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THE CONSTRAINTS OF EMBODIMENT AND LANGUAGE-THOUGHT RELATIONS

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ABSTRACT. This paper aims to impugn the magnified role of specific natural languages in structuring and shaping cognition in the context of language-thought relations. Since language-thought interactions are being increasingly explored in different kinds of empirical studies showing or attempting to show context-specific or general influences of language over thought and thinking, there is reason to tame the excesses of language-specific influences over thought, thinking and cognition. In this regard, any context-specific influences of languages over thought and thinking in being grounded in certain modes/modalities of cognition must be governed by the constraints of body-world interactions that operate on modes/modalities of cognition. Thus, this paper will argue that language-specific influences over thought, thinking and cognition are possible to the extent that they are permitted by the constraints of embodiment.

Keywords: language; thought; thinking; embodiment; cognition

1. Introduction

The connection between language and thought is a matter of thoroughgoing inquiry and analysis in current studies of language and cognition as they are certainly linked to each other. While it is perhaps uncontroversial that language and thought are related and linked in human cognition, the representational structures and categories of language and thought need not be *uniquely* linked for human cognition to be structured by the concepts and conceptualizations made available by specific languages. For one thing, the level or degree of interdependence between language and thought is not always unambiguous owing to the very nature of the influence of language over thought since this influence can be more context-specific and sometimes general enough (see Zlatev and Blomberg 2015). Thus, this matter comes to be linked to general assumptions from the Sapir-Whorf Hypothesis (Whorf 1956). The influence of language over thought, thinking and reasoning can be very context-specific when the relevant influence is located in specific modes/modalities of cognition such as color, space, visual motion, time perception etc. And if that is so, this lends credence to the postulate that the constraints of embodiment determine how modality-specific linguistic symbols come to be grounded in neurally instantiated modality-specific systems (Barsalou 2008). That is because any context-specific

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influences of languages over thought and thinking can be restricted to certain modes/ modalities of cognition such as color, space, visual motion, time perception etc. In this way, any constraints of body-world interactions that operate on these modalities of cognition come to invariably apply to thought and thinking, precisely because such constraints are reflected in linguistic structures and their representations too. Constraints of body-world interactions impose conditions on the operations of cognition in modality-specific systems. For instance, one's experience of color contrasts in the case of different shades of blue in a sunny coastal area may induce the person to detect color changes triggered by the contrast in shades of blue effortlessly, regardless of how that person's language encodes the specific color contrasts. This will have an impact on the evocation of concepts associated with the salient color contrasts which can in turn coincide with the use of the relevant color terms in a specific language. If that language encodes the relevant contrast, this co-modulation of concepts associated with colors and linguistic representations would be found to be facilitated. But this may not presuppose any unidirectional influence from language over thought and perception. Rather, this points to the possibility of body-world interactions shaping the nature and form of concepts and conceptualizations that can modulate the evocation of linguistic representations. Thus, language-thought relations must come to be conditioned by such constraints of embodiment.

2. Language, Conceptualization, and Profiles of Reality

Language and the world of concepts are intimately linked because with the acquisition of a language, one also acquires a conceptual system. The perceptual system built on the sensory systems (hearing, vision, tactile perception, olfaction etc.) is also modulated and influenced by the conceptual system which is partly shaped by language during the course of language acquisition. The perceptual categories of objects, events, scenes, processes are often structured by integrative higher-level conceptual categories in a manner of top-down modulation, and these conceptual categories are also partly built on sensory-motor representations and partly shaped by linguistic categories imposed by languages in the ambient culture. This naturally leads to the supposition that languages shape and influence thought, thinking and perception. As a matter of fact, quite a good number of cognitive consequences have been said to spring from the language-specific conceptualizations of number, color categories, motion, space, time perception etc. (see Gentner and Goldin-Meadow 2003; Levinson 2003; Majid et al. 2004; Casasanto and Boroditsky 2008; Wolff and Holmes 2011; Lupyan 2012). But on closer inspection, some of these consequences can be traced to the properties of our cognitive organization. Two specific reasons seem important. First of all, the conceptual system *as a whole* is not structured or constituted by language. Second, for the part of the conceptual system that is partly

