphorical and non-metaphorical *path*- and *road*-instances are related to people's experiences with the same real-world concept and many verbs occur in both metaphorical and non-metaphorical contexts, there are still important differences between the usage patterns of these verbs. As may be expected given the overall frequency differences between non-metaphorical and metaphorical *path*- and *road*-instances, the verbs in the non-metaphorical instances are more frequent and varied than those in the metaphorical instances. However, there are also qualitative differences between the verbs in the two types of data, and these do not seem to go back to the overall frequency differences between the *path*- and *road*-instances. Whereas the verbs in the non-metaphorical data refer to anything that can possibly be done in the context of any type of path or road, those in the metaphorical are more restricted.

First, the verbs in the metaphorical instances are more closely connected with motion than with non-motion. Columns B–C, 4 suggest that *stand*, which refers to being located rather than to travelling through space, is more often used in non-metaphorical *path*-contexts than in metaphorical. This tendency is further substantiated by the usage pattern of the collocation *stand–path*¹ in the rest of the BNC. Of the nineteen instances of this collocation, there are only two metaphorical instances, and these are both indirectly related to motion in the sense that they refer to the action of someone or something that constitutes an obstacle in a moving figure's way (see Johansson Falck 2010). Accordingly, the verb patterns in the *road*-instances suggest that verbs that refer to stopping somewhere along the road and to being located in a *road*-context are not often used together with metaphorical *road*. All the instances of *park*, *stop*, *stand*, and *live* in

my data are used together with non-metaphorical *road* (Columns D–E, 2, 4). This tendency is also evident from the fact that all but one of the forty-two *stand–road* collocations² in the rest of the BNC, all the forty-two *stop–road* instances³, and both *stay–road* instances⁴ in the corpus are non-metaphorical. The metaphorical *path* or *road* then, more so than the non-metaphorical, is connected with the function of paths or roads of taking us from one place to another, from A to B.

Second, metaphorical *path*- and *road*-instances are more closely connected with motion *along* the road than with other directions of motion (B–E, line 3). The frequencies of *cross* suggest that non-metaphorical roads are crossed more often than metaphorical. There are no *cross*-instances in the metaphorical *road*-instances in my data (D–E, 3) and none of the 529 *cross–road* instances⁵ in the rest of the BNC are metaphorical. The *cross–path* instances are more evenly distributed between metaphorical and non-metaphorical contexts. There are two *cross*-instances in the metaphorical *path*-instances in my data and three in the non-metaphorical (B–C, 3). Accordingly, nineteen out of thirty-nine *cross–path* instances in the rest of the BNC are metaphorical. Further analyses, however, show that the *cross*-instances in metaphorical *path*-contexts typically refer to someone or something that crosses the path of a figure travelling along the metaphorical path. In that sense, these instances, too, are indirectly related to travel along the artefact (cf. *stand–path* above). In example (3), for instance, someone’s ambition is seen as a driving force that motivates a person to take off along the path towards becoming an eloquent speaker. The crossing of this path refers to the point when the ambitious person, on his path towards becoming eloquent, comes in contact with the works of William Shakespeare. Similarly, in example (4), the travel along the path pertains to a newly released album’s way to people’s

ears. In this example, the crossing of the path refers to how these people react when they first hear the album.

- (3) I'm not sure how that ambition changed course in Cape Town. I was always terribly shy and I was sent to what were known as elocution lessons – to get me out of myself. A.R. *Did Shakespeare cross your path early on?* A.S. Well, not really. I remember the elocution teacher was very keen on the modern plays that were being published then... [my emphasis]
- (4) In the early to mid-'80s, The Wasp Factory's prole art debut would not have seemed so brave, but in releasing *an album bound to infuriate and confuse most who cross its path* at this time they really are pressing their luck. [my emphasis]

The uses of *cross*, then, suggests that metaphorical paths and roads are connected with travel along, and not across the artefact. The usage patterns of the collocations *across-path* and *across-road* show similar tendencies. Four out of 102 *across-path* instances and none of the 701 *across-road* instances in the BNC are metaphorical (see Johansson Falck 2010). Again, the focus of the metaphorical instances is on features connected with the function of the artefact. Not even verbs that refer to changing the direction of motion along the path or road (e.g. *criss-cross*, *descend*, and *turn*, see line 3) tend to be metaphorical. There are no metaphorical instances of these verbs in my data, and none of the 240 instances of *turn-road*⁶ in the rest of the BNC are metaphorical.

