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„Impact of language on thought and worldview, especially in the domains of time and space"

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Abstract

With my research question ´Has recent experimental research found evidence for the hypothesis that one's native language, especially in the categories of its conception and description of time and space, constrains one's capacities of experiencing and conceptualizing physical, if not social, reality in a strong sense?´, this research is going to explore if speakers of a certain language can have a line of thought that those of other languages cannot. This paper is going to review several major sub-hypotheses of linguistic relativity and compare some of the most noteworthy findings of relatively recent research on linguistic relativity with each other by focusing on what kinds of new insight they may possibly provide, on how they may complement or contradict one another and on what limitations they may involve. Also, this research is going to deal with the issue of discontinuous classification, along with several other issues, from the perspective of linguistic relativity. Given that quite a few pieces of meticulous research on the topic in question have been done and are being done, copious pieces of evidence regarding linguistic relativity may be gushed out in the foreseeable future. What lies in the future research may be to illuminate the mechanism of linguistic relativity with the aid of other disciplines to estimate the extent of the impact of language on thought and worldview so that they can see how substantial it is.

Acknowledgment

My own idiosyncratic philosophical-orientedness, not only in the way of exploring this topic but also in the way of employing my rhetoric, seems to have been lurking throughout this undertaking, making me doubly meticulous in this project not to allow it to get the better of my scientific stance toward it. In retrospect, Dr. Ritt's insightful input and sagacious guidance went a long way toward keeping my philosophical inclination in check and fueling my scientific zeal relentlessly. I may never be able to pay too much homage to him for this project.

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1. Introduction

Probably due to the very fact that we use language in our routine every day in indefinitely diverse ways, language itself may not seem to be an intriguing topic to deal with at first sight unless we find something that is intellectually stimulating or unexpectedly provocative in it. In the meantime, thought seems to be too complicated a topic for lay people to seriously deal with since it involves various brain activities that go far beyond everyday people's easy grasp quite apart from the fact that it is as familiar to them as language is. Apparently disparate as language and thought are, close scrutiny of the interplay between them may reveal numerous facts that language and thought have inseparable links with each other, for neither of them can be studied properly and sufficiently without its correlation with the other. Though neither language nor thought alone might appear to be fascinating as a research topic to explore, the question of how language affects thought may be an exceptionally intriguing topic to lay people and scholars alike, as the outcome of the research on it, due to the very nature of the two topics as breeding grounds for knowledge, may directly concern our lives and significantly affect various intellectual fields. However, their charm as a research topic may be offset by their elusiveness if one approaches them from an inappropriate perspective, for one may stand a good chance of achieving nothing concrete or decisive. In this regard, it seems to be necessary to clarify on what working definitions of language and thought this research depends in its exploration of language and thought so that its approach to these two concepts can be minimally haphazard, if not ideally appropriate. Sapir (1921: 8)'s understanding of language as "a purely human and non-instinctive method of communicating ideas, emotions and desires by means of voluntarily produced symbols" presents an important suggestion that is worth considering in the light of this research concern. Thought, which is an umbrella term for "an idea, plan, opinion, picture, etc., that is formed in your mind" as indicated in Merriam-Webster (Perrault 2008: 1026), can be meaningful from the perspective of this research concern only when language narrows its range 'sufficiently' down to humans' non-instinctive communicative activity that is voluntary. In other words, confining the concept of language to 'human activity' whose method is voluntary rather than instinctive may effectively reflect why this research on the impact of language on thought bases its concern on Sapir's understanding of language. Unlike language, however, thought seems to

be less susceptible to the variations of its definition, as this research takes the view that only with the impetus of language can thought be generated.

Given that our lives often suggest correlations between language and thought, it may be natural for us to have an interest in the way we use our language and the way we form our thought whenever the former seems to strongly influence the latter. Broad as the range of the potential indicators of linguistic relativity may be, what this paper is concerned with is ultimately how one tends to form one's thought and worldview, based especially on one's language concerning the issues of time and space, not relatively trivial pieces of everyday routine in which the element of linguistic relativity is allegedly detected. Therefore, the most effective approach to the seemingly broad or even somewhat elusive topic of linguistic relativity seems to be the investigation of the impact of language on one's perception-related reactions that tend to form the very foundation of psycho-cognitive aspects of one's viewpoint that develops to thought and worldview. Exceptionally intriguing and, at the same time, superbly practical as it is in this regard, the hypothesis of linguistic relativity seems to have been a secondary issue in the field of linguistics due in part to both its elusive elements and its heavy dependence on various other fields, especially cognitive psychology. Given that this topic is not only fascinating linguistics-wise but applicable to the relevant fields as well, the value of research on this topic may be so immeasurable that it is enough to offset comprehensive and thorough jobs it may entail.

Since language is the very foundation of virtually every piece of one's intellectual job, especially the job that directly deals with the existential issues of humanity, knowledge of the way in which language affects one's mental activities seems to be of great use. In this sense, just as other disciplines of science have provided solutions or at least clues to viable solutions to the problems that humanity has tackled throughout its history, serious inquiries on the topic of linguistic relativity in the discipline of linguistics may also be able to provide an insight into various problems that concern human thoughts and worldview. Since every piece of our intellectual activity seems to be contingent upon sophisticated language that facilitates it so that we can process it to meet our intellectual goals, what seems to be paradoxical is that we may end up making a vain attempt to do a research on it unless our language is sophisticated enough to make the most of the venture. It may be difficult, without doubt, to explore the field of linguistics comprising evolutionary linguistics and cognitive

linguistics that may actually span many other relevant fields like psychology and philosophy, despite the direct relationship of the issue to the very existential issues of ours and to almost every field in which language and thought play important roles. However, this apparently demanding topic of the impact of language on thought and worldview may be of great value if it can develop its intellectual concern into a further insight into the theory of linguistic relativity, compensating for the efforts poured into it and adding an important theoretical ground for the related disciplines.

2. Purpose of the research

With the proclaimed working definitions of the two key concepts of language and thought presented in the preceding chapter, it seems to be necessary as a next step to map out how to approach this research concern at once effectively and efficiently. Most of all, to preclude any chances of attaining nothing tangible or concrete despite the good causes involved in this research, it may be quite obligatory to clarify what this research aims at exploring at its very onset, which in turn will facilitate the evaluation of the outcome of the research. With my research question ´Has recent experimental research found evidence for the hypothesis that one's native language, especially in the categories of its conception and description of time and space, constrains his or her capacities of experiencing and conceptualizing physical, if not social, reality in a strong sense?´, this research is going to explore if speakers of a certain language can have a line of thought that those of other languages cannot.

With all the afore-mentioned potential values of scientific inquiries on the topic of linguistic relativity that have provided a motivational impetus behind this research, this research aims at enhancing the hitherto developed knowledge of how the language we learn and employ conditions the paradigm, perspective and range of both our thought and our worldview by either facilitating or hampering its pursuit of the essence of various issues such as those related to time and space.

Given that this research was launched with my own somewhat unusual intellectual interest in the research topic in question and its potential value in its own discipline and other disciplines alike at its onset, it might involve a slanted view through which I may try to

embrace even the farthest-fetched evidence to support the theory, as overly ambitious projects often entail the side-effect of the kind. To prevent this or at least to minimize the possibility of committing the folly of failing to see the woods for the trees and, more importantly, the folly of trying to make a mountain out of a mole hill, I am going to make meticulous efforts in this paper to elucidate what important things a certain finding in a relevant piece of research suggests in the large framework of linguistic relativity every time it tackles one.

3. Methodology of the research

To effectively explore the proclaimed research question, this paper is going to compare several major hypotheses that aim at clarifying how our cognitive and psychological faculty, in the wake of the impact of language on it, ends up going a long way toward forming or even modifying each language-or each language family-users' own idiosyncratic thought and worldview. This approach seems to be necessary and, to quite a degree, mandatory to make the findings reliable, for the impact of language on one's thought and worldview can never be determined effectively when one can hardly be certain that it is an occurrence that is possibly ubiquitous in various languages.

Also, though analytically comparing the hypothetical explanations on the mechanism of how a language affects the ways the language users' thought and worldview may be a daunting undertaking itself, it may dampen my enthusiasm for this project to pay exclusive attention to the traces of different thoughts and worldviews that are deemed to have been affected by the languages of certain peoples without regard to its mechanism. Therefore, I am going to try glimpsing into the contemporary interpretation of the mechanism of linguistic relativity mainly to give impetus to the insightful comparison of the pieces of relatively up-to-date research findings to be followed in the subsequent chapters by pointing out their potential limitations or loopholes in the light of its possible mechanisms. However, I'd like to make it clear at this point that I am not going to discuss the interpretations of the question of to what extent our language conditions our thought and, at the same time, the question of if the impact of language on our thought is meaningfully substantial, as those questions may

require another set of quantitative research through which sufficient statistical data need to be collected and, more importantly, as existing pieces of literature have relatively scant statistical data that are relevant to the two issues in question.

Thirdly, I am going to compare several pieces of noteworthy findings of relatively recent research on linguistic relativity with each other by focusing on what kinds of new insight they may provide, how they may complement or contradict one another and what limitations they may involve. In this part, I am going to commit myself to interpreting the implications of the findings of the research in the light of both Whorf-Sapir's traditional conceptions of linguistic relativity and the contemporary mainstream viewpoints on it. To further clarify this portion of the methodology as a whole, I will introduce relatively recent pieces of research that are either directly or indirectly related to the hypothesis of linguistic relativity on my research question introduced earlier. At this point, I will try to make as clear as possible what they propose along with what evidence they use to support their proposals and then will discuss if the conclusions they draw can be warranted. To specify further, the evidence and conclusions presented in the findings of the select recent research on linguistic relativity will be placed under close scrutiny, in the light of one pivot of this issue, how languages or language families differ from one another especially in terms of their lexicon and structure, and in the light of the other pivot of this issue, how those differences impact the users' idiosyncratic thought and systematic perceptions and conceptualizations of the world. Given that the outcomes of the relevant research projects to be introduced in this paper have been obtained relatively recently, they may help clarify the elusive points that the classical theory of linguistic relativity and hitherto-suggested relevant hypotheses involve. Also, since indications of the outcomes of each research can enhance or complement each other, this paper will not only compare them with one another but also pay close attention to figuring out if there can be any contradictory elements in them. Also, as a practical method to enhance the validity of certain hypotheses regarding linguistic relativity that have not received due support despite their potential scientific value, this paper is going to juxtapose several noteworthy research outcomes with relevant hypotheses, recounting the relations between them. With the elaboration on the possible relationship between them, this paper is going to discuss if the outcomes can give further weight to the existing hypotheses or suggest

the necessity for the modifications of them, or, in some cases, if there are any new hypotheses that require intensive research on them.

Fourthly, this research is going to deal with the issue of the impact of discontinuous classification on our thought and worldview by focusing on how the inability of continuous classification of our languages negatively affects our thought and worldview, from the perspective of linguistic relativity. This approach goes in line with my own scholastic conviction that, whenever the need arises, a linguist who deals with such a complicated issue as linguistic relativity needs to depend on, with the help of other disciplines, seemingly insignificant or trivial findings that do not seem to immediately provide tangible data but seem to be highly feasible in their applicability to their linguistic research. In this respect, I will glimpse into the pieces of research that are not directly related to the language concerning temporal or spatial issues, provided that the issues of thought and worldview themselves with which this research is concerned require them. In order to be faithful to the very purpose of the research topic, this paper is going to pay more attention to the meticulous interpretation of the research findings than to the enumeration of the immediately decipherable outcomes of the research. Precise interpretation of the scientific value and applicability of those experimental projects may be one of the best ways of making the most of the hard efforts of the researchers involved in them.

Fifthly, this research is going to address how language concerning temporal and spatial issues affects one's thought and worldview by presenting my own hypothesis and relevant literature. In this part in which this paper is to deal with the apparently elusive and complicated issues, I am going to introduce several pieces of research concerning the issues, without reference to their comparative interpretations, though. In this chapter, I am going to present my own notion of how one's understanding of time and space which hinges on the language involved in one's conceptualization generates numerous philosophical issues and enables one to discuss them.

Lastly, this research, apart from its proclaimed major concerns, will pay attention to several minor issues that I deem are related to the theory of linguistic relativity but are hardly viewed with reference to the issue of the impact of language on one's thought and worldview, since the selected issues present strong suggestions to be interpreted in the light of this

research topic. Here, I am going to discuss several other issues most of which are multidisciplinary ones that can be possibly connected to the topic of linguistic relativity. The tertiary issues, in my parlance, are going to be covered comparatively briefly, for I intend to provide them not as a sort of a distractor but as a sort of clincher to highlight the necessity for further research on linguistic relativity, in particular. The issues to be addressed in this part may encourage those who still look askance at the theory of linguistic relativity to have second thoughts about their dismissive attitude toward it or at least have boosted interest in it by alerting them to the correlation between the findings of the pieces of the presented research and their corresponding subcategories in the theory, for those issues are far less elusive than the issues concerning time and space to such an extent that they can be scrutinized even by laypeople.

However, it needs to be admitted, at this point, that the outcome of this research may be limited in its applicability in that all the pieces of the experimental research to be referred to focus on several select languages while the hypotheses to be referred to are broad in their provisional conclusions. Also, since cross-disciplinary approaches that span anthropology, psychology, cognitive science and philosophy have been taken due to the multifacetedness of the topic, the sheer scale of the research itself is relatively high, which in turn may lead the various points made in the paper to be disproportionately covered. Despite these actual limitations, this article may be able to offer a new insight into the theory of linguistic relativity due to the very fact that it is comprehensive, to say the least of it.

4. Theory: linguistic relativity

Despite many skeptical viewpoints regarding its central idea, the actual premise of the hypothesis of linguistic relativity that “a speaker’s language sets up a series of lexical and grammatical categories which act as a kind of grid through which one categorizes and conceptualizes various phenomena” inspired a lot of scholars in relevant fields, especially linguistics, psychology and philosophy (Marjolijn 2000: x). The inspiration seems to have been so strong that a lot of concerned scholars have presented various findings based on either observational studies or experimental research, which in turn went a long way toward

reviving the academic concern with the theory of linguistic relativity (Lucy 1997: 294). Therefore, it may be of good value to investigate, from a historical perspective, who presented and developed the hypothesis of linguistic relativity in its incipient phase and how it has trodden its path in its development and status alike since then, working its way into the concern of contemporary academia. In this regard, this chapter is going to provide the overview of the birth and ongoing maturation of the hypothesis in question by expounding the sub-classification of the theory of linguistic relativity based on how certain points in the theory hardly hold their validity anymore while other points in it have been refined and enhanced. Also, in order to provide solid rationales behind the evolution of the theory including the revival and demise of the noteworthy points in this theory, this chapter is going to be dedicated to the analytical introduction of the prototype of the hypothesis of linguistic relativity along with its relatively current sub-classification, which altogether runs the whole gamut of the theoretical groundwork of this research concern.

4.1. Advent of the theory: Sapir-Whorf hypothesis

Wilhelm von Humboldt, in the early 19th century, asserted on his philosophical notion of the diversity of language in terms of how it influences the mental development of the human species as a whole, indicating that his concern with linguistic diversity is largely based on the hypothesis of linguistic relativity with which his pupil, Sapir, is credited today (Humboldt 1999: 29-36). His understanding of human language as a system which "makes infinite use of finite means", constantly being governed by rules, laid a foundation for Chomskyan understanding of language (1999: 72). Humboldt even stretched his logic on language by arguing that the spirit of a nation might have never been achieved without language (1996: 46). Humboldt's worldview, which is reminiscent of the outlook on the competitions among different nations as can be seen in this argument, may be reflective of his previous career as a diplomat and copious observations of international political upheavals throughout (1999: ix). His concern with language, though, was focused more on how ‘diverse’ human languages construct and influence the mental development of humanity as a whole, which is a rather philosophical issue, than on how ‘different’ languages affect the speakers’ thought, which is more of a linguistic concern that this research is concerned with (1999: 11). Since his importance lies more in the topic of linguistic diversity than that of linguistic relativity

despite the affinity of the former to the latter, his hypotheses will be discussed in the later chapter.

In the early 20th century, an anthropologist Sapir took up the idea that had been originally proposed by Humboldt, publishing his observations of how linguistic differences result in differences in human cognition and behavior, which was followed by the hypothesis presented by his student, Whorf (Basel 2012: 642). Despite the probability that some other savants may have also conceived, intuitively or contemplatively, of the likely impact of language on the way one thinks or perceives, Sapir is credited with the scholarly conception that hypothesized it (Basel 2012: 642). In other words, what triggered and augmented the interest of both laypeople and scholars in this conceptualization was Sapir's projection of his hypothesis that expounds how the language one uses can substantially affect one's mental activities. In presenting his idea on what was to be known as the prototype of the hypothesis of linguistic relativity or Sapir-Whorf hypothesis later, Sapir (1949: 162) was straightforward in manifesting his conception regarding his hypothesis:

> Human beings do not live in the objective world alone, nor alone in the world of social activity as ordinarily understood, but are very much at the mercy of the particular language which has become the medium of expression for their society. It is quite an illusion to imagine that one adjusts to reality essentially without the use of language and that language is merely an incidental means of solving specific problems of communication and reflection. The fact of the matter is that the "real world" is to a large extent unconsciously built up on the language habits of the group.

Given that 'world' is a comprehensive concept comprising a myriad of activities that take place in it and at the same time it can be interpreted quite differently depending on the perspective one uses, there seems to arise a necessity for clarifying what conceptualization of 'world' this paper is concerned with. Sapir hardly seems to have indicated, in his parlance, the things or activities that are within the scale of individual or collective human activities, as suggested in the above quote (Darnell & Irvine 1997: 292). Rather, he seems to have indicated natural phenomena and 'large-scale' societal incidents in his use of the term 'world' given the fact that he used the term to indicate what individuals 'experience' in their surroundings without reference to cultural or systemic activities. Sapir (1921: 8) states, "[t]he world of our experiences must be enormously simplified and generalized before it is possible to make a symbolic inventory of all our experiences of things and relations; and this inventory is imperative before we can convey ideas". Also, Sapir defined thought as "the

highest latent or potential content of speech, the content that is obtained by interpreting each of the elements in the flow of language as possessed of its very fullest conceptual value" (1921: 10). His delicate capture of the essence of thought, viewed from the viewpoint of the proponents of the hypothesis of linguistic relativity, contradicted the popular notion that thought might be what seeks its outlet through the medium of language. Given the way he conceptualized thought, it does not seem to be surprising that he defined language as primarily a "pre-rational function […] humbly works up to the thought that is latent in, that may eventually be read into, its classifications and its forms; it is not, as is generally but naïvely assumed, the final label put upon the finished thought" (1921: 11). What is especially intriguing in his description of thought and language is that he differentiates between them by metaphorically describing their subtle interplay. Though Sapir himself did not clearly mention his teacher Humboldt as the one who had inspired him in his understanding of the correlation between language and thought, he does not seem to have been completely independent of Humboldt's notions of language and thought.

Whorf, who was one of Sapir's students, followed his teacher's idea by claiming that "language closely governs our experience of reality", thus completing the hypothesis of linguistic relativity at least as its archetype. He (1996: 61) asserted that differences between languages lead their speakers to "differ in their perception and action in objectively similar situations". In hypothesizing this notion, he (1956: 57) noted that the language of a North American Indian tribe Hopi has unique features in its expressions of time and space in that despite its lack of tense-descriptive verbs, it was capable of describing various temporal issues. On close inspection, he realized Hopi language achieved its temporal description by incorporating into it such aspects as the length of time an event lasts, such temporal extent as whether an action is completed, progressing, regular or predictable, and such functions as the linkage of clauses by which to involve multiple verbs in the temporal relationship (1956: 57).

He (1956: 58) also noted that Hopi speakers inflect the verbs involved in their utterances to describe a particular action taking place in repeated segments: *rı́ya* equivalent to "it makes a quick spin" and *riyáyata* equivalent to "it is spinning". He hypothesized his observation by arguing that Hopi speakers' conceptualization of the universe occurs within the frame of their language, which in turn is dubbed Whorfian hypothesis (1956: 140). As Edwards (1997: 213) notes, several concerned scientists, especially Brown and Lenneberg

(1954: 465), tested that highly conceptual idea of Whorf's by reshaping Whorf's principle of linguistic relativity as a tangible hypothesis that can be empirically tested, now called the Sapir–Whorf hypothesis, and carried out experiments meant to find out whether color perception varies between speakers of languages that classified colors differently. Since Whorf paid attention to the way one perceives one's reality and tried to figure out how it is determined by one's thought processes in which the language one frequently uses is involved, it seems that 'world' is quite identical to 'reality' in his conceptualization of it (1956: 27). That seems to be, in part, a reason that the term 'political correctness' which worked its way into wide contemporary usage is often associated with his name (Aitchison 1997: 122). Whorf's notion of 'worldview' is noteworthy in that his is analogous neither to Humboldt's nor to Sapir's and more importantly in that it is related to the perspective of Amerindians that was compared with those of other cultures that use different languages from theirs, which in turn is partly responsible for radicalism that his claim is often charged with (Underhill 2009: 14). His radical claim that was presented in emotional terms in defense of Amerindian languages had unfortunate consequences for the reception of the term 'worldview' and, at the same time, for the relevant pundits' overall responses to the works of Sapir and Whorf (Underhill 2009: 18). Consequently, his academic concern with the correlation between language and thought, especially worldview, came to be dubbed "mentalist linguistics" before long, which subsequently gave birth to a few standard quotes that mitigated radical aspects of his original claim, "obscuring both the question of the relation between language and the mind as well as the origin of the term worldview" as a side-effect (Underhill 2009: 15). Revolutionary and, at the same time, provocative as it was at that time, Whorf's theory on the impact of language on thought did not entail his own or his immediate followers' full-scale research to support its validity (Whorf 1956: 144). Blair points out that Whorf's comparison between European languages and Hopi and Navaho Indians' are too far-fetched to directly ascribe differences in the thoughts between Europeans and Hopi and Navaho Indians to differences in grammar between the two language groups, arguing that they seem to be more closely related to the differences of the activities on which their languages are based (2006: 41). As the quote suggests, his use of the term 'world' seems to be quite dissimilar from Whorf's use of it, in particular, which is to be discussed a bit later.

Another important figure whose hypothesis concerning linguistic relativity that should go in tandem with Sapir and Whorf's is Boas, who made public the complexities and

subtleties of Amerindian languages in the way that shows how the thought, culture and language of those diverse peoples reflected the interactions of the three elements in the process of social evolution (1922: 10). Less radical than Whorf's claim as it is, his claim also laid pioneering intellectual stepping stones for later scholars to be inspired.

