Grammatical gender influences the perception of bilinguists.

SE 367 Project Report

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Proposal Presentation

Abstract

How language shapes thought is an important question in context of cognitive science because it might enable us to explain the various factors that affects perception. The idea that language might influence thought was first proposed by Wharf in 1956 which later on came to be popularly known as Whorfian hypothesis. Language however can influence thought in a number of ways, e.g. through the way it describes time, through the way it describes the visual space or through the way it describes even inanimate objects having genders.

This project duplicates with certain modifications the experiments conducted by Boroditsky, Schmidt and Philips and summarized in their work Sex, Syntax and Semantics, to study the effect of the grammatical genders assigned to inanimate objects in certain languages in the cognitive processes involving thinking about these objects. The experiments were conducted to test the effect of grammatical gender on memory, on the description of objects and the separation of effect of gramma form effect of culture. The results obtained were by and large supportive of Boroditsky, Schmidt and Philip's claim of grammatical gender having a pronounced effect on the way we perceive and think about objects even while performing linguistic tasks in a non-gendered language that we are equally fluent in.

Introduction

As an extension of the Whorfian hypothesis of language influencing thoughts Boroditsky, Schmidt and Philips in their work, Sex , Syntax and Semantics attempted to evaluate how grammatical gender associated with several inanimate or abstract objects in certain languages might influence the perception or mental representation of those objects. The main focus of their study was to find out how the grammatical gender rules of one language affects perception of bilinguists even when they are interacting in the other non-gendered language. In this project I attempted to arrive at the same conclusions that they had, conducting a number of experiments that were on similar lines as theirs.

The Whorfian hypothesis, proposed by Benjamin Lee Whorf in 1956 suggests that speakers of diverse languages perceive and act differently in objectively similar situations. However determining how exactly language affects thought has not been so straight forward. The question of how language shapes thought requires us to first segregate thought into two categories - linguistic and non-linguistic. Linguistic thought, or thinking for speaking, involves the cognitive processes related with speech formation. E.g. English speakers need not wonder about the grammatical gender of the subject while planning to utter a verb whereas Hindi speakers do. However the problem is more difficult while assessing the influence of language on thought while performing a non linguistic task or while thinking for speaking in a different language.

It is the latter question that this project tries to seek an answer to, i.e. whether one language has an effect on the cognitive processes related to thinking for speaking in a different language. Even this one question can be handled in different dimensions like the effect on thinking about time, visual stimuli like colours, emotions or, in this case, genders. Earlier work suggested that there is a striking universality in the perception of colours inspite of the huge variation in terminology in different languages. Whereas abstract concepts like time varies in its perception in accordance with its depiction in the language.

Coming to grammatical gender, inanimate objects like pen, bottle, sun etc do not have a biological gender or any obvious characteristic attribute that can provide any evidence about their gender. However the grammar rules of certain languages do allot such objects cursory genders which often seem to be semantically random. Examples of such gendered languages are Hindi, French, German, Spanish etc. And example of "meaningless" allocation of grammatical gender is the consideration of moustache as feminine in Hindi inspite of being a majorly masculine attribute. Then there are non-gendered languages like English which do not have such gender distinctions for inanimate objects. This project, inspired from the paper by Boroditsky, Schmidt and Philips, looks into the way the grammatical gender rules of one language influences the perception of these inanimate objects even while performing linguistic tasks in some other non-gendered languages. This was assessed using multiple tests on bilinguists.

Methods

Three groups of bilinguists were used as subjects for the different experiments conducted:

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Group A - English and Hindi speakers
Group B - English and French speakers
Group C - English and Telegu speakers
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Out of these four languages, Hindi and French are gendered languages while Telegu and English are non-gendered.

Boroditsky, Schmidt and Philips had performed similar tests on three subject groups, one knowing German and English, the other knowing Spanish and English and the third being composed of only English speakers, where German and Spanish are both gendered languages.

The reason why I chose even the third group as a set of bilinguists was because of the unavailability of pure English speakers in the setting where my experiments were conducted. However since Telegu is also a non-gendered language, this was still a close imitation of the subject groups studied in the paper.

The project was divided into three experiments testing different aspects of linguistic-linked cognitive processes. These experiments are described as follows.