Third, the patterns of the verbs in my data suggest that metaphorical *path-* or *road-* instances are more closely connected with a specific type of path or road than their non-metaphorical counterparts. On the one hand, the manner verbs in the *path*-instances suggest that

metaphorical paths are rougher and more difficult to travel along than non-metaphorical paths. On the other hand, the verbs in the *road*-instances suggest that metaphorical roads are faster and more efficient than non-metaphorical roads.

The manner verbs in columns B–C, 1–2, thus suggest that there is a close connection (a) between *walk*, which refers to something that we can do on many different kinds of surfaces, and the non-metaphorical path, and (b) between *tread* and *beat*, which are more closely connected with rough surfaces, and the metaphorical *path* (see columns B–C, 1). *Walk* is not only the most frequent manner verb in the non-metaphorical *path*-instances in my data, 112 out of 118 *walk–path* instances⁷ in the rest of the BNC are non-metaphorical. Accordingly, *tread* and *beat* are the most frequent manner verbs in the metaphorical instances in my data, and the majority of the *tread–path* (22 out of 27 instances⁸) and *beat–path* collocations (33 out of 34 instances⁹) are metaphorical. The patterns of these verbs are in line with the paucity of *drive* in the metaphorical *path*-instances (see columns B–C, 2). If metaphorical paths are generally too rough for walking, they should be unapt contexts for driving too.

The connection between metaphorical roads and efficient travel through space is suggested by a paucity of manner verbs and infrequent uses of verbs that refer to building or repairing the road and to blocking someone's travel along the road in metaphorical *road*-contexts. Although the verbs in the non-metaphorical *road*-instances include several different manner verbs (e.g. *drive*, *cycle*, *walk*, and *wander*: see column D, 1–2), those in the metaphorical focus on travel through space without providing further information about that travel, e.g. people *go down*, *move*, and *travel* along the road (see column E, 9), or they focus on people or things who *are* on the road to or towards something (see E, 12). The lack of information about manner in these fairly schematic verbs is coherent with the speed with which people or things typically

move along roads. The faster we travel, the less likely we are to pay attention to the details, or the context, of that travel. Neither *walk*, which is the absolutely most frequent verb in non-metaphorical *road*-sentences (26 instances), nor *drive*, which seems to refer to prototypical motion on a road, is used together with metaphorical *road*, and none of the 220 *walk–road* instances¹⁰ and 99 *drive–road* instances¹¹ in the BNC are metaphorical. The much more schematic verbs *go* and *set*, however, are much more likely to occur with metaphorical *road* than these manner verbs. A comparison with the usage patterns of collocations including *road* and either one of the terms *go* or *set* shows that 31 out of 180 *go–road* instances¹² and 2 out of 6 *set–road* instances¹³ in the BNC are metaphorical. Although non-metaphorical roads may indeed be built, repaired, and blocked there is a paucity of these types of verbs in the metaphorical *road*-instances in my data (see columns D–E, 5 and 6). Similarly, there are no metaphorical instances of the collocations *pave–road* (15 instances), *build–road* (81 instances)¹⁴, *construct–road* (23 instances)¹⁵, *repair–road* (21 instances)¹⁶ in the rest of the BNC, and very few instances of *block–road* (3 out of 128)¹⁷. When thinking about the road in metaphorical ways we do not seem to have an artefact that needs construction or is being blocked in mind.

