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COGNITIVE, CULTURAL AND LINGUISTICS VARIATIONS AND LEARNABILITY

This paper looks at various challenges learners of a new language may face, focusing on features stemming from cultural differences. In some extreme cases, culture has left enduring traits in speakers' cognition, which may hinder effective learning. A particular example discussed here is vision. It is one of the most basic perceptions in human cognitive activity, but surprisingly, it sometimes undergoes a great deal of cultural influence. It is argued here that such cognitive differences stemming from cultural heritage should be incorporated into language teaching, as observed in education in mathematics.

Keywords: culture-induced cognition, learnability, visual perception, ethnolinguistics, ethnomathematics

1. INTRODUCTION

Learners of a new language face various challenges. Swan and Smith (1987), for instance, list typical errors in learning English according to the different first language of learners. This can be considered a sign that teaching materials may be better tailored according to different linguistic backgrounds of learners. This leads to an issue of grouping learners according to their L1, and this paper intends to raise awareness of diversity in learnability influenced by cognitive ability stemming from cultural heritages. These points are made involving lesser-studied languages, which allows us to see language learning from a new perspective. A particular cognitive ability analysed here is vision. Visual perception can be approached from various disciplines, and this paper takes advantage of its interdisciplinary nature and involves education in mathematics. It reveals that the way we process visual perception may

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vary according to cultural values in each culture. This type of difference is often observable in language, which may affect our effective learning of language.

The organisation of the paper is as follows: differences in human cognition are first reviewed, using vision as an example in relation to spatial orientation, comprehension and cultural value. Following this, cases where pedagogy is heavily influenced by indigenous cultural values are reviewed, involving education in mathematics in Australia. Finally, whether differences in culture-induced cognition can be incorporated into effective language pedagogy is discussed.

2. DIFFERENCES IN *HOMO S. SAPIENS*

Cognitive ability of *Homo s. sapiens* is normally considered the same regardless of their race or the language they speak. Our languages seem to work on the same principles across various languages on the surface, as once assumed during the 80s and 90s with the idea of linguistic universals. However, after decades of research on lesser-known languages with smaller speaking populations, it appears some languages may not comply with this idea in close analysis. Evidence presented so far suggests that there are typological tendencies in language, but exceptions do exist in our languages and cognition. Anthropological and psychological studies show cultural differences affecting the way we use languages. These cases illustrate an intricate relationship between our cognitive and cultural practices. Visual perception alone can demonstrate this point in question.

2.1 Spatial orientation

Living creatures must orient ourselves in space in one way or another. Thus, spatial recognition has been crucial in our survival. Naturally, spatial orientation has had significant impact on the evolution of human cognition and language use. The right-left symmetry is one such instance, and various artefacts even from prehistoric times carry shapes or design patterns based on the right-left symmetry, since symmetry allows us to memorise patterns more easily (cf. Jablan, 1995). In cognitive science, scholars once argued that we human beings have a uniform spatial recognition, and that a person always performs relative spatial recognition. In an experiment on absolute-relative encoding such as the one conducted by Pederson et al. (1998), a participant is first shown a set of objects, such as toy animals placed in a certain order or a direction, and then asked to place the toys in a memorised order. The stimulus table in Figure 1 shows that three cows with different colours on the stimulus table are placed in one direction. A participant is asked to observe their order, and then rotate 180° and reproduce on the recall table the order observed on the stimulus table.

Previously, we human beings were believed to perform relative (i.e. mirror image) spatial recognition, i.e. the space is encoded with respect to the participant's body and his/her spatial orientation. Thus, in the case shown in Figure 1, regardless

of the direction the participant faces, the white cow always comes to the left of the participant and the grey one to the right. This pattern is commonly found among people whose language has a large number of speakers, and these languages are often well-studied. However, it has been revealed through typological studies in the last couple of decades that speakers of less-studied languages have a different pattern of reproducing the order. This type, known as absolute perception, has some anchoring points outside of the participant's body on which to base his/her orientation, including landmarks or cardinal points. As seen in Figure 1, reproduction in the recall table is not affected by the body orientation of the participant, but by some anchoring points. Regardless of the degrees of rotation by the participant, the white cow is placed at the bottom end of the table. Therefore, our previous belief that humans were all supposed to perform relative spatial recognition was proved wrong.

