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A Corpus-based Research on Spatial Metaphorical Binomials

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Abstract: Current linguistic researchers incorporate the concept of "markedness" into spatial metaphorical binomials and assume that language learners follow a sequence of "unmarked-and-marked" when acquiring a language. With respect to the psychological preferences of optimistic hypothesis that consider the "upper" side as "unmarked", dominant-hand theory that deems "right" as "unmarked" and mental anticipation that favors "front" as "unmarked", this research selects a series of spatial metaphorical binomials and their reversed types in relation to "upper/lower" "left/right" "front/back" in the the Corpus of Contemporary American English (COCA) to obtain proportional and distributionl statistics in order to testify and complement current hypotheses.

1. Introduction

Metaphor, a rhetoric device that serves as a crucial means for human beings to conceptualize the objective world, is divided into structural metaphor, entity metaphor and spatial metaphor (Lakoff, 1993)[1]. Spatial metaphor derives from human beings' body structure and life experience and is defined as "a cognitive process of mapping that takes spatial concepts as source domain to other target domains in order to obtain extended and abstract meanings (Lakoff, Johnson1980:14)[2].

Markedness was first initiated by Russian structural unit researcher Trubetzkoy (1931:99)[3] that if a phoneme in two phonemes of phonological opposition is equipped with certain characteristics the other one does not have, then the characterized phoneme is "marked" model sample while the other is "unmarked". Jakobson then extended such concept into inflectional morphology studies (Jakobson 1941:12)[4]. Researchers discovered that human beings always follow a sequence pattern of "unmarkedness" to "markedness" to acquire mother tongue or second language and beginners feel more difficult to acquire marked linguistic forms (Chen 2002:28)[5]. That is to say, the recognition process of the objective world for human beings usually starts with unmarked words with simpler structures and less ambiguous meanings that are easier to comprehend, which sheds some light on the placement of unmarked word before marked ones in spatial metaphorical binomials.

The asymmetry between the upper and lower, front and back, and inside and outside sides, together with the symmetrical phenomenon between the left side and right side of human bodies and the cultural and social influences, brings about the spatial metaphorical binomials in English (Ibid 2002:23)[6].

Academic researchers generally agree that positive words are unmarked while negative ones are marked and language users prefer to place positive word at the first place to reflect its generality while put the negative one behind to emphasize its particularity. Optimistic hypothesis holds that mankind inclines to pursue the positive-driven elements yet avert the negative-imbedded sides (Greenberg 1966:20)[7]. For instance, Nöth (1993:30-31) listed some semantic dimensions such as "more dynamic before less dynamic"; "more active" before "less active"; "useful" before "useless"; "sympathy" before "antipathy"; "good" before "bad"; "beautiful before ugly"; "interesting" before "uninteresting"; "valuable" before "worthless" and "superior" before "subordinate", to name a few. All of these order patterns indicate that the second conjunct(s) in binomials often denotes concepts that are less valued or regarded inferior.

This research draws on the Corpus of Contemporary American English (COCA) which contains more than one billion words of text (25+ million words each year 1990-2019) from eight genres, namely, spoken, fiction, popular magazines, newspapers, academic texts, TV and Movies subtitles, blogs, and other web pages (English-corpora.org)[8].

2. Spatial Metaphorical Binomials Contain the Relationship of "Upper/Lower"

Human being first perceives the objective world through his own body and therefore normally compares his body to a container to perceive and experience, thus the derivation of spatial metaphors (Wang, Zhou 2012:95)[9]. And since our eyes are placed at the upper side and front part of the body, asymmetry between upper and lower part of human bodies exists (Shen 1999:83)[10]. And our sight inclines to perceive the upper side of things first.

According to optimistic hypothesis, we tend to be driven by metaphorical theories that take "upper" as "positive" while "lower" as "negative", which partly accounts for "upper" is generally before "lower" word. To testify this hypothesis, this research selects five pairs of commonly used spatial binomials in relation to the upper and lower relationship and examines each of them in the COCA to collect statistical data of frequency. The results are shown in Table 1.