To conclude, the verbs in both the metaphorical and the non-metaphorical *path* and *road*-instances refer to actions that may be expected on or near the artefacts that these terms refer to, but the metaphorical instances, more so than the non-metaphorical instances, are connected with a specific type of path or road. (see Johansson Falck 2010). Similar to the ways in which metaphorical paths are described, the verbs suggest that metaphorical paths are more difficult than non-metaphorical. Although no major differences were found between the ways in which metaphorical and non-metaphorical roads are described, the verbs that are used together with these two types of roads indicate that metaphorical roads are more efficient than non-

metaphorical. In other words, they are stereotypical instantiations of the paths and the roads described at the beginning of this section.

Table 5. Summary of the verbs in the metaphorical and non-metaphorical *path*- or *road*-instances

	A	B	C	D	E
	Verb categories	Verbs from (284) metaphorical <i>path</i> -sentences	Verbs from (659) non-metaphorical <i>path</i> -sentences	Verbs from (49) metaphorical <i>road</i> -sentences	Verbs from (751) non-metaphorical <i>road</i> -sentences
1	Verbs referring to prototypical manner of motion in the context of a path/road/way	tread (6) beat (3) walk	walk (28) climb (5) run (5) thread tread		drive (14) cycle (2)
2	Verbs referring to non-prototypical manner of motion in the context of a path/road/way		drive (6)		walk (26) park (6) stop (8) wander (2) collide
3	Verbs referring to direction of motion	cross (2)	criss-cross (5) cross (3) turn (5) descend (4)		cross (15) turn (19)
4	Verbs referring to being located		stand (3)		stand (3) live (3) die (2) be found (dead) happen
5	Verbs referring to making/building/repairing a path/road etc., making way	provide (5) make be prepared ease (2)	provide (3) make (3) construct (3) build (2)		build (2) construct pave repair

		make easier light mark be illustrated be indicated open set (2) chart (3) force forge (2) cut beat smooth (2) strew (3) paved	improve upgrade expand waymark (2) draw (2) mark (2) lit open up force cut (3) slash (2) hack clear carve dig plough sweep (2) grease		
6	Verbs connected with obstacles	block (2) litter place put (sth in the) (3) cast (into sb's) encountered	block (5) litter crowd cover come in, move into fall into (2) shuffle into herd into be thrown into run into stray into bump into protrude on to plant [themselves in]		block(3)

			flatten		
7	Verbs connected with finding/losing a path/road/way	find (5) seek trace (2) mark [(the beginning of)] guide direct stray (2)	find(2) trace (2) retrace (2) look for discloses show point (3) guide light mislead stray (2)		
8	Verbs connected with sight	look (2) saw	see (7) look saw [sb. on path] watching [the path that their eyes] travelled [around]		look (4) overlook see (4) watch concentrate (2)
9	Verbs connected with self-directed motion	take (9) continue (6) set out (4) steer (2) set off come	come (17) take (11) continue (3)	go [down/ off / along](9) set [out on](3) move [down/away from] head [up] reach travel	go (13) come (11) move (9) close (7) pass (5) reach [by/the] (4) head (3) travel (2) get [off/back/ across] (4)

10	Verbs connected with following the path/road/way	follow (26) pursue (6) lead (4)	follow (27) pursue lead (9)		follow (9)
11	Verbs that refer to choosing path/road/way	choose (6)	choose		
12	Other verbs	be (4)	be (6)	be	be (8) use (4)