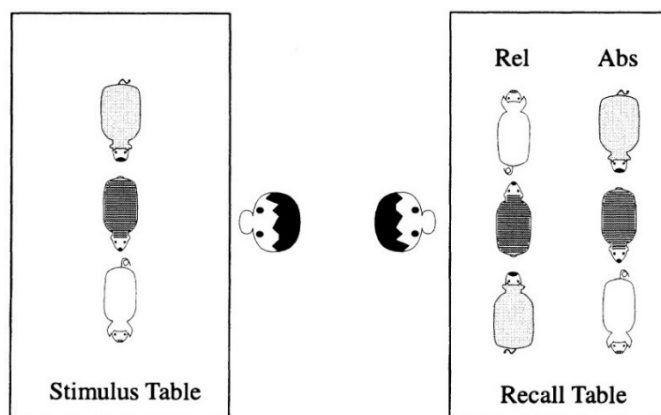


Figure 1. Animals-in-a-row experiment for relative and absolute perception
(Pederson et al., 1998, p. 576)

This striking difference in spatial orientation is also seen in linguistic structures. Inoue (1998) states that some languages in the world do not possess words that can be translated into 'left' and 'right' in English, and speakers of these languages, as listed in Table 1, perform absolute orientation. Without these words, speakers of these languages use various tactics to deal with talking about directions, including the use of cardinal direction (north, south, east and west), body parts (head, leg, chest, back, etc.) or landscape (uphill, downhill, upper river, down river, etc.). The use of cardinal direction and landscape involves a reference point outside of the body to navigate, which requires a detailed knowledge of one's local living environment. Since their reference point in navigation is outside of their body, it is understandable that they have absolute perception.

Table 1. Languages without words for left and right

Means of expressing direction	Language
Cardinal	Guugu Yimidirr (Pama Nyungan); Tamil (Dravidian)
Body parts	Kilivila (Austronesian); Mopan (Mayan); Totonak (Totonakan)
Landscape	Tzeltal (Mayan, uphill; downhill)
Mixed (cardinal and landscape)	!Xun (Khoisan, upper river; down river)

2.2 Vision and comprehension

Let us now turn to metaphor involving vision and knowledge. In many languages and cultures, vision often leads to gaining knowledge; thus this type of metaphor is known as ‘seeing is knowing.’ Therefore, English and other commonly studied Indo-European languages use the verb ‘see’ to refer to understanding, e.g. English *I see your point*. Furthermore, seeing is knowing has further developed and became lexicalised in some languages. A Proto-Indo-European verb **weyd* ‘see’ is the etymological source for the English *wise* or *wit*. Similarly, the Proto-Germanic *wāit* ‘I know’ was derived from the same Proto-Indo-European verb in the perfective aspect ‘I have completed seeing’, and this form did not follow a common developmental path from the perfective aspect to the past tense, but instead came to express ‘I know’ in the present tense. German has gone through various metaphorical changes in the past, and knowledge-related lexicons are somehow related to vision in German, e.g. the German *wissen* ‘know’.

As Toyota & Richards (2017, pp. 2-5) point out, vision seems to play a central role in the five senses that human beings possess, and metaphors can be considered one such instance. In typological study on perception, vision plays a central role in sense extension and can refer to hearing, touch and taste, and scholars working on lesser-known languages and cultures have been familiar with cases that do not comply with examples found in the Indo-European languages. A seminal work in this field, Evans and Wilkinson (2000), presents various cases in Australian and Papuan languages. In these languages, a verb of hearing plays a major role and it is used as a base for a metaphorical extension referring to cognition, e.g. ‘I hear your point’ meaning ‘I understand your point’. It is often the case that verbs in these languages are highly polysemous, but a verb of hearing is still consistently used. Let us look at an example. The Australian language Pitjantjatjara has a verb *kulini* ‘hear’, as in (1a). Among various senses, this verb can be used as a verb of cognition, as exemplified in (1b). This is not a single rare case, since a number of languages spoken in certain parts of the world, e.g. Australia, Papua New Guinea, East Africa and South America, behave differently, and verbs of hearing seem to be the prime source for semantic extensions. The pattern of semantic extension in these languages is schematically

represented in Figure 2. Note that the dotted line from touch to taste shows a dubious case and this extension is dependent on how one interprets data, and thus it is left open to interpretation.