Experiment 1 : Effect on grammatical gender on memory

To investigate this, Boroditsky, Schmidt and Philips taught the two bilingual groups a set of 24 inanimate objects with proper names and tested their memory for the gender of each name. All of the objects were gendered oppositely in either language. Half of the names were gendered according to the grammatical gender of the item in each language whereas half were gendered oppositely. Each name and object pair was shown on the screen for 2 second and there was a distraction period of 5 minutes after each group had learnt the entire set.

Following in same lines, I taught the first two groups, group A and group B a set of 12 objects with proper nouns. 5 of these objects had the same gender in both languages, while 6 had opposite genders and one object could have either gender in French. Thus i conducted the experiment with 12 objects for Hindi subjects and 10 for French. For each group of subjects, randomly half of the objects were chosen to have names conforming to the grammatical gender in the particular language while the other half had oppositely gendered names. All name and object pairs were shown all together for one minute followed by a distraction period of two minutes. The complexity of the names were kept relatively same, e.g. Patricia or Patrick for apple, in order to rule out the effect of the complexity of the names over memory. After the two minute distraction period I asked every subject to recall the gender of the name of each object.

Experiment 2 : Grammatical gender and Object Descriptions

This experiment strived to find out if speakers of different languages actually focus on different aspects of the same object based on it's grammatical gender in their native language. In his work, Boroditsky showed each group of subjects a list of 24 objects and asked them to write down the first three adjectives that came to their minds on thinking about each object. The entire experiment was conducted in

English. once the adjectives were generated they were rated by neutral English speakers as either masculine or feminine. An alphabetical list of these adjectives was provided to the English speakers for this purpose and they were not told of the aim of the experiment. They had to assign a score of +1 for every masculine adjective and -1 for every feminine adjective.

I imitated the same experiment only with 12 objects, 6 male and 6 female in each language, instead of 24 and also the raters could rate an adjective as neither masculine nor feminine, i.e. neutral, n give it a score of 0.

For every adjective, I took the average score assigned to it by dividing its total score by the total number of raters. Then i found out the score of female objects and male objects separately for each group of subjects by adding the scores of all the adjectives that were used to describe the male objects and the female objects.

Experiment 3 : Separating Language and Culture Effects

This experiment was done to detect whether the results obtained in the above experiments were related to cultural factors or only because of language effects. For this purpose, Boroditsky and others designed a fictional Gambuzi language in which they grouped images into soupative and oosative categories. Participants were shown drawings of 4 males and 4 females along with 12 inanimate objects and told which would be oosative and which soupative. This distinction always corresponded to the biological gender but extended arbitrarily to the inanimate objects. After they had mastered the oosative/soupative distinction they were shwn the objects again and asked to generate adjectives to describe these objects. All three groups of people showed a preference for masculine adjectives for the objects grouped with males as opposed to feminine adjectives for those grouped with females.

My experiment was pretty much similar except that the two groups were called nam and nine and there were 3 male and 3 female pictures along with 10 inanimate objects divided equally in the two groups.

Results and Discussion:

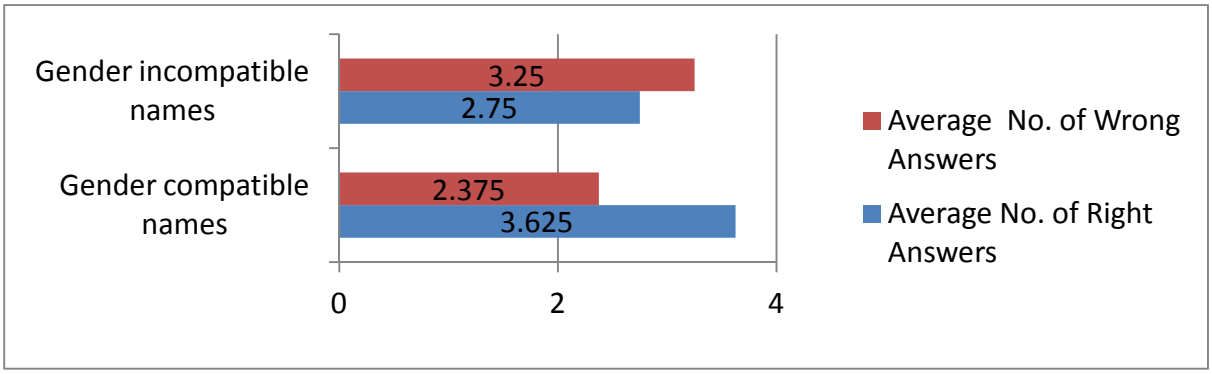
Experiment 1

The results obtained supported the claim of Boroditsky, Schmidt and Philips that the bilinguist seemed to retain the names that were in accordance to the grammatical gender rules of their native language as opposed to those that were not.