In addition to the verb differences that are coherent with what we know about paths or roads, there are also differences between how often metaphorical or non-metaphorical *paths* or *roads* are *followed*, how often we *choose* between these, and how often we see people or things on these different types of paths or roads. Columns B–C, 10 suggest that metaphorical paths are passively followed more often than non-metaphorical. Twenty-six out of 284 metaphorical paths are *followed* and 6 *pursued*, and 27 out of 659 non-metaphorical paths are *followed*, and 1 *pursued*. Similarly, we seem to choose between metaphorical *paths* more often than between non-metaphorical *paths*. There is 1 *choose*-instance in the 659 non-metaphorical *path*-contexts, and 6 instances in the 284 metaphorical *path*-contexts. Columns D–E, 10 show that non-metaphorical *roads*, but not necessarily metaphorical, may be followed (9 out 751 non-metaphorical *road*-instances, and none of the 49 metaphorical *road*-instances are followed), and columns D–E, 8 that we sometimes refer to seeing the non-metaphorical *road*, but not the metaphorical, or to seeing people who move along the non-metaphorical *road*, but not the metaphorical. It is not clear from my material how these differences can be explained, and some of the differences may be related to the uneven distribution of metaphorical and non-metaphorical *path*- or *road*-instances. Analyses of the contexts in which these terms are used (see Johansson Falck 2010), however, indicate that there is a tendency for metaphorical roads to

be about direction of motion decided by the travelling figure (e.g. the figure *goes*, *moves*, or *heads*), and for non-metaphorical *road*-sentences not to be restricted in this way. Metaphorical *path*-sentences, by contrast, are often used in talk about a figure that *follows* or *pursues* a path. This is coherent with the fact that we do not tend to passively follow the metaphorical *road*, or talk about seeing the metaphorical *road*.

5. Discussion

A comparison between the psycholinguistic survey and the corpus-linguistic investigation shows that there are both similarities and differences between people's mental imagery for paths or roads and the patterns of metaphorical *path*- and *road*-instances. The similarities are primarily connected with the functional similarities between these two artefacts, that is, with the fact that they have both been built for taking people or things from one place to another along the artefact. Both people's mental imagery for paths or roads and their metaphorical uses of *path* or *road* seem to be influenced by the anticipations for bodily interactions that these artefacts afford (see Gibson 1979). Unless we consider the function of paths and roads of taking us from one place to another, we are left with no apparent reason for why both paths and roads are primarily connected with travel through space. Although several different things may be done on, along, or near a path or a road, only actions connected with motion seem to be relevant for people's mental imagery for paths or roads, and for their metaphorical uses of *path* or *road*. Accordingly, the focus on travel from A to B along, and not across, the artefact cannot be explained unless we consider that this is the direction in which people or things typically travel when on the path or road.

Another similarity between people's mental imagery for paths or roads and their metaphorical uses of *path* or *road* is their common focus on features that appear to be stereotypical of the specific artefacts that *path* and *road* refer to. The psycholinguistic survey clearly shows that paths are seen as much less efficient means of transportation than roads. Both paths and roads are taken to be *long* and *clear*, but paths are *earthen*, and roads *wide*, *straight*, *fast*, and *paved*. When imagining themselves in a path-context, subjects tend to think that they move along on foot (i.e. they *walk*), but they may also *stand*. When picturing themselves in a road-context they tend to move along in a vehicle (i.e. they *drive*), and their motion is typically not slowed down. Verbs such as *stop*, *park*, or *stand* are considered fairly irrelevant to what subjects imagine themselves doing in a road-context. Accordingly, the corpus-linguistic investigation of the verbs in metaphorical and non-metaphorical *path*- or *road*-instances shows that metaphorical paths are much more difficult than metaphorical roads. Both metaphorical and non-metaphorical paths may be *made* or *provided*, *blocked* by, or *littered* with obstacles, and located in an area that makes them hard to *find* or *trace*. Moreover, the distribution of manner verbs such as *beat*, *thread*, and *walk* suggests that metaphorical *paths* are even rougher than their literal counterparts. The verbs in the metaphorical *road*-contexts, by contrast, do not typically refer to building or repairing the road, or to blocking someone's travel along the road. Moreover, they do not provide information about manner. Metaphorical roads are likely too closely connected with efficient travel through space to be connected with these types of action. Like the metaphorical *path*-instances, they are stereotypical instantiations of the specific artefact that they are connected with.