Pitjantjatjara (Australian, Evans and Wilkinson 2000: p. 563, p. 564)¹

- (1) a. *Ngayulu anangu-ngku wangkanytjala kulinu*
 I people-ERG talk.NOMZR.LOC hear.PST
 ‘I hear people talking.’
 b. *Mutuka/ compyter ngayulu putu kulini*
 car computer I in.van understand.PRS
 ‘I don’t understand cars/computers.’

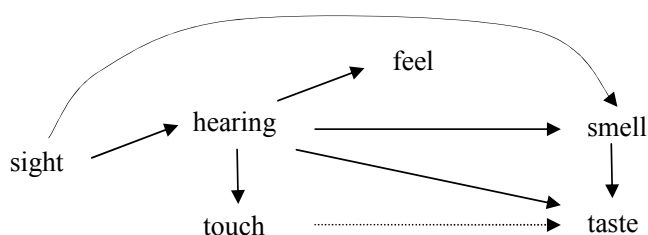


Figure 2. Semantic extensions across perceptual modalities in Australian languages
 (Evans & Wilkinson 2000, p. 560)

Sense extensions shown in Figure 2 seem to suggest that all five senses are somehow wired to each other. From the perspective of patterns found in, say, the Indo-European languages, an example like (1b) is a puzzle. However, this linguistic synaesthesia has an explanation, and it is based on an unusual suspect, i.e. psychosis and its cultural manifestation.

Toyota and Richards (2017, p. 3) state that languages that operate in the system found in Figure 2 have a special cultural practice, where vision is given a special meaning. For instance, adolescent boys among the Crow Indians of Montana are expected to go on a vision quest to seek spirits. They have a social belief that a guardian spirit will come to them and will protect them as long as they follow certain commands, and the Crow boys are hoping to see and hear their guardians. It may not be easy to have visions or hear voices, and they often go through some ordeals and, in some extreme cases, torture themselves in order to achieve their goal. The extent of their behaviour is not easily understood by westerners, and their experience during the vision quest is normally regarded as visual or auditory hallucinations by western psychiatry. Thus, “[w]hat is regarded as a symptom of mental illness in one society may be merely one aspect of normal, even highly valued, psychological experience in another” (Rosman et al. 2017, p. 75).

¹ Abbreviations used in this paper are: ERG = ergative; LOC = locative; NOMZR = nominalizer; PRS = present; PST = past.

Mental illness has been studied cross-culturally (cf. Kleinman & Good 1985), and universal features for some conditions, such as schizophrenia or neuroses, have been recognised (cf. Gadit 2003), but as Rosman et al. (2017) state, “these illnesses are also culturally shaped. Variations in their manifestations are related to social, economic, technological, religious, and other features of the societies in which they are found shape cultural concepts of self and others” (p. 76). In such cultures, ‘seeing’ has a special cultural value, and the verb of vision is reserved for those who can see spirits, including gifted people such as shamans, and thus common people have resorted to the second most prominent form of perception in Figure 2, i.e. hearing, and this is how the verb of hearing became prominent in languages in specific parts of the world.

Religion has much impact on our thoughts and behaviour (cf. Sussex 1993, p. 1006) and, through time, its impact forces some grammatical features to be grammaticalised/de-grammaticalised, such as the future tense (e.g. Burridge 2004; Toyota 2012). We may be physically equipped with more or less the same perceptual apparatus, but the value given to each perceptual sense significantly differs from culture to culture, and a difference may be beyond comprehension without detailed explanation about local cultures. Accordingly, such differences run very deep in speakers’ behaviour, and are often incorporated in linguistic structures, as seen in this section. Thus, the diversity presented here is not a simple surface linguistic variation and is the result of cultural settings forcing on us a different worldview.

