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Metaphorical Mapping of Spatial Prepositions *IN, ON, AT* Based on Image Schema Theory

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Abstract: Based on the theory of image schema, this paper constructs a metaphorical mapping mechanism of the spatial prepositions '*IN, ON, and AT*' from spatial to non-spatial categories. It is found that they have differences in their basic spatial concepts that *IN* represents a three-dimensional concept of 'body', *ON* refers to a two-dimensional concept of 'plane', and *AT* shows a zero-dimensional concept of 'point'. In addition, after metaphorical mapping, the spatial differences are equally applied to the non-spatial concepts of *IN, ON, and AT*.

Keywords: Image schema, Metaphorical mapping, Spatial prepositions.

1. Introduction

English prepositions are relatively stable in form, however, they have complex meanings. In addition to possessing basic prototype concepts in the spatial category, prepositions are also used with various concepts in other categories such as time, state, manner, attachment, belonging, purpose, cause, and so on [2][5]. Therefore, the diverse concepts of prepositions pose difficulties for learners. According to Lindstromberg [13], less than 10% of English Second Language (ESL) and English Foreign Language (EFL) learners were found to demonstrate accurate utilization and comprehension of prepositions. *IN, ON, and AT* are three commonly used prepositions in English, and because of their similar meanings and usages, misuses happen all the time by learners [20]. A comparative analysis of the Freiburg-LOB Corpus of British English (FLOB) and the Chinese Learners of English Corpus (CLEC) revealed that prepositions make up one in five of the English words Chinese students misuse [4].

There are certain rules to follow among the multiple concepts of prepositions, and conceptual metaphor in cognitive linguistics provides an effective research approach [1][15][16][19]. It has been proved that a form of spatial structure is often lent to non-spatial domains through metaphorical extensions (mappings) [9].

2. Theoretical Background

2.1. Metaphorical Mapping

Metaphor is to use the correlation between one thing and another to project the word indicating the thing from one conceptual domain to another conceptual domain, which is cognitive projection or mapping in cognitive linguistics [3][17]. To understand and describe unknown things and phenomena, human beings, based on known concepts and their language expression, from here to there, from the outside to the inside, and at the same time exert amazing imagination, familiar and unfamiliar things in unusual juxtaposition, thus deepening our understanding of unknown things and phenomena [7]. Spatial orientation is regarded as the most fundamental physical experience of human beings, the most basic concept formed by the interaction between human beings and nature, and the earliest concrete concept familiar to human beings. Therefore, preposition acquisition starts from its basic spatial domain meaning, and then extends to other non-spatial domain meanings [10].

Metaphorical mappings are not arbitrary but are grounded in our everyday experience and knowledge. The origin of metaphorical mappings is typically rooted in broader categories of objects, living organisms, and people that we use to categorize the things around us. By relating abstract concepts to these broad categories, we can better understand them. This is because we have a strong familiarity with how we interact with objects, living organisms, and people, and this familiarity serves as the basis for the metaphorical mappings [14].

2.2. Image Schema

The concept of "image schema" was first proposed by Johnson in 1987, who described image schema as a recurrent, dynamic pattern of our perceptual interactions and motor programs that gave coherence and structure to our experience [7]. Image schemata are abstract cognitive patterns formed in the brain, referring as "relatively simple structures that constantly recur in our everyday bodily experience" [8].

Cognitive semantics offers two characteristics of image schemata: (1) They are not specific images but are abstract in another sense. (2) Image schemata represent schematic patterns arising from imagistic domains that recur in a variety of embodied domains and structure our bodily experience [7][8].

Therefore, image schemata provide particularly important evidence for the claim of metaphorical mappings, such as the abstract mappings based on bodily experience, and metaphorical projections from concrete domains to abstract domains. What's more, neither image schema nor metaphorical mapping is arbitrary. The metaphors are themselves motivated by structures inherent in our everyday bodily experience, mapping image schemata into abstract domains with their basic logic [6][8].

According to Langacker (1987), the principle constituents of image schema encompass three parts: trajector, landmark, and path, alluding to the interplay of the static or dynamic asymmetry between the trajector and the landmark. Specifically, the trajector (TR), funnels in as an essential entity in the asymmetric associations, while eluding the

specification of its spatial direction. The landmark (LM), on the other hand, functions as a reference point to delineate the direction of motion for the trajector, thereby providing a frame of reference. Moreover, the distance that the trajector covers is called a path [12].

3. Image Schemata of *IN, ON, AT* in Spatial Category

With the prototypical spatial meanings, English prepositions *IN, ON, and AT* are called spatial prepositions. The perception and intuition of space is the initial experience for human beings, which consequently develops the concepts of space. Through image schemata, the concepts of space formed in the space category would be mapped to other categories, to construct the non-space concepts [18].

The Cambridge Dictionary (https://dictionary.cambridge.org/dictionary/) provides the basic spatial meanings of *IN, ON, and AT. IN* refers to the meaning of 'inside a container, place, or area, or surrounded or closed off by something', and *ON* is 'used to show that something is in a position above something else and touching it'. *AT* is 'used to show an exact position or particular place', as in the following examples:

1. They live in a charming old house.

2. "I can't find my keys." "Have another check in your jacket pockets."

3. Look at all the books on your desk!

4. There's blood on your shirt.

5. She was standing at the top of the stairs.

6. The two vans collided at the crossroads.

Figures 1, 2, and 3 show the basic image schema of IN, ON, and AT in the spatial category respectively.

