

# CS 6795 Introduction to Cognitive Science

## Spring 2012 Homework Assignment 1

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### Assignment

The Sapir-Whorf hypothesis about linguistic relativism suggests that language determines thought. The WWW is full of articles about the hypothesis, especially since it is very controversial (see Wikipedia, for example.) Here is a scholarly article on it: <http://www.icsi.berkeley.edu/~kay/Kay%26Kempton.1984.pdf>.

Please write a paper at least 1200-1500 words long that summarizes the above article from a cognitive science perspective and relates it to at least two theories about cognition in Thagard's book. Feel free to incorporate as many additional references as you wish. Your article should also take a position on the Sapir-Whorf hypothesis: what do you think of it as a cognitive scientist. Please cite all articles (and books) in the APA style: <http://www.apastyle.org/learn/tutorials/basics-tutorial.aspx>.

# 1 Solution

The Sapir-Whorf hypothesis makes the claim that the way people think is strongly affected by their native language. The hypothesis, in its most extreme interpretation, claims that certain thoughts of people who speak one language cannot be understood by people who speak a different native language. According to Kay and Kempton's paper, *What Is the Sapir-Whorf Hypothesis?*, two implicit hypotheses can be interpreted and a third claim is usually tacitly associated with their theory. The first is known as linguistic relativity, i.e. "structural differences between languages are paralleled by nonlinguistic cognitive differences." This first hypothesis seems to be the most mild of the three implying a link between cognition and language. The second proclamation is called linguistic determinism, which states, "the structure of anyone's native language strongly influences or fully determines the world-view he will acquire as he learns the language." This is considered extreme in that the implication is that cultures with more sophisticated languages have a more sophisticated representation of the world. A third hypothesis attributed by work done after Whorf is said to be implied by the first two, "The semantic systems of different languages vary without constraint," otherwise the claim of linguistic relativity is without much consequence (Kay & Kempton, 1984).

The paper proposes an initial experiment that makes an attempt to test whether or not linguistic relativity exists. The authors devise an experiment in which the people tested are of two types: English (in which there are lexical differences in the electromagnetic wavelengths of blue and green) and Tarahumara (in which there is only one lexical term for blue and green, collectively). A lexical category boundary is determined by English-speakers. The experiment asks the subjects to determine which of three color "chips" is most different from the other two. The Whorfian belief would suggest that the English speaking subjects would place a greater significance and difference between the two colors that cross the lexical category boundary of green and blue while the Tarahumara would have a more random distribution in differences. The English speaking subjects exaggerated the distance between the green and blue chips while with the Tarahumara did not. The results seemed in favor of the hypothesis in the first experiment, however, a subsequent similar experiment was devised to try and show that the first was not as a result of a so-called "name strategy." This is a strategy in which the subject subconsciously categorizes the colors based on the conditioned belief of the lexical differences between blue and green. The altered first experiment informed more sophisticated subjects of the potential bias, but the results were mimicked. Kay and Kempton believed this to indicate that the subjective categorization must be happening on a level below the consciousness of the subjects, hence a third experiment must be devised. The authors tried to eliminate the name strategy in a third experiment. First, they

established a neutral color category for the center color of the triad. Then the subject is only able to see two colors at one time, with one of the three colors always visible. The subject is then asked the same question as the initial experiment. The results are no longer consistent with the Whorfian theory since the subjects made distinctions based on the distance between the colors as opposed to the category. The authors state that this implies that when the name strategy is blocked, the Whorfian effect is no longer present.

Key and Kempton support a more modest version in which the third implied hypothesis is rejected and the second hypothesis must be reduced in its consequences. Regarding the first hypothesis, there seems to be “incursions that result in judgments that differ from those made on a purely perceptual basis.” And the paper concludes, “The case seems to be first, that languages differ semantically but not without constraint, and second, that linguistic differences may induce nonlinguistic cognitive differences but not so absolutely that universal cognitive processes cannot be recovered under appropriate contextual conditions,” which is a more reasonable position on the hypothesis.

There is a correlation between the Sapir-Whorf hypothesis and the cognitive science idea of concepts. From a conceptual standpoint, thought is defined as taking in perceptions, relating those perceptions to equivalence classes, and then determining an action based on the equivalence class. The subjects of the experiment were given a choice of actions. The subjects used their perception of the color chips to determine which equivalence class to fit each chip into and made the resulting conclusion based on the categorization. This task is non-trivial since color hue differential is one type of qualia with significant subjectivity. Sapir-Whorf’s hypothesis (in the most extreme interpretation) has the implication that the equivalence classes that one may choose from are based on their native language and also that the ineffable categorization in the lexical sense should result in a hindrance in cognitive selection of an equivalence class. This implies that people with a more rich definition of, for instance, color would be better equipped to categorize a color perceived into its appropriate equivalence class. However, according to Key and Kempton’s second experiment, people can select the equivalence classes independently of their lexical categories. One may make the argument that this is the result of a disconnect between the cognitive categorization and the lexical. If this is the case, then linguistic relativity does not hold and thus Sapir-Whorf falls short.

Mental representation has also been described as using images. When referring to the cognitive term, images are not necessarily strictly in the visual sense, but all other types of perception such as taste, smell, emotional, and tactile feelings as well. Descriptions of things, in particular visual things, require a certain degree of inference. An imagistic approach to cognition allows for

reasoning with much less cognitive computation. If one were to subscribe to the Sapir-Whorf belief, then it would be difficult to justify this imagistic representation of the world. Language is a secondary account of feelings, images, and sensations and it is difficult to convey these senses linguistically. To say that linguistic structure is a strong influence or primary determinant of a person's world view seems to imply that these senses are neglected in one's world view. One's world view describes their sense of existence. This idea that language is the boundary for human thought is entirely unfounded since people take on occupations in culinary arts or any form of art for that matter.

Verbal descriptions of visual scenes in particular require translating the perception of vision into lexical representations of the same. If anything one might say that language is a hindrance of their world view, since certainly information is lost in the articulation of a visual scene. This idea can be extended to the other senses as mentioned previously as well.

The idea that language is the guiding force of human thought is extreme and not well founded. The Orwellian idea that thought can be controlled by limiting language does not hold up well when applied to someone such as Helen Keller. At 19 months, Keller contracted a disease that left her both deaf and blind (Fetty, 2007). Keller had some form of communication, but not much at all. At age six, Keller's teacher, Anne Sullivan, was able to teach Keller how to spell. Sullivan was able to do this, despite the fact that Keller had no real language. Sapir-Whorf would imply that Keller, who lacked language skills, had no mental representation of the world. However, Keller was able know what objects were and who people were based solely on her sense of touch. This would say that there is an internal cognitive representation of the world that is not taken into account in the hypothesis. Whether considering conceptual or imagistic world representations, the idea of one's native language having strong influence over, let alone fully determining, one's world view does not seem to hold up.

## 2 References

[1] Fetty, M. (2007). *Helen: Break down the walls!*. (pp. 4-16). New York, NY: Bearport

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[2] Kay, P., & Kempton, W. (1984). What is the sapir-whorf hypothesis?. *American*

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