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**Boroditsky's Multiple
“Encapsulated Universes”**

*The Sapir-Whorf hypothesis
(pro and contra)*

BA Essay

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Abstract

The central aim of this study is to establish if there is credibility to Lera Boroditsky's (2013) claim that we live in multiple "encapsulated universes". The weak version of the Sapir-Whorf hypothesis is considered with reference to the various conceptualizations of space and time. A key objective is to read a wide range of research from several reliable sources, that provide testimony for the theory of linguistic relativity. A further objective is to examine the inquiry borne out by other scholars who disagree with the theory of linguistic relativity. An ultimate objective is to analyze the contentions on both sides of the debate, drawing conclusions to determine which claims are most convincing. The study is conducted employing secondary research. These sources included journal articles, newspaper articles, interviews, podcasts, presentations and lectures. This type of comparative study is deemed to be the most fitting and likely to yield the best results. Consequently, this study found that there is indeed subtle evidence that exposes language affecting thought in certain ways. For example, Boroditsky & Gaby (2010) found that there is a remote Australian tribe who perceive direction with an alternative approach compared to Western thinking. While, Nunez et al. (2012) found that there is a community in Papua New Guinea that does not utilize the linear Western concept of time. Whereas Boroditsky, Fuhrman, & McCormick (2011) established that Mandarin speakers conceptualize time vertically rather than horizontally. However, other scholars, such as Pinker (2007) in *The Language Instinct* and McWhorter (2014) in *The Language Hoax*, argue that although it is important to discuss these subtle findings, the structure of language does not give a researcher an insight into how individuals perceive the world in any meaningful way. Finding statistical tendencies is essentially academic, while claiming multiple encapsulated universes is unreasonable. Languages vary because of historical happenstance and because of each language's individual and unlimited creative potential. The reality is there is only one human cognition and how languages vary does not demonstrate anything profound about how cognition varies.

Keywords: Sapir-Whorf hypothesis, language, thought, culture, linguistic relativity, linguistic determinism, the conceptualization of space and time cross linguistically, metaphor.

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1 Introduction

The concept of linguistic determinism has been on the linguistic agenda since 1929. Revelations by Edward Sapir and later expanded by Benjamin Lee Whorf, indicated, that the structure of a language determines its speaker's experience of the world. In his seminal book *Language, Thought and Reality* (1956), Whorf arrived at this conclusion after he had studied the Native American Hopi tribe. Whorf found that the Hopi have no overall sense of the present, future and past. Subsequently, the Hopi were believed to observe, and experience time differently compared to Western thinking. Whorf was an advocate of linguistic determinism - the notion that language regulates how its speakers think about the world. However, most contemporary linguists no longer believe in the strong notion of linguistic determinism, such as Pinker (2007) and McWhorter (2014) as the theory was debunked by Ekkerhart Malotki (1983) when he published a dictionary that proved the Hopi tribe do indeed have vocabulary relating to time.

Still, contemporary scholar, Lera Boroditsky (2010a, 2010b, 2010c, 2011, 2013, 2017 & 2018) has reasserted a softer claim that languages can heighten or lessen specific ways of thinking. Indeed, it is apparent that various cultures use languages in diverse ways. However, does this mean that people think differently as a result of the language they speak? As detailed in Boroditsky & Gaby (2010c) there is a remote Australian tribe who perceive direction with an alternative approach compared to Western thinking. Furthermore, Nunez et al. (2012) found that there is a community in Papua New Guinea that does not utilize the linear Western concept of time. Whereas Boroditsky, Fuhrman, & McCormick (2011) discovered that Mandarin speakers conceptualize time vertically rather than horizontally. Moreover, in a conversation with Edge.org, Boroditsky (2013) positioned that each language presents "a whole encapsulated universe". Some of which are comparable and some of which are extraordinarily distinct. According to Amazon.com and Bookdepository.com, Lera Boroditsky is expected to release a book in 2021 titled *7,000 Universes: How the language we Speak Shapes the Way We Think*. The subject matter of this book is ostensibly based on the experiments Boroditsky has conducted over the past several years. The purpose of Boroditsky's research is to demonstrate that language does indeed affect the way people perceive their environment. Until the release of this work, this thesis will examine several pieces of published research by Winawer & Boroditsky (2007), Boroditsky & Gaby (2010c), Boroditsky, Fuhrman, & McCormick (2011) Segel & Boroditsky (2011) and Fedden & Boroditsky (2012). The focus will principally

be on how distinct languages and cultures view the relationship between space and time. The aim is to determine through alternative linguistic perspectives, whether there is any credibility to Boroditsky's claim. The claim is that different perceptions of space and time, expressed through language, proves that language shapes the way people think.

2 Aims

The central aim of this study is to establish if there is any reliability to Boroditsky's assertion that language shapes the way a person thinks. This notion is considered with reference to the various conceptualizations of space and time. A key objective is to read a wide range of research held by several dependable sources, that provide testimony for the theory of linguistic relativity. A further objective is to examine the inquiry borne out by other scholars who disagree with the theory of linguistic relativity. A final objective is to analyze the contentions on both sides of the debate, drawing conclusions to determine which claims are most convincing.

3 Methods

3.1 Research question

Lera Boroditsky (2010a, 2010b, 2010c, 2013, 2017, 2018) has contended that distinct languages can enhance or reduce specific ways of thinking. Boroditsky (2013) positioned that each language presents "a whole encapsulated universe". Therefore, the planet has around 7,000 parallel worlds, some of which are similar and some of which are particularly distinctive. This study aims to evaluate the work presently available that offers support for the theory of linguistic relativity. The initial proposal is to discuss what evidence Boroditsky has found to support her theory, including aspects of space, time, color, gender, number and size. However, after finding a plethora of information, the thesis question was then narrowed down. The thesis then continued to focus specifically on how languages and cultures view the relationship between space and time. This narrowing is not because other evidence found is irrelevant. The reason is simply to be able to cover an in-depth review and analysis within the limits of this thesis. Therefore, through alternative linguistic perspectives, the main aim is to determine if there is any credibility to Boroditsky's (2018) assertion: that people who speak different languages perceive the concepts of space and time differently; Accordingly, the languages people speak helps shape the way they think.

3.2 Approach

The study is conducted employing secondary research. These sources include journal articles written by Boroditsky (2007, 2010c, 2011, 2012) both individually and in collaboration with other scholars. This research also included newspaper articles, interviews and lectures (210a, 2010b, 2013, 2017, 2018). These sources provide evidence for the relationship between language and thought. Once the research by Boroditsky has been examined a further process is to examine research borne out by other researchers who disagree with the weak version of the Sapir-Whorf hypothesis. Namely John McWhorter (2014 & 2018) and Steven Pinker (2007 & 2018). This research included published books, podcasts, secondary interviews and lectures. The proposal is to examine contrasting studies for agreements and disagreements and to evaluate the main points critically. Ultimately, the thesis would provide analysis and arrive at conclusions ascertained from the study. These conclusions would ideally be linked to practical examples from everyday experience and demonstrate why this study is significant.