2.3 Vision and cultural value

Apart from cultural impacts, it is possible to detect a clear cognitive difference concerning vision according to cultural value. When seeing an object, we human beings, regardless of ethnic, racial and linguistic background, view it in terms of a binary pair between an object in focus and its background. The former is commonly known as figure and the latter as ground in cognitive science. We all take advantage of this pair, but how figure and ground functions in actual practice may vary. Experiments carried out by Nisbett (2003) and Nisbett and Masuda (2007) suggest that there is a basic difference in perception between East Asia and western countries. With the help of an eye-tracking device, the way we see objects is proven to differ, and Europeans are claimed to have a narrow focus in perception, so that people tend to gaze on a person or an object that stands out in a scene. People in East Asia, on the other hand, are more likely to attend to a broad perceptual and conceptual field, and due attention is paid to the background. Thus, when seeing a person in a picture, such as the one in Figure 3, Europeans tend to spend more time on gazing at the person, and less time is used to observe the background. East Asians, on the other hand, generally spend equal amounts of time on the person and the background when looking at a picture like Figure 3. This difference is schematically shown in Figure 4. Note that an option

in bold has prominence in perception, and an Eastern view has both figure and ground in bold.



Figure 3. Difference in visual perception between figure and ground

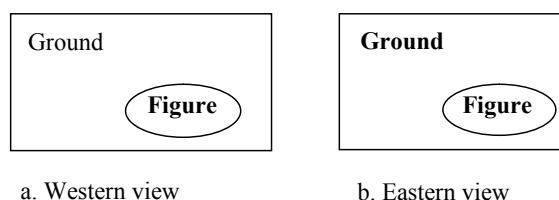


Figure 4. Schematic representation of figure-ground relationship:
(a) a European type; (b) an East Asian style

The researchers consider the difference in terms of the concepts of individualism and collectivism. Generally speaking, people in the West tend to be more individualist, whereas people from Asian countries are more collectivist. The Asians from collectivist societies tend to be holistic in their world view, focusing on the relationships and the context of the situation at hand, while people in individualistic societies focus on separate elements. They argue that the difference has a historical reason: the Asians lived in a community interconnected with one another, valuing the group over the individual. This social orientation survived in their fundamental world view, manifested in the way they look at the world and how to comprehend it.

3. CULTURE AND TEACHING: A CASE OF MATHEMATICS

Various issues found in the field of education in mathematics can be comparable to language and culture teaching/learning. Mathematics, as we commonly learn it in school, is heavily influenced by so-called western mathematics, which often considers itself objective and value-free, and which is taught without any reference to history, politics and culture. Thus, one may think that mathematics is understood in an identical manner wherever it is studied. However, two types of teaching method have been claimed to exist. In the application-first (inductive) method, “[one] first learn[s] the formula and practice[s] applying it. After seeing how this formula leads to the right answer again and again, [one] then moves on to understand the concept or principle underlying it” (Meyer 2014, p. 94). Contrary to this, in the principle-first (deductive) method, “[one] first prove[s] the general principle, and only then use[s] it to develop a concrete formula that can be applied to various problems” (ibid.). The distribution of patterns in western countries is shown in Figure 5. Notice that among speakers of the Germanic languages, the Germans are principle-oriented and the rest are application-oriented.

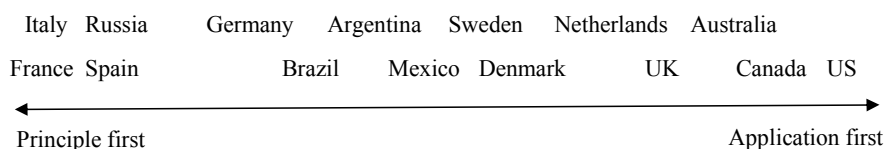


Figure 5. Difference in teaching methods and ways of negotiation (Meyer 2014, p. 96)

Studies on certain ethnic or racial groups prove that there is not a single kind of mathematics, but there are several. What has been overlooked is that there are cases where a mathematical pattern does not translate directly into the Western version, and different cultures may use a related, but different, kind of mathematics to meet the demands of Western societies (cf. Eglash 1997). Some use a term ethnomathematics, which “refers to a cluster of ideas concerning the history of mathematics, the cultural roots of mathematics, the implicit mathematics in everyday settings and mathematics education” (Vithal and Skovsmose 1997, p. 133). An often-quoted case in question is found in Australia. Young Australian indigenous students often struggle with mathematics at school, since they often have to learn ‘western’ mathematics (the application-first method). Due to their cultural background, they may not be able to understand why they have to deal with questions such as time, and fail to perform as well as non-Aboriginal students at school.