Among the ten proposals that Black (1959: 229) presented to summarize Sapir-Whorf hypothesis, the following may be noteworthy in that they either directly or indirectly mentioned the correlation between language and worldview. He (1959: 229) argues that

> (2) A native speaker has a distinctive "conceptual system" for "organizing experience"; and (3) a distinctive "world-view" concerning the universe and his relations to it. (4) The background linguistic system partially determines the associated conceptual system; and (5) partially determines the associated world-view.

Given that the term *worldview* can be somewhat arbitrarily interpreted due to the fact that it is literally a broad concept, it seems to be inevitable, at this point before this paper touches further how language affects one's worldview, to clarify on which of its definitions available this paper is to base its discussion, especially in terms of its scope. Underhill (2009: 135) redefines 'worldview-as-Weltanschauung' that is Humboldt's original understanding of it by subcategorizing it into three terms. One is "cultural mindset for the relatively rigid and fixed conception of the world which frames our perception and conception of politics, society, history, behavior, the individual's place in the world and the organizing frameworks of social relations" (Underhill 2009: 135). The second is "personal world for the perception and conception of the world which is specific to each individual" (Underhill 2009: 135). The last is "perspective for the changing nature of the way each person perceives and conceives the world" (Underhill 2009: 135). He maintained that an individual's perspective changes as he or she moves through the world, interacting with others and encountering new and different experiences (Underhill 2009: 136). The three subcategories all seem to effectively comprise and, at the same time, summarize the broad term *worldview* which is to be dealt with, regarding how it is affected by one's language. Given that this paper proclaimed earlier that its concern is the impact of language on thought and worldview, it does not seem to be redundant to make it clear once again at this point that the concept of worldview on which this paper hinges is quite analogous to the first subcategory presented by Humboldt that does not overlap with the private nature of thought.

4.1.1. Sub-classification of linguistic relativity based on relevant hypotheses

When it comes to the status of thought and language, especially concerning their distinct attributes and overlapping nature alike, there are contentious interpretations of them. This chapter is going to introduce several pieces of contentions regarding this issue, which will be followed by sub-classified hypotheses on linguistic relativity. Given that it will be of big help to elaborate on the rather elusive and complicated points to be made later, briefly introducing the relevant hypotheses that 'metaphorically' schematize linguistic relativity is expected to help elucidate the correlation between language and thought.

Watson (1913: 160), who is a behaviorist, argued about a century ago that thought should be considered to be equivalent to "the production of sub-vocal speech", strongly insinuating that thought is, in a sense, a form of expression that is done with tacit language and thus that thought and language can be considered seminally identical. As opposed to his claim, Molt and Wolff (2010: 12) argue that "people can have thoughts that are difficult to express". Wolff and Holmes (2011: 254) support their claim by maintaining that "if people thought entirely in words, words expressing new concepts could never be coined because there would be no way of imagining their meanings". They argue that "infants and even primates are capable of relatively sophisticated forms of thinking even in the absence of language" (2011: 254). The argument presented by Wolff and Holmes can be interpreted as an allusion to the kind of thought that can be formed through "categorization, reasoning and memory" without being affected by general linguistic representations (2011: 256).

Controversial as it may appear to be, there is one thing that should never be overlooked regarding the contention between Watson's argument and his dissenters' counterarguments. Given that language acquisition process takes place with the subjects' exposure to the environment in which a particular language is used and, at the same time, given that primates' nonverbal communicative ability (King 2004: 4) already suggests their possession and utilization of sign language, the premise 'in the absence of language' which is a bone of contention in this debate seems to harbor contradictory attributes in the first place. To reach the bottom of this controversial point, one may have to conduct research, though it might be practically impossible at the moment, on a comparison between humans or nonhuman primates raised without any exposure to language learning environment and their counterparts raised with exposure to varying degrees of language learning-related stimulation.

For example, one can hardly conclude that adults with alexia who lost their ability to speak quite early in their lives think with no aid of language at all, provided that their exposure to language did take place at certain points during their developmental stages (Wolff & Holmes 2011: 257).

4.1.1.1. Language as a prototype of mental activities

This sub-hypothesis of linguistic relativity claims that language is a very early stage of one's mental activities, which is a slight mitigation of the radical claim that almost identifies language and thought (Wolff and Homes 2011: 254). To adequately address how language works as a prototype of mental activities, it is necessary to categorize how language constitutes one's mental activities. Penfield and Lamar (2014: 188), through their studies on dysphasia, revealed plenty of facts about brain mechanisms that underlie the functions of language, consequently spotting a lot of areas in the left hemisphere and the right hemisphere of the brain that work when one uses a language. According to them, language develops through the relative relationship between cortical areas and individual coding areas within which motor patterns are established (2014: 225). A neuroscientist Masland, through his studies on the relation between verbal communication and nonverbal communication, noted that young children's babbling, along with their mimicking of the sounds they hear around them, forms different stimuli based on their acoustic differences, which in turn strongly suggests the possibility that variations of sounds among the various languages themselves already contain different experiences quite apart from their semantic elements (1967: 14). With the consideration of this high probability of different experiences that happen in the wake of various linguistic acoustics, it may be possible to understand "language as a prototype of mental activities" (Wolff and Homes 2011: 254). If language itself is one of the most prototypical mental activities, exploring this issue with the aim of finding some evidence to validate the hypothesis of linguistic relativity can be of good value, given the high possibility that language differences can be partly responsible for different thoughts and worldviews.

Wolff and Homes (2011: 254) metaphorically schematized micro-categories of linguistic relativity that can account for how language works in different phases, affecting thought throughout. Following (2011: 254) are the summaries of their schematized

understanding of the involved phases that can illustrate the hypothesis of language as a prototype of mental activities:

· Thinking for speaking
· Language as meddler
· Language as augmenter
· Language as spotlight
· Language as inducer

Table 1 below shows the metaphorical schematization of linguistic relativity done by Wolff and Homes (2011: 254) by visualizing how each category generates each subcategory.

Table 1 Classes and subclasses of hypotheses on how language might affect thought

<table>
<tr><td colspan="6">“Language affects thought”</td></tr>
<tr><td rowspan="5">“Thought is language”

Language as language-of-thought</td><td colspan="5">“Thought is separate from language”</td></tr>
<tr><td rowspan="4">“Thought and language are structurally parallel”

Linguistic determinism</td><td colspan="4">“Thought and language differ structurally”</td></tr>
<tr><td rowspan="3">“Thinking before language”

Thinking for speaking</td><td colspan="2">“Thinking with language”</td><td colspan="2">“Thinking after language”</td></tr>
<tr><td>Language as meddler</td><td>Language as augmenter</td><td>Language as spotlight</td><td>Language as inducer</td></tr>
<tr><td colspan="4"></td></tr>
</table>

Adapted from “Linguistic relativity,” by Wolff, Phillip; Homes, Kevin J, 2011, *Wires Cognitive Science* 2, 253-265.

Given that the first two categories in the leftmost of Table 1 “Thought is language” (Wolff & Homes 2011: 254) and “Thought and language are structurally parallel” (Wolff & Homes 2011: 254) eliminate the necessity for the research on the impact of language on thought by equating their statuses, they are going to be excluded from the ongoing discussion. However, the second category “thought and language are structurally parallel” (Homes 2011: 254) deserves to be mentioned briefly here since the alleged validity of this hypothesis is what triggered Whorf’s interest in the topic that is known as linguistic relativity today and spurred his pioneering undertaking.

4.1.1.2. Linguistic determinism

The second leftmost category in Wolff and Homes (2011: 254)'s schematization "thought and language are structurally parallel" goes in line with Whorf (1996: 61)'s notion that language determines the basic categories of thought and thus speakers of different languages think differently. Gentner and Goldin point out that Whorf, getting his motivational inspiration regarding this hypothesis from his teacher Sapir's interest in linguistic diversity, presented his highly conceptual theory that "the categories and distinctions of each language enshrine a way of perceiving, analyzing, and acting in the world" (2013: 61). This hypothesis, commonly known as strong Whorfian hypothesis as well, is not considered to be valid anymore, since hardly any of the findings of various pieces of hitherto-done research support this claim (Hussein 2012: 645).

4.1.1.3. Thinking before language

Wolff and Homes (2011: 254) suggest that the three categories "thinking before language", "thinking with language" and "thinking after language" are the elements that are involved in linguistic relativity. To discuss it briefly, the third leftmost category "thinking before language" indicates "thinking that occurs immediately prior to using language" (Wolff and Homes 2011: 254). In other words, thinking processes are associated with language production, in the first place (Wolff and Homes 2011: 254). This hypothesis, though directly relevant research is too scarce to discuss it in this research, seems quite intriguing in the study of linguistic relativity due to its radical claim that different languages predetermine different thinking processes that precede them, as one can see in the case of a comparison between English speakers and Mandarin or Indonesian speakers in their use of verbs in terms of tense (Wolff and Homes 2011: 255). Wolff and Homes (2011: 255) note that English specifies verbs based on the tenses in which they are involved while Mandarin and Indonesian do not. Thus, they argue that, when using a verb to describe a past event, English speakers need to attend only to when an event took place unlike Mandarin or Indonesian speakers (2011: 255). Also, they note that Turkish speakers must indicate in their description of the past events whether they were witnessed or not, strongly suggesting that different languages may trigger different thinking processes right before the language speakers' actual utterances (2011: 255).

Their metaphorical rephrasing of it as “thinking for speaking” indicates that the effect of language on thought takes place immediately before the production of language, namely vocalization or textualization (2011: 255). They attempted to prove the existence of this phase through an experiment in which the participants were asked to verbally interfere with certain tasks (2011: 255). They argue that “speakers of a language engage in special kinds of mental activities, attending to certain aspects of experience”, thus referring to this phase of correlation between language and thought as “thinking for speaking” (2011: 255). This phase “thinking for speaking”, they claim, is observed in people’s attentional patterns and memory for motion events (2011: 255). They illustrate their claim on this phase by alluding to such languages as Chinese, English, German and Russian that tend to “encode *manner* in the main verbs like jog, roll and march and *path* in a variety of other linguistic structures” unlike other languages that have exactly opposite patterns (2011: 255). Slobin (1996: 76) also presents his hypothesis on the possible existence of this phase in linguistic relativity by maintaining that “the expression of experience in linguistic terms constitutes thinking for speaking”. This research concern, however, will mainly comprise the latter two categories, excluding “thinking before language”, in its in-depth discussion of the topic in the light of this research question in the later chapters, for the suggested experimental research on this phase is not exhaustive enough to counterbalance the ephemerality of arguable ‘thinking’ that takes place immediately before the production of language.

4.1.1.4. Thinking with language

To put it as simply as possible, this hypothesis, which has been presented relatively recently, posits that thinking takes place together with language (Wolff & Homes 2011: 255). This stage which is dubbed “thinking with language” can be explained with its subcategories that can also be tersely accounted for as follows. What differentiates this stage from others is that processes associated with language are activated along with nonlinguistic means (Wolff & Homes 2011: 255).

The phase “language as meddler” is when linguistic representations compete with nonlinguistic representations, especially motion (Wolff & Homes 2011: 256). In this stage, the effects of language on thought "occur from the spontaneous recruitment of linguistic codes in tandem with nonlinguistic codes" (Wolff & Homes 2011: 256). Decisions regarding various elements in one's utterances are made in this phase through the process in which

linguistic codes and nonlinguistic codes are intertwined (Wolff & Homes 2011: 256). According to Wolff and Homes, "when linguistic codes and nonlinguistic codes are consistent with each other, speed and accuracy are facilitated, but when they conflict, speed and accuracy are compromised" (2011: 256).

In some cases, "linguistic representations may combine with nonlinguistic representations to enable people to perform tasks that could not be completed with either type of representation alone" (Wolff & Homes 2011: 257). As the term of its subcategory "language as augmenter" indicates, in this phase, language comes to offer impetus to what is on the verge of forming as thought by virtue of its capability of conceptualization so that what is burgeoning as a fuzzy piece of thought can be conceptualized as solid thought (Wolff & Homes 2011: 257). What is intriguing in this phase, in particular, is that nonlinguistic representations are often nurtured, many of them being incorporated into linguistic representations (Wolff & Homes 2011: 257).

4.1.1.5. Thinking after language

Wolff and Homes (2011: 254) denominate the rightmost category of the possible impact of language on thought in Table 1 as "thinking after language", subcategorizing it into two smaller phases, as they believe language conditions the matrix in which following ideas are to be formed. This category accounts for the hypothesis of linguistic relativity far more than other categories do, regarding the intensity of the likely impact language has on thought (Wolff and Homes 2011: 254), which in turn suggests that this category is the most directly relevant to this research concern. Wolff and Holmes (2011: 254) note that "[l]anguage may prime a particular mode of processing that continues to be engaged in even after language is no longer in use". What is especially noteworthy in this phase is that the effects of language on thought do not relent in spite of the speakers' engagement in other activities that are not related to language, since the effects take place after the tangible production of language (Wolff & Homes 2011: 254).

Wolff and Homes (2011: 255) note that the impact of language on thought continues to work even after the speaker, reader, listener or writer is engaged in the actual use of the language or exposed to the used language. The lingering impact of language on thought can be substantiated by cognitive linguistics which is going to be accounted for in the next chapter. To further elaborate upon how the lingering effect of language on thought is formed,

Wolff and Homes (2011: 255) subcategorize “thinking after language” into “language as spotlight” and “language as inducer”.

The phase “language as spotlight” addresses the possibility that, after a language is used, certain properties in one’s thoughts get more spotlight than others (Wolff & Homes 2011: 255). According to Wolff and Homes (2011: 255), “after exposure to words and constructions that highlight specific properties, attention may linger on those properties. In effect, language may act as a spotlight, making certain aspects of the world more salient than others”. In other words, the users of a certain language are predisposed to pay more attention to certain aspects of their experiences or surroundings (Wolff & Homes 2011: 255). It seems to require more investigations on it to see if the possibility that the lingering impact of language on thought after the use of language is universal among those who use the same language or are exposed to it. If the lingering impact in question is not general, it can hardly be concluded that the impact is attributed largely, not to mention solely, to the language.

The phase “language as inducer” takes place when “language primes certain types of processing in nonlinguistic thinking” (Wolff & Homes 2011: 260). Wolff and Holmes (2011: 260-261) support the existence of this phase by describing the experiment that compared one group whose participants were asked to verbally describe a scene with the other group whose participants were asked to draw the scene. In this experiment (2011: 260), they created a scene in which an object is supported by another object from below. They claim that, when the object supporting another object from below is suddenly gotten rid of, the participants in the former group paid more attention to gravitational dynamics than to the removed object whereas the participants of the latter group paid more attention to the whereabouts of the removed object than gravitational dynamics (2011: 261).

This effect of language as an inducer on people’s mental activities may be more noticeably observable and thus more effectively substantiable in people’s cognitive activities than other effects of language on thought that were discussed earlier, as the endeavors to measure the lingering impact of their language activities on their mental activities can benefit from the accumulated knowledge in cognitive linguistics and the advanced technology of cognitive science (Casasanto 2010: 477). Given this, it may be worth investigating the correlation between cognitive science, including cognitive linguistics, and the theory of

linguistics so that more of the pending claims made in the latter can be scientifically substantiated.

4.2 Cognitive linguistics and the theory of linguistic relativity

To briefly introduce the discipline of cognitive linguistics before addressing its correlation to the theory of linguistic relativity, it grew out of the work of a number of researchers active in the 1970s who were interested in the relationship between language and mind and who did not follow the prevailing tendency to explain linguistic patterns by means of appeals to structural properties that are inherent in language (Casasanto 2010: 453). Instead of attempting to segregate the element of syntax from all the other components in language "in a 'syntactic component' governed by a set of principles and elements specific to that component", cognitive linguists investigated how language structure is related to non-linguistic things (Casasanto 2010: 454). One of the remarkable discoveries their investigation made is that many of the cognitive principles and mechanisms are not specific to language but rather "inclusive of principles of human categorization, pragmatic and interactional principles and functional principles in general, such as iconicity and economy" (Casasanto 2010: 454).

One of the most significant assumptions made by the mainstream cognitive linguists is that meaning, through which one's utterances become communicable, is so crucial to language that it should be given higher priority as a primary focus of study than other elements in language should (Fauconnier 1997: 3). According to this view, the most significant function of linguistic structures is expressing meanings, and thus mapping out the interplay between meaning and form should be a primary concern in linguistic analysis (Fauconnier 1997: 3). In other words, in this view, there is an inseparable link between linguistic forms and semantic structures since the former is a medium by which the latter is expressed (Fauconnier 1997: 3). To simply put, cognitive linguistics approaches language with its immediate attention to underlying concepts with which forms are equipped (Casasanto 2010: 453). Consequently, the logic, from the perspective of cognitive linguistics, can be stretched to the point that study of language requires the investigation of semantic structures of all the meaningful units in language, which in turn directed a large portion of scholastic attention to the possibility, if not the power, of language in the formation of

thought (Casasanto 2010: 458).

Given that cognitive linguistics looks upon language as a system that is entrenched in the cognitive faculty of man, what cognitive linguistics have been concerned with comprises

> the structural characteristics of natural language categorization (such as prototypicality, systematic polysemy, cognitive models, mental imagery and metaphor); the functional principles of linguistic organization (such as iconicity and naturalness); the conceptual interface between syntax and semantics (as explored by cognitive grammar and construction grammar); the experiential and pragmatic background of language-in-use; and the relationship between language and thought, including questions about relativism and conceptual universals. (Geeraerts & Grandelaers 1995: 111-112)

One can note here that behind the enhanced possibility of scholastic exploration of the impact of language on thought has lain the development of cognitive linguistics. Cognitive linguistics is, at large, classified into two subcategories based on the relevant linguists' scholastic concerns (Fauconnier 1997: 6). One main concern of cognitive linguistics is "a set of theoretical assumptions for syntactic and semantic theories, which is more solidly grounded than that of generative linguistics" (Fauconnier 1997: 6). The other main concern is "the link between the study of language and the mind, through which they expect to find important aspects of brain functioning" (Fauconnier 1997: 7). Given that cognitive linguistics is closely related to its neighboring disciplines such as psychology, anthropology, and sociology whose findings in turn feed back into it, it is most likely of utmost benefit to take into consideration several important findings in those disciplines that bear important suggestions to this research concern. Fauconnier (1997: 187) claimed regarding the value of cognitive linguistics:

> […] the most surprising aspect of the organization of language and thought is the fundamental unity of the cognitive operations that serve to construct the simple meanings of everyday life, the commonsense reasoning of our daily existence, the more elaborate discussions and arguments in which we engage, and superficially far more complex scientific theories and artistic and literary productions that the entire cultures develop over the course of time […] the simplest meanings are not in fact simple at all. They rely on remarkable cognitive mapping capacities, immense arrays of intricately prestructured knowledge, and exceptional on-line creativity. They also rely on the impressive, and poorly understood, human ability to resolve massive under specification at lightning speed.

What is noteworthy in the quote is that our cognitive abilities often underlie even

inexplicably complicated intellectual issues that we tackle (Fauconnier 1997: 187). In this respect, it seems to be no surprise that quite a few pieces of the hither-to done prototypical research on linguistic relativity were based on how our language conditions our thought by affecting our cognitions.

Comprehensively, cognitive linguistics argues that "language is both embodied and situated in a specific environment" (Niiranen & Ribeiro 2011: 227), which can be construed as cognitive linguists' understanding of language as a cornerstone of thought. Discussing cognitive linguists' hypothesis on how language is created may help elucidate the principal arguments in cognitive linguistics. Niiranen and Ribeiro (2011: 228) claim that language itself is context-based and embodies itself through the contextual and pragmatic mechanism. In other words, both the structural features of an individual language and the actual utterances of a speaker of a certain language themselves are the process of materializing the context the language is bearing in practical ways (Niiranen & Ribeiro 2011: 228). To recapitulate, using a certain language may be tantamount to embodying the inherent context upon which the language is fundamentally grounded. Due to the very fact that cognitive linguistics understands the generative and functional mechanism of language with its pivot on semantics that pays attention to the interplay between language and cognition along with the embedded empirical and environmental elements in meanings (Evans & Green 2006: 17), the main ideas in cognitive linguistics should be closely linked to the prototypical hypothesis of linguistic relativity. Linguistic relativity is a vast concept that comprises various linguistic environments in our everyday language use, which in turn suggests the possibility that the knowledge we acquire through cognitive linguistics is a very cornerstone on which we can build solid and advanced knowledge regarding the elusive concept of linguistic relativity.

Hardly can one overlook the impact of cognitive linguistics on linguistic relativity since human cognition itself is highly vulnerable to the ways a certain language is employed to explain or describe certain issues. This may become evident when one considers how the mass media's language, comprising denotation, connotation, insinuation, assertion and rhetoric, creates distinct effects upon the readership's interpretation of the issues covered by them. To demonstrate the correlation between cognition and language, Whorf (1956: 216) introduces the case of numerous snow-related words in Eskimo's language, claiming that Eskimos' ability to find snow that is ideally suitable for building an igloo, which requires

thinking from the onset, is contingent upon the existence of various snow-related words in their language. His claim is later dismissed by Pullum (1989: 278), who rather pejoratively equates the alleged abundance of snow-related words in Eskimo language with the abundance of horse-related words among horse breeders and tree-related words among botanists. Also, a piece of research conducted by Berlin and Kay in 1969 showed that lexical elements of color are highly susceptible to universal semantic restrictions, and thus the Sapir–Whorf hypothesis came to be discredited (1999: 144). However, since the late 1980s with a distinct milieu in the study of linguistic relativity, new research findings on how cognition is affected by differences in linguistic categorization have lent broad support for the possibility of further experimental research on the hypothesis of linguistic relativity (Pae 2012: 49). According to them, effects of linguistic relativity are shown not only in the abstract realm of spatial or temporal cognition and in the social use of language but also in the field of such simple cognition as color perception (Pae 2012: 50). More recent studies have also shown that color perception is particularly prone to the effects of linguistic relativity when the information is processed in the left hemisphere of the brain, suggesting that the left hemisphere of the brain relies more heavily on language than its counterpart does (Wilson & Keil 1999: 144).

Conversely, the theory of linguistic relativity is changing the façade of cognitive linguistics as the impact of the latter on it is increasingly unveiled (Evans & Green 2006: 78). Fauconnier and Turner (2003: 11) talk about "three I's: identity, integration and imagination that are involved in our thinking". In explaining how elements work together to form our thought, they (2003: 18) claim that

> basic mental operations are highly imaginative and thus produce our conscious awareness of identity, awareness and difference. Framing, analogy, metaphor, grammar and commonsense reasoning all play a role in the unconscious production of these apparently simple recognitions and they cut across divisions of discipline, age, social level and degree of expertise.

More or less abstract as their remark above may sound, what is noteworthy, in particular, in the light of the hypothesis of linguistic relativity is that they address the integration of various imaginative concepts, through the process of mental operation, into our thought, no matter how simple our thought may be (2003: 18). This strongly suggests the probability that thought can never be independent of language in the first place, which is the very idea that lies at the core of the hypothesis of linguistic relativity.