3.3 Rationale

The justification for conducting a study that analyzed both sides of the linguistic relativity argument is to examine the points of contention from an impartial standpoint and to determine what arguments were most convincing. Secondary research is chosen because as an undergraduate student in linguistics, there is a need to investigate the fundamental arguments of linguistic relativity and gain considered insight as a starting position. Furthermore, this type of comparative study is deemed to be the most fitting and likely to yield the best results from research. The knowledge, practice and understanding gained from such research could then lead to further investigation making use of other methods of research.

3.4 Evaluation

There is an appreciation that no research methodology is flawless. Focusing on only secondary research has meant that there will be no original data collected for this thesis. However, there is a plan to overcome this originality downside. This will be achieved by providing measured analysis, by making use of everyday examples taken from personal experience and to establish a strong command of the subject area using a robust voice. Additionally, a comparative thesis will not deliver an all-encompassing examination of the subject area. However, this study will serve the purpose of providing insight into the main principles of linguistic relativity.

Furthermore, this study will illustrate the processes and considerations of contemporary scholars in their endeavors to discover how language works through scientific principles and practices.

4 Main Outcome Measures

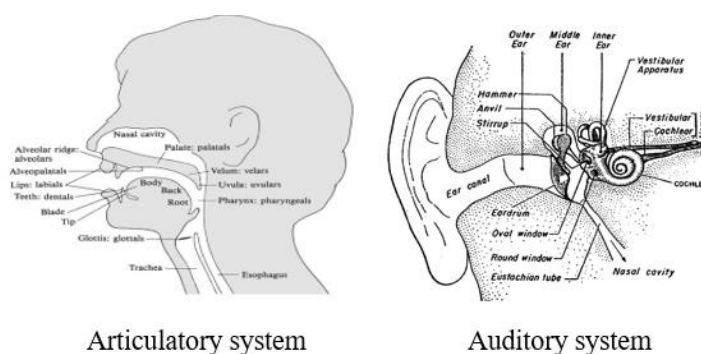
The aim of the study is achieved if the following testable objectives are reached:

- i. Establish that a broad range of reliable sources have been examined that provides testimony for and against the theory of linguistic relativity (see sections 5.1, 5.2, 5.3, 6 & works cited).
- ii. Analyze the work of Lera Boroditsky and provide evidence that supports the assertion that different perceptions of space and time shape the way a person thinks (see section 5.2).
- iii. Explore and probe the challenges presented by other scholars who disagree with the theory of linguistic relativity (see section 5.3).
- iv. Consider critically the theories expressed on both sides of the discussion and voice which claims are convincing (see sections 5.2, 5.3 & 6).
- v. Draw measured conclusions based on the information uncovered during the study (see section 6).
- vi. Demonstrate a level of personal acumen in contemporary linguistics, especially concerning the theory of linguistic relativity and how language works (see section 5.1, 5.2 & 5.3).
- vii. Deliver an individual contribution, analysis and interpretation that contributes to the subject area (see section 5.1, 5.2, 5.3 & 6)
- viii. Reveal why this research is necessary and whether there are further questions that need to be addressed (see section 3.3, 5.1, 5.2 & 5.3)

5 Results

5.1 About language

Initially, it is necessary to talk about what language is, before this paper discusses what it is not. When a person speaks, they produce a variety of sounds using their articulatory system (lips, glottis, teeth, tongue). The articulatory system creates acoustic air vibrations that send a coded message to a listener's auditory system. When those vibrations hit the eardrum, they then send a signal to the brain that reconstructs those coded signs into thoughts.



Articular system

Auditory system

This phenomenon is a miraculous and sophisticated skill in which only humans are innately endowed. This inherent capability helps humans learn the vocabulary and grammar of a language with virtual ease. Once a person has learned their language, communication is accomplished by mixing and manipulating a finite quantity of vocabulary in order to generate an unlimited set of new meanings.

Dubinsky (2011) reveals that if one considers that the vocabulary of the average college graduate is between 65,000 to 75,000 words and any one of these words might be used to make up a sentence that can vary in length. Therefore, it can be concluded that the human language is a communication system capable of producing an infinite number of possible outcomes (p.16). People are continually producing and hearing sentences they have never produced or heard before. This is known as linguistic productivity. For example, the following sentence is taken from a British comedy television series *A Bit of Fry and Laurie*, written by and starring Stephen Fry and Hugh Laurie, broadcast on the BBC between 1989 and 1995:

“Imagine a piano keyboard, eighty-eight keys, only eighty-eight and yet, and yet, new tunes, melodies, harmonies are being composed upon hundreds of keyboards every day in Dorset alone’

However, this is only one language. There are around seven thousand languages spoken globally and countless other languages that have been spoken in the past. A speaker is required to realize the set of complex rules that govern the language if they are to become proficient. In other words, they must know the essential rule-based codes of the language in order to transfer their thoughts in any meaningful way. These rule-based structures vary significantly between languages. They differ in the arbitrary signifiers (words) ascribed to their signifiers (objects/notions). They differ in what sounds a language can produce and in what combination or order those sounds can be formed. Additionally, they differ in their linguistic typology or structural features such as phonemes, morphemes, lexemes and syntax as well as their

grammatical rules and features such as number, person and tense. Consequently, it can be determined that language is a phenomenon that is incredibly sophisticated with many areas to consider. O'Grady et al. (2011) assert that:

"All languages have grammars that are equal in their expressive capacity, and all speakers of language have (subconscious) knowledge of its grammar. The existence of such linguistic system in humans is the product of unique anatomical and cognitive specialisation not found in other species" (p.14).

Consequently, given language is "a unique anatomical and cognitive specialisation" and providing human beings have "equal expressive capacity". Does this mean that different languages allow people to use their cognitive skills in equally complex but different ways? The next chapter will survey how different cultures utilize language to perceive space and time.

5.2 Multiple "Encapsulated Universes"

The issue concerns the very elaborate and differing structures that exist between languages, and if these different structures make people think about the world from very different vantage points. Some researchers, as will be revealed, say that everybody looks at the world similarly (see section 5.3). For example, if a person speaks a language that does not mark tense or gender or number, or if a person conceives time as moving in a particular direction, then perhaps, those speakers still pay attention and consider all these varying aspects of language - but choose not to express it. This suggestion establishes the primary contention; could it be that everyone is aware of all these different aspects of language to the same degree. In a lecture for the School of Advanced Research, Boroditsky (2017) asserted that this is not the case. Because rationally this requires that each person is obliged to consider every one of the different items that are incorporated in every one of the 7,000 languages spoken around the planet (SAR). If this were valid, then it would mean theoretically that each person must realize and decode a very sizeable corpus of data at any given time. Lera Boroditsky (2017) contends, that results from psychology experiments have revealed that a person's attention to detail and what they can recall at any given moment is inadequate for such a momentous task (SAR). Therefore, if a person cannot possibly contemplate all the humanly possible ways to talk about the world using language, then it must be true that people "attend" to the world in distinct ways.

Boroditsky (2010a, 2010b, 2010c, 2011, 2013, 2017 & 2018) has conducted experiments to ascertain whether there is any scientific evidence to prove that language shapes how a person thinks. Through these experiments, Boroditsky uncovered new-found data concerning how

people perceive time and space that gives testimony to the theory of linguistic relativity. The following will be a discussion on what has been revealed from such experiments.