Table 1: Order Preference in Spatial Metaphorical Binomials in Relation to Upper/Lower Side

Frequency			Frequency		Total
up and down	15444	(98.91%)	down and up	170 (1.09%)	15614
up to down	24	(88.89%)	down to up	3 (11.11%)	27
top to toe	24	(100%)	toe to top	0(0%)	24
top to bottom	1700	(93.72%)	bottom to top	114 (6.28%)	1814
high and low	1397	(83.90%)	low and high	268(10.06%)	1665
Total	18589	(97.10%)	Total	555 (2.90%)	19144

The results of Table 1 basically testify the optimistic hypothesis and clearly demonstrate that the lexeme concerning "upper" side appears more frequently in front of that regarding "lower" side for the former one accounts for nearly 97% of all counted while the latter one occupies only a tiny fragment of the total.

To broaden our research perspective, this study shifts its focus to the more unusual type that places the lower side before the upper one and picks out ten example sentences from each of those categories (except the "toe to top" and "down to top" binomials where only three sentences in total could be identified) to include them within the framework of context.

For the 33 sentences we have extracted,

① To specifically follow a direction or sequence of "first the lower side then upper side":

For example: "In the decay of a neutron into a proton one quark changes from down to up, which requires that a weak interaction happens. (Web: www. Gizmag.com, 2012)"

In this sentence, a particular sequence of change that happens first at the bottom of a neutron and then occurs at the upper side requires the reverse of the customary order.

②To holistically refer to an inclusive action that goes back and forth:

For example: "Even if he was crying or groaning or fidgety, he'd quickly settle down with the noise and rough motion as we went down and up and up and down until sleep overtook

Him (Fiction: Southern Review, 2015)."

In this sentence, both directions of "down and up" and "up and down" appear to integrally indicate an action endowed with a feature of sweeping back and forth.

③ To place the parallel lexemes simultaneously without intentionally distinguish the sequence:

For example: "current best practice in school-based screening for social and emotional problems is to use feasibly implemented instruments that differentiate between students at low and high risk (ACAD: Education & Treatment of Children, 2019)."

In this category, upper and lower lexemes are placed in a manner that does not intend to distinguish certain fixed order and seemingly the more negative "marked" one is put in front of the positive "unmarked" one, which violates the optimistic hypothesis. But we should also bear in mind that this category only accounts for a tiny fraction of the total.

To sum up, the optimistic hypothesis is generally applicative and the basically unconscious placement of the upper & lower lexemes in a spatial metaphorical binomial predominates the majority of the objects that have been examined. As for the particular cases in which the more negative "marked" one is put in front of the positive "unmarked" one, they normally follow a specific fixed direction of "first the lower then the upper" or appear with the more conventional ones to generate a back and forth effect; or simply serve as an violation of optimistic hypothesis which do not frequently show up.

3. Spatial Metaphorical Binomials Contain the Relationship of "Left/Right"

Psychological experiments conducted by Olson and Laxar (1974:1135) [11] indicate that left-handed people embrace psychological inclination towards "left" and right-handed ones have mental advantages towards "right". Since most people are right-handers that are accustomed to using right hands, a mental preference towards "right" determines that "right" side is positive and unmarked. And traditional spatial metaphorical binomial studies argue that right appears more than "left" at a preceding position. However, this research arrives at surprisingly contrary results in the COCA.

Table 2: Ordered Preference in Spatial Metaphorical Binomials in Relation to Left/Right Side

Frequency			Frequency			Total
left and right	3242	(70.74%)	right and left	1341	(29.26%)	4583
left to right	1984	(78.64%)	right to left	539	(21.36%)	2523
Total	5226	(73.54%)	Total	1880	(26.46%)	7106

Table 2 explicitly demonstrate a discrepancy between the assumed dominant hand psychological theories and the corpus-based statistical figures. In order to facilitate our reflection upon this mismatch and our tracing of possible elements, this research picks up the top of the twenty sentences within each of the four binomials and endeavors to summarize some generality and particularity.

①In the "left to right" binomial, the preposition "from" turns to be the most frequent among the collocations and collocates with "left to right" 14 times in the 20 chosen sentences in total.

And in the twenty example sentences, the sequence of introducing or listing objects or persons account for 50% (10 in 20).

For instance:

➢ "Here are the four Ramapo all-around competitors during Saturday's Individual State Meet.

From left to right: Lauren Kish, Kayla Yosif, Kara Giacose and Sahara Gipson (BLOG: 2012).”

- “The five small shields represent five historic regions, they are (from left to right): Croatia, Dubrovnik, Dalmatia, Istria, and Slavonia (BLOG: 2012).”
- “They are (left to right): Vice President for Information Technology and CIO Brad

Wheeler; Internet2 Director of Network Operations and Engineering at IU's GlobalNOC Chris Robb; (BLOG: 2012)”, etc.