However, cognitive linguistics, though it is closely related to linguistic relativity at a fundamental level, does not sufficiently substantiate the correlation between language and thought, given that not only semantic elements of a certain language but also its morphosyntactic elements do seem to influence one's thought. A good example is a tag question like *You do not like classical music, do you?* The respondents who care for classical music respond differently depending on what mother tongue they have, as often as not. Those whose mother tongue is English respond by starting their response by *yes*, though with a bit higher pitch than when the question is given in a positive voice like *You like classical music, don't you?* However, people who speak different mother tongues from English often reply by starting their sentences with *No, (I don't). I like (love) classical music.* What does this suggest? What is a covert suggestion in this? One possible explanation is that many languages lack tag questions in a strict sense. They employ an equivalent *right?* In place of the tag question. Another possible explanation is that other languages pay more attention to the whereabouts of 'not' than to the employment of verbs or the objects. As suggested in this illustration, cognition does not seem to suffice to account for this difference in people's thought.

It is undeniable to say that basic language forms have a lot to do with the byproduct of one's cognition since what one sees, hears, tastes, smells and feels is basically what urges one to utter something about the experience (Fauconnier 1997: 20). However, it seems to be questionable to argue that the environment is a decisive factor in the formation of language. To illustrate, human infants burst into cry upon birth and start to murmur sounds that are similar to those murmured by other infants raised in completely different environments. Language learning processes and patterns in certain language cultures do resemble those in other language cultures regardless of the environments the young learners are exposed to, showing a strong correlation between language acquisition process and inborn linguistic device. To illustrate again, American Indians that had more direct contact with nature had many more words and phrases that are commonly used to describe their natural experience (Sapir 1956: 288). However, vocabulary diversity seems to be nothing but a tiny portion of linguistic relativity given that the way language affects thought is much more intense when the language is versatile and sophisticated in its role as a catalyst for thought promotion than when the language has more cognition-based vocabulary.

All things considered, nevertheless, cognitive linguistics has an inseparable link with

linguistic relativity, as cognition is, without doubt, a very basic fuel for forming complicated thoughts regardless of times. Though it will be addressed later, the concept of time and space starts at the level of one's cognition regarding brightness of the daytime or the size of one's residence, for example (Gibbs 1996: 25). In this sense, it may be safe to say that findings in cognitive linguistics can pave the way for the hypothesis of linguistic relativity which depends heavily upon intuitive knowledge that can be substantiated by empirical research. There are, fortunately, quite a few experiments that were done to figure out the correlation between cognition and thought, though most of them are at such a basic level that they validate the claim that cognition strongly affects instant judgment or choice rather than the claim that it affects real thought this research is concerned with, as a matter of fact.

4.3 Language as a matrix for thought

In this chapter, I will address the issue of in what ways language and thought can be differentiated from each other, for it may become completely meaningless if language and thought are actually identical things that simply take different media for the sake of expressions. Though possible correlations between language and thought presented by several scholars were discussed in the earlier chapters, I am going to employ the single term 'matrix' to describe correlation between language and thought along with the role of language in the formation of thought. According to the view that is in line with this conception (Fauconnier 1997: 145), since language is a byproduct of social activities, thought that is expressed through language is highly susceptible to the intrinsic nature of language. This also means that thought is created with the aid of the expressive power of language in the first place and that different linguistic tools different languages employ to express identical things can sow the seeds of different thoughts. It may be indisputable that language is the medium through which one expresses one's ideas, opinions and perspectives. This understanding regarding the functions of language seems to be based on the observation of language as a product of one's mental activities.

This function language performs, however, may be the tip of an iceberg if we consider the fact that language underlies quite large portions of our mental activities. In other words, though our thought is expressed through the process of vocalization or textualization in whose creation language directly involves, our thought may not be available in the first

place unless language is involved in it. As a matter of course, this view may be encountered with the claim that one can engage in thought exclusively with visual imagery (Libby 2013: 4). The validity of this sort of claim as a counteractor against linguistic relativity may hinge upon how we are going to define our thought. Discussion of thought in this paper is going to take no account of simple visualization through imagery that hardly involves one's judgment, deduction or induction, or several pieces of observational or instinctive learning that are observed in certain animal species. Therefore, the issue of language as a matrix for thought is not whether it is but how much it is. Then, the nature of the issue with which this paper is concerned at the moment may get clear.

4.4 Language and worldview

In this chapter; I will present the historical overview of the term *worldview* quite apart from the clarification of the distinction between thought and worldview that was made in the earlier chapters, as the investigation of the controversial aspects of this term is closely related to the evolution of the hypothesis of linguistic relativity. Given that the clarification of the term *world* needs to be prioritized over that of the term *worldview* in order to effectively investigate how the latter came to develop into an important concept, independently of the concept of thought in the hypothesis of linguistic relativity, it seems to be necessary to briefly address the term *world* before touching the concept *worldview.*

"The word is a world (La parole est un monde)" (Underhill 2009: 3), which strongly suggests how words one learns or uses make up one's viewpoint regarding the world, may be one of the most terse and, at the same time, the best-known quotes about how language affects one's point of view regarding the world. Given the fact that humans constantly interact with the world from their birth to their ultimate demise as they perceive, feel, experience and think regarding numerous resources and diverse stimulations they face in the world through the journey of their lives, there seems to be closer connections between language and the world than between language and thought (Wolff & Homes 2011: 255). In other words, when seen from the embryonic perspective, language may be one of the products of human activities that the world enabled to take place in the first place. In the meanwhile, when seen from the developmental perspective, the abstract term *the world* is a byproduct of the accumulation of our conscious or unconscious thoughts, activities, and creations based on the

language matrix of a particular group to which we belong (Vygotsky 2012: 223). If we are willing to take a more scientific perspective to consider this concept in a less abstract spectrum, we may be able to borrow the insight of quantum mechanics that views language as "an emergent phenomenon in a dynamic adaptive complex system exhibiting local manifestation or expression" (Fathulla & Jost 2008: 13). Here, we can see that the correlation between language and thought can hardly be investigated scientifically without consideration of the correlation between language and the world, for language is a dynamic system that is a product of our interactions with or in the world.

The term *worldview* has been ideological to quite an extent since it traditionally involved strife between different cultures, ethnic groups, nations and even societies (Underhill 2009: 14). How people came to have varied worldviews based upon the variations of their geographic inhabitance may be one of the main concerns of sociologists or linguists just as how people came to have somewhat different physical appearances may have been one of the main concerns of anthropologists. As discussed earlier, though language has a great faculty in pinning down abstract things and then making them into things we can take advantage of for various purposes, it also has its inherent side-effect given that once it successfully pins an elusive concept down, it does not go ahead, as often as not, in its further exploration of figuring out the very essence of what it is, thus counterbalancing the hitherto-made efforts to pin it down by too simply taking it for granted to complement its incompleteness or modify flaws in it. Elusive and comprehensive as it is, the concept of worldview needs to be redefined here since setting a clear boundary around it is an absolute prerequisite for the discussion of the topic this paper is to deal with. In other words, without prior discussion on the boundary of the concept of worldview, this paper may make a vain attempt to conduct research on how language conditions one's worldview.

Also, the term *worldview* "has gained a wide currency in the disciplines of philosophy, sociology and cultural studies as well as in linguistics" as Underhill noted (2009: 153). According to Underhill (2009: 54), James Orr, who is a Christian thinker of the late 19th century, attributed the coining of the term worldview to Humboldt despite the fact that the term worldview is traced back to Immanuel Kant, who is a couple of generations ahead of Humboldt. Given that Humboldt himself was a native German speaker, the term worldview, which is a translation of the German term *Weltanschauung* he originally used, needs to be

clarified in its indication. For Kant, *Weltanschauung* is related to the idea *Welthegriff* which is translated into 'world concept', and Naugle stated that "*Weltanschauung* functioned as an idea of pure reason to bring the totality of human experience into the unity of the world" (Underhill 2009: 54). According to Trabant, worldviews-*Weltanschauung*- were divisions of the world in the sense of conceptions and ideologies (Underhill 2009: 55). One important suggestion that we can infer from the arguable origin of the term worldview is that it is ideological even at its embryonic stage of formation. Since Underhill's classification of the seemingly all-encompassing term *worldview* may facilitate this research, it seems to be appropriate to introduce his subcategories of the term worldview. He classified the term into five subcategories, "world-perceiving, world-conceiving, cultural mindset, personal world and perspective" (Underhill 2009: 55). This research, however, will exclude the fifth subcategory "personal world and perspective" (Underhill 2009: 55) in its coverage of the concept of worldview in that this category has overlapping elements with the concept of thought this research deals with.

Thanks in part to some of the suggestions made regarding the correlation between language and worldview by several concerned scholars with authority, especially Wittgenstein and Pinker, the theory of linguistic relativity seems to be reviving, at least concerning how different languages encourage one to have different worldviews. Then, what about the variations within a language? We do not employ our language in the same ways though we belong to the same language group. The differences regarding how we use a language are manifested most conspicuously through how we write. Our age, our gender and especially our knowledge are often responsible for the different ways we write. We choose to use different words and phrases for common topics and to configure them in unique ways that are linguistically sensible. The ways verse writers maneuver their language are quite different from the ways prose writers do. Also, the ways young children use their language are never similar to the ways young adults or senior people do. Many of these distinct classes of people may have different worldviews. Then, is it valid to say that the ways they use their language contribute to the formation of their worldview despite the identicalness of the cultural or national categorization of the language? This is most likely quite hard to substantiate, intriguing as it is, since, though their different worldviews are detected, one can hardly determine if this difference is attributed more to the differences in their languages or in the

ways they use their languages than to the differences in their experience or in other environmental elements or vice versa.

Still controversial in a sense and invariably tantalizing in another sense as it is, the hitherto investigated correlation between language and thought may further lend support to the hypothesis on potent impacts of language on the ways one views the world. Hill and Manheim (1992: 6) claim that “Sapir's phrase *real world* is an ironic reminder that the naturalized world of our everyday experience is no more culturally unmediated than that of any other culture”. This suggests to what degree our conception of the world is likely to be affected by our experience which is ultimately expressed or shared through our language. Also, Stern (1995: 48) notes Wittgenstein’s assumption that “because our language emerged in response to the pragmatic need to communicate about and to control our environment, the precise nature of its relationship to the simple objects must be left an open-ended question", insinuating that semantic nature of "the world" and "worldview" themselves can never be independent of our communicative interactions with our surroundings. In other words, what we refer to through the terms *the world* and *worldview* is subject to variations depending on how we relate the terms to what we conceive as their embodiments. Brown’s point of view regarding the progress of the world in terms of language is intriguing, in this regard, since he claims that human mental power, especially diversity of language, is the product of humans’ constant struggles with their inherent verbal capability some of which were favored or others of which were hampered by their mental power, as can be seen in Greek, Latin and Roman (1967: 25). When it comes to the formation of one’s worldview, it seems to be necessary to take note of Wittgenstein’s understanding of the existentialism about mind and language, for he asserts that one’s thoughts and words rely on not only what is explicitly present before the mind but also the context in which the things take place (Child 2010: 63). Given that one’s thoughts and words tend to incorporate contextual information along with empirical information into their conceptualization of various things, the role of language in the formation of worldview, which is obviously a substantial piece of thought, seems to be self-evident.

The following observations in some languages can be considered in the light of the impact of language on worldview. Sentences have bases to which modifiers are added to create the meaning that the speakers need to convey. Some languages have their idiosyncratic

syntactic structuring system in which modifiers tend to precede modifyees in a sentence. One representative language in which modifiers are usually placed before modifyees is Korean. In contrast, some other languages, notably English, have a system in which modifiers are usually added to modifyees from behind. One exclusive advantage of the former type of language may be the encouragement of the speakers to refine their ideas before actual utterances of them. In the meanwhile, one exclusive downside of this type of language may be that speakers have to start a new sentence when they have to add modifiers in an untimely manner. On the other hand, one big advantage of the latter type of language is that modification is much freer and more flexible than the languages in which modifiers are usually placed before the modifyees. In other words, one exclusive advantage of the latter type is the convenience and flexibility of adding modifiers, which in turn does not require the whole sentence to be started again or the previous utterances to be discarded so as to add new modifiers. In other words, users of the latter type of language are relatively flexible in their attempt to expand the sub-sentence structures without risking undermining the intactness of the sentence structure as a whole. In the meantime, one exclusive disadvantage of this type of language is a high chance of rendering the sentence too verbose.

Given this, it may be intriguing to note whether the thought or perspective of the speakers of the former type of language in which intra-sentence modification is relatively restricted is different from that of the speakers of the latter type of language in which modifiers, especially those that comprise multiple words or relatively complicated structures, are commonly placed after the modifyees, and then to investigate whether the differences, if there are any, have anything to do with this syntactic disparity. To illustrate, the English sentence *I bought a book that was written in the attic of a church by a Spanish priest in the 1700s in a bookstore in the town I visited during the summer break* shows a lot of modifiers that are placed after the modifyees *a book* and *in a bookstore*. A Korean equivalent to this sentence can appear as *I during the summer break I visited the town in a bookstore in the attic of a church in the 1700s by a Spanish priest was written a book bought*. As indicated in the sample sentence of the latter language, the multiple modifiers are all placed before the modifyees *a book* and *in a bookstore*. In the sampled Korean sentence, it is out of the question to add modifiers without perturbing the sentence structure once the modifyees are uttered, given that the speaker's utterance of the modifyees *a book* and *in a bookstore*

completes a sentence. In contrast, the sampled English sentence can show a flexibility of accommodating some more modifiers, maintain its basic sentence structure in such a way as the sentence *I bought a book that was written in the attic of a church by a Spanish priest in the 1700s in a bookstore in the town I visited during the summer break "which was about a week longer than usual"*. Then, does it affect the ways they think and see the world, and can its impact on their thoughts and worldviews be substantiated if it does? Hawkins, using the terms “prepositional languages” and “postpositional languages”, postulates that heavy modifiers tend to be placed after the heads-modifyees-and light modifiers tend to be placed before the head. (1983: 99) What is noteworthy here is that there are some languages in which modifiers are overwhelming placed before the modifyees. Given that one’s utterance, whether it is oral or written, sequentially form a sentence and that the two structurally fundamentally different modification manners obviously require the speakers and writers alike to take different approaches to their sentence-building jobs, it seems to be highly probable that this difference affects certain parts of the mechanism of the formation of their idiosyncratic viewpoints. Given that this is another large subtopic that is closely related to the main topic of this research but is heavily dependent upon a comprehensive study that goes beyond the boundary of the proclaimed topic of the impact of language, especially in the domains of time and space, on thought and worldview, it seems to be more reasonable to suggest a strong possibility that deserves to be hypothesized than delve into it. The speakers of such languages in which modifiers are usually placed before modifyees seem to have much more intense context-oriented inclinations in their communication than those of the opposite kind, which can be easily explained by more energy and attention that are required to process the modifiers. It seems to be tempting to explore if the worldviews of the speakers of such a language as Korean or Japanese are actually affected by their intense context-oriented inclination for which their languages are partially responsible (Libby 2013: 6).

4.4.1 World-perceiving

To concisely define this subcategory of the worldview in question, “world-perceiving” in the discussion of the theory of linguistic relativity in this research indicates our perception of the world that changes and develops by virtue of language (Underhill 2009: 134). As discussed earlier, the way we perceive the world does not remain the same all the time, being vulnerable to various elements we are exposed to or we actually experience in our existence.

Thus, the theory of linguistic relativity posits that language is one of the strongest elements that are behind the mechanism of our changing and developing perception (Pyers & Senghas 2009: 808). Quite a few pieces of the experimental research that focused on the impact of one's mother tongue on one's cognitive inclinations, like one's perception of color, shape or texture, can be primarily categorized into the frame of world-perceiving.

4.4.2 World-conceiving

World conceiving is a concept "for the changing and developing manner in which we draw that world into the realm of thought and form concepts and frameworks to represent things and our experience of the world" (Underhill 2009: 135). In a more everyday term, the range of the world we can think of and think within is proportional to the range of our linguistic capability that can conceptualize it. Given this, from an evolutionist point of view, what happened to or around our primitive ancestors who lacked well-developed languages to conceptualize them were simply passing events that do not actually constitute their world (Underhill 2009: 135). It seems to be true that perception itself can go a long way toward forming the perceiver's world when the objects of perception are literally simple to such an extent that the act of perceiving them is sufficiently the act of understanding them. Also, less obvious it may be, it does not seem to be flawed to say that our world is composed exclusively of what we can conceive with our language, given that our language is at the very core of the mechanism of our conception and that the world is, in a strict sense, what our conception has materialized.

4.4.3 Cultural mindset

Another category of worldview is cultural mindset which is behind the relatively rigid and fixed conception of the world which frames our perception and conception of politics, society, history, behavior, the individual's place in the world and organizing frameworks of social relations (Underhill 2009: 81). Rocher, from his anthropological perspective, defines culture as "a connections of ideas and feelings accepted by the majority of people in a society" (2004: 142). Given that language is an important part of culture, without doubt, and culture is likened to a bridge that links thoughts generated by the speakers of a certain language group, it seems to be worthwhile to consider cultural mindset as a part of worldview in this research.

In his discussion of how cultural mindset embodies itself in the language practices of different language groups, Underhill (2009: 82) states that

> [w]hen groups and generations fail to understand each other though they speak the same language, it is because their cultural mindsets have grown into very different expressions of the world though those expressions are derived from the same world-perceiving and world conceiving which organize the language shared by all groups within their linguistic community.

As he notes, cultural activities involve languages, as one's language is at the very foundation of one's cultural activities. It is tempting to learn how one's language affects one's cultural mindset if its impact on it is taken for granted. If "culture is a system of behaviors and modes that depend on unconsciousness" as Sapir (1956: 10) says, the study of the impact of language on cultural mindset may reveal a lot of things, especially contextual and empirical realities that work together to form a certain group's language.

Immigrants' children who learn the host country's language from an early age, making their capability of using the host country's language surpass their capability of using their mother tongue, show quite a different cultural mindset from those who are raised in the same foreign country whose capability of using their native tongue far surpasses their capability of using the host country's language (Oyserman 2011: 190). Some parents have their children attend schools whose curricula are based primarily upon their mother tongue for various reasons like ethnic pride, provision for their later education, dissatisfaction with the host country's education system and the like (Oyserman 2011: 192). Unable to rule out the possibility that differences in their cultural mindset may be attributed more to other elements than to the impact of language, it may be necessary to pay attention to a relevant research on it. However, at a societal level at the very least, it seems to be obvious that linguistic traditions, along with historical, philosophical and religious traditions, go a long way toward internalizing cultural values in individual levels, not to mention affecting educational or social systems (Oyserman 2011: 195).

There is a piece of intriguing research on the impact of language on cultural mindset and the resultant impact of cultural mindset on various abilities of distinct cultural groups, comprising visual memory, dichotic listening and "incidental recall of spatial location of objects and complex reasoning" (Oyserman 2011: 202-205). One of Oyserman's findings that

is especially noteworthy is that even tiny cues in certain situations can trigger or activate cultural mindsets, whether they are individualistic or collective (2011: 206). Oyserman hypothetically concludes that the structures of individualistic and collective mindsets exist in memory (2011: 206). In addition to this hypothetical conclusion, he argues that one's metacognitive experience of fluency or dysfluency can be determined by whether one is placed in the culturally fitting context or not (2009: 206). The commonality of the phrases *our wife* and *our husband* among the Korean speakers despite the fact that Korea is a monogamous society suggests that language heavily affects cultural mindsets, especially collective mindset in this case. In case a surmise may be raised regarding the possible impact of ethnic homogeneity or cultural unity of Koreans on their language that is on the opposite side of the hypothesis of linguistic relativity, it seems to be necessary to note that a first person singular possessive pronouns *I* is less versatile and adaptable than a first person plural pronoun *we* in terms of its collocative faculty in that it should be accompanied by a postposition to function so that a mellifluous phrase or a sentence can be formed. Without a following postposition, it forms an acoustically-unnatural phrase or a sentence-it sounds bluntly terse- unlike a first person plural pronoun *we* that can be flexibly and seamlessly connected to following nouns without a postposition. To illustrate, in the sentence *You can come to my house tomorrow,* Korean equivalent to *my* is *nae* or *nah-eu* but neither *nae* nor *nah-eu* sounds phonetically smooth when it is pronounced by being connected to the following word. Since Korean language is a phonogram that is based upon phonemes rather than syllables, individual sounds are easy to pronounce, as often as not. However, when the sounds form syllables, their easy pronounceability drastically wanes in many cases. Therefore, their prevalent use of *we, us, our* and *ours* in lieu of *I, my, me* or *mine* even in the situation in which it does not literally make sense can be accounted for. This alternative use of the plural pronoun *we* seems to be behind their idiosyncratic cultural mindset, feeding into their strong collectivist mindset (Millsom 2008: 131). Similarly, Gentner and Goldin (2003: 160) note that English speakers use pronoun ‘he’ or ‘she’ when indicating someone who was introduced earlier unlike the speakers of Turkish, Chinese or Hungarian that have no gendered pronouns. Due to this, according to their claim, different cultural mindsets can form when a speaker whose mother tongue is Turkish, Chinese or Hungarian starts to talk about his or her friend, constantly referring to the person as ‘my friend’, since the listeners whose mother tongue is English may think that the speaker is trying to hide the friend’s gender for whatsoever

reasons (2003: 160).

4.4.4 Personal world

This term is often used for the perception and conception of the world which is not common for everyone but specific to each individual (Underhill 2009: 150). Personal world "designates the individual's own form or version of the mindset he or she adheres to both consciously and unconsciously" (Underhill 2009: 135). Personal world can be differentiable from personal perspective or viewpoint in that it is the range and the dimension of the world itself rather than how one conceives or perceives the world.

What is important here is that the range or the dimension of the world that is specific to individuals tends to be determined by the language they are capable of using or understanding. The assertion Wittgenstein (Martland 1957: 20) made in his thesis "the limit of my language is the limit of my world" tersely epitomizes the abstract entity 'world' that is not simply formed by external factors but crucially affected by internal factors. Martland (1975: 24) explores the above-mentioned quote by Wittgenstein by applying it to the discipline of art, identifying artistic expressions as language of art. He (1975: 29) argues that artists impose their conceptions upon certain world. Metaphorical or abstract as his argument may sound, it deserves to be considered from a psychological point of view. As he insinuates, when a musician composes a musical piece such as a piano sonata or when a poet writes a poem, they start their creative jobs with raw ideas, or inspiration in a nonscientific term, in their brain. He (1975: 41) notes that music pieces and art paintings are languages just as lines in poems are. Though his notion may not be readily acceptable by linguists but be dismissed as a metaphorical analogy or rhetoric, his idea suggests an important point that places Wittgenstein's quote previously introduced in brighter light. Their world is represented through their art works which are, in a strict sense, identical to their artistic expressions, and their artistic expressions are their languages they have at their own disposal. Quite apart from the controversial issue that pivots upon the inclusion of painters' or musicians' artistic expressions that are not word-based into language, the world that is specific to individuals seems to have a lot to do with their language, especially its range, as Wittgenstein claims.