5.2.1 Knowing Left from Right!

Time is a nontangible notion that is conceptualized relative to space. It is used every day by languages and cultures all over the world. *Metaphors We Live By*, by Lakoff and Johnson (1980) explored the ability of metaphor to generate new meaning. Lakoff (1980) theorized that the concept TIME AS SPACE is so prevalent because people need tangible concepts such as space to think about time. This conceptualization is the same way people think about LIFE IS A JOURNEY, and the MIND IS A MACHINE.

Furthermore, Boroditsky (2017) asserts that "time" is the number one noun employed in English with "year" and "day" both in the top five most frequently used nouns, respectively. Consequently, the study of how various languages conceptualize space and time is important because it is fundamental to human experience and expression. It is something all cultures and languages do, in often distinctive ways, and therefore reveals something about the human condition.

Boroditsky (2010b) reveals that native English speakers are likely to conceptualize and then organize a series of events from left to right (p.1). Boroditsky (2010b) suggests that this organization is because English speakers write from left to right (p.1). However, if a person speaks a language such as Hebrew or Arabic, then events are organized in the opposite direction, from right to left - for the same reason. Consequently, speakers of different languages can visualize the ordinary concept of time in varying ways. Boroditsky (2010b) contends that the written form of language affects how speakers' sequence events in their minds, thereby, validating the idea that language shapes the way a person thinks (p.1). Although, it must be acknowledged that most languages do not have written forms and therefore speakers of non-literate cultures must be conditioned in another way to conceptualize and think about time.

Genesis

Chapter 1

<p>א בראשית ברא אלהים את השמים ואת הארץ :</p> <p>ב והארץ היתה תהו ובהו וחשך על-פני תהום ורוח אלהים מרחפת על-פני המים :</p> <p>ג ויאמר אלהים יהי אור ויהי-אור :</p> <p>ד וירא אלהים את-האור כי-טוב ויבדל אלהים בין</p>	<p>1 In the beginning God created the heavens and the earth.</p> <p>2 And the earth was waste and void; and darkness was upon the face of the deep; and the Spirit of God moved upon the face of the waters</p> <p>3 And God said, Let there be light: and there was light.</p> <p>4 And God saw the light, that it was good; and God divided the light from the darkness.</p>
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Hebrew writing ordered from right to left.

English writing ordered from left to right.

sarshalom.us

5.2.2 The Future is Behind us!

Furthermore, English speakers perceive that the future is ahead, and the past is behind. One theory is that a person walks forwards and not backwards; therefore, people are travelling in a forward direction. Nunez & Sweetser (2006) state that:

“An English speaker, for example, might gesture forward for the future, and point at the ground in front of his or her feet while saying right now; these are part of a general deictic timeline, with future metaphorically located in front and past in back of speaker” (p. 422)

Nevertheless, it appears that in some languages the future is not in front in the same way as in English. In Aymara, a language spoken in the Andes of Chile, Bolivia and Peru, the future is behind. Nunez & Sweetser (2006) found that an Aymara speaker motions to the front when talking about the past and motions behind when talking about the future:

“Aymara speakers’ gestures provide further evidence that their construal of time involves a FUTURE IS IN BACK OF EGO (and PAST IS IN FRONT OF EGO) mapping” (p. 422).

For Aymara speakers’, this conceptualization of past and future is perfectly logical. In Aymara, the past has been observed and experienced, whereas the future has not been observed or experienced. Therefore, the past is located forward in a position where the eyes can see. While the future is located behind in a position where the eyes cannot see. This conceptualization of time is certainly different compared to a Western perspective. Below is a photo of an Aymara speaker pointing forward representing the past and pointing down to represent the present.

R. E. Núñez, E. Sweetser/Cognitive Science 30 (2006)

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Fig. 11. Example of a pointing gesture opportunistically using the tip of a tool (a musical instrument). It is coproduced with the Aymara expression *aka maran* (“this year”), pointing straight downward, and marking colocation with ego.



Fig. 12. Example of a right-hand index finger pointing gesture contrasting past times *antes* (“before”) and *ahora* (“now”).

5.2.3 The Past is Up in the Air!

Additionally, it has been found that some cultures conceptualize time not on a horizontal axis but instead on a vertical axis. Boroditsky, Fuhrman, & McCormick (2011) state that Mandarin speakers realize time on a vertical axis; pointing upwards to signify the past, and downwards to signify the future. Earlier Radden (2003) found that: "shànyuè (up.month) means 'last month' and xiànyuè (down.month) means 'next month'" (p. 228). This evidence demonstrates that the way English speakers map time, from source to target domains, is not the only way to conceptualize time.

Moreover, speakers are conditioned to think about time orientated by prominent landmarks or landmasses in their local. It is believed that the Yangtze river plays a historically and culturally significant role to Mandarin speakers. This tendency is not uncommon. Rivers are often essential lifelines for many communities - allowing people to travel, trade and communicate. For example, Estuary English is an instance of how the people living along the River Thames, London, speak with a similar dialect. This demonstrates that landmarks can influence the culture and language of the people that live beside them.

To Mandarin speakers downstream is regarded as the future and upstream regarded as the past. This conceptualization of future and past corresponds to how biology uses these terms. According to the *Oxford Dictionary of English* (2010) in biology upstream signifies being "located in or towards the part of a sequence of genetic material where transcription takes place earlier than at a given point" (p.1956). Therefore, describing an occurrence that happened earlier in a series of events. Whereas according to the *Oxford Dictionary of English* (2010) downstream signifies being "situated in or towards the part of a sequence of genetic material where transcription takes place later than at a given point" (p.528). In other words, if a person's current location is EGO and EGO IS PRESENT, then upstream is an event that happens in the future.

Furthermore, after receiving some criticism relating to how her previous experiments were conducted, Boroditsky, Fuhrman, & McCormick (2011) organized additional experiments and again found that "English and Mandarin speakers differ in their representations of time" (p.430). Boroditsky, Fuhrman, & McCormick (2011) found that when asked to point, in order to signal directions, English speakers used a horizontal axis 95% of the time, whereas Mandarin speakers used a vertical axis 42% of the time. Therefore, Mandarin speakers were eight times more inclined to think about time vertically than horizontally. Boroditsky, Fuhrman, & McCormick (2011) also revealed that even when the test is conducted in English, native

Mandarin speakers produced "vertical arrangements" 37% of the time. Furthermore, Boroditsky found that the direction in which people write can no longer be the reason for this phenomenon. Mandarin speakers who write the same way as English speakers, from left to right, are still seven times more likely to think about time on the vertical axis.

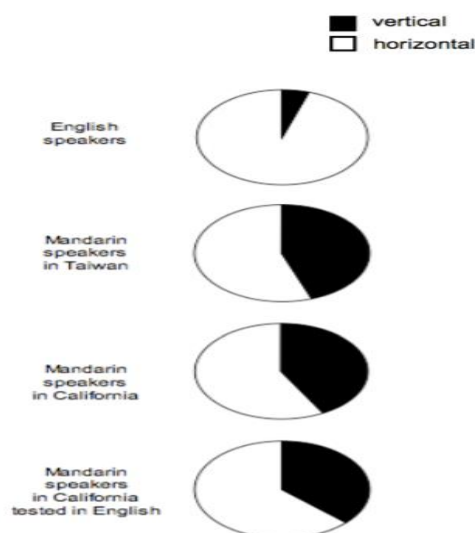


Figure 2: Patterns of spatial layouts of time in the 4 groups tested in this study. The charts show proportions of vertical and horizontal layouts produced by subjects.