I suppose this naming sequence from left to right has to do with our reading habit that normally begins at the left side and reads on rightward until the right end of a line in a sentence. Therefore, we introduce people or objects (especially through the media of paper or image that are visually presented) following a habitual order of left to right.

②In the “left and right” binomials, there are 11 sentences in the entire 20 sentences(55%) that unconsciously place “left” before “right” as to mention these two lexemes simultaneously, which should be separated from those that specifically relates to verbs of actions to convey an action of “first left then right” order.

For instance:

- “This central image is circled by a border consisting of sheaves of wheat on the left and right (BLOG:2012) ”
- “ I believe a lot of them are making hay while the sun shines, so to speak, as are most the people I know on both the left and right (BLOG:2012). ”
- “Dartmouth Medical School in Hanover, N.H., has demonstrated in startling ways how unconscious suggestions affect behavior by studying split-brain patients whose left and right hemispheres have been surgically separated(MAG: U.S. News&World Report). ”

③ In the “right to left” binomial, we notice that this special binomial extremely frequently collates with the verb “read” (and “write”), and the number of in all the twenty example sentences which have been chosen amounts to 4 (20%).

For example: “I would have preferred a book closer to the size of an American comic book. It also read right to left like most manga books (WEB: 2012). ”

And the case where binomial “right to left” occurs close to the phrase “left to right” that integrates a general all-around sense accounts for 30% (6 in 20).

For example: “And if you look down that way you can see the traffic pass from time to time across the intersection, not toward you, not up and back, but from side to side, from left to right, or from right to left (FIC: Southwest Review 2018).”

With the particular one sentence contains both the verb “read” and binomials of “right to left” and “left to right” simultaneously:

- “She read them from right to left and then from left to right and thought: the Tigers were playing the night of the first Detroit riot,...(FIC: Hystopia 2017)”

④ In the “right and left” binomial, a significant portion is attached to verbs that specifically involve actions or dynamics.

For instance:

- “Take space, take solitude, take stillness to process all that has come at you right and left, all that has penetrated like an arrow into the depths of your soul...(BLOG:2012)”
- “...and as we passed through the jungle he slashed to right and left to clear the track...(WEB:2012)”
- “They were told that there was somebody attacking the King and instead they started shooting right and left and they assassinated maybe over- murdered over 100 people (SPOK: CNN 1991).”

In these above-mentioned sentences, the idiom "right and left" that means "in all directions or from all sides" frequently appears, which is usually attached to a particular verb (especially those closely related to actions involving the use of hands or hand gestures). A relatively stronger preference for

"right" emerges because in reality, people with right hands as their dominant hand outnumber those who are left-handed, and the sequence of "right" before "left" attached to verbs applies to more common situations.

In addition, our mental partiality towards right can also be detected when we name the “left” and “right” at the same time to refer to binary division of one thing (normally a noun). As is indicated:

- “Then throwing off his garment, he shall get upon another, and put his right and left hand upon his tail (WEB: 2012).” (binary division of the “limbs”)
- “Arthur, on the other side, also marshalled his army, which he divided into nine square companies, with a right and left wing(BLOG:2012)” (binary division of the “political party or ideology”)
- “‘Spacial Orientation’ is an abstract concept and as such I cannot treat it. I don't know how to correct the function of Spacial Orientation but I do know how to help a person distinguish between right and left (WEB: 2011).” (binary division of the “orientation or direction”)

To sum up, this research proves the hypothesis of dominant hand’s determination of right-inclined mental preference does have sense to some extent, but the statistical figures generally challenge the original academic assumption. “Left to right” is frequently used when introducing or listing persons or objects one after another especially through visually represented media such as images or photos which accords with our reading habit from left to right; as for “left and right”, over half of the binomial is employed to unconsciously place “left” before “right” as to mention these two lexemes simultaneously; in the “right to left” binomials, a significant fraction collocates with the keyword “read” or “write” plus the case where “right to left” appear together with “left to right” that integrates a general all-around sense account for 50% of the selected; and “right and left” binomial is closely attached to a particular verb (especially those closely related to the actions that apply hand or involve hand gestures). In a word, the dominant hand psychological theory can be preserved and accounts for some mental preference to some extent but requires complementary further explanation that takes a more universal situation into account.