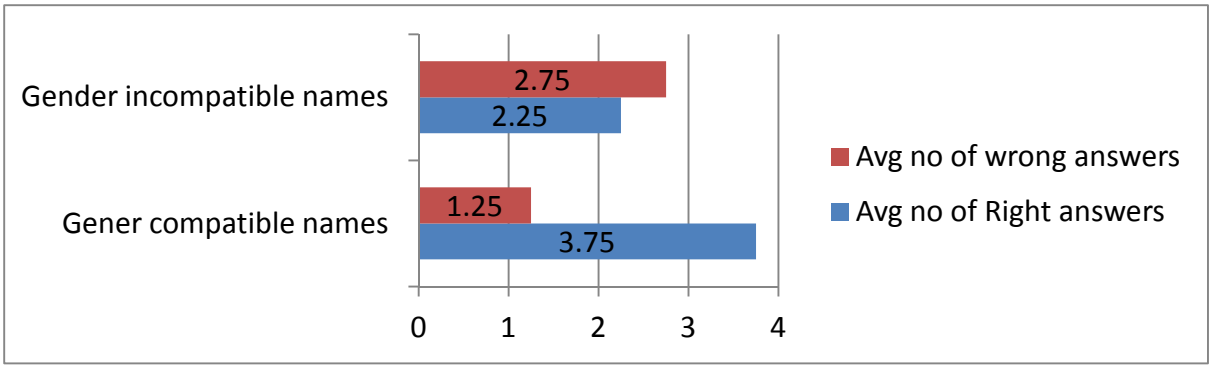
The following histograms represents the average number of objects the gender of whose names were correctly recollected by each group. For every group, for

gender compatible names, number of objects remembered correctly by every person was added up and divided by the total number of people in that group to arrive at these numbers. Similar procedure was followed for gender incompatible names.

English and Hindi speakers (8 subjects, 12 objects)



English and French speakers (4 subjects, 10 objects)



the results demonstrate that the link between grammatical gender of the object and the gender of the name assigned to it mattered, even if marginally, in the retentive capacity related with that particular object-name pair. This is a striking observation given the fact the names assigned were English names and not Fench or Hindi, such that there should not have been any gender effect seen in this perspective.

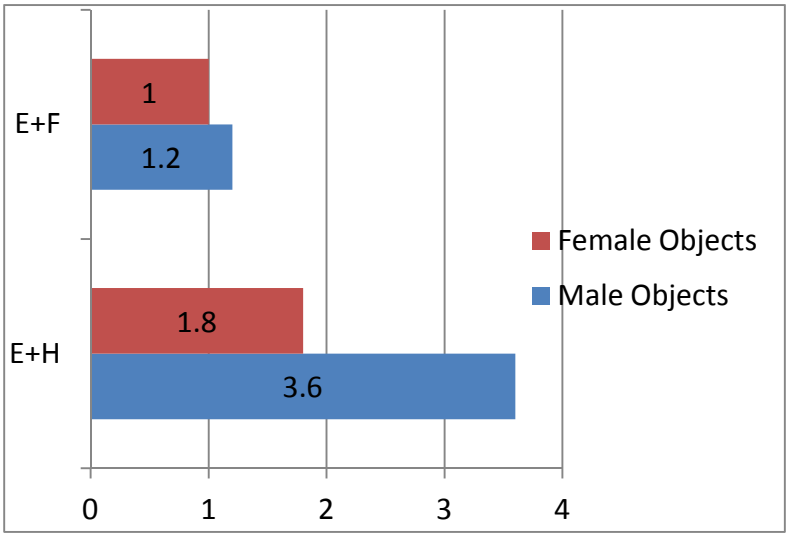
However certain factors that might have influenced the results were varying complexities of the names as well as varying familiarity with the names. e.g. The subjects tended to remember certain names that were really common in English even if they were paired wrongly with an object as far as gender was concerned.