Boroditsky, Fuhrman, & McCormick (2011)

5.2.4 Never Eat Shredded Wheat!

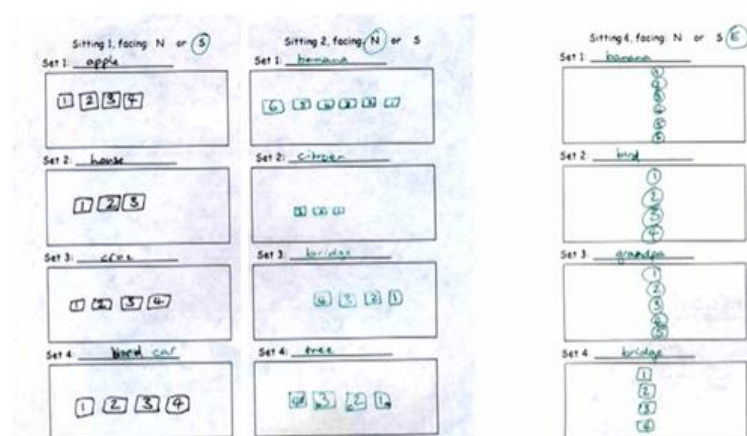
Time does not have to move relative to the body. Boroditsky & Gaby (2010c) investigated the language of the Aborigine Pormpuraw tribe. This tribe live in north Queensland Australia and speak the language Kuuk Thaayorre. Moreover, relating to directions Boroditsky & Gaby (2010c) found that:

“indigenous languages don't use terms like "left" and "right." Instead, everything is talked about in terms of absolute cardinal directions (north, south, east, west), which means you say things like, "There's an ant on your southwest leg." To say hello in Pormpuraaw, one asks, "Where are you going?", and an appropriate response might be, "A long way to the southsouthwest. How about you?" If you don't know which way is which, you literally can't get past hello” (p.1).

Boroditsky & Gaby (2010c) experimented by giving the Kuuk Thaayorre speakers an assortment of images that exhibited chronological sequences. For example, a picture of a man from young to old or food being consumed such as a whole piece of fruit to the fruit having been eaten. Boroditsky & Gaby (2010c) asked natives of Pormpuraw to organize the

rearranged pictures on the floor to demonstrate the chronological sequence that they thought is accurate. Boroditsky & Gaby (2010c) unearthed that for Kuuk Thaayorre speakers:

“seated facing south, time went left to right. When facing north, right to left. When facing east, toward the body, and so on. Of course, we never told any of our participants which direction they faced...[they] not only knew that already, but they also spontaneously used this spatial orientation to construct their representations of time” (p.2).



Boroditsky & Gaby (2010c). Psyche Science.

Therefore, Kuuk Thaayorre speakers always arrange time from east to west. When a person changes direction, time does not change direction with them. For English speakers', every time a person moves their body, time changes direction in an egocentric manner (left to right). Therefore, time is perceived as acting in a different direction relative to the direction they are facing. If two people are standing face to face, then time travels in a different direction for each of them. For Arabic and Hebrew speakers, this will be from right to left - equally their perception of time changes as they turn their bodies. Boroditsky (2017) states that for Kuuk Thaayorre speakers, time always travels in the same direction, regardless of which direction they are facing (*TEDWomen*).

Consequently, it has been found that time does not have to travel in relation to the body. Time can travel with reference to the environment in which a person inhabits. According to Boroditsky (2010b) this distinctive way of looking at time is not a linguistic happenstance. Boroditsky (2010b) contends that almost a third of all languages depend on cardinal directions to realize space (p.1). By acquiring such languages, native speakers learn to be particularly skilled at navigating and maintaining a trail even over new-found terrain. This aptitude occurs to such an extent previously thought to be beyond human skills. In a presentation, Boroditsky (2017) said that there is:

“a big difference in cognitive ability across languages, where one group does not know which way is which [the audience] and another group, I could ask a 5-year-old, and they would know” (TEDWomen)

Boroditsky (2017) further asserts that the different ways of perceiving time and space, through language, demonstrates that some languages allow a person to perform tasks that people who speak other languages cannot accomplish. Boroditsky (2017) contends that specific languages do not allow a person to think in a certain way that is conducive to performing such tasks.

5.2.5 A Landmark Case!

Furthermore, time does not have to travel in a straight line. Nunez et al. (2012) writes that for the people living in Gua village of Papua New Guinea, time slopes down the mountains into the village in one direction and as soon as it reaches the village it turns and leaves the village in a different direction.

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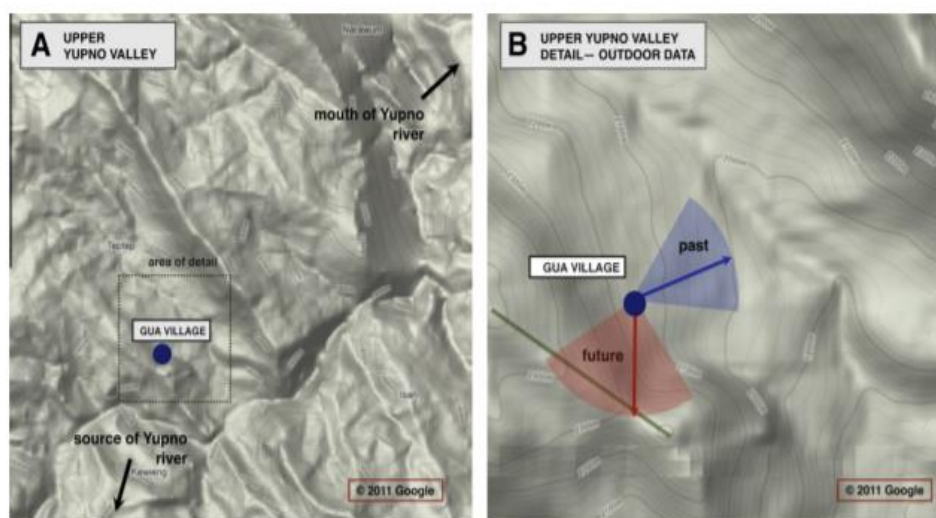
R. Núñez et al. / *Cognition* 124 (2012) 25–35

Fig. 2. The topography of the Upper Yupno valley surrounding the village of Gua. (A) Shows the approximate directions of the source and mouth of the Yupno river. (B) Shows a detail of the Gua area with mean pointing directions for past- and future-category gestures produced outdoors, including 95% confidence cones (based on 1000 parametric bootstrap estimates). The past points downhill through the elevation lines towards the mouth of the river. The future points uphill towards the closest mountain ridge (green line), in the direction of the Yupno river's source. Strikingly, the Yupno spatial construal of past and future reflects the local topography and is not organized in terms of the usual opposite directions along a line. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

Nunez et al. (2012) maintains that this happens because time is related to the source and mouth of the local river Yupno. An important cultural location for the people of Gua village. This study demonstrates that conceptualizing time linearly, is not the only approach. Nunez et al. (2012) writes that:

“Results show that the Yupno spontaneously construe deictic time spatially in terms of allocentric topography: the past is construed as downhill, the present as co-located with the speaker, and the future as uphill. Moreover, the Yupno construal is not linear, but exhibits a particular geometry that appears to reflect the local terrain. The findings shed light on how, our universal human embodiment notwithstanding, linguistic, cultural, and environmental pressures come to shape abstract concepts.” (p.25)

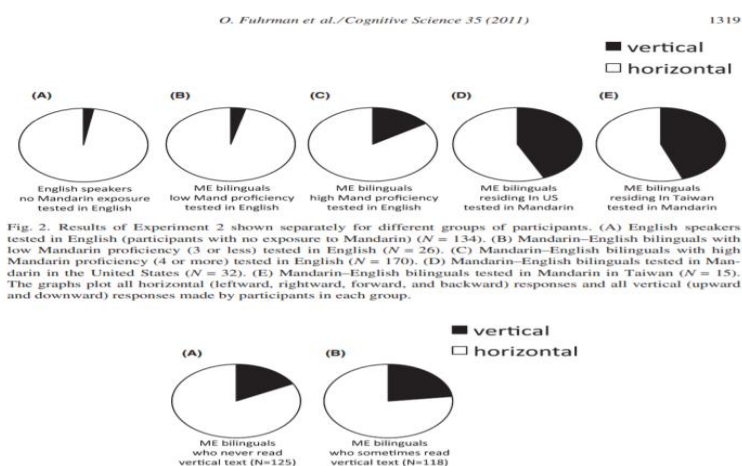
Moreover, Emslie (2016) in an online article for National Geographic writes:

“Such environmentally based systems for orientation are not uncommon. They can be found in indigenous languages in the Arctic, the Amazon, and the Himalaya, and various cultures embrace contrasts such as upriver/downriver or landward/seaward”

Therefore, contrasting how distinct cultures perceive time in a variety of ways, may well lead to the notion that language is shaping how time is perceived. However, it plausibly could also be that cultural traditions and topography is establishing those distinctions.

5.2.6 New Way, New Thinking!

Boroditsky, Fuhrman, & McCormick (2011) conducted an experiment where English speakers were taught new ways to talk about time. English speakers normally think about time on a linear horizontal axis. According to Boroditsky (2017) the experiment encouraged speakers to think about time on a vertical axis instead (SAR). As a result, English speakers were brought into the laboratory and taught new Mandarin metaphors for time. After they had learned this new way of thinking about time, they began to use it in conversations. The test subjects were then assessed to see if they had begun thinking in this new way. Boroditsky, Fuhrman, & McCormick (2011) found that this is what happened precisely. When people learned to talk in a new manner, they began to think in a new manner (p. 429). Boroditsky (2017) asserts that this demonstrates that language has a “causal power”; in other words, a person can change the way they think by embracing the metaphor system of another language (SAR).



As specified, Boroditsky (2010c & 2011) has conducted research to ascertain whether there is any scientific evidence to prove the theory of linguistic relativity. Through these experiments, Boroditsky has found some evidence to demonstrate that language does indeed affect the way a speaker thinks. Nevertheless, this thesis has only examined the evidence regarding the conceptualization of space and time in various languages. Yet, it must also be noted that Boroditsky (2010a, 2010b, 2013, 2017 & 2018) has uncovered further evidence relating to gender, color and sense of blame. These studies reveal notable differences between speakers of different languages. These articles and lectures are well worth attention and indicate that language positively affects thought to some extent. However, the next chapter will reveal what precisely this experimental evidence exposes about the relationship between language and thought. It will reveal whether Boroditsky's (2017) claim that "human minds have invented not one cognitive universe, but 7,000" stands up to scrutiny.

5.3 Linguistic Relativity: The Challenge

To begin this chapter, and as a reminder, here is the famous quote from Benjamin Lee Whorf from 1956 that has caused much debate ever since:

“We dissect nature along lines laid down by our native languages...We cut nature up, organize it into concepts, and ascribe significances as we do, largely because we are parties to an agreement to organize it in this way—an agreement that holds throughout our speech community and is codified in the patterns of our language. The agreement is, of course, an implicit and unstated one, but its terms are absolutely obligatory; we cannot talk at all except by subscribing to the organization and classification of data which the agreement decrees” (Whorf et al., 2012).

In other words, Whorf believed that language controls the way a person thinks, known as linguistic determinism. Both John McWhorter (2014) in *The Language Hoax* and Steven Pinker (2007) in *The Language Instinct*, contend that it is important to analyze the arguments put forward by proponents of the Sapir-Whorf hypothesis; in that, they both find the theory to be erroneous. Such scrutiny will help people to understand how language works, its relationship with thought and most importantly, how culture and environment play a significant role in shaping thought. McWhorter (2014) argues that dissecting nature up into “obligatory subscriptions” or the idea that humanity is divided into 7,000 encapsulated universes is false:

“no one would deny that human cultures are quite diverse, nor would anyone deny that the diversity means that humans of different groups experience life differently. However, language structure is not what creates this difference in experience” (p.27).

Additionally, given that the strong version of the Sapir-Whorf hypothesis is not a widely held view in linguistics, the following chapter aims to provide argumentation on why even the weak version of the theory (linguistic relativity) is problematic.

5.3.1 Knowing Left from Right!

As previously discussed (see section 5.2.1), native English speakers are likely to organize a series of events from left to right. In an interview, Steven Pinker (2018) emphasizes that there are languages and cultures where left and right are not as important as they are to English speakers. This occurrence tends to happen in languages that do not have a written form. In English, a speaker must continuously pay attention between left and right because that is the way a person reads. Furthermore, it must be noted that written language is not a language in of itself. Children do not have a natural tendency to read or write - they must be shown how to, through formal education. However, children have a natural tendency to speak. Therefore, written language cannot be used as an example of how people conceptualize their universe, because children are employing language before learning to read or write. Children in literate cultures are then conditioned to conceptualize a sequence of events following their writing system. Therefore, it is not language affecting how sequences of events are orientated, but rather, it is the result of a culturally learnt behavior. In an interview, Pinker (2018) replied that:

“what people do not reason through is that you have got a convent, you have got a particular culture, you have got an ecosystem, you have got a language, and you have got some cognitive differences...why are you sure that it is the language that causes the cognitive differences? As opposed to the often-massive differences in the ecology and lifestyle” (Language and Progress).

Furthermore, Pinker (2018) suggests, that cognitively, virtually all animals easily confuse left from right: “there is nothing to differentiate left from right other than human artefacts such as letters of the alphabet or automobiles.” He uses an example of a photograph, where if one turned a photograph upside down then immediately a person would know it is upside down. However, if the photograph were mirror-reversed (flipped), unless it had writing on it, then that person would probably not be able to tell that it is orientated differently. Pinker (2018) claims that:

“we never confuse up and down and most languages do not distinguish between left, and right. So it is not surprising that non-literate cultures do not have a front or behind, a left and a right” (Language and Progress).

5.3.2 The Future is Behind us!

English speakers perceive the future to be ahead, and the past to be behind (see section 5.2.2). Whereas, in some cultures, this appears not to be the case. In Aymara, the future is behind, and the past is in front. This discovery reveals that there are objectively different ways of perceiving time. In an interview, McWhorter (2018) concedes that once we have acquired language, there are specific effects that can happen (Language and Progress). Psychologists such as Boroditsky have evidently demonstrated this. Therefore, it is important when discussing linguistic relativity to acknowledge such experiments.