My previous comparison between the verbs in metaphorical and non-metaphorical *path*- or *road*-instances (see Johansson Falck 2010) shows that some of the differences between

metaphorical and non-metaphorical instances are related to a difference between real and imagined journeys. The verbs in the non-metaphorical *path*- and *road*-instances refer to anything that can possibly happen on or along these artefacts, and those in the metaphorical instances to what we think will happen in their contexts. Metaphorical instances are thus more closely connected with stereotypical features, and with fewer verbs, than the non-metaphorical instances.

The focus on travel through space suggests that metaphorical *path*- and *road*- expressions are structured in line with conventional primary or conceptual metaphors such as ACTION/CHANGE/TIME IS MOTION, PURPOSES ARE DESTINATIONS, and LIFE/LOVE/PURPOSEFUL ACTIVITIES ARE JOURNEYS (see e.g. Grady 2005; Lakoff and Johnson 1980; 1999). Neither the differences between the *path*- and the *road*-instances, however, nor the differences between the metaphorical and non-metaphorical instances of the same term can be explained by referring to mappings at these fairly schematic levels of organisation. Mappings at the level of lexical metaphor thus appear to be more important than has generally been acknowledged by scholars within this framework (cf. Johansson Falck, in press a).

However, the qualitative differences between the metaphorical and non-metaphorical instances do not seem to be explicable merely in terms of linguistic meaning either. Had metaphorical language simply been derived from literal language one would expect the same type of constructions that are used in literal language to appear in metaphorical language too. My data, however, shows that only some of the constructions that are used in non-metaphorical contexts are also used in metaphorical ways. For instance, people *drive* on non-metaphorical *paths*, but not on metaphorical ones, and they *build*, *pave* and *repair* non-metaphorical *roads*, but not metaphorical ones. One possible language internal explanation for the differences is provided by Deignan (2005) whose corpus analyses suggest that "true ambiguity [between literal and

metaphorical senses] is rare in naturally occurring language" (Deignan 2005: 217) and that "metaphorical uses of words may have a stronger tendency to occur in fixed patterns than literal uses" (Deignan 2005: 207). She argues that this type of differences may be due to the human desire to communicate efficiently. If certain constructions are used in metaphorical language, and others in non-metaphorical, then ambiguity will be avoided, and the patterns of language signal which type of meaning is intended. Deignan's explanation is plausible, and lexicalisation patterns do play a role in how people's bodily experiences are used (cf. Clausner and Croft 1997; Johansson Falck, in press b) or how events are remembered (Filipović and Geva, this volume). However, her explanation does not account for the tendency for metaphorical language to be more closely connected with mental imagery than non-metaphorical language. Importantly, the present study shows that metaphorical *path*- or *road*-instances are more closely related to people's mental imagery for paths or roads than the non-metaphorical instances of these terms. Both the psycholinguistic data and the metaphorical instances, but not the non-metaphorical instances, appear to be strongly influenced by the different ways in which people typically move on real-world paths and roads. In the psycholinguistic survey, the difference between the path and the road is evident partly from the fact that people *walk* on paths and *drive* on roads. In the metaphorical instances, it is reflected by the fact that people *tread* or *beat* paths, and by the fact that manner of motion is not encoded in the verbs that refer to travel in metaphorical *road*-contexts (i.e. people *go down*, *set out on*, or *move along* the metaphorical road). The verbs in the non-metaphorical data are not restricted to referring to what is expected. They refer to all types of world situations (cf. Johansson Falck 2010).

The view that metaphorical language derive from simulation based activities that are strongly influenced by what appears to be typical of any given situation provides one possible

explanation for the differences between the metaphorical and non-metaphorical patterns. If both people's metaphorical uses of *path* or *road* and people's mental imagery for paths or roads originate from their imaginative understandings of what it must be like to be on a path or a road, and these understandings are guided by certain cognitive principles, then the patterns resulting from these two types of processes should be coherent. This is precisely what my data suggests. Both the psycholinguistic data and the metaphorical instances reflect a strong emphasis on a) travel along the artefact and b) on certain stereotypical features connected with these specific artefacts. This type of focus is not reflected in the lexicalisation patterns in the non-metaphorical part of my data, and is thus not explicable in terms of semantic memory alone (cf. Russell and Davies, this volume).