4.4.5 Perspective

One's perspective occupies quite a portion in one's worldview along with the four subcategories. To figure out its delicate nuance from the four afore-mentioned categories, it may be of a good help to take a look at the original meaning of this concept rather than its adaptations that have worked their way into everyday people's lexicon. According to Merriam-Webster Dictionary, perspective refers to the "technique or process of representing on a plane or curved surface the spatial relation of objects as they might appear to the eye" (Perrault 2008: 875). In this respect, perspective can be referred to as a next step that follows one's perceptive or cognitive behavior. In other words, it is the way one interprets what he or she has perceived or conceived. This understanding of the essence of perspective may help validate the claim that "[a]n individual's perspective changes as he or she moves through the world, interacting with others and encountering new and different experiences" (Underhill 2009: 135). What is of particular importance about ‘change' here is that perspective is constantly evolving. Just as the changing of the world, to some extent, fashions our perspective regarding that world, the changing of ourselves that take place along with our adoption of new ideas and novel expressions in the form of language throughout our mental or physical maturation and the accumulation of our experience also alters our perception of the world (Wittgenstein 1974: 43).

In the contemporary society, English as a lingua franca (Seidlhofer 2005: 339) seems to be taken for granted and a lot of pieces of research have been done and are being done on this ‘trend'. Despite the fact that the clout of English as a lingua franca can be found in various elements of the society, it does not seem to be easy to single out its impact on people's perspective since perspective itself involves intricate and complicated mental activities. The new Oxford American dictionary defines perspective as “a way of regarding situations, facts, etc, and judging their relative importance” (Jewell & Abate 2001: 950). Given that this research is concerned with how language affects thought and worldview, it seems to be necessary to narrow down which aspect of English as a lingua franca has something to do with one’s perspective. English as a lingua franca which refers to communication between speakers with different first languages is relatively a recent phenomenon but this term is not the one that has accompanied this phenomenon since its embryonic stage (Seidlhofer 2005: 340). A lot of other terms that correspond to English as a

lingua franca like “English as an international language” (Jenkins 2003: 141), “World Englishes” (Jenkins 2003: 141), “English as a global language” (Crysal 2003: 3), “English as a world language” (Mair 2003: x) have been used as general terms that describe this phenomenon (Seidlhofer 2005: 339). One of the most important considerations that differentiate ‘English as a lingua franca’ from other terms is that English as a lingua franca is value-neutral and has a minimized slanted bias toward the status of English (Seidlhofer 2005: 339). Phillipson who acted, at the grass-root level, mainly in Europe argues that spread of English as an international language has imperialistic aspects in it, insinuating that behind the projected term *English as an international language* and various efforts to generalize it lie the covert stratagems made by those who have a big stake in the unhampered spread or use of English (1992: 65). Provocative and controversial as his claim may be, it presents an important point that concerns the topic of this research. Though the established position of English as a popular communication tool in the global world may not change abruptly due to the denomination that is given to English for this role, coining a new term to describe its role as a global communication tool that does not include any of such words as *world*, *international* or *global* can prevent the imperialistic code Philipson warned against from being embedded in the spread of English among speakers of other languages as their mother tongues. Lingua franca whose etymology is related to Frankish language that represents the convergence of several popular commercial medieval languages such as French, Italian and Arabic is relatively neutral not only in the process of its adoption and in the general public’s recognition of it (Brosch 2015: 72). This may effectively illustrate how even a single phrase affects one’s perspective.

5. Mechanism of linguistic relativity

It may not be so simple, even with the knowledge on it that has been accumulated since Whorf and Sapir's seminal works and technological devices that have been adopted in the field of linguistics, to figure out ‘how' our language influences our overall thought, not to mention our worldview. Notwithstanding our intuition that may hardly negate the correlation between language and thought, especially how the latter is at the disposal of the former, exploring the issue of how the impact of the former on the latter takes place seems to be

another big conundrum in the research concerning the hypothesis of linguistic relativity. It seems to be similar, concerning its demanding attribute, to such an issue as exploring the mechanism of the impact of DNA on one's character with the very idea that DNA significantly affects one's character. Nonetheless, this topic is not only exceptionally intriguing but also invariably fascinating, given that thought and language are two of those that are at the very epicenter of our timeless existential issues and that they form a reciprocal relationship with each other in their roles and functions (Fauconnier 1997: 18). In other words, our thought may be too elusive if we do not have a device to pin it down and express it either in written forms or in spoken forms, and, at the same time, our language, no matter how sophisticated it is, may be too dear for us unless our thought knows how to use it.

Wittgenstein (1974: 43)'s famous remark 'the meaning of a word is its use' suggests one important key to the demanding job of scrutinizing the mechanism of linguistic relativity which, all reliable things considered, is never supposed to be simple enough to understand easily. As he (1974: 44) suggests, usage of a word is dependent upon the context in which it is used, and the context is highly susceptible to various elements in one's surroundings, experiences, perceptions on the spot and other miscellaneous variables that are often different from place to place and from period to period. What is especially noteworthy in this suggestion of his in the light of this research concern is that 'space' and 'time' are often dominant elements in contexts from which other sub-elements tend to ramify (1974: 44). To simply put it, even exactly the same utterances can mean completely different things depending on the contexts and vice versa, due to the mechanism of language, which hence presents an important suggestion that the way language affects thought is prearranged by the way language is used. This is especially noteworthy in that it significantly expands the boundary of linguistic relativity by incorporating into it the fact that not only structural differences of language but also usage differences of language affect one's thought, and thus their worldview. One-dimensional notion that people think differently depending on the language they use seems to be stepping into a new conceptual phase that the way people use language affects their thought differently and, equally importantly, differences in thought derived from different languages they use are found not only in immediate experiences they have in their lives but also in higher-dimensional existential issues they constantly address throughout their lives. Figuring out how language affects our thoughts which give rise to our

behavior may mean that it might be possible for us to change our thoughts and subsequently our behavior the way we want, especially when changing them was persistently hard under other methodological approaches.

Even when we take it for granted 'provisionally' that language definitely impacts the formation of our thought and worldview or, in other words, that we think and interpret the world based on our language, we may hardly feel that our understanding of this 'phenomenon' is sufficient without exploring the mechanism behind this dynamics. Complicated and intricate as it may appear to be, the mechanism can converge on the three hypotheses on "lexico-grammatical features, morpho-grammatical features and rhythmic and phonetic features of language" (Humboldt 1999: xxix). Firstly, lexico-grammatical features are one axis upon which the dynamics between language and thought takes place. In this view, our thought is the product of the combination of words, phrases, clauses or sentences as if a whole complete image of a jigsaw puzzle is a combination of tiny pieces (Humboldt 1999: xxix). Secondly, morpho-grammatical features, morpho-syntactic grammatical features to be more precise, relate the composition and arrangements of words and phrases. As seen earlier in the case of the placement of modifiers, these features seem to be working at a larger scale than lexico-grammatical features in their potential influence on the way the language users think or form their worldview (Humboldt 1999: xxix). Lastly, languages have diverse rhythms and euphonies, and for Humboldt, these are not merely byproducts of language construction, but they play a role in expressing internal mental states (Humboldt 1999: xxix).

Investigating 'how' language affects thought and worldview does seem to be an exacting undertaking that requires meticulously premediated research tools with the consideration of all the possible elements in the suggested mechanisms. However, just as suspected mechanisms behind the impact of language on thought are not unclear at all, studies on them may become increasingly sophisticated, unveiling the mechanisms little by little and thus lending more solid scientific weight to the findings of the recent experimental research on the hypothesis of linguistic relativity to be addressed in the following chapter.

6. Recent experimental research on linguistic relativity

The tenability of linguistic relativity seems to have been enhanced or, maintained at the very least, with the outcomes of various pieces of ongoing research in the related fields that suggest a strong correlation between language and thought, though some of them, like the one on Eskimo words on snow whose invalidity has recently been debunked, might have ended up undermining its tenability (Steckley 2008: 51). This section of the paper, which directly concerns the research question of this paper, is going to embark upon the project of reviewing, comparing and contrasting several noteworthy pieces of relatively recent experimental research in terms of how they differentiate language from thought, what evidence of the validity of the hypothesis of linguistic relativity they claim to have found and how their findings complement or contradict one another. The first consideration of what premise on the distinction between language and thought a researcher has is an invariably important point in any of the research on this hypothesis, despite its contemporariness, given the fact that with the ill-established premise that language and thought are distinguishable from each other, exploring the impact of the former on the latter, not to mention the other way around, may end up becoming fuzzy, possibly undermining the value of every piece of the findings

6.1 Lucy's research

Summarizing the concept of linguistic relativity from the contemporary perspective by claiming that "culture, through language, affects the way in which we think, and especially our classification of the experienced world", Lucy presents several pieces of insight he obtained through his experimental research (1996b: 42). His understanding of the differentiation between language and thought, as indicated in the quote above, may be likened to the one between a prism through which one sees the world and the optical outcomes which are formed by it. His parlance itself seems to show there are hardly any elements of fuzziness in his distinction between language and thought, unlike the early scholars' understandings of it which incorporated vague elements into their discussions or hypotheses to a degree.

Among relatively recent research outcomes that give weight to the impact of language on our perception is his research conducted in 1996 regarding the effects of certain differences of morpho-syntactic structures between English and Yucatec-a Mayan language

spoken in the Yucatán Peninsula and northern Belizeon-on the perception of each language group speakers (Lucy 1996b: 37). Hardly uncontroversial as it is, his findings can go a long way toward making up for a possible limitation of Hurford (2012: 32)'s syntactic scheme hypothesis that specifies the role of language in thought expansion. Hurford (2012: 36) embarked upon Chomsky's seminal work on generative grammar through his experiment on birds, claiming that even simple chirps made by birds have a clear syntactic organization. His experiment can be linked to the hypothesis of linguistic relativity in world perceiving given that the logic of generative grammar (Chomsky 2002: 13), can be stretched to the point that perception is related to grammar (Skehan 1998: 29). In other words, if grammar is inherent even in the primitive animal communication that depends mainly on visual or auditory cues, then different syntactic structures in grammatical patterns of different languages can strongly suggest the possibility of different perceptions of the world based on different grammars in diverse languages (Hurford 2012: 170). However, given that Hurford did not address this possibility overtly and his research did not proceed further to validate this possibility as a compelling hypothesis, it seems to be too early to suppose the correlation between the morphosyntactic grammar and perception. Though Hurford's claim (2012: 39) that massive stores of symbols and constructions lead to forms and functions that together bring about syntax-lexicon continuum that in turn creates pre-syntactic properties is intellectually inspiring enough, it seems to be inevitable for the hypothesis to be encountered with some challenges when it needs to account for the variations of human language. However, one's efforts to trace back the origin of grammar can be enhanced with one's knowledge on how language affects one's thought. As Hurford (2012: 596) investigates, "a transition from proposition-expressing one- word utterances to two-word concatenations" through which one can convey more complicated messages can be considered an actual embryonic stage of the birth of grammar. What is noteworthy here is that every step in the evolution of language itself, not to mention that of the formation of grammar, seems to go in tandem with its impact on the language users' thought (Hurford 2012: 539). To be more specific, every step involved in the formation of a certain word, its circulation among the members of the society and concatenations influences the users' thought, feeding back into the subsequent stages. Lucy's research can be groundbreaking in this respect since his research findings can contribute to figuring out how even a single word, due to the code embedded in it, can trigger different cognitions, thoughts and worldviews. Lucy (1996b: 39) states that

> [c]ertain properties of a given language have consequences for patterns of thinking about reality. […] they are then linked by two relations: (1) language embodies a particular interpretation of reality and (2) these language interpretations can influence thought about that reality.

He (1996b: 40) noted that the quantificational unit presupposed by English nouns is frequently the shape of the object, thus leading the use of these English lexical items to routinely draw attention to the shape of a referent as the basis for incorporating it under some lexical label and assigning it a number value. He also noted that Yucatec nouns have elements that are in contrast to English nouns, since Yucatec nouns that refer to the equivalent objects hardly specify quantificational unit, "fairly routinely drawing attention to the material composition of the referent as the basis for the same purpose instead" (1996b: 40). Lucy (1996b: 62) conducted his research, assuming that if those two contrasting linguistic patterns affect their overall cognitive sensitivity to the different types of similar objects, it can be hypothetically concluded that:

> Yucatec speakers should attend relatively more to the material composition of stable objects (and less to their shape), whereas English speakers should attend relatively less to the material composition of stable objects (and more to their shape).

In this experiment, he (1996b: 41) showed twelve speakers in each of the two groups "fifteen triads of naturally occurring objects such as combs, matchsticks and spools". Each triad was composed of one original pivot object along with one alternate object whose 'shape' is the same as the pivot object and the other alternate object whose 'material' is the same as the pivot (1996b: 41). As the experiment started, upon showing the participants in each language group a pivot object, a plastic comb with a handle, and then asked them one by one whether it was more similar to the first alternate object, a wooden comb with a handle or more similar to the second alternate object, a plastic comb without a handle, for example (1996b: 41). He (1996b: 41) expected that English speakers would choose the 1st alternate object, the wooden comb with a handle, which represents the same shape and different material. To the contrary, the Yucatec speakers, he expected, would choose the 2nd alternate object, the comb with the same material but without a handle (1996b: 66). Exposing the subjects to a lot of other triads he had prepared by controlling, in similar modes, their "size, color, function, wholeness, and familiarity", Lucy continuously compared the two groups throughout the experiment (1996b: 66). He observed that the participants in the adult English speaking group chose "the material

alternate" only "23% of the time" whereas the participants in the adult Yucatec speaking group opted for it "61% of the time" (1996b: 66).

6.1.1 Lucy's research findings

Through the analysis of the experiment he did to English speakers and Yucatec speakers, he (1996b: 67) claims that material orientation of the former group and shape orientation of the latter group, along with different syntactic arrangements of the relevant words, show the impact of language on their cognitive inclination underlying distinct syntactic evolution of the two languages in question. According to Lucy (1996b: 67), the effects of language on thought can be explored in three aspects. The 1st of this issue is the so-called semiotic relativity that is related to how speaking any natural language at all may influence thinking. In other words, how symbolic components of language transform thinking in certain ways (Lucy 1996b: 67). He notes that this will make it possible for us to compare humans that make varied use of them for a good many purposes with other species that lack these symbolic elements in their communication (2004: 2). The 2nd one is how structural differences of language, namely morpho-syntactic configurations in language, which is at the center of the issue that the hypothesis of linguistic relativity has traditionally addressed, have an impact on one's thought (2004: 2). Thirdly, functional level consideration concerns whether using language in a particular way (e.g. schooled, scientific) may influence thinking (2004: 2). Niemeier(2000: x) summarizes Lucy's propositions introduced above by arguing that

> [t]he question is whether verbal discursive practices affect some aspects of thinking either by modulating structural comprehension or by directly influencing the interpretation of interactional context. If so, we can speak of a functional relativity of thought with respect to speakers using language differently. This level has been of particular interest during the second half of the twentieth century with the increasing interest in discourse-level analyses of language and can, therefore, be conveniently referred to as discursive relativity

Here, she (2000: x) notes that the issue of linguistic relativity converges on whether the impact of verbal discursive practices on thought arises through regulating structural comprehension or interfering in interactional context. As noted by her, linguistic relativity seems to take place at the level of discourse at large, suggesting the possibility of reducing the conventional term to "discursive relativity" (2000: x). What is not to be overlooked in

Lucy's proposition is that the three types of language influence on thought he hypothesizes are not functionally independent but intrinsically interdependent to a noteworthy degree (1997: 305). This is arguably an important premise in the hypothesis of linguistic relativity in that investigations of the impact of language on thought should not be rigidly fragmentary at least in terms of their concern with what elements are involved in the formation of the impact in question.

6.1.2 Evaluative consideration of the conclusion of Lucy's research

As mentioned in the preceding chapter, Lucy's finding indicates that Yucatec speakers may pay more attention to the material composition of certain items, attending less to their shape, whereas English speakers may pay less attention to the material composition of certain items, attending more to their shape. He (1996b: 66) presents the hypothetical conclusion that material-orientation of Yucatec speakers and shape-orientation of the English speakers, along with different syntactic arrangements of the relevant words, show the impact of language on their cognitive inclination underlying distinct syntactic evolution of the two languages. What is noteworthy in the light of this research concern is if the observed impact of the imbedded meaning of a certain word on the speakers' cognitive inclination is substantial enough to be considered to go beyond the boundary of cognitive response and suggest the impact of language on 'thought'.

His research finding is meaningful in that it made it possible to assume that even lexical differences as well as structural differences can have a substantive impact on one's cognitive ability which is definitely a part of thought. To generalize his hypothetical conclusion, it seems to be necessary to compare different language groups in the civilized worlds, as we can hardly preclude the possibility that different cognitive inclinations between Yucaktec speakers and English speakers, which are derived largely from disparities in their cultural traits that are non-linguistic, may be responsible for their different reactions to the word in question in the first place. This may remind us of Pinker's parody regarding the circularity of Whorfian notion "They speak differently so they must think differently. How do we know that they think differently? Just listen to the way they speak!" (Pinker 1994: 61). If a certain portion in each of the two language groups' brain that is highly sensitive to this cognitive stimulus is distinctly developed for any reasons, it may be difficult to draw the

conclusion that material-orientedness of Yucatec speakers and shape-orientedness of English speakers are attributed more to the lexical differences with different semantic codes embedded in them than to the neurological differences predisposed to exhibit them when faced with words with that elements.

One method, though it might not be quite feasible with the contemporary medical technology at the moment, to diagnose the afore-mentioned potential possibility may be to pre-scan the brains of the speakers of both groups so that one can see neurological differences between the two groups, if there are any, and then to monitor if the suggested differences of cognitive inclinations can be observed in brain-scan as well. If different cognitive inclinations triggered by equivalents words that different language speakers in civilized worlds use are measured in brain scan, then it may be viable for the outcome of this research of Lucy's to give weight to the hypothesis of linguistic relativity as a solid piece of evidence to validate it.

6.2 Boroditsky's research

Boroditsky (2001: 2)'s research approach to the hypothesis of linguistic relativity seems to be most noteworthy in that she endeavored to minimize the potential loophole in her findings by taking into account what was lacking in Lucy's research. To be more specific, her research presents a piece of methodology that is different from Lucy's, through which potential influence of other elements than linguistic ones on the outcomes of the research can possibly be filtered out, which in turn facilitates the obtainment of more reliable research findings. The way she differentiates language from thought can be found in her consideration of the hypothetical conclusion of the latest research findings that "language is part and parcel of many more aspects of thought than scientists had previously realized " (Boroditsky 2001: 21-22). In this research, she understands language as the entity that goes far beyond the boundary of thought despite the fact that it has some overlapping elements with it (2011: 3). Her concession of the existence of overlapping elements between language and thought seems to be essential in reviewing the outcomes of contemporary experimental research on the hypothesis of linguistic relativity in that this concession provides an insight into what to consider and what not to consider as possible evidence of the impact of language on thought (Boroditsky 2001: 3). As research techniques and technologies are expected to become increasingly sophisticated, the outcomes may become increasingly delicate and, at times,

intricate. Given this, paying exclusive attention to the elements of language that are, without doubt, far out of the boundary of thought may make it possible to maximize the potential validness of the findings and subsequent conclusions to be drawn from them.

Boroditsky's research is intriguing in that she attempted to answer her research questions "Does the fact that languages differ mean that people who speak different languages think about the world differently? Does learning new languages change the way one thinks? Do polyglots think differently when speaking different languages?" by conducting a series of three pieces of experimental research (2001: 1-2). In other words, this serial research of hers tried to overcome the possible limitations of the pieces of hither-to-made research on linguistic relativity. She summarizes the problems of those pieces of experimental research by claiming that the first problem of those studies is that they "cannot tell us whether experience with a language affects language-independent thought such as thought for other languages or thought in nonlinguistic tasks" (2001: 2). She points out that the second problem of such studies is that one can hardly be sure that the stimuli and instructions used in the comparative studies of different languages are truly the same in the compared languages (2001: 3). Lastly, she indicates that, even regarding nonlinguistic tasks like classifying things or making similarity judgments, the tasks themselves are so explicit that participants may be inclined to choose a certain strategy for the task at hand (2001: 3). By paying attention to the fact that most cultures use spatial metaphors to conceptualize time, she tries to examine whether different ways of discussing time can lead to different ways of conceptualizing it (2001: 4).

In this experiment, she pays attention to whether the different uses of spatial metaphors, predominantly horizontal in English speakers while both horizontal and vertical in Mandarin speakers, have long-term implications or short-terms implications in their impact on the thought of the speakers of both languages (2001: 8). In this experiment, the participants were asked to respond to true or false priming questions that are embedded with spatial scenarios consisting of a picture and a sentence description. One of the two scenarios that she dubbed "ego-moving frame of reference" provided an illustration in which a human figure is moving toward the object *M* placed next to him with the sentence "*M* is in front of me" below the illustration, for example (2001: 8). The other scenario that she dubbed "the object-moving frame of reference" provided an illustration in which the object X is placed

next to the object M moving toward it with the sentence "X is in front of M" below the illustration, for example (2001: 8). In order to "map onto (and bias the use of) the ego-moving and time-moving perspectives in time, respectively", she made sure that half of the priming questions depict motion to the left and the other half to the right and that half of the questions were 'true' and half were 'false' (2001: 8-10). In addition to rendering all the objects frontless and vertically symmetrical, she made sure that the objects in the ego-moving primes look stationary without mobility, like trees, and that the objects in the object-moving primes are round or wheeled ones with mobility, like cars (2001: 8-10). Immediately after being subject to the series of priming questions, the subjects were asked to read an ambiguous temporal sentence like "Next Wednesday's meeting has been moved forward two days" and then to indicate to which day the meeting had been rescheduled (2001: 8-10). However, she had the subjects in the control group respond to the above target sentence without being exposed to such priming questions.

Her 2nd experiment aimed at further testing the relationship between language experience and patterns in thinking (2001: 10-12). To study the extent and the ways learning new languages influences one's way of thinking, she tested Mandarin–English bilinguals in similar ways to the 1st experiment. All of the participants in this experiment were Mandarin–English bilinguals whose mother tongue is Mandarin. In order to facilitate the assessment of the effects of second-language learning on thought, all the participants in this experiment were chosen to vary much more in how early or late in life they started learning English than did the participants in the 1st experiment (2001: 10-12). She notes that if one's acquisition of new languages does change the way he or she thinks, then the participants who learned English relatively early or had more exposure to English most likely show less of a 'Mandarin' bias to think about time vertically (2001: 10-12).