There is indeed a diversity of living environments and cultural backgrounds among indigenous students in Australia, e.g. Western Australia and the Northern territory (cf. Warren & Miller 2013, p. 152), but wherever the students may live, their

understanding is in principle based on common cultural expectations, such as the ones listed in (2) (Owens and Wegener 1995, cited in Meaney 2002, p. 175). (2c) and (2d) suggest that their view is based on 'here and now,' where visibility plays an important role in their society, and which is also noticeable elsewhere in their society (cf. (1) from Pitjantjatjara). Previous research also confirms these points, e.g. these students have different physical and cognitive abilities, e.g. 'superior ability in visual imagery,' 'different concept of time and different habits of using time,' along with a lack of terms for concepts such as length and time (Harris 1991, p. 48, p. 53), or as Kearins (1991) reports, Aboriginal children in both urban and rural areas perform better at directional understanding and worse at number knowledge in comparison with their non-Aboriginal counterparts. As far as mathematics and various issues dealing with numbers are concerned, it has been suggested that "non-Western children's cognitive development is different because of differences in what is valued in adult cognitive behaviour" (Meaney 2002, p. 175).

- (2)
 - a. A focus on group performance and arrangements for a shared reward.
 - b. Doing and observing activities, imitation, and repetition.
 - c. Activities which are self-explanatory in themselves, and have their own inherent relevance, rather than being a means to a remote end.
 - d. Requiring skills that can be demonstrated concretely and situationally rather than conceived abstractly.
 - e. Emphasising helping relationships amongst learners, affiliation among peers, and nurturance and care for each other.

Visual imagery is important and highly valued in Aboriginal culture, and visual inputs are often incorporated in mathematics teaching after getting inspiration from designs and patterns from indigenous arts. For instance, linear functions can be explained in illustrated growing patterns connecting mathematics and indigenous Australians culture, as demonstrated in Figure 9. It demonstrates a cyclic pattern that shows the development of mathematics over time. This type of visual representation often helps students to grasp the expansion of number better. It is often the case that teachers develop materials like the one in Figure 6 themselves and various patterns in visualisation can be found.

Apart from cases in Australia, there have been reports from different parts of the world, including multilingual countries such as South Africa (Setati 1998), Botswana (Berry 1985), and Papua New Guinea (Harris 1987), and bilingual societies such as Navajo (Moore 1994), Maori (Barton et al. 1998) and Inuktitut (Eskimo-Aleut, Denny 1980).