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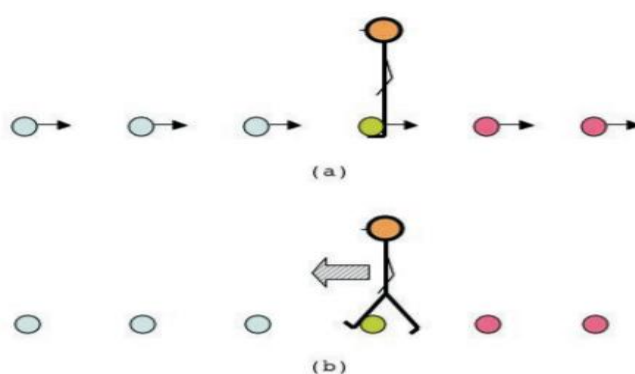


Fig. 1. The TIME PASSING IS MOTION metaphor according to Lakoff (1993). The special case TIME PASSING IS MOTION OF AN OBJECT metaphor is depicted in (a), where times are conceived as spatial objects moving, relative to a static canonical observer, from front (future times) to back (past times). In this case, the observer is the deictic center. The other special case of the metaphor, TIME PASSING IS MOTION OVER A LANDSCAPE, is illustrated in (b), where the observer moves relative to static objects conceived as times. The deictic center in this case is a static object in the landscape.

However, McWhorter (2014) writes, “the truth about how languages are different is that largely they differ in the degree to which they do the same things” (p.46) and “serendipity plays a much vaster role in language than one would expect.” (p.48). In other words, language develops by linguistic happenstance. The way people use their language to talk about reality varies as much as the creative potential of language allows it to do so. However, there is only one reality. People simply describe and label it with many creative differences.

Furthermore, Pinker (2007) believes that it does not make sense to think that the mind uses language as its “internal medium of communication”:

“The idea that thought is the same thing as language is an example of what can be called a conventional absurdity: a statement that goes against all common sense but that everyone believes because they dimly recall having heard it somewhere and because it is so pregnant with implications” (p.47).

Pinker (2007) argues that there are several reasons why this is not the case; one of them is that people do not remember verbatim - rather people remember the “gist” of what we hear in

conversations (p.47). Pinker (2018) maintains that "memory for content, for gist, for meaning, far exceeds memory for form" (Language and Progress). Another contention is that kids have thoughts before they have language. Pinker (2007) states that language is:

"a distinct piece of the biological makeup of our brains. Language is a complex, specialized skill, which develops in the child spontaneously, without conscious effort or formal instruction" (p.4).

Furthermore, Pinker (2018) asserts that "without an ability to represent the world before you even have a language, you would not be able to learn a language in the first place" (Language and Progress). Therefore, language cannot be the meaning of thought, because if it were, then babies would be incapable of thought, which would mean, therefore, they would be incapable of acquiring a language.

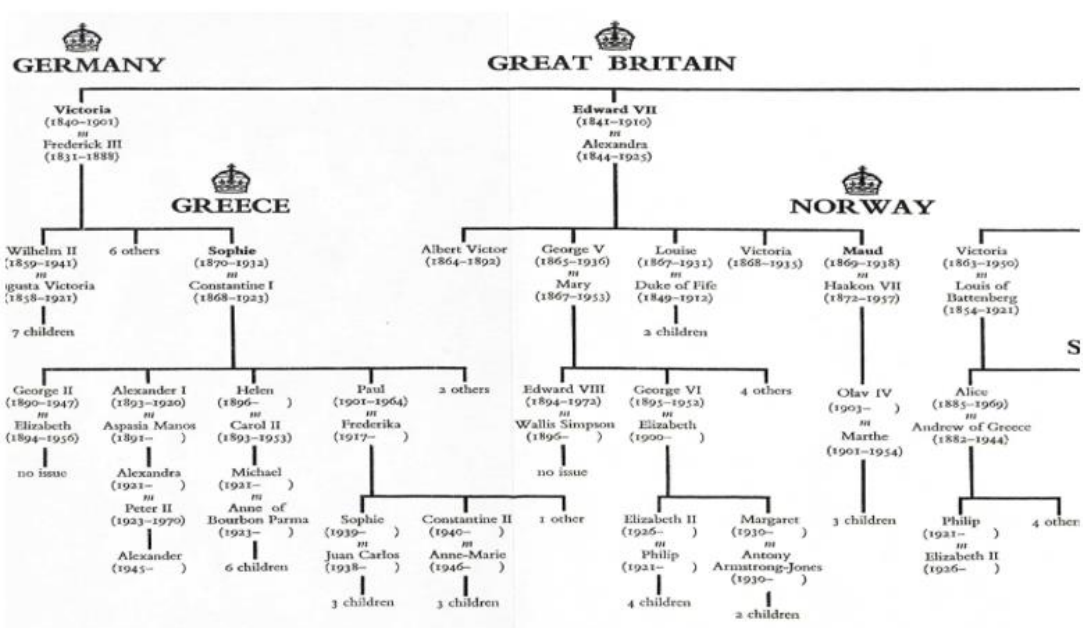
Additionally, understanding does not solely rely on words. In linguistics, there are fields of semantics and pragmatics. All logical distinctions are not marked by the vocabulary a person uses. Distinctions are part of an understanding of the meaning behind sentences. For example, one of the reasons computers are not able to translate or talk like a human is because they are not able to understand all the subtle semantic distinctions of which the mind is capable. Pinker (2018) asserts that "language is the tip of the iceberg of the distinctions that we make conceptually" (Language and Progress).

5.3.3 The Past is Up in the Air!

Some languages conceptualize time not on a horizontal axis but instead on a vertical axis (see section 5.2.3). Boroditsky (2010a) found that Mandarin speakers realize time on the vertical axis; pointing upwards to signify the past, and downwards to signify the future. Boroditsky (2010a) claims that the tendency to perceive time in this way means that Mandarin speakers "attend" to the world differently. However, Boroditsky, Fuhrman, & McCormick's (2011) experiments have revealed that even though Mandarin speakers make use of a vertical axis much more than English speakers, they still mostly perceive time in the same way as English speakers do. Moreover, English speakers can also conceptualize time vertically. As noted by Lakoff and Johnson (1980), English speakers certainly make use of vertical arrangements when using time metaphors (p.20). For example:

UNKNOWN IS UP - "we don't know what's happening right now, everything is up in the air."
KNOWN IS DOWN - "we got to the bottom of the situation"

In English, the family tree is another example where time is conceptualized on the vertical axis. In a family tree, ancestors are located towards the top of the tree. These are relations from the past that current descendants most likely did not meet. Whereas their descendants and the most recent family members are located further down the family tree – with the most recent being at the bottom. Therefore, English speakers can perceive time on a vertical axis in the same way Mandarin speakers can, with the past located up and future located down. Below is the family tree of Queen Elizabeth II showing English time conceptualized by English speakers on a vertical axis.



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Moreover, the tendency of one language to statistically choose one axis more often than another is purely random and based on historical and cultural norms. It certainly does not mean that a speaker is obliged to think about the world in only one way. It might suggest their culture has an inclination to think in one way. However, that is where it stays: a cultural predisposition.