shaped by language during language learning, it is eminently plausible that the conceptual system minus language with its operations manifested in interactions with the outer world often induces and motivates certain modes of conceptualization and perception that hook onto suitable linguistic expressions/structures that roughly but otherwise aptly express them. The working of the conceptual system minus language may thus coincide with the working of language, thereby conveying the impression that it is language that is doing the central job when specific linguistic structures align with the conceptual categories expressed. To take just an example, knowing (or learning) a language different from the first language has been associated with the reconfiguration of the conceptual system housed in the mind/brain (see Bylund and Athanasopoulos 2017). The underlying assumption here is that when one learns a new language, a new mode of conceptualization is also learnt and this paves the way for the emergence of a new way of talking about things conceptually available in the new language learnt. In the context of the research reported in Bylund and Athanasopoulos (2017), it is about learning a new way of talking about time that (supposedly) gives rise to a new way of thinking. It is thought that a new way of thinking thus obtained confers on the language user(s) an ability to switch varied ways of thinking as a mark of what can be reckoned to be a kind of cognitive flexibility. The norms of conventional rules in the grammar of a language carry with them a sort of a recipe for new conceptual operations. Crucially, the fundamental idea on which this view is ultimately based is this: different languages permit different profiles of reality which are, in fact, different ways of organizing the same (or even similar) chunk of experiences. This forms the bedrock of the *linguistic relativity hypothesis* or the *Sapir-Whorf Hypothesis* (Whorf 1956). It is worth mentioning that Whorf formulated this hypothesis after studying the Hopi language and notably the Eskimo language in which different words for different shades of snow are found[1] (see for a different view, Pullum 1991). This in fact led him to postulate that human thoughts as well as the profiles of reality our thinking and behavior shape and constitute are laid out along lines dictated by the specific languages we speak. Therefore, Whorf (1940: 230) says the following.

> We dissect nature along lines laid down by our native languages. The categories and types that we isolate from the world of phenomena we do not find there because they stare every observer in the face; on the contrary, the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds— and this means largely by the linguistic systems in our minds. We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way — an agreement that holds throughout our speech community and is codified in the patterns of our language.

[1] Even though Whorf was not the first person to spotlight the curious case of the Eskimo lexicography that involved different words for 'snow' (it was Franz Boas who highlighted this first in his 1911 book *The Handbook of North American Indians*), it is Whorf who drew attention to the possibility that the multiplicity of snow-words can be linked to the multiplicity of language-related concepts in his 1940 article 'Science and Linguistics' (see Pullum 1991: 276).

It may be interesting to note, in this connection, that Whorf was in particular opposed to the universality of what he called 'natural logic'--the system of inferences linking talking to thinking as consolidated in mathematics and symbolic logic--of which different languages are taken to be different but parallel expressive mediums. Instead, he saw natural logic as an extension of human language itself because it allowed him to say that any formulation of natural logic must be bound by the grammar of the language used for the formulation. This way natural logic turns out to be relative to the concepts a language accommodates and admits of. On the current interpretation, natural logic can be regarded as the suite of cognitive processes, representations, and operations associated with thoughts, thinking, reasoning and cognizing. Despite the appeal of the *Sapir-Whorf Hypothesis,* it has faced criticisms for advancing conceptual relativism (Pinker 2007; McWhorter 2014). But, be that as it may, Chafe (2018) has made the interesting point that language influences thoughts by way of the creation of semantic structures that are extracted from real-world experiences. Whatever the case may be, the goal of this paper is *not* to actually encapsulate facets of this debate. Instead, the central goal of the paper is to contend that the special role of natural languages in mapping out the realm of cognition must be explored with caution and as much guardedness as may be desirable, especially when any assumption is made about the entry into cognition through particular languages. It is also noteworthy that there is no need to cleave to the universality of Whorf's natural logic but the variation in natural logic among linguistic communities and humans need not be solely governed and shaped by natural languages, for it can be variable due to contingencies of body-world interactions and also of non-linguistic cognition.