Experiment 2:

The results of this experiment were only very slightly supportive of previous claims. According to Boroditsky's papers people tended to describe objects with a grammatical gender of male using masculine adjectives even in English, and likewise for the feminine gender. However according to the results I obtained from

this experiment, though definitely the adjectives used for the feminine objects were slightly less effeminate than those used for the masculine objects, however ideally they should have had negative scores associated with them (since feminine adjectives were being scored as -1), which was unfortunately not observed.

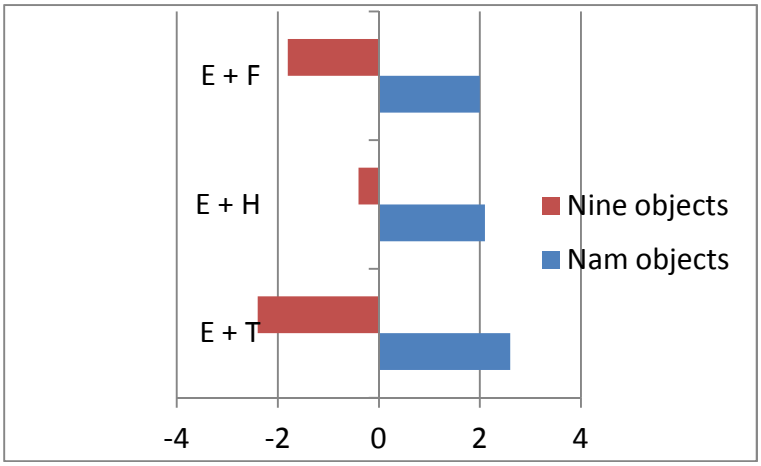
The results are elucidated in the following histograms:



Inspite of the anomaly, i.e. the feminine objects should have been described with adjectives generating an overall negative score, the score of the adjectives used to describe feminine objects were still lesser than those used to describe masculine objects. This shows that the grammatical gender of the object does affect the perception of the object making the subject focusing more on certain aspects of the object more than the others. The anomaly might also have been because of the set of raters chosen which included more females than males and their judgement of the adjectives might have been biased.

Experiment 3:

The result was as expected, i.e., the score of adjectives generated to describe each set of objects depended on the group they were grouped with. The results were scored using the same method as in the previous experiment. The results are as follows:



As expected and predicted according to Boroditsky's paper, objects grouped with females received negative scores and objects grouped with males received positive scores. The effect seemed more pronounced in the English and Telegu speaking group, probably because they had no initial bias towards either gender in case of any object. However this experiment shows that just the grammar, irrespective of any cultural connotations (as in this case it has a completely new, imaginary language), does have an effect on the perception of objects. This shows that just because the language groups certain objects as males and certain as females do we start perceiveing them in that manner.

Conclusion:

This project demonstrated that grammatical gender in one language does have an effect on the perception of objects even while conduction linguistic tasks in another non-gendered language.

The results obtained however could probably be more pronounced because of the backgrounds of the test subjects chosen, who, though fluent in both languages, had received formal training for a larger duration in the gendered languages Hindi and French. Thus in certain cases may be the cognitive process occured just like it would while speaking in Hindi or French and then the results were translated into English. i.e. whether or not the subjects "think" in one language and "speak" in another, is one factor that might have largely influenced the results. However if that was the case, the second experiment also could have been expected to show a more positive outcome. The anomaly in the results in that experiment kind of tends to rule out the above effect.

Thus it might be safely concluded that grammar does indeed have a role to play in defining the cognitive representations of objects atleast as far as gender is concerned.

Links to experiment details:

Experiment 1 objects
Experiment 2 objects
Experiment 3 objects

References

1. Boroditsky, L., Schmidt, L. & Phillips, W. (2003) Sex, syntax, and semantics. In: Language in mind: Advances in the study of language and cognition, ed. D. Gentner & S. Goldin-Meadow, pp. 61 - 80. Cambridge University Press.