Her 3rd experiment was done by making native English speakers learn to use "vertical spatial terms (above, below, higher than, and lower than) to talk about time" (2001: 17). For example, they learned to say that ''cars were invented above fax machines'' and that ''Wednesday is lower than Tuesday'' (2001: 17). The use of the vertical terms *above/below* and *higher than/lower than* in this training was similar to the use of *sha`ng* and *xia`* in Mandarin which mean 'up' and 'down' respectively (2001: 17). In this training, an event that took place earlier than another was always described to be *above* or *higher* than another event

and an event that took place later than another was always described to be *below* or *lower* than its counterpart so that the English speakers' habit of thinking about time horizontally can be affected (2001: 17). In a technical sense, she aimed at embedding the vertical metaphor that was observed in Mandarin speakers in English speakers' memory (2001: 16). According to her, "If it is indeed language (and not other cultural factors) that led to the differences between English and Mandarin speakers in Experiment 1, then the ''Mandarin'' linguistic training given to English speakers in Experiment 3 should make their results look more like those of Mandarin speakers than those of English speakers." (2001: 17)

6.2.1 Boroditsky's research findings

Through the 1st of the serial experiment, she concludes that native English and native Mandarin speakers think differently about time despite the fact that the test was conducted in English (2001: 12). She states that "English speakers were faster to verify that *March comes earlier than April* after horizontal primes than after vertical primes" and "Mandarin speakers were faster to verify that *March comes earlier than April* after vertical primes than after horizontal primes" (2001: 12). She concludes that "this habit of thinking about time horizontally was predicted by the preponderance of horizontal spatial metaphors used to talk about time in English" and vice versa (2001: 12). According to her conclusion, habits in language seem to encourage habits in thought since Mandarin speakers manifested vertical bias even in their usage of English (2001: 12). One's native language appears to exert a strong influence over how one thinks about abstract domains like time. She claims that Mandarin speakers relied on their mother tongue's way of thinking about time even in their utterances of English sentences. Through the analysis of the way in which Mandarin speakers interpreted time vertically even in their utterance of such a sentence as *March comes earlier than April*, she (2001: 12) argues that "the fact that vertical terms are commonly used to talk about time predicts that Mandarin speakers would find it more natural to construct a vertical time line when thinking about purely temporal relations. English speakers were more likely to think about time horizontally because horizontal spatial terms predominate in English temporal descriptions" (2001: 18-19).

Through the 2nd of the serial experiment, she concludes that Mandarin speakers' inclination of interpreting time as a vertical entity had a lot to do with how late in life they

started to learn English (2001: 18-19). Also, she noted that Mandarin speakers' vertical bias regarding the interpretation of time was independent of the period of time in which they were exposed to English. She claims that their propensity for interpreting time as a vertically-moving entity has more to do with their exposure to their mother tongue than with English (2001: 20). She calls this predilection for the vertical or horizontal interpretation of time "the acquisition of semantic biases" and says it decreases with the onset of the age at which second-language exposure begins and that it is susceptible to the same variables that acquiring basic language skills tend to involve (2001: 20).

Through the 3rd of the serial experiment in which English speakers who had been trained to talk about time using vertical terms showed a pattern of results very similar to that of Mandarin speakers, she concludes that, even without the influences of cultural differences, differences in the ways to describe things result in differences in the ways to think about those things (2001: 20). Through this last part of the experiment, she is convinced that the outcomes of the 1st part of the experiment are attributed more to differences in language than to other cultural differences. By interpreting the outcome of this experiment as an indication that an acquired way of discussing a familiar domain can be linked to an acquired way of thinking about that domain, she strongly argues for the claim that language underlies habitual thought in some cases (2001: 20).

The ultimate hypothetical conclusion she reached through the series of this experimental research is that "language can be a powerful tool for shaping abstract thought. When sensory information is scarce or inconclusive (as with the direction of motion of time), languages may play the most important role in shaping how their speakers think" (2001: 20). Her conclusion provides important suggestions to the concerns of this research in that the abstract categories of thought such as temporal ones to which she paid attention seem to lie at the very core of one's thought that this paper is concerned with.

6.2.2 Evaluative consideration of the conclusion of Boroditsky's research

It seems to be all but obvious that her serial research done in 2001 overcame the suggested shortcomings of the previously-done experimental studies that do not give sufficient weight to the hypothesis of linguistic relativity due mostly to the possibility of the impact of the variables on the outcomes of their research.

Her research is meaningful in particular in that it was done to figure out the impact of language on thought that goes beyond the boundary of simple cognition and then touches the issues of time and space that deserve to be connected to thought in a true sense. Unlike Lucy's research, her research focused on two major language groups that account for large slices of global population. Also, unlike Lucy's research that was focused on lexical items that are mostly confined to simple perceptions, hers focused on one of the abstract categories that are closely related to real thoughts in a sensible meaning. In other words, her research findings do seem to herald the worthwhile resurgence of academic concern with the hypothesis of linguistic relativity. Thanks to those approaches she took, feasibility of the generalization of the conclusions of her findings, not to speak of the validation of her findings, may gain a stronger impetus than that of Lucy's. This research of hers deserves to be credited with elevating academia's concern with the hypothesis in question from as the object to be validated to as the object to be corroborated.

One important question not to be overlooked seems to be what is responsible for the vertical interpretation of time among Mandarin speakers and horizontal interpretation of time among English speakers. If the causes of their different interpretations of time have more to do with non-linguistic elements than with linguistic elements, then the implications of her research findings may become more complicated, given the fact that conclusion may have to be drawn again with the consideration of the parameters, whether non-linguistic or linguistic. To illustrate, traditionally Mandarin characters have been arranged vertically to form phrases, clauses or sentences whereas English alphabets have usually been arranged horizontally for the same purposes. If these different modes of the arrangements of the characters or alphabets are at the very core of their disparate interpretations of time, which, obviously, are not purely linguistic elements, then each language group speakers' idiosyncratic interpretation of time as either a vertical one or a horizontal one may be considered to be only partly attributed to its language, even though validity of her findings may invariably hold. She briefly mentions that such a non-linguistic cultural element as writing direction was excluded through this part of the experiment (2001: 16). However, if the afore-mentioned non-linguistic element is deeply embedded in the ways the speakers of both language groups viewed time, it may be hard to generalize the outcomes of the research. The 2nd part of the serial experiment was done exclusively to Madarin-English bilinguals. If English-Mandarin bilinguals could be tested in

the same manners, her conclusion might be able to garner a stronger impetus, given that the possibilities of other cultural influences than linguistic elements on their interpretation of time can be more legitimately ruled out through that additional test. Also, if she comes across two language groups whose cultural disparities are marginal but whose drastically different interpretations of certain abstract issues are suspected to be attributed to their language differences, then it may be much more viable for her to rule out the possibility that the different language groups' different interpretations of certain abstract issues are attributed to their cultural differences that are not linguistic anyhow.

6.3 Pica et al's research

Pica et al's intriguing experimental research done in 2004 attempted at figuring out, by paying attention to Mundurukú, an Amazonian language with a very limited number of numeric lexicon, whether language makes it possible for one to count numbers or it is possible for one to count numbers without the help of languages (2004: 499). It seems to be necessary to consider, at this point, how they conceptualized the distinction between language and thought before starting the review of their research, as done in the reviews of Lucy's research and those of Boroditsky's research alike. Though Pica et al did not clarify how they differentiate language from thought, the experiment itself seems to manifest that their conceptualization of both language and thought is relatively broad. To be more specific, they incorporated numerals into the range of language and subsequently the activity of counting into the range of thought. In this regard, there does not seem to be any fuzziness in their differentiation between language and thought. Rather, their experiment may make up for the findings of the two pieces of research introduced earlier, firstly in that they expanded the boundary of lexical items to numerals and secondly in that they focused on not abstract categories but concrete ones, both of which in turn suggest how their research can add another piece of insight into the hypothesis of linguistic relativity.

Pica et al embarked on their research, intrigued by the fact that Mundurukú speakers could maneuver large approximate numbers despite the fact that they lacked numeric lexicon that is capable of indicating numbers that are bigger than five (2004: 499). Motivated by Mundurukú speakers' apparently atypical ability of quasi-calculation with no aid of language, they set out to conduct an interesting experiment on the relation between language and

calculation, which obviously belongs to the concern of the proponents of the hypothesis of linguistic relativity (2004: 499). They presented the premise that though it might be ideal to take comparative approaches to the two groups one of which is composed of the members deprived of numeric learning in the first place and the other of which is composed of the members exposed to numeric learning, they seemed to have had no other choice than to select a language group whose numeric system is so rudimentary that it is equivalent to its absence, due to ethical issues involved in the ideal experiment (2004: 501). Pica et al also noted the fact that Mundurukú speakers used copious expressions that vary in terms of the extent of precision expected and achieved, from such short phrases as "more than one hand", "two hands" and "some toes" to such long phrases as "all the fingers of the hands and then some more" (2004: 502). Pica et al noted how certain Mundurukú words are actually used to process numeric data (2004: 502):

> The words for *three* and *four* are polymorphemic: *ebapũg*=2+1, *ebadipdip*=2+1+1, where *eba* means *your (two) arms*. The words for *three* and *four* are polymorphemic: *ebapũg*=2+1, *ebadipdip*=2+1+1, where *eba* means *your (two) arms*. This possibly reflects an earlier base-2 system common in Tupi languages. Above *five*, there was little consistency in language use, with no word or expression representing more than 30% of productions to a given target number. Participants relied on approximate quantifiers such as *few* (adesũ), *many* (ade), or *a small quantity* (bũrũmaku)

To investigate whether numeric concepts are contingent upon the availability of number words, Pica et al firstly paid attention to whether Mundurukú speakers have a sense of approximate numbers (2004: 499). They posited that if Mundurukú speakers have a sense of approximate numbers, they may be able to process numbers non-verbally beyond the range of their number words (2004: 500). Also, they (2004: 500) noted that if they lack a sense of approximate numbers, Mundurukú speakers' performance in this task may be at chance level. They presented number comparison tasks in which the participants were given two sets of up to 80 dots and then were asked to indicate the more numerous set, so as to investigate Mundurukú speakers' performance in approximate operation with large numbers (2004: 501).

Next, they used a non-symbolic version of approximate addition task which they deemed to be independent of languages and presented simple animations illustrating a physical addition of two large sets of dots into a can (2004: 502). The participants were asked to approximate the results and compare them with the third set numbers (2004: 502).

Lastly, they attempted to see if Mundurukú speakers can manipulate exact numbers based on Weber's law that "outside the language system, numbers can only be represented approximately, with an internal uncertainty that increases with number" (2004: 503). Predicting that they may fail to process the tasks that require them to manipulate exact numbers, they used an exact subtraction task in which the subjects were asked to predict the outcome of a subtraction of a set of dots from an initial set of dots ranging from two to eight (2004: 503). They made sure that the operands are relatively large, ranging between four and six while the remaining numbers of dots were small enough for the subjects to name (2004: 503).

6.3.1 Pica et al's research findings

In this research, Pica et al found that though Mundurukú speakers and French control group speakers did not show much difference in their abilities to approximate numbers up to eighty-that were presented to them in the form of dots-despite the fact that Mundurukú speakers had the numerical naming range that is only maximum five-, their differences were noticeably significant in their abilities in apprehending exact numbers (2004: 503). According to Pica et al (2004: 503), Mundurukú speakers are capable of mentally representing very large numeric data of up to 80 dots, far beyond their naming range, and spontaneously applying such concepts as addition, subtraction and comparison to their approximate representations (2004: 503). They say the capability of numeric approximation is known to be possessed by monolingual adults and young children without any formal learning of arithmetic. What is noteworthy here is that numeric approximation is a basic competence that is not only independent of language but also universally available even to preverbal infants and quite a few non-human species (Pica et al 2004: 503).

However, they say, in their explanation of a possible reason for Mundurukú speakers' failure of apprehending exact numbers, that the limited availability of numeric names for them is not directly responsible for their failure of creating mental representations of exact numbers. They argue that Mundurukú speakers' inability of exact calculation is attributed to the lack of a counting sequence of numerals in their language (2004: 503). They point out the fact that Western children, by the time they reach the age of three, exhibit a rather abrupt shift in their ways of processing numbers from approximating to counting as they suddenly figure

out that each count word indicates a precise quantity (2004: 503). As compared to Western children, they argue, "this crystallization of discrete numbers out of an initially approximate continuum of numerical magnitudes does not seem to occur in the Mundurukú" (2004: 503)

Also, they (2004: 503) argue that despite some Mundurukú speakers' apparent possession of the basic ability to count on their fingers, Mundurukú participants rarely depended on this ability throughout their experiment. They (2004: 503) say that counting done through language, "by requiring an exact one-to-one pairing of objects with the sequence of numerals", functions to conceptually integrate the ability of dealing with the approximate number representation into the ability of exerting the discrete object representation. In this regard, according to them (2004: 503), Mundurukú speakers were far below par with the French control group speakers in terms of fast apprehension of exact numbers. Hence, Pica et al (2004: 503) draw a hypothetical conclusion that the ability of approximating numbers is independent of language while that of exactly calculating numbers is available only by virtue of language. Along with this hypothetical conclusion, they assert that "language plays a special role in the emergence of exact arithmetic during child development" (2004: 503).

6.3.2 Evaluative consideration of the conclusion of Pica et al's research

Above all, this research is intriguing in that it was done to figure out the correlation between language involving numeric lexicon along with sequence and thought involving numeric approximating along with calculating. It may be exceptionally encouraging for linguists to be reaffirmed that behind the state-of-the-art technological advances built on mathematics lies the sophistication of language involved in mathematics.

The findings of their research, though, may not be exempt from the skeptical assessment by the opponents of the hypothesis of linguistic relativity in that the two compared language groups seem to have quite a few variables that are not easy to be kept uniform. In this regard, it seems to be necessary to compare the two similar cultural groups that use disparate language systems, including the epistemological aspects of the numeric lexicon and the sequential foundations of the quantum of the numeric lexicon, that involve calculating. Upon obtaining similar findings in our comparative research on two different language groups with similar cultures, whose numeric language systems are significantly

different, we may be able to corroborate the validity of their findings in the light of the hypothesis of linguistic relativity, thus able to say that differences of the languages that engage in calculation lead to differences of mental representations involved in the calculation, which accounts for an important part in our thought.

7. Discontinuous classification and thought

This chapter is going to borrow an insight from other disciplines than linguistics with a view to expanding linguistic perspective regarding the hypothesis of linguistic relativity, given that experimental research on this hypothesis is not just a matter of how to investigate differences in language that are deemed to be responsible for differences in thought but also a matter of where to get inspiration for the necessary insight into this elusive hypothesis. In this chapter, instead of presenting pieces of the experimental research that were actually done, I am going to present my notion on several pieces of feasible research projects, some of which are multidisciplinary, to be taken into account in the light of the hypothesis of linguistic relativity. To preclude the possibility of the coverage of this topic from becoming discursively broad, I am going to confine the content of this chapter to the issues that are closely related to the domains of time and space and then have it illuminated from the viewpoint of linguistics with inspirational insights borrowed from other disciplines, especially anthropology. Also, given that the issue of discontinuous classification which is worth being linked to linguistics does not have much coverage in other noteworthy scholars' works than Richard Dawkins' and that his coverage of this issue is tantalizing to quite a degree from the linguistic perspective, this chapter is going to delve into this issue with almost exclusive reference to Dawkins who tends to be classified as an ethologist or an evolutionary biologist.

As discussed earlier time and again, the virtue of language in terms of its exclusive power of pinning down abstract things and visualizing elusive things can work as a double-edged sword in many cases. One illustrative case is “discontinuous classification” in which language classifies things with discontinuous gradients like numeric figures or alphabetical grading (Dawkins 2011: 3). Generated due more to the rationales of expediency, practicality and fairness than to the rationales of precision and exactness, discontinuous classification has

inherent harms that are not immediately conspicuous despite its lurking hazard that can be far-reaching in many sectors of our life, according to Dawkins (2011: 5). Dawkins uses the metonymical expression "tyranny" to refer to the potentially negative aspects of discontinuous classification (2011: 5). Though this issue may appear to go beyond the boundary of linguistic concerns with the hypothesis of linguistic relativity at a glance, it is, in actuality, what lies at the center of the hypothesis in question as an illustrative case in which the impact of language on thought or worldview is more vivid and grave than other ways it is known to be. Dawkins addresses this issue-which is linguistic rather than biological-with an insight he obtained through his anthropological and biological studies. He argues that "our strange need for dividing lines, black-and-white answers and absolute definitions leads to unhelpful distortions of reality" (2011: 5). He further contends that "if we could accept life's natural grey areas, we would be far better able to calculate risk and comprehend the world we inhabit" (2011: 5). Too metaphysical and contemplative as his remark on the possible negativity of discontinuous classification may be considered, perspectives from his discipline are extraordinarily noteworthy and valuable given that they allow us to scrutinize thorny linguistic issues like the one this research is concerned with not only from a different angle but also from outside the possibly rigid and hidebound framework. He (2011: 6) asserts that "our language is ill-equipped to deal with a continuum of intermediates", favoring setting demarcations when dealing with such an issue as whether a 16-cell human embryo is a human or not a human, which in turn gives rise to a potent determinant in the issue of abortion. According to him, despite the fact that personhood never pops into existence at any one moment but gradually matures, we have no hesitation in classifying it with such terms as embryo, fetus, infant, child, adolescent, adult and senior (Dawkins 2011: 6). Rather visceral as this illustration may sound, the cost of this sort of classification arguably becomes a seed for discrimination, bias, prejudice and, most seriously, distortion of reality, according to his argument (2011: 7). Due to the gregariousness of human ancestry that still remains in modern humans' DNA, which is also described as humans as social animals, humans are inclined to favor grouping themselves and classifying things that are directly related to them (Dawkins 2011: 11). Simultaneously, it seems that they tend to be sensitive to the classification of themselves and of the things that they consider part of themselves. Also, Dawkins (2011: 11) insinuates that, especially when data obtained by grouping are necessary for certain tasks, we humans tend to apply the methodology of discontinuous classification, which often entails

grouping of things. His insight into the issue of discontinuous classification does seem to provide various pieces of intellectually stimulating inspiration for linguists. However, since this paper is concerned mainly with how our languages that describe temporal and spatial issues condition our thought and worldview, I am going to refer only to the discontinuous classifications that are related to the language concerning the issues of time and space.

To delve into the issue of discontinuous classification linguistically to a sufficient degree, we need to clarify presumptions necessary to get this issue to be scrutinized. Fortunately at least for the sake of this issue, human languages are not identical; they differ morphologically, lexically, phonologically or semantically from each other in many elements. If it is possible to figure out how different languages with different modes of discontinuous classification in dealing with the common objects lead to different judgment, interpretation or perspective regarding the same phenomenon, Dawkins' hypothesis that potentially deleterious discontinuous mind is caused by discontinuous classification for which language is responsible may be able to lend a viable research topic to those who are concerned with the hypothesis of linguistic relativity. Discontinuous classification in continuous framework seems to be ubiquitous, as a matter of fact. From history to geography to ethnicity, the list may go literally ad infinitum. Following are several examples of discontinuous classification whose cues can be seriously considered in the light of the hypothesis of linguistic relativity.

Firstly, geographic, demographic and even climatic differences, as a matter of course, affect time-related language, and, at the same time, variations of temporal language affect people's thought in return, resulting in different perspectives on certain important issues (Boroditsky 2008: 591). To illustrate, the year '1999', which is called the last day of the 20th century by civilized cultures under the discontinuous classification of their common history, is nothing but a certain point in an abstract concept of time that our cultures devised in reference to the two physical elements of motion and force. However, due simply and apparently to the very attribute that it is the last number within a piece of timeframe that is rendered by this discontinuous classification, too many irrational thoughts had been spawned until its advent, regardless of the fact that some of which are interpreted to have been positive and others of which are deemed to have been at the exact opposite end of the spectrum or, at least plain meaningless (Plante 2013: 21). Suffice it to say that such things as apocalyptic suicide has not been reported among the uncivilized ethnic groups that do not depend on

discontinuous classification of temporal issues they have in life (Plante 2013: 22). In this regard, it may be feasible to conduct research on certain linguistic groups that do not rely on discontinuous numerical devices in their description of temporal issues. Their responses can be compared with those given by English speakers, for example, and then be juxtaposed with the findings of the subsequent research in which the former group members are tested again after being subjected to the training of discontinuous classification and the latter group members are tested again after being subjected to the training of continuous classification.

Next, humans are known to be inherently hostile to differences (Dawkins 2011: 11). From this perspective, allowing them to use language arbitrarily to classify continuous phenomena or substances in discontinuous framework despite the fact that its need is more of expediency may be tantamount to abusing language the way that it sows the seeds of conflicts. In many cases, to minimize any potential antipathy to be caused by discontinuous classification of continuous phenomena, classifiers seem to resort to euphemisms. A good example may be the classification of nations based on their economic index, like developed nations, developing nations and underdeveloped nations, which does not seem to have caused serious antipathy. However, the paucity of negative attitude toward this may have more to do with the nature of the issue than to the appropriateness of the well-employed euphemism. The term ‘development’ itself is most likely not an issue that directly arouses one’s psychological instinct (Dawkins 2011: 11). However, the classification of ethnicity or social class does seem to be quite a sensitive issue, given that it concerns human dignity (Dawkins 2011: 11). As big-brained apes in a strict sense, modern humans are still living within the boundary of ecological environment (Dawkins 2012: 12). Dawkins notes that as gregarious species, apes are exclusive to outsiders and even cruelly hostile to differences (2011: 11). What is especially noteworthy, in this regard, is that, when classification is necessary, it is often done by those who are dominant. Therefore, even euphemism is biased toward pleasing those who are dominant or those who have the de facto power, not biased toward pleasing everyone involved. Given that discontinuous classification rendered by language can affect our mentality, causing discontinuous mind (Dawkins 2012: 14), we may feel it necessary to pay attention to the diversity of languages that may have differing degree of discontinuous classification at least in some common issues. One feasible research, in this respect, to study the impact of the language that discontinuously classifies a temporal or spatial issue with

euphemisms or malphemisms can be the one that pays attention to a comparative study between a language group that does not depend on euphemistic or malphemistic discontinuous classification regarding such issues as economic status of a region or a country and a language group that does. Pieces of the experimental research that compare, regarding the same issues, two language groups, one of which marginally depends on discontinuous classification and the other of which heavily depends on discontinuous classification, may suggest how our thought is affected by discontinuous classification that is almost ubiquitous in the languages used in the civilized world. The insight that is borrowed from the afore-mentioned disciplines, then, may benefit the disciplines that are concerned with how to minimize the potential harm of discontinuous classification, in particular.