We may now home in on cases that are regarded as 'context-specific' influences of language over thoughts, as Zlatev and Blomberg (2015) have argued. We may take, for example, Slobin's (2003) well-known study of motion verbs in Spanish and English. This study checked if thoughts about motion in tasks of 'thinking for speaking' (speaking, writing, listening, reading, viewing, understanding, imaging, remembering etc.) are affected by the way languages encode the conceptualizations of motion. It needs to be recognized that languages such as Spanish incorporate the conceptualization of path in motion verbs and languages like English include manner in verbs of motion (as in 'slide' or 'roll'). The supposition that Spanish speakers would visually interpret path more easily and English speakers would land on a salient visual interpretation of manner appeals to this very distinction. This is indeed what has been reported in Slobin's study. It makes one consider this to be a kind of 'motion warp' in the mind much like the 'time warp' discussed by Bylund and Athanasopoulos (2017) who conducted a duration reproduction task with Swedish and Spanish speakers and found that Swedish speakers were influenced by the stimulus length, while Spanish speakers were affected by the stimulus size/quantity or volume (the Swedish conceptualization: long/short time; the Spanish conceptualization: much/small time). In addition, Spanish-Swedish bilinguals were found to be influenced by the specific language encoding, depending on the language context. This is a kind of time warp. The warping takes

place in the mind only in the sense that the mental representations of motion or time can be significantly altered by the relevant linguistic representations. Thus, it seems as if the forms of conceptualizations of motion or time can be 'warped' by the linguistic representations acquired. At this juncture, it is of particular concern to recognize that the view of specific languages influencing *and* determining the thoughts we have and entertain seems to centralize and condense language as the factor shaping cognitive structures and conditioning cognitive processing. But this can be misguided and flawed.

For one thing, even if language users are induced to use a particular type of language-specific conceptualization rather than another, it is by no means necessary that language-based conceptualizations in language users within a single linguistic community or even within an individual are uniform. Hence even when language users tend to saliently use one sort of conceptualization compatible with the linguistic representation in the given language, they need not, and perhaps should not, be expected to deploy the same concepts when completing a task, say, the reporting of mental imagery. After all, people do differ in their conceptual systems and, if conceptual systems vary across humans, different individuals of even the same linguistic community may bring to bear different concepts from the conceptual machinery upon specific tasks demanding the influence of language-specific conceptualizations (see Lamb 2000). This may obtain, regardless of whether or how concepts and reasoning are influenced by language-specific conceptualizations. This suggests that it is highly plausible that even when language users are observed to saliently use a kind of conceptualization compatible with the linguistic representation in the given language, they may do so with the aid of variable concepts whose sources of variation need not be traced solely to linguistic representations. These divergences in conceptual systems then minimize the role of language-specific conceptualizations in shaping concepts and thinking/reasoning based on them, for after all concepts and thinking/reasoning may be affected by a lot of non-linguistic processes and real time body-world interactions. For another, any observed convergence on the selection of a specific language-based conceptualization in a group of participants may be explained by appealing to common patterns in non-linguistic processes and body-world interactions that favor the selection of a specific language-based conceptualization. For instance, if Swedish speakers have been found to be influenced by the stimulus length in the line growing condition (indicating distance) as part of the experiment in the study of Bylund and Athanasopoulos (2017), the convergence on the stimulus length-motivated interference in Swedish speakers may be due to the evocation of cognitive schemas or impressions triggered by the line and the non-verbal prompt (a cross for the displacement operation). The linguistic cue provided before the presentation of the stimulus simply helped pick up the right cognitive schema or impression out of a number of schemas and impressions already formed in response to stimuli of lines and containers filling in the experiment. The same considerations apply to the Spanish speakers for whom by the volume-motivated interference was greater. The description of the experimental procedure in Bylund and Athanasopoulos (2017: 913) is useful for the argument being made here: "A prompt preceded each stimulus,