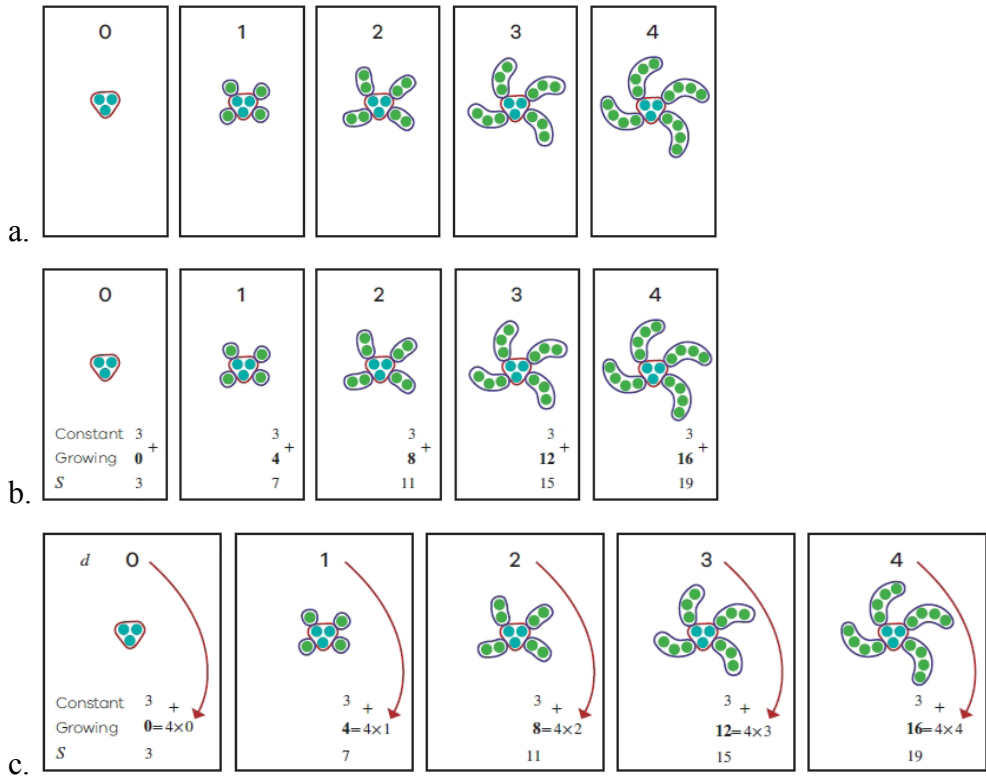


Figure 6. Visual representation of growing patterns: a linear function $y=4x+3$ in three steps (Matthews 2020, pp. 7-8)

4. CHALLENGES IN LANGUAGE TEACHING

Ethnomathematics can be comparable to ethnosyntax, which assumes that “[g]rammar is thick with cultural meaning. Encoded in the semantics of grammar we find cultural values and ideas, we find clues about the social structures which speakers maintain, we find evidence, both historically relevant and otherwise, of the social organization of speech communities” (Enfield 2002a, p. 1). Language acquisition is not simply a matter of learning vocabulary and grammar, but one has to learn socio-historical backgrounds unique to each target language. However, this is easier said than done. As an example, consider Figure 9. Those who are familiar with Western culture normally consider it a scene of a bus stop, where people are waiting for a bus. However, speakers of Lao (Tai-Kadai) in Laos do not understand it this way. An artist was asked to sketch a scene depicted by a serial verb phrase *khon jùnn thaa lot-mêê*, which literally translates as ‘person stand wait for a bus,’ and the result was similar to the scene in Figure 9. However, once people were asked to describe the

picture, the most common answer was ‘people (standing) waiting to cross the road’, and some even answered ‘people having their height measured’ (Enfield 2002b, pp. 234-236). These answers are natural, because the respondents have no clear image of a bus stop in their culture and thus, no mental image of people waiting at a bus stop. In Laos, buses stop on street corners, and are not to be waited for at a bus stop. Thus, speakers of Lao, in learning English, have to learn a new set of vocabulary *wait for a bus* as well as a new social practice concerning the use of public transport, i.e. how to catch a bus. It may not be a problem to learn the verbal phrase *wait for* itself, but the collocation with a bus can be a problem.