Furthermore, we can even adapt anthropological issues Dawkins addressed himself to linguistic ones, for an anthropological insight can be of a good help for one to understand the hazard of discontinuous classification humanity's language practice has brought about as its side-effect. For example, Dawkins (2011: 6) argues that, in the wake of discontinuous mind caused by discontinuous classification, most people who learn about evolution have trouble understanding how a species can evolve to be a totally distinct species with the elapse of time despite their acceptance that there are evolutionary mechanisms that give rise to the changes within species. This has rendered the ethical issue that overrides such issues as necessity and expedience, strongly suggesting that we should go out of our way to come up with a way to classify or at least describe continuous things continually with meticulously selected words, when it comes to classifying humans.

Table 2 Common questions that are representative of discontinuous mind and their flaws

	Examples of discontinuous mind	Logical flaws in the discontinuous mind
Topic	"How does a species start?"	"A species does not *start*"
	"How can there be a first member of a species?"	"There is no first member of any species."
	"Who was the first human?"	"There was no *first* human."
	"How can you go from a single celled organism to a multiple-celled organism to a fish to a lizard to a mammal?"	"Very gradually over billions of years via accumulated advantageous mutations producing a biological ratcheting of complexity."

As illustrated in Table 2, Dawkins (2011: 3) asserts that taxonomic classification system that

is also applied to biological studies of the evolution of species at least partially needs to take the blame for the fact that quite a few people have a hard time understanding that there was actually no first member of any species. He points out the fact that taxonomy arose from the discontinuous thought of the first naturalists who believed that species were invariable, disparate units and that "modern biologists came to learn that the taxonomic system does not actually reflect biological reality in its truest form" (2011: 2). Furthermore, he (2011: 2) claims that

> [i]t is actually a socially constructed system of knowledge that is an inadequate but necessary conceptual tool used to understand levels of biological diversity. In this way the discontinuous mind produced a system of knowledge that is now employed by academics that think continuously.

Studying something in depth often requires conditioning the raw data like observations and experiences into the data that can be processed easily or effectively, which in turn accounts for the ubiquity of taxonomical classifications in various disciplines, especially those that may defy scientific exploration otherwise. However, as Dawkins mentioned above, scholastic disillusionment on the virtue of taxonomic classification that is often too discontinuous to be reflective of reality does seem to give rise to the necessity for better methodology to be taken in the field of taxonomy. Dawkins (2011: 2) argues that, since taxonomical approaches are often taken with the aid of language which lacks the capability of continuous classification but does possess the ability of perpetuating the classification once it successfully establishes itself, their clout often wreaks havoc upon the society, feeding into the mentality of its members in irrevocable ways. Dawkins (2011: 2) claims that "the very reason we are all classified as one species is because of the biological species concept. With this concept species are members of a population whose fertile sexually mature members can actually or potentially interbreed to produce fertile offspring in nature" (2011: 3). He views continuity as a key to understanding evolution. He argues that

> […] our species Homo sapiens sapiens, us. If you were to enter our theoretical time machine and head back say, 500 years, you (a Homo sapiens sapiens) would still be able to interbreed with any other human on the planet. Although there has been genetic change within our species over the past 500 years, there has not been enough time for mutations to accumulate within our species to prevent successful interbreeding. Now step back in the time machine and head back 5,000 or even 20,000 years. Although a great deal of genetic change has still occurred over that time span, you would still be able to produce offspring with an Egyptian pharaoh or a Paleolithic hunter and gatherer (whether you classified that offspring as a 'hybrid'

> would depend on the socially constructed system of knowledge employed to classify organisms).

As suggested in the quote, even when human species have no biological differences but have slight external variations rendered by human genes' order and the subsequent adaptations of the hosts to their environment, humans overstretched their desire for classification to themselves, heralding the advent of self-derogatory practices. Their awareness of the absurdity and flawlessness of the classification of themselves does not seem to be enough to obliterate the practice as discussed earlier in that the traces of this classification are deeply embedded in our lives by language. Dawkins (2011: 3) argues that discontinuous mind not only produces confusion but also is often used to justify discrimination.

Another evidence of discontinuous mind rendered by discontinuous classification of continuous things by language is the relative scarcity and poor acceptability of the terms that are coined to link the connections. There seem to be no neat terms that racially or ethnically refer to the offspring of the parents who are described differently racially or ethnically in the existing taxonomy, which in turn and again manifests the limitation of discontinuous classification (Dawkins 2011: 3). Dawkins argues that a representative sector in which hazard of discontinuous mind caused by discontinuous classification is the most manifest is human evolution and adaptation to the environment (2011: 5). Humans have developed various traits as animal species for the sake of survival ever since they emerged on this planet as a primitive form (Dawkins 2011: 7). Those traits are never discontinuous but continuous, for they are the outcomes of genes' mandate for their hosts, depending especially upon the ecological conditions like climate (Dawkins 2011: 7). Nevertheless, we humans have devised various labels to classify ourselves, geographically, ethnically and historically, with the corollary of discontinuous classification of continuous phenomena (Dawkins 2011: 8). Another element that is problematic in the methodology of discontinuous classification is that since classification is done by means of language, as often as not, it is highly vulnerable to persistence once established (2011: 4). Dawkins (2011: 4) emphasizes the point that

> […] with a slow, gradual accumulation of genetic change evolution can produce millions of species without any of them having a discrete origin. In other words, we are all intermediates. Over thousands and hundreds of thousands of years depending on numerous factors a species can turn into a different one. However, it will never happen in one generation. There will never be a situation when one species gives birth to a different species.

What the hypothesis of linguistic relativity can come in here is that, if we can compare languages whose taxonomical classifications are significantly different from each other, both in terms of the degree of discontinuity and their impact on the speakers' thought, it may be possible to corroborate the validity of the hypothesis of linguistic relativity, not to mention give weight to Dawkins (2011: 2)' claim that, though the actual cases of discontinuous classification of continuous things are ubiquitous in almost every sector of the society, their potential hazards have been eclipsed by their apparent virtues that are associated with science.

Merely anthropological and thus not directly relevant to linguistics as his remark may appear to be, his studies provide one with a keen insight into how the language one primarily uses impacts one's thought by narrowing or broadening one's horizon. Though linguistic relativity is resurging as an issue that captures the attention of academia today due to various pieces of research that have been done in various aspects of language, the sheer scale of the research hardly seems to be up to par with the estimated value of the knowledge on the hypothesis. To simply put, research on linguistic relativity is most likely research of scale since the range and the degree of the impact of our language on our thought determine the value of the hypothesis. If the impact of our language on our thought were too meager to be substantial or were too confined to certain aspects of language and certain portions of our thought to be generalized, the hypothesis might find it hard to maintain, not to speak of nurture, its value as a worthwhile topic of academic concerns. This is one of the main reasons that this paper addresses the issue of discontinuous classification despite its proclaimed premise that it is not going to deal with the issue of how much or to what degree language affects thought. In this sense, it can be said that scholastic efforts to validate the hypothesis of linguistic relativity should be made in two manners: going ahead with various pieces of research in the discipline of linguistics and harnessing the research outcomes in other disciplines that shed a new light on the concerned linguists. Dawkins' remark "In this way, it is best to say that our ability to use language to classify the world is inherently insufficient" (2011: 6) seems to be a serendipitous, intellectual stimulant that provides valuable cues for those who are concerned with the hypothesis in question. As his input suggests, one's discontinuous mind rendered by the capacity of one's language in its continuous description rather than one's own cognitive capability of continuous thought or perspective seems to have a huge potential as an obstacle to making sense of the world that is neither discontinuous nor

static but continuous and constantly changing. The comparison between Figure 1 and Figure 2 may present important suggestions regarding continuous classification and discontinuous classification in the light of the hypothesis of linguistic relativity.

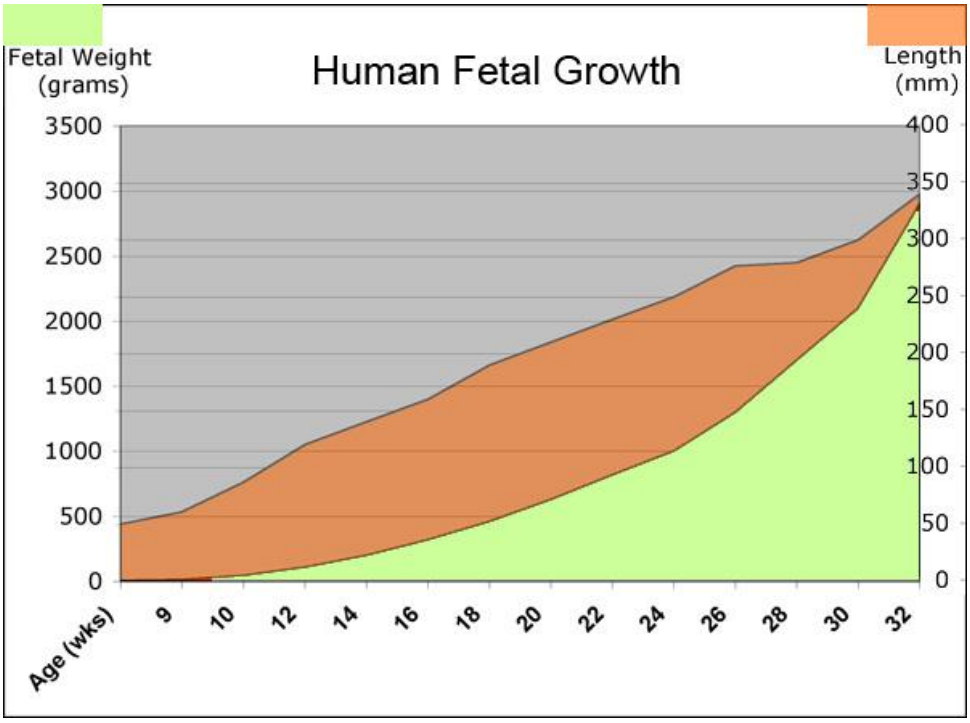

Figure 1 Continuous classification on human fetal growth. Reprinted from UNSW Embryology, by Hill, Mark A. 2015. 3 Apr. 2015, retrieved from https://embryology.med.unsw.edu.au/embryology/images/d/d6/Fetal_length_and_weight_change.jpg

As can be seen in Figure 2-1, continuous classification of the growth of a human fetus, which is too continuous to be called classification, seamlessly shows the rate at which a fetus develops. However, it does not show much room in which language can interfere, as language tends to classify a process that is on a continuum depending on lexical elements that are not easily compatible with the paradigm of continuum. As a consequence, it does not deliver much information about what actually happens throughout the development of the human fetal growth. In a sense, it may be safe to say that the poor ability of language itself is what necessitated the various paralinguistic descriptive devices, like the graph presented above, that can supplement it.

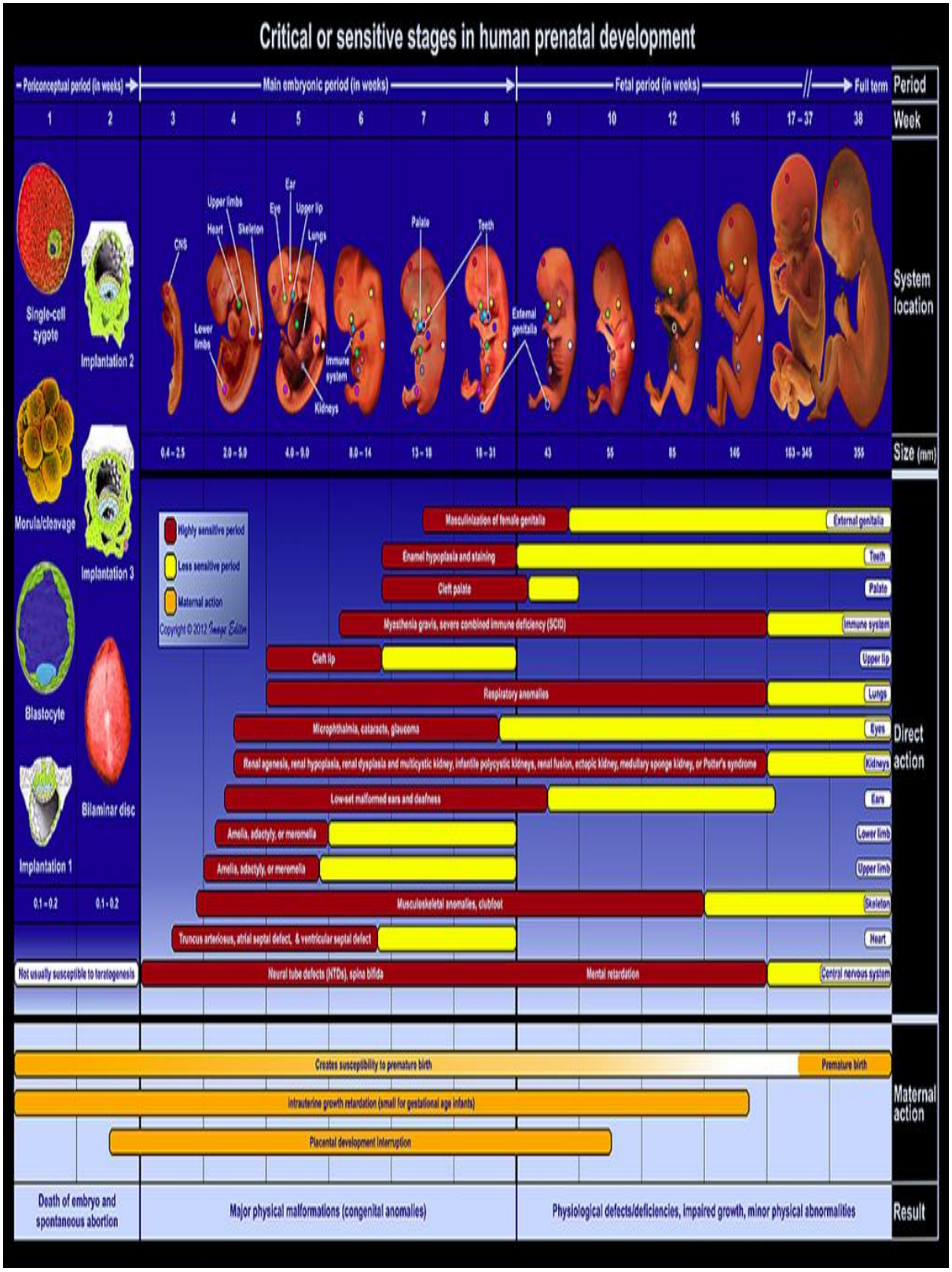

Figure 2 Discontinuous classification on human fetal growth. Reprinted from Emergency Preparedness and Response, Radiation and Pregnancy: A Fact Sheet for the Public, by Centers for Disease Control and Prevention 2015. 3 Apr. 3 2015, retrieved from www.bt.cdc.gov/radiation/prenatal.asp

On the other hand, Figure 2, which is based on discontinuous classification, shows a lot of detail about what kinds of developments are involved throughout the course. However, as the necessity for referring to the certain points or ranges arises, modern civilizations have coined various terms such as zygote, blastocyst, embryo and fetus to indicate certain ranges in the gradient. Advantageous as this discontinuous classification is in a purely linguistic sense, it involves a hazard of creating discontinuous mind about the sensitive issues relevant to it, as suggested by Dawkins (2011: 11). Despite the commonly-used terms, fetus and embryo, both of which have strong association of human beings, biologists and anthropologists have somewhat different viewpoints regarding their human status (Dawkins 2011: 11). Dawkins (2011: 11) argues that "with respect to those meanings of "human" that are relevant to the morality of abortion, any human fetus is less human than an adult pig". According to him, a decisive feature of a human being that is at the heart of the debate between pro-choice activists and pro-life activists as well as legislation of the relevant laws is 'pain' (2011: 11). In other words, whether the human organism that is during the developmental stage in a mother's womb we call fetus is a human or not is dependent upon whether it can feel pain or not, according to Dawkins (2011: 11). He subsequently claimed that the public is responding to both his claim and biological status of fetus with visceral sentiment rather than logical judgment (2011: 12). Such terms as fetus, embryo, feticide and embryocide are too familiar to us not to have our scientific mind independent of the terms. This insight may also be able to lend itself to those who are concerned with the hypothesis of linguistic relativity, in that it seems to be feasible to conduct experimental research on how different languages equipped with different degrees of discontinuous classification terms for the description of human fetal growth affect the speakers' thought on the critical point between a human and a nonhuman.

All things considered, it seems to be safe to say that, modernized, civilized, technologized and enlightened as we may claim we are, many of our persistent notions and stereotypes are still deeply rooted in major religions like Catholics, Christianity, Buddhism and Hinduism that have relented in their influence but still affect huge slices of the world population. When it comes to knowledge, several specialists' keen insight have often been correct and the general public's rather emotional or simply intuitional or empirical thoughts were at times misguided, as can be seen in Newton's case and Einstein's case alike. Likewise, discontinuous language employed to describe continuous phenomena can lead one to think

too discontinuously to aptly make sense of the world that is neither static nor constant. Given that language is at the very core of discontinuous classification that arguably leads to discontinuous mind that can be potentially harmful, at least a large pragmatic aspect of the research on the hypothesis of linguistic relativity seems to have been come across thanks to the insight borrowed from other disciplines. The remainder regarding the points of feasible research on this issue seems to be a matter of methodology.

8. Language concerning temporal issues

Merriam Webster (Perrault 2008: 968) defines time as "a nonspatial continuum that is measured in terms of events which succeed one another from past through present to future". In the meantime, the new Oxford American dictionary (Jewell & Abate 1025) defines time as "the indefinite continued progress of existence and events in the past, present, and future regarded as a whole". Time-related issues can hardly avoid elusiveness given that time itself is too abstract, if not too complicated, to define clearly, not to mention to understand, as suggested by the inclusion of such temporal terms as 'past', 'present' and 'future' in the definitions of time offered by the two dictionaries. As a response to this elusive nature of time, philosophers are often divided into two groups, namely process philosophers and philosophers of the manifold (Faber 2014: 28). Process philosophers maintain that the flow of time which is often measured by human advance through it is an important metaphysical fact (Faber 2014: 29). For instance, as a proponent of intuitionism that claims that mathematics is not so much the discovery of objective principles as the outcome of mental activity of humans, Bergson holds that one can understand the elapse of time only by means of "non-rational intuition" (Faber 2014: 33). Bergson even argues that reality regarding the entity of time can hardly be represented by the scientific conceptualization of time as a dimension (Faber 2014: 38). On the other hand, philosophers of the manifold hold that "the flow of time or human advance through time is an illusion itself", illustrating their claim by stating that "words such as past, future, and now, as well as the tenses of verbs, are indexical expressions that refer to the act of their own utterance" (Faber 2014: 57). Hence, from their perspective, it is an illusion itself to conceptualize the change of an event as the passage of time represented by the expressions of the past, present and future (Faber 2014: 57). They claim that one's

description of a certain event as the event of the future simply indicates the event that may take place later than one's present utterance and one's description of a certain event as the event of the past is no more than the indication of the event that took place earlier than one's present utterance (Faber 2014: 63). Faber notes that, from the viewpoint of the philosophers of the manifold, 'past' and 'future' do not aptly describe a certain event regarding the temporal change involved or to be involved in it (Faber 2014: 63). To summarize the main contention in the perspective regarding time between the two philosophical groups, the former understands the future as the changeable and undetermined and the past as the unchangeable and determined whereas the latter the latter argues that applying the availability of change to one's understanding of the past and the future is out of the question in the first place in that temporal status of an event relies simply on the point of utterance (Faber 2014: 78). Irrefutably, as suggested in the contention regarding time between the two philosophical groups, philosophical descriptions of time do seem to exhibit paradoxical aspects in them. The elusiveness of the entity of time is closely linked to the inability of language to pin it down with several neat phrases. In this sense, different lexical approaches to the entity of time seem to harbor different thoughts in understanding this metaphysical entity, which in turn manifest its status in the core of not just philosophical issues but the hypothesis of linguistic relativity.

To address the issue of time in the light of the hypothesis of linguistic relativity with the consideration its elusiveness in terms of verbal description as illustrated earlier, it seems to be appropriate to start by discussing Wittgenstein's point of view relevant to it. Wittgenstein (Stern 1995: 45) states that

> learning to handle the word *time* involves a multiplicity of verbal skills, including the ability to handle such connected words as *earlier*, *later*, *now*, *second*, and *hour*". These verbal skills have to be picked up in very complex ways (partly by ostension), and it is not surprising that the meaning of the word *time* cannot be distilled into a neat verbal definition.

As he (Stern 1995: 45) notes, elusiveness of time seems to be closely related to the required comprehensive verbal skills that are capable of dealing with the entity of time itself and the term of time alike. Given that the onset of everyday people's conception of time itself is philosophical rather than mathematical or physical, it seems to be inevitable for them to be

trapped in the expedient conceptualization of this entity. As was mentioned time and again and is to be mentioned later again, the virtue of language that makes it possible for an abstract concept to be pinned down and thus to be easily dealt with or explored can be counterproductive due very to the fact that humans tend to stop thinking further or be skeptical about something once it is established in a neat form, a neat definition with objective-looking language when it comes to the field of linguistics. In this regard, the reality of time might be better fathomed by envisaging things that slowly change their phases or are replaced by something else than by employing haphazard descriptions of it.

8.1 Impact of language concerning temporal issues on thought

How one conceives and perceives time, which is more philosophical than cognitive in that their conception and perception of time is highly susceptible to their language's descriptive power of it, has a great impact on their emotions because time is, as often as not, described linearly, thus making its passage irreversible and inexorable. Though Buddha, Pythagoras, Plato and several other pundits in history argued for the circular flow of time, claiming the possibility of rebirth after their existing lives or recollection of their previous lives by which to affect the public's conceptualization of time to a degree, their ideas were not as catholically overarching or deeply embedded as the linear description of it which actually represented the earliest time description in human history (Roeckelein 2000: 4).

Boroditsky (2011a: 339) presents her hypothetical conclusion regarding the factors that go a long way toward making people conceptualize time. She (2011: 339) points out that how the language one speaks describes time, what linguistic context one is in at the moment and what particular metaphors one is using in order to talk about time at the moment reflect one's conceptualization of time. What is noteworthy here is that all these three factors that are involved in their conceptualization of time pivot upon the language they use primarily or are using at the moment.

Language that describes our quantitative, temporal experience or expectation preconditions our thought to such a degree that many ready-made images are formed in the mind (Fodor 1975: 25). Complicated as its generative mechanism may be, time-related language has developed in various parts of our lives throughout history. Given that we cannot perceive or feel time, it is likely that such commonly-used phrases regarding time as *the*

elapse of time or *20 years have passed* have been, most likely, caused by the very nature of our language. With its capability of pinning down things that are neither tangible nor concrete, language seems to have contributed to turning this literally abstract thing into an everyday concept that we are familiar with. Due to various temporal units and expressions, we seem to be easily steering clear of a myriad of troubles that, most likely, early humans suffered in their everyday existence (Ellul 1988: 127-128).