indicating whether duration or displacement was to be estimated. The prompt consisted of a symbol (an hourglass for duration and a cross for displacement estimation) and a verbal label". That this alternative interpretation is viable is substantiated by the results of a second experiment conducted by Bylund and Athanasopoulos (2017). Both the Swedish and Spanish groups were affected by the spatial interference in the lines condition in the absence of linguistic cues. This shows that cognitive schemas or impressions of both lines (indicating distance) and container filling (indicating volume) were perhaps active in the minds of both groups, and one of them (lines, in this case) happened to become more perceptually salient in the specific contingencies of body-world interactions. What is crucial here is that the Spanish group was affected by the lines even though the language-based conceptualization in Spanish should favor the volume-motivated interference. Similar arguments revealing gaps and plausible flaws can be extrapolated to Slobin's (2003) study as well.

Furthermore, there are a number of other general concerns that warrant attention as well. Language-specific conceptualizations may sometimes be in conflict with the actual working of our cognitive organization in the real world. We may consider the case of the manner of motion and the path of motion. The conceptualizations of these may have contextually grounded salience effects when we visually engage with objects, scenes, people etc. in everyday life. These effects are not fully determined or governed by mental representations. They are often structured and modulated by the properties of body-world interactions engaging with physical events and motions out there in the world. That is because body-world interactions usually engage the brain in touch with the contingencies and regularities of the outer world, thereby causing the contingencies and regularities of the outer world to be reflected in the cognitive system (Northoff 2018). Thus, for example, the path of motion of a baby crawling under a table may be more perceptually salient than the manner of motion, chiefly because crawling is what babies usually do (unless a divergent behavior in crawling is detected). Likewise, the path of motion of a heavy object falling from above suddenly detected by a person taking a stroll may turn out to be more perceptually salient because the detection of the path of motion can save the person from being injured. But, on the other hand, if a vehicle is found to be hurtling round the corner of a street, the manner of motion instead of the exact path of motion of the vehicle may be more perceptually salient for a passerby. Besides, the manner of motion is usually as perceptually salient as the path of motion in pictures and paintings since these are abstractions to be inferred from the static representations. However, the manner of motion is, by its very nature, more dynamic than the path of motion since the latter is more static by its nature, unless, of course, paintings or pictures are created to induce a bias in favor of either of them. Real-time interactions with the outer world can help isolate the perceptual salience effects of specific conceptualizations in many cases. Similarly, it is not hard to imagine varied conceptualizations of time being present in the minds of language users (possibly even in those having no time marking in their languages such as Amazonian languages) only some of which may be activated in a given situation based on the body-world interactions. One may consider, for

example, the perception of time on moving modes of transport such as boats, canoes, trains etc. and, if one experiences the passage of time by looking out for a certain duration of time, the distance-based conceptualization may seem prominent. On the other hand, a person working or spending time in a fixed location (say, a room) in a stationary position may well experience time in terms of a volume or quantity. However, the perception of movement even in a stationary position, say, in a movie being watched by someone, may possibly induce a distance-based conceptualization of time. In a nutshell, even if language users are induced to use a particular type of linguistic salience effect, it does not simply follow that the language-based conceptualizations *cause* language users to saliently use one or the other sort of conceptualization in specific linguistic tasks (Mondal, 2017).