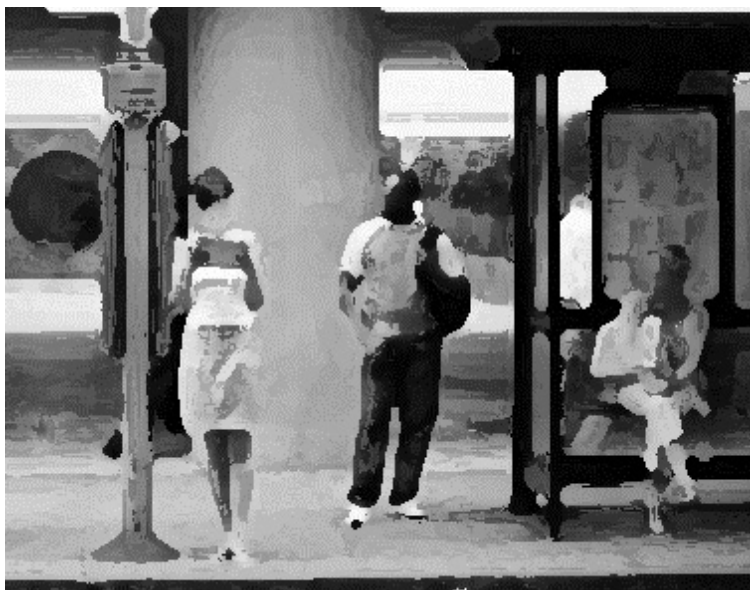


Figure 7. People waiting at a bus stop

It has been widely recognised that cognition and culture are important factors in learning activities (see, for instance, Hofstede 1991). Needless to say, learning a new language means that one has to behave in a different cultural and mental setting. As Vaughn (2019) claims, “[b]ecause learning a language well typically occurs within the context of a culture, people learn to have different associations and feelings associated with a particular language” (p. 99). In other words, a learner of a new language has to step out of the comfortable realm of their own culture and venture into a new, foreign set of social practices (cf. Kramsch 1993, p. 238). Therefore, learning a language involves the acquisition of a new culture, and aiming to attain a good level of cultural intelligibility or cultural competence.

The cases involving vision presented so far here also illustrate such case requiring cultural competence, but these cases are more complex than the Lao

example. Speakers' cultural practice has left enduring marks in their cognition, and accumulated cultural practices from the past are now deeply rooted in their worldview and their cognition. For instance, the languages listed in Table 1 lack the concept of 'left' and 'right' and the speakers of these languages fail to understand metaphors. It is commonly assumed that space serves as a source domain in the conceptual metaphor of time, and this is found in various languages from different regions and language families. For instance, prepositions in English such as *from*, *to*, *before*, *after* and *around* can all refer to space, e.g. (3), but they can also refer to time, as exemplified in (4).

- (3) a. *I travelled from London to Cambridge.*
b. *Children performed a play before a small audience.*
c. *The house you mentioned is right after the newsagent from here.*
d. *The insects gather around the lamp at night.*
- (4) a. *I travelled from Sunday to Monday.*
b. *Children performed a play before Christmas eve.*
c. *The house you mentioned was built right after the Second World War.*
d. *The insects became active around midnight.*

In conceptual metaphor, space is something that we deal with every day and it is physically observable by humans. Thus, it is considered cognitively concrete. Time, on the other hand, is less concrete due to its lack of tangibility. Promoters of the universalness in conceptual metaphor argue that this type of relationship can be found in various languages. However, speakers of the languages listed in Table 1 are said to lack the ability to understand the space-to-time metaphor, and special expressions merely refer to space.

An explanation put forward by Inoue (1988) is that the lack of words for 'left' and 'right' does not allow speakers to assume the flow of time in a certain direction. The direction can vary according to each culture or language, but the common direction is either from left (past) to right (future) (cf. Figure 8a) or from top (past) to bottom (future) (cf. Figure 8b) in Chinese (cf. Radden 2003). In the horizontal flow, the concept of 'left' and 'right' is required in order to comprehend the direction. Whether these words have to appear first to influence the culture and cognition or vice versa, i.e. linguistic relativity, should be discussed elsewhere, but it seems a reasonable argument that these words are required to deal with the conceptual flow of time.

To support this idea further, another similar relationship, i.e. time and body parts, should be considered. The past-future distinction and the front-back distinction of the body have been studied in various languages. The common pattern is the association of past with the back part of the body, and future with the front part.

This can be seen in the grammaticalisation path indicating the direction of time flow (Heine and Kuteva 2002), as exemplified in (5). A front-back reversal can be found in some languages. For instance, Aymara (Aymaran, Bolivia, Peru) grammaticalised *nayra* ‘eye/front/sight’ for the past, and *qhipa* ‘back/behind’ for the future (Nuñez & Sweetser 2006, p. 402), and the same pattern can be found in Malagasy (Austronesian, Dahl 1995), Tuvan (Turkic, Klein 1987), or Maori (Austronesian, Thornton 1987). Speakers of these languages associate the front part of the body with the past, and the back part with the future, contrary to the more dominant pattern of front-future/back-past, but they still have the metaphor of time based on space. Amondawa (language isolate, Amazon basin) is reported to lack the space-time metaphor (Sinha et al. 2011). There is no mention of words for ‘left’ and ‘right’, but judging from the argument so far, it should lack these words.