5.3.4 Never Eat Shredded Wheat!

On the other hand, time does not have to move relative to the body (see section 5.2.4). As previously presented, Boroditsky & Gaby (2010c) claimed that language can allow a person to perform tasks that people of other languages and cultures cannot accomplish. English speakers cannot navigate across terrains with the same precision as Aboriginal people do. Boroditsky (2017) further claimed that the English language does not help its speakers perform such tasks (SAR). At school English speakers learn cardinal directions using the mnemonic Never

Eat Shredded Wheat (NESW). English speakers have no real sense of which way is which without either explicitly knowing or guessing from landmarks. Whereas Aboriginal speakers acquire a command of cardinal directions what seems like instinctively from birth. However, McWhorter (2018) takes umbrage to this notion that it is the structure of languages that guides the way people think. McWhorter (2018) claims that:

“it is the culture and the topography that are channelling your view and feeding into the language because frankly languages that do this, and there are some, are only spoken where everything is flat” (Language and Progress).

McWhorter (2018) reasons that there are no close distinct landmarks to speak of in the landscape of Aboriginal communities for them to find left, right, front, and behind useful. Hence, these cultures use cardinal directions. McWhorter (2018) further points out that “as soon as you bring these people into a city, they stop doing that” (Language and Progress).

A curious question here is why did Boroditsky not extend her study with an experiment involving people who speak an Aboriginal language who then moved to a town or a city? This study could be undertaken in order to determine if speakers still conceptualize space and time using cardinal directions. If it is language that is affecting how speakers perceive the world, then assuredly, it would not matter where that person is located. They would continue to perceive in the same way they have always done given that they are still speaking the same language. Interestingly, this matter could be a topic for further research. Where the proposition is that people who move to a different location start thinking in different ways because their environment has changed. If this hypothesis were to be proven correct, then it would mean that their experience is affecting thought processes and not their language as asserted by Boroditsky.

5.3.5 A Landmark Case!

Additionally, time does not have to go in a straight line (see section 5.2.5). Nunez et al. (2012) discovered that the people of Gwa village in Papua New Guinea think about time in an original way. Time slopes down their local mountain into the village in one direction and as soon as it reaches the village it turns and leaves the village in a different direction. This conceptualization of time happens because time is related to the source and mouth of the local river Yupno which is a significant cultural location for the people of the Yupno. McWhorter (2014) writes that “Languages evolve according to the needs of their speakers”

(p.40). Therefore, it would make sense that speakers use what surrounds them to help navigate and understand the world.

Furthermore, McWhorter (2014) studied the Tzeltal language of Mexico. He found that they do not have words for front or behind, left or right. Instead, they say uphill or downhill and make use of place names rather than directions. The Whorfian leaning would be to assert that the Tzeltal language is shaping the way its people conceptualize directions. However, the Tzeltal live on the side of a mountain. Therefore, it is feasible that they utilize their mountain landmark to conceptualize their world. McWhorter (2014) compares the Tzeltal to another tribe, the Tzotzil:

“Tzeltal and Tzotzil are essentially variations on the same language: one, two, three is hun , cheb , oxeb in Tzeltal and jun , chib , oxib in Tzotzil . Yet the Tzotzil differ from the Tzeltal in that they do speak in left - right / front - back terms linguistically — yet if you submit them to a psychological experiment , they still reveal themselves to conceptually process direction in terms of geographical coordinates” (p.20)

For both communities, direction does not change when they move their body. They make use of cardinal directions, like what is revealed from studies involving the Pormpuraw tribe in Australia by Boroditsky & Gaby (2010c). Therefore, the Tzeltal and the Tzotzil share a similar language, however, one language has words for left and right, and the other language does not. Nevertheless, both speakers conceptualize their world with reference to their environment in the same way. Consequently, McWhorter (2014) argues that it is not the arbitrary classifications of words that are marking existence but rather their culture. McWhorter (2014) states that “processing direction geographically is something about culture, which can occur whether it penetrates language or not” (p.21).

5.3.6 New Way, New Thinking!

Boroditsky (2017) asserted that language has “causal power”, in other words, a person can change the way they think by changing the language they use (SAR). In contrast, McWhorter (2014) writes:

“if we had records of the language Stonehenge’s builders spoke, its structure could tell us nothing about what they were like, nor would early Quechua teach us anything about what it was to be an Inca in the 1500s” (p.55).

Although, Boroditsky & Gaby (2010c), Boroditsky, Fuhrman, & McCormick (2011), Segel & Boroditsky (2011) and Fedden & Boroditsky (2012) have obtained some impressive

results, that reveal subtle differences in how language speakers conceptualize the world. McWhorter (2014) argues that an analysis of the structure of language does not give a researcher any insight into how people perceive the world in any meaningful way. Furthermore, Winawer & Boroditsky (2007) maintain that if language speaker A responds slightly slower on laboratory experiments in comparison to language speaker B, in the perception of color differences, then that means that both speakers understand existence in a different way (see section 5.2.6). On the contrary, McWhorter (2014) writes:

“One assumes that whatever a psychological experiment might eke out of a person in an artificial context, whatever eensy-weensy differences on that score one might find in the cosseted context of a psychological experiment, all human beings are in the same mental boat” (p.88).

Furthermore, to argue that language makes a speaker “attend” to the world in different ways is to say that all English speakers “attend” to the world in similar ways. English is an official language in Australia, India, Nigeria, Ireland, Bahamas, Jamaica and South Africa – to name but a few. Therefore, by this reasoning these English speakers must look at the world in the same way because of their shared language. The reality is that English speakers live in considerably different environments. English speakers can be located on continents, on small islands, by the sea, beside mountains, on rivers, in city skyscrapers and some might argue even in The Whitehouse! It is true that English speakers have ‘bigly’ different customs, history, beliefs and traditions. These aspects appear to have little to no bearing to the advocates of Neo-Whorfian experiments.

One could conceivably conduct an experiment that could prove that English speakers living in different countries think subtly differently about certain aspects of existence. Therefore, proving that people see the world differently even within the same language. Neo-Whorfian's are determined that some little quirk in the way a remote tribe conceptualizes direction then means that they live in a different universe. The structure of language seems to be their only answer to the debate over language and thought. McWhorter (2014) writes that:

“surely the axiom cannot be “language shapes thought ...The language in someone’s head cannot “know” that it is spoken in heads on the other side of the world. Presumably a language shapes thoughts in whatever head it finds itself in” (p.134).

Additionally, Brown (1991) found that human beings share much more than one might at first expect. This passage is much lengthier than quoted and offers fascinating reading:

“Value placed on articulateness. Gossip. Lying. Misleading. Verbal humor. Humorous insults. Poetic and rhetorical speech forms. Narrative and storytelling. Metaphor. Poetry with repetition of linguistic elements and three-second lines separated by pauses...space, motion, speed, location, spatial dimensions, physical properties, giving, lending, affecting things and people, numbers (at the very least “one,” “two,” and “more than two”), proper names, possession...Binary distinctions, including male and female, black and white, natural and cultural, good and bad...Non-linguistic vocal communication such as cries and squeals” (p. 429-431).

These findings show that human beings have more in common than what separates. Finding statistical tendencies to showcase differences is primarily academic. While, claiming multiple “encapsulated universes” is unreasonable. The reality is that there is only one human cognition and how languages vary does not demonstrate anything profound about how cognition varies.