Moreover, it is highly likely that a number of plausible conceptualizations of time constructed during the language users' engagement in linguistic tasks are all present in their minds, and linguistic expressions produced by the specific language users or presented as cues appear to be rough paraphrases of the actual conceptualizations. After all, any linguistic expression provides the *contours* of the actual conceptualizations. This reinforces the impression that the underlying cognitive representations are structured by the relevant properties of particular languages. That is so because language users have no way other than that of producing or comprehending the specific linguistic expressions their languages allow. This may have nothing whatsoever to do with the actual thinking strategies for time. Thus, the "calibration problem" between categories of language and categories of thought remains entrenched in view of the fact that categories of thought can have an independent realm (Lucy 1992). Nonetheless, there is no denying that language-based conceptualizations of thinking strategies exist in language speakers' mental repertories and not all of these thinking strategies may be deployed in a given situation, given that language-general influences over thoughts cannot be flatly shrugged off (Zlatev and Blomberg 2015). This is so because certain thoughts may be easily accessible and expressible in a language (especially in the lexicon of a language) via the interface between syntax/phonology and meaning (Jackendoff, 2002). The proposal in this paper is rather to reject the idea that language-based conceptualizations of thinking strategies for time, motion, space etc. do the whole job when language users engage in diverse tasks of language use. The interactions with the objects, people, processes in the environment dynamically modulate the activation of language-based conceptualizations and also the actual thinking strategies (linguistic or non-linguistic).

3. Linguistic Conceptualization, Constraints of Embodiment, and Cognitive Reality

We may now concentrate on the link between linguistic conceptualization and the kind of cognitive reality it may liaise with and eventually project. It has been observed that bilinguals or even multilinguals exercise a sort of cognitive flexibility when using multiple language-based conceptualizations. But any cognitive flexibility observed in bilinguals may reflect cognitive reality rather than any linguistic version of reality.

For instance, when bilinguals switch from one way of thinking about time or motion to another from the context of one language to that of another, it is not necessarily a particular language that induces the bilinguals to do so. The raw cognitive imprint or impression that a word or a perceptual event evokes may actually facilitate this switching of ways of thinking. As a matter of fact, the idea behind the *label feedback hypothesis* (Lupyan 2012) can be turned on its head. The underlying idea of the *label feedback hypothesis* is that the processing of a given stimulus can change as a function of the co-activation of a corresponding verbal label via a sort of top-down modulation. If so, on the current view argued for in this paper, this would actually mean that the cognitive system as a whole can itself switch to different modes/strategies of thinking or cognitive representations (some of which may be language-based conceptualizations) as conditioned by differences in body-world interactions. The switching behavior in bilinguals in the study of Bylund and Athanasopoulos (2017) can be accounted for in this way. It is essential to understand that the observed linguistic effects on cognitive strategies in thinking are nothing but stabilized regularities of a fluctuating cognitive system. Evidence for this view comes from the fact that the activation of modal semantic features in both brain-damaged patients and normal people is not deterministic but rather dynamically governed by many factors some of which are contextual and some of which are purely cognitive in themselves (Kemmerer 2019: 47-50). For example, brain-damaged patients with action production deficits retain an intact understanding of action verbs such as ‘kick’, plausibly by relying on the visual motion features of such verbs. Also, precentral motor cortices in subjects reading a series of verbs have been found to be sensitive to not only action verbs but also stative verbs. This strongly suggests that language-based conceptualizations are not themselves fully based on language in the brain structures. Therefore, there is reason to think that the constraints of embodiment are not selectively and exclusively oriented and confined to language. Crucially, the aspects of the cognitive system minus language can project certain modes of thinking. This is also because context-specific influences of languages over thought and thinking involve modal linguistic symbols that are guided by body-world interactions in being ultimately anchored in neurally instantiated modality-specific systems (Barsalou 2008).