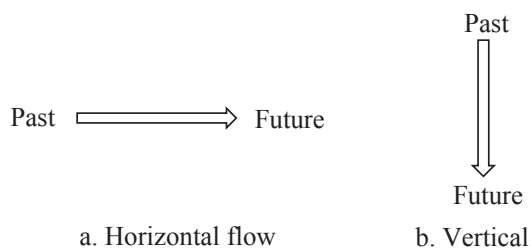


Figure 8. Schematic representation of time flow

- Back
- (5) a. Thai *laŋ* ‘back’ < *laŋ-càag* ‘after’ (lit. back from’); Icelandic *bak* ‘back’ < *baki* ‘behind, after’; English *back* (N) < ‘earlier’; Nanay (Tungustic) *xamasi* ‘back’ < ‘ago’; Estonian *tagasi* ‘back’ < ‘ago’.
- Front
- b. Shona (Bantu) *mberi* ‘front’ < ‘ahead’; Moré (Niger-Congo) *béoghé* ‘be in front’ < *béogho* ‘tomorrow, the following day’.

Conceptual metaphors are often considered universal, but it is certainly not always the case. Cases involving vision are simply the tip of the iceberg. Future research further may reveal more complex cases, and demands for creating teaching materials catering for such cases will grow even stronger, allowing us to understand how we learn language better.

5. CONCLUSION

This paper examines how different types of culture-induced cognition can influence language pedagogy. Vision-related issues presented here can demonstrate intricate relationships between culture and cognition, which are, in turn, visible in

linguistic structures. Vision has been often discussed in isolation in separate disciplines, but it is somehow intertwined in pedagogy, as observed in education in mathematics. In addition, lesser-studied languages and cultures can enlighten us in this respect, since they demonstrate what is otherwise often overlooked. Radical differences examined in this paper can indicate that our cognition differs at a fundamental level, and we do not perceive the world in a uniform way.

Thus, diversity in fundamental culture-induced cognition can have a significant impact on language pedagogy. If cognitive variations exist, the combination of L1 and L2 may have to be reviewed according to what type of cognition is involved. Further study is definitely needed, but since we may be different in terms of cognition, variations in teaching methods and materials are required in order to achieve more efficient L2 learning.

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КОГНИТИВНЕ, КУЛТУРНЕ И ЈЕЗИЧКЕ РАЗЛИКЕ И УСВОЈИВОСТ ЈЕЗИКА

Резиме

Приликом учења новог језика, ученици се суочавају са различитим изазовима који не морају нужно бити лингвистичке природе. Оно што се често занемарује јесте утицај социокултурних фактора на процес учења језика. Управо се тим аспектом овај рад бави из новог угла, укључивањем когниције обликоване културом. Посебна пажња посвећена је чулу вида, једном од основних средстава људске перцепције, које се, међутим, различито манифестује у језичким изразима и комуникативном понашању, нарочито у мање проучаваним језицима. Суочени са таквом разноликошћу у процесу учења, постојећи наставни материјали и методе можда нису довољни да одговоре на когнитивне разлике настале под утицајем културних фактора између J1 и J2. У математичком образовању, посебно у области познатој као етноматематика, овакве разлике су препознате, па су предузети различити покушаји да се реше потешкоће ученика у наставном процесу. Етнолингвистички подаци могу се сагледавати из перспективе етноматематике, па чак и у оквиру когнитивних понашања повезаних са чулом вида. Очигледно је да људи не поседују увек исти поглед на свет нити исто разумевање стварности, што утиче на способност усвајања новог језика. Надамо се да ће овај рад допринети подизању свести о разноликости у успешности усвајања језика, која је последица утицаја когнитивних способности обликованих културом.

Кључне речи: когниција обликована културом, усвојивост језика, визуелна перцепција, етнолингвистика, етноматематика