6. Conclusion

The coherence between the patterns of the psycholinguistic and corpus-linguistic data has several theoretical implications.

First, it suggests important principles for how people's embodied experiences of spatial artefacts are used in metaphorical ways. Both the psycholinguistic and the corpus-linguistic data focus on the function of the artefacts. The strong focus on function, in turn, suggests that both people's mental imagery and the production of metaphorical language are influenced by, and motivated by, people's understanding of the world around them through affordances.

If the results of this study can be generalised to other terms that refer to spatial artefacts, then the focus on function in metaphorical language provides an explanation for why metaphorical uses of terms like these tend to be used in language structured in line with primary and conceptual metaphors such as ACTION/CHANGE IS MOTION, LIFE/A PURPOSEFUL ACTIVITY/A RELATIONSHIP IS A JOURNEY, PURPOSES ARE DESTINATIONS, and TIME/CHANGE IS MOTION.

Second, it lends support to the view that metaphorical language originates from embodied sensorimotor-based simulations of the actions referred to in the language. The similarities between the patterns that were found in the data resulting from people's imaginative understandings of what it must be like to be on a path or road and those resulting from the processing of metaphorical language suggest that these patterns are guided by similar cognitive principles.

Third, if people's perceptions of the world around them through affordances strongly influence metaphorical language, then the patterns of metaphorical language will be partly predictable from the opportunities for bodily interaction that objects in the world around us afford.

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Notes

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¹ These include 7 instances of *standing*, 8 of *stood*, and 4 of *stand* and *path*.

² These include 16 *stand–road* instances, 7 *stands–road* instances, and 19 *standing–road* instances.

³ These include 10 instances of *stopping*, 29 of *stopped*, and 3 of *stops* and *road*.

⁴ These include 1 *stayed–road* instance, and 1 *stay–road* instance.

⁵These 529 instances include all different forms of the verb *cross* (e.g. *cross*, *crosses*, *crossing*, *crossed*) used together with *road*. The frequency of these collocations, like those of the other collocations discussed in this paper, is based on a 3-word-window (both to the left, and to the right). *Cross-road* instances that were not about the verb *cross*, but about e.g. the noun *cross*, and compounds such as *Charing Cross Road* were not considered relevant for this study and were excluded from my material. Other collocations that are part of this study were treated in the same way, that is, instances that were not about the nouns *path*, *road*, or *way* and collocating verbs were excluded from the study.

⁶ These include 113 instances of *turn-road*, 31 of *turns-road*, 29 of *turning-road*, and 67 of *turned and road*.

⁷ These include 49 instances of *walked-path*, 42 instances of *walk-path*, 24 instances of *walking-path*, and 3 instances of *walks-path*.

⁸ These include 15 instances of *tread*, 10 of *treading*, and 2 of *treads* used together with *path*.

⁹ These include 15 instances of *beating*, 15 of *beat*, and 4 of *beaten* used together with *path*.

¹⁰ These include 89 *walk-road* instances, 64 *walking-road* instances, and 67 *walked-road* instances.

¹¹ These are all in the present tense: *drive-road*.

¹² These are all in the present tense: *go-road*.

¹³ These are all in the present tense: *set-road*.

¹⁴ These are 25 *build-road* instances, and 56 *built-road* instances.

¹⁵ These are 17 instances of *constructed-road*, 3 of *constructing-road*, and 3 of *construct-road*.

¹⁶ These include 10 instances of *repair-road*, 4 of *repairing-road*, 5 of *repairs-road*, and 2 of *repaired-road*.

¹⁷ None of the 42 *blocks-road* instances and 12 *blocking-road* instances is metaphorical. 1 out of 35 *blocked-road* instances and 2 out of 39 *block-road* instances are metaphorical.