The conception of time, despite quite a few side-effects spawned by it, seems to have affected even the society itself as well as people's mindset, as indicated in Klein (2013: 1)'s remark that "[t]ime and space are the basic categories of our experience and our cognition, and without effective communication about them, no well-coordinated collective action, hence no human society, would be possible". His remark may account for why all natural languages, by necessity, have developed copious expressions by which to deal with the issue of temporality and spatiality as human society develops (Klein 2013: 2) According to Klein (2013: 6), there are basically four ways natural language encodes time in itself:

> First, tense concerns the relation between TT (topic time that corresponds to the finite component of the utterances) and TU (the time the utterance is made). Second, aspect concerns the relation between TT and TSit-the way or sometimes the ways in which some situation is hooked up to some TT. Third, tense and aspect form time in expressions. Last, adverbial modifications also form time descriptions in expressions.

When the public accommodates certain terms or expressions that happened to be circulated or coined by somebody, expediency seems to play a larger role than reason. Conception of time as a linearly-flowing entity, which is prevalent in most cultures and linguistic groups except several ethnic or linguistic minorities, spawned numerous benefits (Klein 2013: 5) as well as several crucial side-effects (Slife 1993: 3). To jump to the side-effects that were rendered by this conception, one's life tends to be future-oriented, placing the primacy of one's understanding of time on the past since the past comes first to one and the future appears as the last that is like the destination of a journey, within the frame of one's conception of time as a linearly-flowing entity (Slife 1993: 2). Future-oriented inclinations of one's life seem to be predictable, if not inevitable, outcomes of linear conception of time given that, when one tends to think of something that flows or goes forward, one tends to pay attention to the direction in which it is moving. Regarding the uncanniness of how we could come to conceptualize time that we cannot actually conceive, Boroditsky (2011a: 334) maintains that

we, humans, came up with a solution to that mystery by "representing the abstract things through analogical extensions from more experience-based domains". In other words, by formulating mental representations of the things that are abstract and intangible in nature, we tend to apply concrete and tangible representations so that we can 'effectively' and 'expediently' approach their essence (Boroditsky 2011a: 334). The very reason why time is often associated with space is most likely that most people in the civilized world have learned to spatialize time by being exposed to such cultural artifacts as "graphs, time-lines, orthography, sundials, clocks, hourglass and calendars" (Boroditsky 2011a: 337). An important element regarding one of the core issues this paper addresses is to be found here. Since each languages depends on its own tools to conceptualize, visualize and spatialize time, there take place variations in their representations of time. Boroditsky (2011a: 334) presents her hypothetical summary of the elements that affect people's reasoning on temporal representations as follows:

1. The pattern of spatial metaphor that people use to talk about time
2. The set of spatial representations and reference frames that are available for co-opting for thinking about time (either in the linguistic or cultural environment more generally, or in the immediate context more specifically)
3. Organizational patterns in cultural artifacts (e.g. writing directions)
4. Aspects of cultural or individual disposition, age and experience

Given that spatial representations of time are often different depending on the languages that involve the four elements listed above, it is understandable why English speakers tend to see time as an entity that lies ahead of them, whereas the Aimar, an indigenous people in South America, tend to see time as an entity that lies behind them and Mandarin Chinese tend to see time as an entity that is below them (Boroditsky 2011a: 334).

8.2 Impact of language concerning temporal issues on worldview

Quite apart from its influence on people's thought, language that describes temporal issues does seem to exercise its clout on people's worldview by virtue of its arguably manipulative faculty of interpreting their perceptive or cognitive experience (Boroditsky 2011b: 64). This insight may go in tandem with sociological investigations of certain incidents, given that the influence of temporal language on one's worldview, from this perspective, is observed more frequently in social issues than in individual ones.

One of the most representative cases that illustrate the impact of temporal language on people's worldview is closely related to its numerical denomination of temporal quantum. The conception of clock, hourglass and other apparatuses that are devised to quantify time may be one of the greatest feats of humans in the development of their knowledge, but its counteraction has caused quite a few side-effects, one of which is most likely the rigidity of their thought and heightened anxiety about the change of the numeric figures. Dein and Littlewood (2000: 110) address the issue of apocalyptic suicide which was covered in the previous chapter of this paper in its discussion of the issue of discontinuous classification, pointing out "a strong dualistic philosophy, a leader with total control over the movement, and a relative isolation in the presence of apocalyptic teachings" as its main causes. They quote a terrorism committed by a group named Concerned Christians that is based on Denver and terrorism and suicide committed by Japanese group named Aum Shinrikyo along with many other cases, all of which held strong apocalyptic beliefs about the end of the world (2000: 113). What is noteworthy here is that the numeric figures about the chronology of human history, which are variations of temporal language, underlie these atrocities (Dein & Littlewood 2000: 115). Consciously or unconsciously, the leaders of those groups or those who prophesized about the end of the world are all victims of numeric delusion through which their latent lunatic obsession, paranoia or other sorts of mental weaknesses sought outlet. Given that one of the major ways we use our language to describe temporal issues underlies the apocalyptic mind mentioned above, apart from the issue of continuity or discontinuity to be discusses in the later chapter, it seems to be necessary to view such an issue from the perspective of linguistic relativity. It may be self-evident that the cause of such a worldview is worth illuminating from the perspective of linguistic relativity given that religious extremists recognize a certain point in time that is described as 1999 as a spatial metaphor that encourages them to envisage the end of something grave they believe in (Boroditsky 2011: 334).

9. Language concerning spatial issues

Though Whorf himself did not actually pay attention to 'space' as a category that one perceives differently based on the language one uses, recent prominent research outcomes

show spatial language also has noticeable effects on one's perspective. Also, though apparently much less abstract than the conception of time in the field of physics, the conception of space seems to have as big an impact on people's thought as that of time, given that it seems to form a reciprocal relationship with time in many cases. In the following experiment, Boroditsky (2000: 8) examines "whether making people think about spatial relations in a particular way might affect how they then think about time". First, the participants answered several priming questions about spatial relations of objects in pictures which used either the ego-moving or the object-moving spatial schemas (Boroditsky 2000: 8). Then, they were asked to interpret an ambiguous temporal statement such as "next Wednesday's meeting has been moved forward two days*"* (Boroditsky 2000: 8). If the employed ambiguous statement is subject to the interpretation based on "the ego-moving spatial schema", then *forward* is expected to be associated with the direction of the observer's motion, and the updated date of the *meeting* may be understood as *Friday* (Boroditsky 2000: 8). If the statement is subject to the interpretation based on "the object-moving spatial schema", however, *forward* is expected to be associated with the direction of motion of time and thus the updated day of the event may be understood as Monday (Boroditsky 2000: 8). She argues that "the findings lend support to a metaphorical theory of concept learning that abstract domains such as time are indeed shaped by metaphorical mappings from more concrete and experiential domains such as space" (2000: 26). From Wittgenstein's perspective (Egidi 1995: 185):

> visual space is an oriented space, namely a space in which there is an above and below and right and left. And this above and below, right and left have nothing to do with gravity or right and left hands. It would, e.g. still retains its sense even if we spend our whole lives gazing at the stars through a telescope. To say of visual space that it is absolute is the same as to say that it possesses a system of absolute coordinates […] theses coordinates are associated with the directions of the field of bodily orientation, left, right, top, and bottom.

As he notes, since visual space is determined by where one sets the orientation regarding certain spatial issues, one's language which often depends on usage and context rather than clarification in its coverage of spatial issues may harbor the possibility of different interpretations of spatial issues by different speakers, especially when they speak different languages in which different cultural codes concerning spatial orientation are embedded (Egidi 1995: 185-188). Most of the languages on this planet describe the space with the terms

equivalent to sky, atmosphere, heaven, cosmos, universe, or utopia. Sensible as it may be to describe it as something that exists above one's head, it seems to have greatly contributed to creating the concept of omniscient and omnipotent gods in the relevant cultures, to mention one of the most noticeable societal impacts of spatial language. This notion that what is physically at higher position is what is superior to its counterpart, fueled by humans' animal instinct of being territorial, seemed to help form the worldview that what is positioned higher tends to be the one that is more advanced, more prestigious, more aesthetically appealing and so on. Suffice it to say that, though the distinction of north and south has nothing to do with up and down, one often associates north with up and vice versa, as Wittgenstein suggested (Egidi 1995: 188).

9.1 Impact of language concerning spatial issues on thought

As was discussed earlier, given the philosophical considerations of time that is deeply impeded in its etymology, the issue of how one's thought is actually influenced by temporal language they use may well legitimately claim its academic value for exploration. Space, which may be less abstract than time, has its own idiosyncratic property due largely to its association with time. To specify, not only does one spatialize time, but one temporalizes space (Casasanto 2010: 458). This is often observed in English in such an expression as "my brothers live five minutes *apart*" (Casasanto 2010: 460). Though laws of physics apply universally, phenomena that take place in the physical world may not be always physical but be rather abstract, at least from the perspective of perceivers. Therefore, one's comprehension of apparently abstract phenomena often go in tandem with one's efforts to turn them into tangible or concrete things. Given that many of these efforts are made through metaphorical representations, it is not so surprising that each language group has different representations of spatial phenomena. Just as the other issues this paper addresses should be considered with the aid of nonlinguistic elements, the issue of the impact of spatial language on thought and worldview should also incorporate nonlinguistic elements into it so that we are not likely to be trapped in "logical circularity" as Pinker insinuated (Casasanto 2010: 461). Pinker (2007: 58) argues one may fall into a logical loophole in that they should closely watch how people speak in order to figure out if different languages they speak render their thought different. Pinker's argument is supported by Clark (2004: 62), who hypothesizes that more universal

representations take place when people with different mother tongues think for other activities than for speaking, such as remembering or categorizing, since their representations include a lot of materials that are not customarily encoded in their languages. Given that spatial categories, quite like temporal ones, do seem to entail quite universal representations due to their metaphysical attribute, it seems to be intriguing to see how people's verbal activities, especially speaking, affect their representations of spatial issues which may be quite analogous to each other otherwise.

Feist and Gentner (2007: 283) carried out three experiments to figure out the impact of spatial language on people's recognition of spatial scenes. To be more specific, their experimental research aimed at how spatial language influences the way people encode and remember spatial relations in visual scenes (2007: 283). In their 1st and 2nd experiments, they had the subjects perform yes-no tasks after showing them ambiguous pictures with or without sentences with spatial prepositions in them (2007: 283). For each of the prepositions tested, they came up with a sentence such as "The block is *on* the building" and a triad of pictures that varied in their degree of fitness for the sentence (2007: 284). They devised the standard pictures that can "represent possible exemplars of the spatial term instead of central exemplars" (2007: 284). Also, they depended on spontaneous verbal description to make sure that standards do not directly represent the key prepositions (2007: 284). For each of the standards, one variant, namely plus variant, was a better exemplar of the spatial term and the other variant, namely minus variant, was a poorer exemplar as its counterpart (2007: 284). The standard was designed so that the spatial preposition could apply to it and the two variants either better typified the core prepositional category or less typified it (2007: 285). The subjects were shown the set of standards and then were given the tasks in which they had to recognize which pictures they saw (2007: 285). Feist and Gentner assumed that, if the subjects apply the semantic categories of the spatial terms when encoding the standard, they should be more likely to have false alarms to the plus variant than to the minus variant (2007: 285). In other words, they should show a shift in recognition toward the category's center, in this case (2007: 285). They believed that "if we were to see language effects only when the participants were provided with language at encoding, this would provide support for a thinking-for-language hypothesis—a generalization of Slobin's thinking-for- speaking hypothesis to encompass comprehending as well as producing language" (2007: 285). Also,

they believed that, on the other hand, "if we were to see spatial category effects even without the presentation of language at encoding, this would support the possibility that language influences cognition in a more far-reaching manner" (2007: 285). They learned that only those who were offered sentences with spatial prepositions in them ended up making a larger number of false alarms toward the center of the prepositional categories than those who were not (2007: 286). In other words, whereas those who were exposed to sentences with spatial prepositions in them were highly prone to have false alarms to pictures closer to the center of prepositional category, those who were exposed only to the pictures without spatial prepositions in them showed only symmetrical responses to the false alarms (2007: 286).

With the outcome that strongly indicates that recognition memory regarding spatial scenes can be affected by spatial language presented, they assumed that the results may lend support for the interactive encoding claim since the subjects "adjusted their encoding of the pictures to better accord with the spatial prepositions" used in the sentences that represent the pictures (2007: 286). To enhance the reliability of the outcome obtained by precluding the possibility that the participants see the other items from the same triad during the recognition task, they conducted the 2nd experiment in which they presented all the subjects with only one recognition item from each triad (2007: 286). In this experiment, they found that the subjects who were exposed to the sentences with spatial prepositions in them were significantly more likely to have false alarms to the plus variant than to the minus variant while the participants in the control group did not show such an inclination (2007: 286).

Also, through their 3rd experiment, they tried to confirm that the observed language effects in the 2nd and the 3rd experiments reflect the interactive encoding of sentence and picture, not the use of a separately encoded verbal memory (2007: 287). They interpreted the observed "shift toward the core of the semantic category" as the indication that spatial language affected the participants' perception while the interactive encoding of the sentence and picture was going on (2007: 287). Also, through their 3rd experiment in which they "varied the materials to test the interactive encoding account against a separate encoding account in which separately stored sentences are accessed during picture recognition", Feist and Gentner noted that a spatial preposition, which is inaptly presented, actually performed a similar function in directing the shift toward the central category of the preposition in question, interpreting the observed pattern as an interaction between language and perception

during the encoding (2007: 287). Through the series of this experimental research, they draw a hypothetical conclusion that interactive encoding between spatial prepositions and pictures makes it possible for spatial language to affect the encoding and memory of spatial relations (2007: 291). However, it seems to be still highly controversial whether language actively changes one's prior visual memories or language simply exists as an alternative encoding means (Feist & Gentner 2007: 293).

In the meanwhile, Regier and Carlson (2001: 293) conducted a research on the acceptability of the spatial term *above* to investigate how and what nonlinguistic perceptual processes may underlie the semantics of the English projective spatial terms, reaching the hypothetical conclusion that "linguistic spatial categories can be explained in terms of underlying structures that are not linguistic character". They explained their findings by arguing that since spatial terms encode location in the first place, they are presumably underpinned by the "where" pathway and this pathway, in turn, encodes the objects themselves in relation to the pathway, which thus makes their relation highly context-dependent (2001: 294). Their measurement of the degrees of acceptability of *above* in relation to a certain object indicates the acceptable degree of obliqueness and low position in thematical data. Somewhat complicated as it is, their findings can be harnessed to illuminate the research concern of this paper with the help of cognitive science. Humans' cognitive capacity to structure space linguistically is staggering and at the same time directly related to their linguistic learning, neurobiological capability or conceptualizing faculty (Fauconnier 1997: 5). Since each language has developed its own lexical or syntactic constructions to structure spatial language and this developmental process is built upon highly contextual learning and conceptualization along with highly anatomical neurobiology, different spatial languages that different groups use bear a strong possibility to, in a sense, predispose the speakers of the languages to their idiosyncratic thought and worldview.

9.2 Impact of language concerning spatial issues on worldview

Geographic knowledge may strongly affect one's worldview since geographic knowledge itself can be one of the greatest sources of perspective regarding worldview. Continental countries like China, Russia and the United States tend to view other countries as peripheral ones due in part to their location and due in another part to the sheer size of their territories.

Given that one's perception of space itself, in a sense, can be considered to be tantamount to one's perspective, a logic that one's worldview is affected by one's geographic location does not seem to be invalid, even at a glance. Languages that describe space, in this respect, can hardly be independent of variations regarding how they can differently affect the thought that the users or the learners of the languages in question form.

To reiterate, as it is difficult to conceptualize time, it does not seem to be easy to conceptualize space, despite the fact that space is often considered to be less abstract and thus less elusive than time. Given that one's recognition of space is affected by one's acquaintance with spatial language as the research outcomes presented in the preceding chapter show (Gentner et al. 2013: 330), spatial descriptions most likely influence people in their worldview. The impact of spatial representations on worldview may become more obvious when one considers the fact that the world itself and the numerous subcategories the world involves are, in actuality, spatial descriptions of the humans' experience in their daily interactions with each other.

However, one needs to be reminded of the fact that language made it possible for conceptualizing virtual space that defies human experience (Boroditsky 2011a: 339). Good examples of this may be idealized worlds like *heaven, paradise, elysium, arcadia and utopia* that most likely people's desire for happiness conceptualized. Though, like other terms, their etymological mechanism seems to have more to do with the visualization of humans' wishes than humans' languages themselves, embodying them as established terms may feed into their mentality much more drastically than when those words did not exist at all, despite the possibility that people can envisage their imagery somewhat vividly without concrete terms for them. This can be observed when one sees the religious fanatics, who are preoccupied with their religious ideal that is often represented through the terms listed above, sacrifice their present for their afterlife that they claim will be spent in such places (Dein & Littlewood 2000: 115).

10. Tertiary issues in linguistic relativity

There are some important issues that are directly or indirectly related to the hypothesis of linguistic relativity though their hypothetical maturity seems to be relatively weak at present. The issues to be explored below are the ones that are deemed to garner more impetus regarding their hypothetical validity sooner or later by virtue of the findings on linguistic relativity on other categories. In a sense, they can be interpreted as the contemporary versions of the hypothesis of linguistic relativity that can offer invaluable knowledge to humanity as a whole should enough findings be obtained through well-guided research.

10.1 Linguistic diversity and linguistic relativity

Though the concept of linguistic diversity and that of linguistic relativity are distinct in their respective nature, they are actually closely related to each other when it comes to the discussion of their respective value, in particular. Estimating that half of the 6,000 languages that are being spoken in the world today would disappear by the end of the 21st century, the UNESCO started to alert the public and the policy makers to the importance of linguistic diversity (UNESCO 2010: 8). As was noted in the earlier chapter in which the topic of the advent of Sapir-Whorf hypothesis was addressed, Humboldt (1999: 3) is most likely a pioneer in his support of linguistic diversity, though he may not be universally credited with pioneering in the hypothesis of linguistic relativity. He advocated the preservation of linguistic diversity with the claims that since each language has its own unique worldview, losing one language is equivalent to losing one important worldview (1999: 37). He further argues that losing one language means losing one important literary route through which a culture creates important intellectual pleasure (1999: 54). His claim that the more one knows about language, the more one gets to love it actually goes far beyond the realm of sentimental conservatism of good old days. The very essence of the value of linguistic diversity can be understood from the viewpoint of linguistic relativity. In order for a prototypical language to become mature as a full-fledged one, it takes at least several hundred years (Humboldt 1999: 143). Regarding the tricky issue of the reason that languages in the world are not the same, modern linguists, with their accumulated knowledge about the origin and the generative mechanism of language, have reached the point that they can answer the question, with some

amounts of certainty (1999: 182). Preserving endangered languages may be no different from preserving endangered species in that their true values are better understood by the scholars in their respective disciplines than by those who are their speakers themselves or those who are the advocates of their preservation.

Regarding the potential value of linguistic diversity, not only as the object to be preserved but also as the subject to be explored, there seems to be one thing that should be considered especially by those who are concerned with the hypothesis of linguistic relativity. It should be noted that even the hypothesis of linguistic relativity was on the verge of being dismissed in the academics before several savants, such as Wittgenstein, Pinker and Lucy, presented relevant theoretical grounds or research findings that were strongly supportive of the hypothesis. In other words, at least as far as knowledge is concerned, before it matures to the degree that it can be certain that certain things deserve to vanish with the sweeping power of time, it seems to be always prudent not to discard them completely, especially when the things in question are artifacts that are the byproducts of the accumulation of humanity's evolutionary efforts. Humboldt's unusual love of all the languages he studied may suggest the value of preserving endangered languages that is never smaller than that of exploring the impact of language on thought. Though linguistic diversity is not a main concern of this research, its seems to be obvious that proponents of linguistic diversity may be able to garner further impetus whenever research on linguistic relativity unveil the hither-to concealed aspects of the impact of language on one's thought and worldview. Like heads and tails of a coin, findings of the research on the hypothesis of linguistic relativity are expected to reciprocate findings of the research on the hypothesis of linguistic diversity and vice versa, doubling the value of their respective findings. Given this, it seems to be a positive phenomenon that the value of linguistic diversity is illuminated, especially in the context of the E.U.'s struggle to unite Europe through its emphasis on multilingualism that is based upon its realization of the importance of linguistic diversity for the sake of political and social unity (Frey 2013: 286). Though the E.U.'s efforts to preserve endangered languages is founded upon its utilitarian or, to be more precise, political view that spotted the stronger and more efficient possibility of achieving unity through diversity than the possibility of accomplishing unity through solidarity or uniformity that is on the opposite end of the spectrum, it can positively forebode some of the other actions that are friendly to the breeding habitat of

linguistic diversity (Frey 2013: 290). To wrap up a seeming digression at this point, the commonplace metaphor that language is the history of a linguistic group and thus languages, whether dominant or waning at present, are the inheritance of humanity as a whole may better summarize the importance of linguistic diversity than the enumeration of the values of its preservation may.

To get back to the issue of the value of language diversity in the light of linguistic relativity, we may need to take a cue from biological diversity. We often address the issue of biological diversity, especially in terms of its importance for the whole ecosystem. The logic of its significance to the ecosystem may not be compelling to other people than environmentalists, biologists or other relevant people who appreciate the existence of various species on this planet, unless everyday people find any utilitarian value in sustaining biological diversity which often entails their inconvenience, whether small or big. Quite apart from the ethical issue of coexistence with other species that does not actually motivate people to be alerted to the value of biological diversity, there should be something that tangibly benefits people who accede to inconvenience imposed upon them by the efforts to preserve ecological preservation. Fortunately, biodiversity is the very source of human knowledge about living organisms that is meant to serve 'their' benefits in the long run. Likewise, research on linguistic diversity which requires great efforts, entailing the consumption of large sums of resources, should offer concrete and substantive profits to humanity, to offset the resources that the undertaking entails. Fortunately again, it seems to have a more direct and larger profit than is estimable from the sentimental point of view, which is indeed captured by the perspective of linguistic relativity: universal applicability of the findings of the research on linguistic relativity may be contingent upon the preservation of linguistic diversity.

To reiterate, as Humboldt (1999: 230) pointed out, the loss of one language is equivalent to that of one perspective that has been formed for centuries or millennia. Ever since we humans established our existence in whatsoever primitive forms, each people in humanity has constantly evolved its languages in many aspects. Given the fact that our knowledge regarding the value of our language seems to be too meager since language forms and functions in large timeframe work, it seems to be prudent not to place linguistic diversity at the disposal of nature's law like the survival of the fittest. With limited linguistic diversity,

it seems to be inevitable to obtain only limited findings in our research on the hypothesis of linguistic relativity. The value of language, from the perspective of both linguistic diversity and linguistic relativity, does seem to have less to do with what language we use than to do with how we use our language, as various pieces of research on the correlation between language and thought teach us, to say the least of it.