4. Spatial Metaphorical Binomials Contain the Relationship of “Front/Back”

The physical features that humans’ eyes are situated at the upper and front side of our faces determine that we often advance towards the direction in front of us and go backwards towards the direction back to us (Li 2013:117). On the other hand, people get used to embracing anticipation and illusion for things they have not experienced yet and remain hopeful towards the future in front of them and believe we should not indulge in things that have gone passed, henceforth the association between “front” and positive as “unmarked” and “back” and negative as “marked” (Chen 2002:30).

English binomials directly relate to “front/back” are not so common, so we search about two pairs of “before and after” “fore and aft” in COCA, with Table 3 displaying the results.

Table 3: Ordered Preference in Spatial Metaphorical Binomials in Relation to Front/Back Side

Frequency		Frequency		Total
before and after	4446 (99.71%)	after and before	13(0.29%)	4459
fore and aft	226 (100%)	aft and fore	0 (0%)	226
Total	4672 (99.72%)	Total	13 (0.28%)	4685

Table 3 convincingly testifies the academic assumption that “front” is prior to “back” side for the former is deemed as positive and “unmarked” and the latter is negative and “marked” since the preference that places “front” before “back” nearly dominants the linguistic usage of binomials (over 99%).

Taking all the 13 exceptional sentences into analysis, we observe that:

One sentence places “after” in front of “before” in order to follow an alphabetic sequence:

“Alphabetical: After and before bowed boy but David down each face fell from gone got ground had his Jonathan kissed lad more most of on other rose side south stone...(WEB:2012)”

The majority of these sentences that employ “after and before” involve an action of “retrospecting”, a kind of looking back things that have already happened from a much later point of time (69.23%, 9 in 13).

For instance:

- “Of course, after and before the experience, we have access to a perspective that identifies the experience with a subject (ACAD: 2016).”
- “The biggest surprise we saw was a big increase in fall-related injuries -- right after and before the storm.”
- “I hear her actually - saying not to tell stories after and before the frost, after and before winter season, not only because you must pay attention to where you are going,...(FIC: News from Native California:2007)”

To sum up, the spatial metaphorical binomials in relation to front/back side demonstrate a prevailing preference for “front” and the statistics form COCA verifies the academic linguistic assumption that attaches “front” to positive and “unmarked” while “back” to negative and “marked”. And the extremely rare cases basically involve an act of “retrospecting”, a kind of looking back things that have already happened from a much later point of time.

5. Conclusion

Lyons (1979:638) points out that the canonical situation of utterance is egocentric. No matter which term is used, it describes humanity’s concept of itself in the universe where the person is his or her own frozen dimension. That is, man perceives of himself or herself as always being at the center of the universe. Lyons (1979:638), therefore, proposes his further arguments:

The canonical situation-of-utterance is egocentric in the sense that the speaker, by virtue of the speaker, casts himself in the role of ego and relates everything to his viewpoint. He is at the zero-point of the spatiotemporal coordinates of what we will refer to as the deictic context. ... Egocentricity is temporal as well as spatial, since the role of speaker is being transferred from one participant to the other as the conversation proceeds, and the participants may move around as they are conversing: the spatiotemporal zero-point (the here-and-now) is determined by the place of the speaker at the moment of the universe...

That is to say, the place on which the speaking person stands is prone to be taken as the reference point in space and the moment he is speaking as the reference point in time.

In terms of the egocentric theory, a special branch of spatial metaphorical binomials in relation to “upper/lower” “left/right” “front/back” are chosen and investigated into through the Corpus of Contemporary American English (COCA) to acquire statistical figures about distribution and proportion of binomials that conform to our psychological anticipation (that place “unmarked” lexemes before the “marked” ones) and those of their reversed binomials.

We have observed that the spatial metaphorical binomials in relation to “upper/lower” and “front/back” generally abide by the linguistic markedness hypothesis yet the corpus research results seem to violate the “left/front” pair in which “right” are assumed to be “unmarked” and should be placed at the preceding position. Having taken 33 example sentences into consideration, we still notice the feasibility of the psychological preference hypothesis that determines “right” as “unmarked” based on our physical dominant right hands’ predominance and further issue possible explanations to complement the dominant-hand theory and form a broader view of the binomial phenomenon.

The research results generally conform to the egocentric hypothesis that the spatial metaphorical

binomials are coined with taking our own human beings as reference point. An inclination for here-and-now effect is relatively observed and has great influence upon our decision of one particular orientation as the “marked” one. This particular research may shed some light on the close link between linguistic studies and psychological research and inspire future exploration into the vast interdisciplinary field of linguistics.

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