In this connection, it is also vital to consider the proposal that observing modulations of neural activity for perceptual or non-linguistic stimuli that can be predicted by certain well-demarcated properties of languages must be the best evidence that language shapes human thought (Thierry 2016). Thus, this appears to be a neurolinguistic version of linguistic relativity. As a matter of fact, Thierry (2016) has provided data from a number of neurolinguistic studies on the influence of language-based conceptualizations on color processing, perceptual processing and categorization, motion perception etc. For instance, pictures for the words "sea' and "horse" presented in the same order as the one in which the words appear here in a picture-to-picture priming task triggered a higher amplitude of the N400 wave (an ERP (event-related

potential) wave measuring the brain response to a stimulus over a time course). In addition, no conceptual priming effects were found for the pictures of the words "sea" and "horse" presented in the same order. This is interpreted to suggest that the unrelated pictures for the words "sea" and "horse" are linked to the lexical-semantic concept of the English compound "seahorse" and this perceptual linking is mediated and facilitated by the linguistic concept of "seahorse". But this conclusion may be unwarranted. It is plausible that the unrelated cognitive impressions or schemas triggered by the unrelated pictures were evoked and a higher amplitude of the N400 wave signaled just that, *not* the formal linking of "sea' and "horse" as lexical structures in order to reach the lexical-semantic concept of the English compound "seahorse". When the amplitude of the N400 wave was significantly reduced when the pictures were presented in the reverse order (the horse picture first and then the sea picture), the pictures were somehow conceptually related, plausibly due to the experience of familiarity of these images in the experiment or of situations evoking memories of horses seen by the sea. In any case, it is evident that it is the cognitive impressions or schemas triggered by the unrelated pictures that were not somehow related conceptually but they may or may not directly evoke the concept of "seahorse" and, even if they do, it is the cognitive evocation of a linguistic concept just like the evocation of the linguistic concept of a car key through the images of a car and/or a key. Similar arguments can also be extended to another study testing motion perception in Germans and English speakers who were engaged in a motion event-picture matching task, as reviewed in Thierry (2016). Endpoint-match stimuli elicited an electrophysiological signature of greater amplitude in German speakers, but no differences in electrophysiological signature between endpoint-match and trajectory-match stimuli were found in English speakers. Since English encodes both the trajectory and endpoint of an event and German as a non-aspect language encodes only the endpoint, the results were interpreted to mean that language-based conceptualizations of aspect shaped the neural processing of motion. Again, it is plausible that the shape shown in the picture target as matched with the endpoint shape in the animation (a square towards which a dot moves) had a perceptual salience effect on speakers of both German and English groups, regardless of how the matching of the trajectory appealed to both groups. It may also be noted that the trajectory of something moving is a more abstract, fleeting and less concrete concept than a shape, and hence the perceptual salience of a shape is not out of question.

Overall, the discussion above indicates that the cognitive flexibility in bilinguals is open to cognitive reality by virtue of which any word in a(ny) language bilinguals know that can (potentially) activate or evoke the same cognitive schema (or mental impression) can do an equal job. Therefore, the cognitive reality language projects by way of the establishment of a higher-order representational system on the neuro-cognitive system as a whole (that is, the brain) is constitutive of the linguistic projection of reality. But the linguistically structured cognitive reality is always *part* of the overall cognitive reality that our sensory-motor, affective, cognitive systems all together project.

The projection of cognitive reality onto the actual world may thus override any linguistic projection of reality, except when the form of linguistic cognition as part of the neuro-cognitive system exerts an influence on cognitive processing. Taken in this sense, the observed linguistic effects on cognitive strategies in thinking during language use are stabilized regularities of a fluctuating cognitive system. And there is no need to think that the conceptual space of cognition is a fixed system which can be molded by linguistic influences. Rather, the neuro-cognitive system can be thought of as a dynamical system that is attracted to aspects of conceptualization targeted by certain words but not others. So, it is not the words or linguistic constructions that alter the shape of the conceptual space. Instead, the conceptual system itself changes in real time to accommodate various configurations of cognitive processing our body-world interactions give rise to, involving varied aspects of conceptualization (Mondal 2021). The role language plays here is that of a pointer, but then anything non-linguistic can also be a pointer in more or less the same way. The experience or concept of storms or rains may come to the mind when one hears the loud sounds of thunder even though no one utters the word "thunder". Most of our day-to-day affairs of cognitive processing are governed by facets of body-world interactions in this way.