To close, Murphy’s Law theorizes that if something can go wrong then at some time or another it will go wrong. For example, every part of a machine can and will break down eventually and will need to be replaced. A subjective hypothesis about language is that languages can differ; therefore, they do differ. Languages endure wear and tear like machinery. If someone can speak in a non-uniform way, then sooner or later someone will speak in a non-uniform way. If enough people join that person in regularly using that non-uniformed pronunciation or expression, then language change occurs.

Moreover, no one is ever quite sure which parts will wear out and which parts will remain in good condition. That is what language is, as McWhorter (2014) writes “all languages are on the boil; none sit unheated” (p. 48). It seems romantic but inaccurate to declare that people think vastly different from each other because of the language they speak. At the same time, a proponent of neo-Whorfian's would also have to argue that people who speak the same language live in only one “encapsulated universe.” Is it reasonable to think that Lera Boroditsky, Leo Varadkar, Noam Chomsky, Rhianna, Nerendra Modi, Stephen Fry, Jacinda Adern, Usain Bolt, John McWhorter, Mel Gibson, George Lakoff, Mike Pence or Cyril Ramaphosa attend to the world in similar ways because of their shared language?

Humans are naturally endowed with a unique set of structural rules that are independent of experience. This allows languages to be learnt from birth. Languages derive from the same human cognition with the assistance of a preinstalled universal grammar – based on the theories of Chomsky as outlined by Cook (1995). Even though, languages differ significantly in their approaches to how they label the world, this does not mean that cognition varies. Languages vary because they provide people with an unlimited creative potential to do so and therefore they do so. In essence environment and experience mark a person’s culture

and that in turn affects the conceptualization of the world much more than the structure of language does.

6 Conclusion

There is only one human cognition and how languages vary does not demonstrate anything profound about how cognition varies. Languages vary because of historical happenstance and because of each language's unlimited creative potential. The aim of this thesis is to determine through alternative linguistic perspectives whether there is any credibility to Boroditsky's (2013, 2017 & 2018) claim: that different perceptions of space and time, expressed through language, shapes the way people think. As observed, Boroditsky (2010a, 2010b, 2010c & 2011) and other scholars including Nunez & Sweetser (2006), Winawer & Boroditsky (2007), Segel & Boroditsky (2011) and Fedden & Boroditsky (2012) have carried out research to ascertain whether there is any scientific evidence to prove that language shapes how a person thinks. Through these experiments, they have demonstrated that there is indeed subtle evidence that exposes language does affect the way a speaker thinks. However, the debate is whether this, in turn, equates to seeing reality in different ways or if it signifies that humanity has 7,000 "encapsulated universes".

John McWhorter (2014) and Steven Pinker (2007) both disagree with Boroditsky, not with the academic statistical tendencies of her neo-Whorfian experiments, but rather, with the claim that people have a different lens in which they "attend" to the world. Pinker (2007) noticed that children do not have a natural tendency to read or write, however, children have a natural tendency to speak (p.6). Therefore, written language cannot be used as an example of how people conceptualize their universe because children are employing language before reading or writing. Additionally, most languages do not have written forms. The reading and writing aspects is an area Boroditsky, Fuhrman, & McCormick (2011) had acquiesced on, yet, Boroditsky continued to assert these claims in presentations in both 2017 and 2018.

Pinker (2007) further questioned why neo-Whorfian researchers are certain that it is the language that causes the cognitive variations as opposed the often-substantial differences in the ecology and lifestyle of its speakers. Furthermore, Pinker (2007) observed that humans never confuse up and down and most languages do not distinguish between left and right. Therefore, it is not unexpected to discover that non literate cultures do not have a front or behind, a left or a right. Rather, they tend to make use of cardinal directions or utilize landmarks for guidance. While McWhorter (2018) admitted that once a person has acquired a language there

are certain affects that can happen as psychologists like Boroditsky (210a, 2010b, 2010c) have demonstrated through clever but synthetically controlled lab experiments. However, it is important when discussing linguistic relativity to acknowledge such experiments and the data they have found.

Nevertheless, McWhorter (2014), asserts that language develops by linguistic happenstance. The way people use their language to talk about reality varies as much as the inventive potential of language allows it to do so. Therefore, there is only one reality with people simply describing and labelling the same reality with creative differences. Pinker (2007) believes that it does not make sense to think that the mind uses language as its internal medium of communication. Primarily, people do not remember verbatim but rather they remember the "gist" of what they hear in conversations. Furthermore, children have thoughts before they have language. Therefore, language cannot be the meaning of thought because if it were, then babies would be incapable of thought, therefore be incapable of acquiring a language.

Still, understanding does not solely rely on words, in linguistics there are fields of semantics and pragmatics. All logical distinctions are not actually carried out in word, but they are part of an understanding of the meaning behind sentences. Moreover, the tendency of one language to statistically choose either a vertical or horizontal axis when conceptualizing time is essentially random and based on historical and cultural norms. It certainly does not mean that a speaker is obliged to think about the world in only one way. It might suggest a society is inclined to use one axis over another but that is where it stays: a cultural predisposition.

Moreover, in contrast Boroditsky, Fuhrman, & McCormick (2011) revealed that English speakers think about time using both axes and Mandarin speakers think by majority like English speakers when it comes to past and future. Additionally, McWhorter (2014) takes exception to the notion that it is the structure of language that is guiding the way people think, arguing that it is the culture and the topography that are conditioning peoples' views. Language develops corresponding to the needs of its speakers; therefore, it would make sense that speakers use what surrounds them to help navigate and understand the world. McWhorter (2014) demonstrated that in two very similar languages, one with words for left and right and the other with no vocabulary for left and right, both orientate relative to the mountain they live on, indicating that it is not their language that is channeling special awareness but rather the aspect that they both share in common; their culture.

Likewise, an analysis of the structure of language does not give a researcher an insight into how individuals perceive the world in any meaningful way. The differences between one

language speaker responding a diminutive proportion of a second slower than another language speaker does not mean that one has uncovered a brand-new universe.

In addition, to argue that language makes a speaker "attend" to the world in different ways is to say that all English speakers "attend" to the world in similar ways. English is an official language in numerous countries around the world. Therefore, by this reasoning, all English speakers must perceive the world in a similar way because of their shared language. This would be regardless of their lifestyle, environment, culture and history. Whorfian proponents are resolute that language is the only answer to the Sapir-Whorf debate.

McWhorter (2014) asserts that language cannot shape the way a person thinks because if it did then knowledge of English would give a person an insight into how someone else processes the world from Ireland to India from Australia to Jamaica. Ostensibly, language ought to shape thinking in whichever brain it finds itself in, not because of the shared language structure. The truth is that people have a lot more in common than neo-Whorfian statistical tendencies would make one believe. As revealed by Brown, humanity shares, to mention only a few, spatial dimensions, non-linguistic vocal communication, facial expressions, music, dance, gossiping and lying. These findings show that human beings have more in common than what divides. And that is something to be valued. Finding statistical tendencies is essentially academic, while claiming multiple encapsulated universes is unreasonable. Languages vary because of historical happenstance and because of each language's individual and unlimited creative potential. The reality is there is only one human cognition and how languages vary does not demonstrate anything profound about how cognition varies.

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