10.2 Impact of language on one's judgment of other people's qualities

One's interactions with other people occupy a large part in the formation of one's worldview since the world, to a large degree, consists of human activities, which in turn affects how one interprets the phenomena taking place in one's surroundings. However, it may be too complicated an issue to explore how the language one speaks affects one's judgment of other people in reasonably objective manners; one's judgment of other people is highly vulnerable to all sorts of elements that work not only independently but also intricately. It may not immediately ring the bell to imagine how the language a speaker uses can influence the speaker's own judgment of other people's qualities, given the fact that, unlike the claim that a speaker's language can affect how he or she is 'judged' by others, it may not be immediately intuitive to think about the impact of the speaker's own language on the way the speaker himself or herself judges other people. Quite apart from its counterintuitive element, it may be intriguing to learn the possibility that the language one speaks can influence the way one understands other people, if this hypothesis, which apparently fits the category of linguistic relativity, is valid. However, this hypothesis can be validated only when a speaker's language alone, without any influences of other elements, can affect the speaker's own judgmental consideration of certain features of other people whom he or she perceives or with whom he or she interacts.

Quite provocative as the hypothetical claim regarding the impact of one's language on one's judgment of other people's qualities may sound, there is a pair of relevant experimental research on this issue. As I categorized it as a tertiary issue, I am not going to deal with this issue in depth in this paper. However, this issue is noteworthy in that differences between language, independently of culture, history or other non-linguistic elements, can encourage the speakers of certain languages to have bias or prejudice toward other people. A comparative study on the fluent bilingual speakers of certain language groups

conducted in 2010 represents the afore-mentioned claim, whose findings in turn can possibly lend weight to the hypothesis of linguistic relativity. According to Boroditsky (2011: 65), both sets of the findings that were published in 2010 indicate that even one's penchant for something or somebody is influenced by the language the context involves. According to Boroditsky (2011: 2011 64)'s introduction of the comparison of the two studies,

> [t]he studies, one by Oludamini Ogunnaike and his colleagues at Harvard and another by Shai Danziger and his colleagues at Ben-Gurion University of the Negev in Israel, looked at Arabic-French bilinguals in Morocco, Spanish-English bilinguals in the U.S. and Arabic-Hebrew bilinguals in Israel, in each case testing the participants' implicit biases. For example, Arabic-Hebrew bilinguals were asked to quickly press buttons in response to words under various conditions. In one condition if they saw a Jewish name like "Yair" or a positive trait like "good" or "strong," they were instructed to press "M,"; if they saw an Arab name like "Ahmed" or a negative trait like "mean" or "weak," they were told to press "X." In another condition the pairing was reversed so that Jewish names and negative traits shared a response key, and Arab names and positive traits shared a response key.

As her own description of the procedures of her experiment vividly shows, it seems to be intriguing to look into such bilingual speakers' arguable biases for which their languages are responsible, provided that those biases are truly attributed to the differences of the language they are using at the moment. To briefly introduce the findings of the research, the observers found 'big' shifts in these involuntary automatic biases in bilinguals depending on the language environment in which the test was conducted (Boroditsky 2011: 65). The Arabic-Hebrew bilinguals exhibited more positive implicit attitudes toward Jews when they were exposed to Hebrew settings than when they were exposed to Arabic settings (Boroditsky 2011: 65). By means of the measurement of how quickly the subjects responded under the two different conditions, the study above could, at least hypothetically, suggest the existence of involuntary and automatic biases in people's minds toward or against certain traits of ethnic groups (Boroditsky 2011: 65).

This experiment may have its intrinsic limitation, though, in that it did not simulate how the bilinguals respond in their judgment of other people's qualities based directly on what language they are actually speaking or writing but simulated in what language contexts they are in at the moment. As a corollary, the outcome may not immediately reflect how a language has an effect on its 'user's judgment of other people's qualities but indicate how a 'context' in which a certain language is used can make it possible for various inherently

covert elements imbedded in the language make the language user unconsciously allow themselves to be altered in their judgmental considerations of their experience of external realities. However, given the fact that contextualized language overrides decontextualized language in language usage and that decontextualized language is often associated with theoretical aspects than practical ones of a language, the inclusion of contextual elements in the consideration of the hypothesis of linguistic relativity seems to be valid (Oers 1998: 474).

Too far-fetched, depending on the perspective of the viewers, as it may appear to be, the outcome of the experimental study introduced above may be able to lay a groundwork for exploring the possibility of how one's language can create a pre-embedded image in the speaker's mind as to the judgment of other people's qualities. What is pending regarding this issue seems to be to determine whether the causality is derived exclusively from purely linguistic elements which are activated or largely from a rather complex heterogeneity in which language is preponderant.

10.3 Impact of language on one's learning process

Digressive as it may appear to be, correlation between language and learning process cannot be omitted in my discussion of the impact of language on one's worldview as a tertiary issue, given that at the very center of most of the learnings is language and that one's learning directly affects one's worldview. In a simpler term, the impact of language on one's worldview garners one of its impetuses from one's learning process. Due to the idiosyncratic density of learning that often entails other potential elements in its process, learning involves significant amounts of input in terms of the targeted knowledge or skill, in each of which language plays a crucial role. Given this, it seems to be inevitable to address the issue of how language affects one's leaning process as an interim report on the tertiary issues concerning the main topic of this paper.

There is a claim that one's ability to remember certain things can be influenced by his or her language (Boroditsky 2011: 64). Boroditsky (2011: 65) hypothesizes that there is a possible relationship between the structure of a language and either the facilitation or the hindrance of the language users' learning process. She (2011: 65) argues that "because the number words in some languages reveal the underlying base-10 structure more transparently

than do the number words in English (there are no troublesome teens like 11 or 13 in Mandarin, for instance), kids learning those languages are able to learn the base-10 insight sooner". She (2011: 66) further argues that "depending on how many syllables the number words have, it will be easier or harder to keep a phone number in mind or to do mental calculation". The presented case, though, may not be superbly persuasive given the fact that mental calculation is often a byproduct of one's conscious or unconscious practice and that it seems to be blurry whether their mental treatment of the given numeric information is done based more on their own mother tongue or more on mental visualizations of rather universal mathematical codes that those two cultural group children predominantly use for calculations.

Another interesting claim of the kind posits that language can affect how quickly infants figure out whether they are male or female (Guiora 1983: 235). Guiora compared three groups of kids growing up with Hebrew, English or Finnish as their native language, noting that "Hebrew marks gender prolifically (even the word 'you' is different depending on gender), Finnish has no gender marking and English is somewhere in between" (1983: 235). Based on the findings of this experiment, he hypothetically concludes that children growing up in a Hebrew-speaking environment figure out their own gender about a year earlier than Finnish-speaking children do; English-speaking kids fall in the middle (1983: 250). This hypothesis, though, seems to be too fragmentary in its perspective and, at the same time, too susceptible to variables to claim its validity. This is because, though it is taken for granted that the process of infants' realization of their own gender is done mostly through their languages, it can hardly be ruled out that the causation may be explained less neatly by the differences of gender-related elements in their languages than by how and when they are exposed to those linguistic elements in their own idiosyncratic cultural settings.

Though experimental research outcomes that champion the claim in question are relatively scant, learning which is often done through language seems to be, without doubt, a basic process in which the learner can stand a pretty good chance of starting to form or even alter his or her viewpoint regarding various things they have already experienced and will be experiencing later. If learning is not exempt from being the object on which a language can exert its influence of 'linguistic relativity' and, more importantly, if the hypothesis of linguistic relativity is validated further, 'learning' seems to be another locale where the importance of linguistic relativity lies. Then, as a natural corollary, it may be possible to

further claim that learning a new language, from the perspective of linguistic relativity, is an important chance to learn a new way to view the world.

10.4 Linguistic relativity and foreign language acquisition

This chapter is going to discuss the issue of how one's acquisition of a foreign language can affect his or her thought and worldview, not touching the issue of the impact of language on one's overall learning process which was covered in the preceding chapter. Prior to the exploration of this issue, we can consider full access theory which postulates that "failure to assign a representation to input data will force subsequent restructurings, drawing from options of Universal Grammar" (Schwartz & Sprouse 1996: 40). To be more specific, full access theory claims that the earliest utterances second language learners make in their learning process of the target language contain all grammatical properties of the structure of their mother tongues when their learning of the target language is done after a critical period (Schwartz & Sprouse 1996: 41). This is an exceptionally intriguing hypothesis even from the viewpoint of linguistic relativity in that it, in a sense, complies with Clahsen (1990: 139)'s hypothesis that one's acquisition of a foreign language is intrinsically different from one's acquisition of one's mother tongue in terms of its exclusive dependence on inductive reasoning. Another reason why this hypothesis is intellectually stimulating is that, in another sense, it diverges from Clahsen (1990: 139)'s hypothesis in terms of its reference to Universal Grammar rather than to inductive reasoning as a determinant of the difference. If different mechanisms function between one's acquisition of one's mother tongue and one's acquisition of a foreign language, especially in terms of the operation of Universal Grammar and inductive reasoning as postulated in full access hypothesis, then it may be tempting to explore how the acquisition of a foreign language, independently of the psychological or cultural elements that often accompany the learning process of a foreign language despite the fact that they are not linguistic, can affect the learner's thought and worldview. However, this chapter is going to refer to only a couple of pieces of the perspective of full access hypothesis since the hypothesis in question is largely concerned with grammatical elements and, more importantly, its validity as a whole is not solid enough.

Current controversy over the hypothesis of linguistic relativity touches on the issue of language acquisition as well as that of cognitive development, for the proponents of the

hypothesis of linguistic relativity argue that formation of the probable correlation between language and thought seems to develop during one's language learning process, as opposed to various universalist scholars who argue that one's language acquisition ability is innate and modular and that the ability is gradually constructed by all the learners based on the identical linguistic processes regardless of one's language and culture (Lucy 1996: 52-53). Unlike conventional viewpoints, like Piaget's, that see cognition as what develops through regular stages in each of which reorganization of the language knowledge acquired in the preceding stage takes place and further prepares one to undergo the next stage, the viewpoints held by ardent proponents of the hypothesis of linguistic relativity, such as Vygotsky's, see the cognitive development as the product of semiotic properties of language (Vygotsky 2012: 36). They argue that transformation of human behavior during the phylogenetic and ontogenetic development is fostered by language that plays the role of semiotic mediator, whose view forms functionalistic understanding of language unlike Piaget's (Vygotsky 2012: 36). Thus, language, throughout its development, has two significant interrelated and inseparable functions: a representational function that plays a pivotal role in nurturing the ability of reasoning and conceptualizing and, at the same time, a communicative function that enables them to be socialized.

If one's language acquisition or development process shows important things related to how language affects the development of one's thought-related ability, it may also be observable in their foreign language acquisition process, though some variations may be involved in it. The ways language, in this case a speaker's mother tongue, affect thought can be observed in the speaker's second or other foreign language acquisition processes (Schwartz & Sprouse 1996: 40). The language to which an infant is exposed most both in terms of frequency and in terms of amounts, as often as not, forms the infant's mother tongue and thus underlies its acquisition process of other languages (Kalverboer et al 2012: 149). Foreign language acquisition process often involves thoughts, whether they are rather simple or quite complicated, given that the learners are often encouraged to express their ideas in the form of speech or text while learning a foreign language. Then, it is quite intriguing to note how one's mother tongue actually affects one's foreign language acquisition process. Following are the elements of the way one's mother tongue affects one's foreign language

acquisition which are supposedly related to the way one's foreign language acquisition process affects one's thoughts.

Firstly, sounds of the foreign language are often perceived in the spectrum of one's mother tongue, restructuring them by linking them to the similar sounds of the learners' mother tongue (Tomasello 2003: 15). Most of the languages have consonants and vowels that correspond to those of other languages, with relatively a small number of unique sounds that other languages can hardly replicate. For example, since 'b' in English is quite similar to 'ㅂ' in Korean, in terms of its phonetic property and trait, English learners whose mother tongue is Korean often associate the words that contain this consonant to their counterparts in Korean. This is often called language transfer and has come to replace the old-fashioned notion that foreign language learners' mistakes are creative construction process (Gass & Selinker 1992: 32). Language transfer takes place in discourse, semantics, syntax, lexicon, phonology and even writing systems, interacting with cultural, social and personal factors that also influence the learners' perceptions, cognitions and thoughts (Gass & Selinker 1992: 34).

Connecting the issue of foreign language acquisition with the hypothesis of linguistic relativity may be too complicated a task to be approached by means of research, given that this issue addresses the impact of one language on another language through the medium of the learners' thought. However, it may reveal, provided that research on this issue is meticulously prearranged and successfully carried out, one of the veiled aspects of the impact of language on thought given that one's foreign language acquisition process seems to be concrete enough to manifest the concerned impact.

10.5 Impact of language on philosophical points of view

As the last tertiary issue to be covered in this paper, this chapter is going to discuss the correlation between philosophy and the hypothesis of linguistic relativity by focusing on how philosophical points of view can be considered in the light of the hitherto-made findings of the noteworthy pieces of the experimental research concerning the hypothesis of linguistic relativity. Though this paper has so far dealt with the issue of how language affects thought and worldview, hitherto-made evidential observations seem to be too tantalizingly

fragmentary and meager to allow the hypothesis of linguistic relativity, relative to the scales of the objects this hypothesis addresses, to gain more sufficient momentum to go beyond the boundary of the cluster of table theories. In this regard, this chapter is going to discuss the issue of if philosophical points of view can also be affected by language, based on the series of experimental research previously introduced and literature directly relevant to this issue, quite apart from the arguably never-ending issue of whether philosophy is possible due to the sophistication of language or sophistication of language is a byproduct of such an intellectual field as philosophy. Given the fact that the discussion of this topic may converge on the judgment of the value of knowledge concerning the hypothesis of linguistic relativity due to its nature, I am going to confine the discussion of this topic to the value-neutral discussion of what the hitherto-made findings of the research on the hypothesis of linguistic relativity may suggest to the discipline of philosophy. Given that intellectual gallantry, rather than scholastic meticulousness, may better merit the explorative job regarding the possible suggestions of research findings, it seems to be inevitable, if not necessary, to expand the interpretation of the conventional boundary of the hypothesis of linguistic relativity to a marginally digressive degree so that I can effectively connect the suggestions of the hypothesis of linguistic relativity to philosophical mind and present well-grounded rationales behind them. Let me make it clear, though, that the latter part of this chapter will get back on track in order to expound why the seeming digression of the earlier part of this chapter is important to reach the bottom of the elusive issue of linguistic relativity.

First of all, Wittgenstein's contribution to the resurgence of the public's and scholarship's interest in the hypothesis of linguistic relativity can never be stressed too much, given that he is the one who garnered ample observational evidence to support it decisively to such an extent that it is enough to evolve into a full-fledged theory unlike his theoretical progenitors who were more or less cursory in their collection of evidence as discussed in the earlier chapters. Blair (2006: 41) summarizes Wittgenstein's role in the consolidation of the hypothesis of linguistic relativity by asserting that

> what Whorf discovered by intuition, Wittgenstein came to after a long and intense reexamination of his own early work: and the fragmentary evidence that Whorf gathered to support his conjecture about linguistic relativity paled in comparison to the myriad examples that Wittgenstein marshalled in his attempt to show the relationship between language and thought.

Wittgenstein's contribution to the revival of linguistic relativity has a lot to do with his famous quote "The limits of my language mean the limit of my world" which compellingly and, at the same time, warningly summarize how the limits of one's language delineates the limit of the reality one can experience since, as his philosophical insight has penetrated into the very nature of the capability of language, representations in language "mirror the reality they represent" (Mark 2006: 37). Reciprocal as it may be, this can present numerous philosophical questions like 'The more sophisticated one's language, the more profound one's understanding of the things happening in the world', 'Our knowledge functions only within the range of the capability of our language' or even such drastic or seemingly naïve ones like 'Can we change the society for the better by maneuvering our language?' or 'Is it possible for the society to be brighter and more pleasant to live in if it can manage to slash the official circulation of words that have negative images in them by illegalizing them?' Absurd the afore-mentioned hypothetical questions may be, those questions cannot be completely meaningless or ridiculous in that they may be able to capture the attention of the public and work as a grass-root mechanism for the utilitarian applications of linguistic relativity to the general public's life. As was strongly insinuated by Wittgenstein (Stern 1995: 17), linguistic relativity paved the way for the inevitability of philosophical language development as a counteractor since the job of philosophy is not explaining or deducing but indeed describing. Even through the consideration beyond the framework of linguistic relativity, it seems to be valid to say that without language it is impossible, in the first place, to explore our experience of the world philosophically. If this arguable norm can pass the test and thus is completely exempt from controversy, is it also valid to say that many of the equivocal philosophical dilemmas are actually and closely related to the philosophers' efforts to describe the phenomena with the language that is not mature or sophisticated enough to address them? In other words, is it more precise to say that, though we have managed to pin down many of our experiences in the world with a potent tool, namely language, are we not capable yet of successfully dealing with them with this tool that needs to be further honed for the sake of more demanding tasks?

Also, as commonly acknowledged, different philosophers of different eras and regions interpreted the same philosophical issues differently in quite a few cases, suggesting the possibility of the impact of the regional, cultural or historical difference on the formation

of different philosophical notions, which in turn strongly suggests the plausibility of the impact of language difference of the philosophers on those different interpretations. To quote Wittgenstein again, philosophy does the job of describing things, not explaining or interpreting them in fact and we think with our language to a large extent (1958: 227). If Wittgenstein's notion was right and each of the philosophers just did the job of describing things their reasoning allowed them to approach, then we may inevitably reach a hypothetical conclusion that the more philosophical descriptions that are done in different languages we collect, the better we may be able to reach the bottom of the persistently elusive philosophical issues that humanity has tackled throughout its history. To illustrate, there is a comparative research done on the different perspectives between Eastern cultures and Western cultures. Megumi and Smith (2012: 21), through their comparative analysis of cognitive abilities between Japanese children and American children, provide compelling research findings on cross-cultural differences in cognitive faculty. Their hypothetical conclusion that Western cultures and Eastern cultures have differences in the degree of their emphasis on contextualization and decontextualization when interpreting objects can not only explain why people in Eastern cultures are more relation-oriented while people in Western cultures are more object-oriented at a cognitive level but also account for how their different cognitive inclinations are preconditioned by their languages (2012: 32). One can be tempted to consider, motivated by the hypothetical conclusion drawn by Megumi and Smith, if Eastern philosophers' preoccupation with seeking balance between individuality and nature along with individuals' duty in the society and Western philosophers' preoccupation with finding absolute truth along with individuals' rights have anything to do with Easterners' relation-oriented cognitive inclination and Westerners' idiosyncratic object-oriented cognitive inclination respectively. In turn, comparative research on the degree of contextualization and decontextualization between Eastern languages and Western languages may be able to gain impetus as a piece of highly feasible undertaking.

Last but not least, one can be reminded of Boroditsky (2001: 20)'s hypothetical conclusion that language is most likely a potent implement for giving rise to abstract thought, especially in the milieu in which sufficient or conclusive sensory information is not available. Though her assertion (2001: 20) that "languages may play the most important role in shaping how their speakers think" is more or less controversial, virtually every piece of noteworthy

experimental research on the hypothesis of linguistic relativity seems to suggest that language underlies, if not directly triggers, the formation of ‘abstract’ thought which is, without doubt, at the core of philosophical mind. In a sense, it seems to indicate the viable directions in which future experimental research on the hypothesis of linguistic relativity needs to be launched. If it is possible to figure out how different languages have different degrees or ways of describing various conceptualized phenomena, experiences or observations which are highly abstract, then it may be possible to make philosophical mind more flexible and more versatile in the issues whose nature is expected to be unveiled only with the sophistication of language tackling them.

All in all, research on the impact of language on one’s thought is especially important when the thought is related to philosophical ones given that it seems to be practically impossible without the consideration of power of language to embark on philosophical exploration of various life issues. Also, given the fact that philosophy is, by nature, a matter of description, not a matter of interpretation or explanation, philosophical exploration of various life issues seems to be, in the first place, contingent upon the language that is the actual vehicle of our thought. In a sense, if it is taken for granted that the sophistication of our languages and our insightful explorations of philosophical issues are reciprocal, it seems to be necessary to figure out, both with our accumulated knowledge on linguistic relativity and with new research specifically aimed at the exploration of this issue, how philosophical minds can be ‘differently’ affected by the ‘different’ languages with which they are laden.

11. Conclusion

Ever since the strong version of linguistic relativity was discarded in academia, a balanced view of linguistic relativity has been supported by most of the linguists who claim that language does not influence certain kinds of cognitive processes in trivial ways but works as a pivotal factor upon which other factors, which are quite universal, hinge. The comparative review of the several pieces of noteworthy experimental research that has been done so far strongly indicates that our language does impact our mental activities to such a degree that it can legitimately claim scholastic concerns. However, it may be still undeniable that the findings of the hitherto-made experimental research are too tantalizingly fragmentary to work

as potent pieces of evidence that can lend sufficient weight to the hypothesis of linguistic relativity as a worthwhile research topic.

However, in the milieu in which quite a few pieces of experimental research on the relevant topics and hypotheses in question are being done as discussed in the chapter that introduced hazardous impact of discontinuous language on thought and subsequently in the chapter that featured several tertiary issues concerning the hypothesis in question, it is expected that copious pieces of 'evidence' regarding linguistic relativity will be gushed out to us in the foreseeable future. In other words, various pieces of ongoing and upcoming experimental research may provide us with their outcomes in which we can find strong evidence of linguistic relativity sooner or later, as long as they invariably focus on exploring the ways in which language influences thought and, often collaterally, on estimating to what extent language conditions thought. Nonetheless, it still seems to be irrefutable that it is literally hard and, in a sense, may be impossible to precisely figure out 'how' language we employ affects our thought and worldview and 'how much' it influences our thought, as almost all the findings of the hitherto-conducted research show only fragmentary influences of language on various elements that are involved in our thought-related activities and future research on this topic may not vary so much in this respect. This, however, may be attributed more to the very attribute of language than to any possibility that its role in thought formation is haphazard or inconsequential, all things considered.

Ultimately, what lies in the future research that needs to be done by those who are concerned with the hypothesis of linguistic relativity, in this regard, may be to illuminate the mechanism of linguistic relativity with the aid of other disciplines such as neuropsychology. Given that the study of its mechanism, despite the possibility that its findings can be a clue to learning the extent of the impact of language on thought and worldview, can hardly be done without the help of other disciplines, it seems to be necessary to garner more insightful interdisciplinary expertise in its research. As I presented through the various traces of the likely impact of language on thought and worldview that are immediately observable in our daily social interactions, expanding the boundaries of the experimental research and then putting together the fragmentary findings by having relevant scholars in other disciplines join this project may make it possible to sublimate the crude findings in worthwhile knowledge.

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