4. Conclusion

This paper has argued that the variation in thought and thinking is perhaps more pervasive due to the brain-world interactions in linguistic experiences but this variation need not be explained by variation in languages. Therefore, this position is not tantamount to supporting any kind of *universalist* thesis for thought and thinking as defended by Pinker (2007), for example. Any conformity of thoughts to certain common patterns is decidedly due to the shared concepts that all humans have over and above any variation that exists owing to a multiplicity of factors of which language is but one.

References:

Barsalou, L. W., "Grounded cognition", in Annual Review of Psychology, 59: 2008, 617-645.

Bylund, E. and Athanasopoulos, P., "The Whorfian time warp: Representing duration through the language hourglass", in Journal of Experimental Psychology: General, 146(7), 2017, 911-916.

Casasanto, D., and Boroditsky, L., "Time in the mind: using space to think about time", Cognition, 106, 2008, 579–593.

Chafe, W., Thought-based Linguistics: How Languages Turn Thoughts Into Sounds, Cambridge University Press, 2018.

Gentner, D. and Goldin-Meadow, S., Language in Mind: Advances in the Study of Language and Thought, MIT Press, 2003.

Jackendoff, R., Foundations of Language: Brain, Meaning, Grammar, Evolution, Oxford University Press, 2002.

Kemmerer, D., Concepts in the Brain: The View from Cross-linguistic Diversity, Oxford University Press, 2019.

Lamb, S, "Neuro-cognitive structure in the interplay of language and thought", in M. Pütz and M. H. Verspoor (eds.), Explorations in Linguistic Relativity, John Benjamins, 2000, 173-196.

Levinson, S. C., Space in Language and Cognition: Explorations in Cognitive Diversity, Cambridge University Press, 2003.

Lucy, J., Language Diversity and Thought, Cambridge University Press, 1992.

Lupyan, G., "Linguistically modulated perception and cognition: the label-feedback hypothesis", in Frontiers in Psychology, 3, 2012, 54.

Majid, A., Bowerman, M., Kita, S., Haun, D. B. and Levinson, S. C., "Can language restructure cognition? The case for space" in Trends in Cognitive Sciences, 8, 2004, 108–114.

McWhorter, J., The Language Hoax: Why the World Looks the Same in Any Language, Oxford University Press, 2014.

Mondal, P., Natural Language and Possible Minds: How Language Uncovers the Cognitive Landscape of Nature, Brill, 2017.

Mondal, P., "The limits of language-thought influences can be set by the constraints of embodiment" in Frontiers in Psychology, 12, 2021, 593137. doi: 10.3389/fpsyg.2021.593137.

Northoff, G., The Spontaneous Brain: From the Mind–Body to the World–Brain Problem, MIT Press, 2018.

Pinker, S., The Stuff of Thought: Language as a Window into Human Nature, Penguin, 2007.

Pullum, G. K., The Great Eskimo Vocabulary Hoax, Chicago University Press, 1991.

Slobin, D. I., "Language and thought online: cognitive consequences of linguistic relativity," in D. Gentner and S. Goldin-Meadow (eds.), Language in Mind: Advances in the Study of Language of Thought, MIT Press, 2003, 157–192.

Thierry, G., "Neurolinguistic relativity: How language flexes human perception and cognition", in Language Learning, 66(3), 2016, 690–713.

Whorf, B. L. "Science and linguistics", in MIT Technological Review, 42, 1940, 229-231.

Whorf, B. L., Language, Thought and Reality, MIT Press, 1956.

Wolff, P. and Holmes, K., "Linguistic relativity" in Wiley Interdisciplinary Review in Cognitive Science, 2, 2011, 253–265.

Zlatev, J. and Blomberg, J., "Language may indeed influence thought" in Frontiers in Psychology, 6, 2015, 1631.