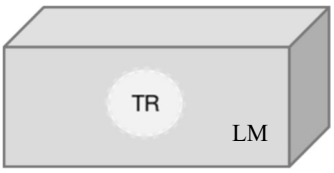

Figure 1. The Basic Image Schema of IN in Spatial Category

Figure 2. The Basic Image Schema of ON in Spatial Category

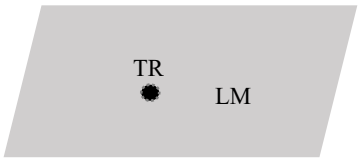

Figure 3. The Basic Image Schema of AT in Spatial Category

Specifically, in the basic image schema of *IN*, LM is a three-dimensional body (such as room, box, pocket), and TR (people, key) is wrapped by LM completely. As for *ON*, the spatial relationship between TR and LM is reflected as a two-dimensional plane surface. TR (book, picture) is on the upper side of LM (desk, wall) and there is a contact relation. The area of the contact surface generated is usually equal to that of TR. In the image schema of *AT*, TR is represented as a point on LM, whether LM is a two-dimensional plane (stair, road) or a three-dimensional body (mountain). It can be seen that the spatial concepts expressed by *IN, ON, and AT* are differentiated from the three-dimensional 'body', to the two-dimensional 'plane', and finally to the zero-dimensional 'point'.

4. Metaphorical Mapping of *IN, ON, AT* in Non-spatial Categories

People often use the concept of space to express time. The spacial concept is mapped into the category of time, forming time metaphors [11][21]. Since the concept of space is concrete that people can directly experience, while the concept of time is abstract, fuzzy, and uncertain, the mapping happens from concrete concepts to abstract concepts, which follows the law of metaphorical mapping.

The difference in the basic image schema of *IN, ON, and AT* in the space category also applies to their metaphorical concepts in the time category. Specifically, *IN* shows the largest area in the spacial image schema, it represents the longest time in the time category, such as year (in 1999), century (in the 20th century), season (in winter), month (in July), and so on. In addition, the concept of 'TR is completely surrounded by LM' in the spacial image schema of *IN* is mapped to the time category as 'during part or all of a period'(I will finish the report in two hours). As for *ON*, in the spacial concepts, the area it represents is smaller than *IN* and larger than *AT*. Accordingly, after the metaphorical mapping, the length of time described by *ON* is shorter than *IN*, usually measured by day (on Monday, on the weekend, on July 4th). *AT* shows the shortest length of time as a specific time point (She will arrive at the airport at 8 o'clock).

In addition to the time category, the spatial concept of *IN, ON, and AT* can also be mapped into other non-spatial categories, such as state, behavior, mode, social relations, and so on. The following examples are metaphorical mapping to the domain of the human body by *IN, ON, and AT*.

(1) With your hair and your beautiful skin, you'd look good in red.

(2) I work from home and live in my pyjamas most of the time.

(3) I left my car in a lay-by and set off on foot.

(4) You can either be on your knees giving it to God, or you can give up.

(5) His dazed eyes stare at the eels, which still writhe and entwine.

(6) Byfuglien sent a wrist shot from the point at Lundqvist, who was screened by Miettinen.

The three-dimensional spatial concept of *IN* is mapped here as 'people are in the container of clothes or colors'. In the

examples, the body of people (TR) is wrapped inside 'pyjamas' or 'red color' (LM). As for *ON*, its two-dimensional spatial concept of plane surface is applied to the human body in that the soles of feet or knees (TR) are above and in contact with the ground (LM). The spacial concept of *AT* is mapped to the eyes or wrist, emphasizing that the movements by the eyes or wrist are focused on a specific point.

Therefore, it is found that after metaphorical mapping, the conceptual differences of 'three-dimensional body, two-dimensional plane, and zero-dimensional point' existing in *IN, ON, and AT* when used in the spatial category are consistent with their conceptual differences in the non-spatial categories. Based on the three basic spatial image schemata of *IN, ON, and AT*, a unified image schema can be formed as in Figure 4, which applies not only to the spacial category but also to the non-spacial ones.

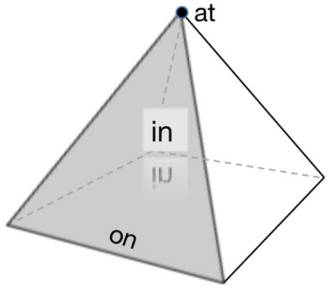

Figure 4. Unified Image Schema of IN, ON, AT

5. Conclusion

To sum up, the concepts of spatial prepositions *IN, ON, and AT* go far beyond the category of space, but project to time and other non-spatial categories. In addition, both their basic spatial concepts and non-spatial metaphorical concepts follow the law of 'body - plane - point', which can be explained by metaphorical mapping and image schema of cognitive linguistics.

This study makes certain contributions to academic and English teaching. First of all, it confirms the academic view that metaphorical mapping is not random but follow the certain principle. Secondly, it helps ESL and EFL learners to understand the logic between various concepts of English prepositions by image schema and metaphorical mapping, improving their language skills.

However, there are still some limitations in this study. Only three prepositions are selected, for which only some of their metaphorical concepts are discussed. The spatial concept of prepositions can also be mapped into many other categories, such as mode, state, relationship, and so on, which are worth further discussion in future studies.

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