Reply to Lera Boroditsky
“How Language Shapes Thought”
(Scientific American, February 2011)

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Lera Boroditsky is a faculty member of the Stanford Psychology Department. The purpose of her article is stated in the third paragraph (page 63 of the published version):

“The notion that different languages may impart different cognitive skills goes back centuries. Since the 1930s it has become associated with American linguists Edward Sapir and Benjamin Lee Whorf, who studied how languages vary and proposed ways that speakers of different tongues may think differently. Although their ideas met with much excitement early on, there was one small problem: a near complete lack of evidence to support their claims. By the 1970s many scientists had become disenchanted with the Sapir-Whorf hypothesis, and it was all but abandoned as a new set of theories claiming that language and thought are universal muscled onto the scene. But now, decades later, a solid body of empirical evidence showing how languages shape thinking has finally emerged. The evidence overturns the long-standing dogma about universality and yields fascinating insights into the origins of knowledge and the construction of reality. The results have important implications for law, politics and education.”

In my UCLA classes, particularly Linguistics 1, I argue that the structural properties of language have little if any influence on thought. “Structural properties” include syntactic structure, word morphology, and lexical resources (= specific words for things, qualities, and actions). My claim, and that of linguists who hold similar views, is that insofar as there is any connection at all between linguistic structure and thought, human experience shapes the properites of language; languages do not shape how humans experience the world. The types of experience that shape language are facts about the real world (the sun comes up in the east, fire is hot, the human eye has evolved to process a certain range of the electromagnetic spectrum in a particular way, etc.), universals of human cognition (the ability to apply specific labels—“words”—to specific objects and actions, the ability to quantify, the ability to express reference, etc.), and the practices of one’s culture (conventionalized ways of referring to time, space, kinship, natural phenomena, spiritual phenomena, etc.).

In my classes, I admittedly present what amounts to a parody of the Whorf hypothesis by claiming, for example, that the Whorf hypothesis would claim that Spanish speakers view a table as having female characteristics because mesa is grammatically “feminine” whereas they view a book as having male characteristics because libro is grammatically “masculine” (at least I hope that this example is a parody rather than a claim that anyone has seriously made!). Presumably, however, the kinds of examples that Boroditsky presents in favor of the idea that language structure influences thought are not meant to be parodies. To be fair, I admit to have not read any of the primary reports on the research that she refers to, and the brevity of her summaries in her short Scientific American article, aimed at a popular audience, may not reflect the true strength of the research, which, if based on scientifically valid studies, would be backed up by statistical

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2 This view is argued in more detail in Steven Pinker, The Language Instinct, HarperPerennial, 2007 [first published by William Morrow in 1994], Chapter 3.
information, replicable methodology, and the like. On the other hand, if this is the best case that she can come up with, the contrary view that I present in the preceding paragraph seems alive and well.

Before launching into a critique of Boroditsky’s paper, let me add a couple of additional points. First, she claims that around the 1970’s “a new set of theories claiming that language and thought are universal muscled onto the scene.” This presumably refers to the Chomskian program that attempts to characterize “Universal Grammar”, that is, the set of properties that are universal to human Language. I consider myself to be part of a school that claims that Language is part of human biology and that all human languages thus embody properties that are universal in the same way that the range of the electromagnetic spectrum that human eye can process, the range and types of sounds that the human vocal tract can produce, etc. are universal. This does NOT mean that any particular property is universal to all languages: not all languages overtly express tense, not all languages differentiate male vs. female, not all languages distinguish ‘green’ and ‘blue’, not all languages have labial stops like b or p, etc. I would characterize “Universal Grammar” as that set of properties of human cognition and physiology that have the potential for expression in human language. As for thought, I don’t know of any linguist, Chomskian or otherwise, who claims that “thought” or “thoughts” are universal! As I like to ask my students, “How many thoughts are out there, waiting to be discovered?”

Second, it would be ridiculous on my part to claim that there is no relation between language and thought. Every time we speak, we are using language to concretize a thought. Putting things into language through writing or speech helps us organize and clarify our thoughts (which, of course, carries the implication that the thought was there in the first place, even without a linguistic expression!). Some languages make it easier to express certain kinds of thoughts than other languages. Spanish subjunctive allows direct expression of mental uncertainty or conditionality that can only be inferred from context or expressed by additional phrases in English. Semantically related but connotatively different terms like ‘embarrassment’, ‘modesty’, ‘reticence’, ‘shyness’ (and thousands more such sets that one finds in a thesaurus) give ways to express thoughts that might be difficult to directly express in languages that don’t have a set of vocabulary items that apply to the respective shades of meaning. But in all these cases, the thought was there. Language gave a way to label it. Language did not create it.

The preceding paragraph provides a segue to the first paragraph of Boroditsky’s section, “Under the Influence”, where she talks about how different languages might talk about “having seen Uncle Vanya on 42nd street”. With reference just to her discussion of the term “uncle”, she points out that Mandarin Chinese would have to know whether Uncle Vanya is the brother of her father or her mother (and maybe whether he was an older or younger brother—I’m not sure about Mandarin, but plenty of languages make such a distinction). So what?!! This fact has nothing to do with what English or Mandarin speakers know about Uncle Vanya. If he is your father’s elder brother, Mandarin will express that directly in one word, whereas it is left vague in English or will require a phrase “older paternal uncle”. Using the single word meaning Mandarin “older paternal uncle” may evoke certain cultural responses among Mandarin speakers. Maybe you can expect some money from his estate when he dies that you couldn’t expect if he were your maternal uncle, but it is this cultural fact about relationships that affects your thinking
and that leads to having a special linguistic term. It is not the existence of the linguistic term that shaped your thought.

Expressing spatial relations: Kuuk Thaayorre people of Australia use the cardinal points (north, south, east, west) rather than relational terms (left, right) to express spatial relationships, which means that wherever they are, Kuuk Thaayorre speakers have to keep track of where east is. “They do this better than folks who live in the same environments but do not speak such languages and in fact better than scientists thought humans ever could. The requirements of their languages enforce and train this cognitive prowess.” This is a non-sequitur. There is no evidence at all in this discussion that the language is making them good at describing spatial relationships. They learned to do this by growing up in the Kuuk Thaayorre cultural environment; the language didn’t cause them to think this way. The language encodes a learned means of expressing these relationships. It is not surprising that this would be a useful way to express express spatial relationship in a culture where people live in the open and are always aware of where the sun is.

Expressing temporal sequences: Given a set of pictures on cards indicating events in a sequence (a man aging, a banana being peeled), Kuuk Thaayorre people arrange the cards in a sequence moving geographically east to west, no matter where the arranger is located with respect to the cards. Where is language involved here?! This task is not a linguistic one. It only involves knowing where east is. A far more likely hypothesis than one having to do with language is that the daily path of the sun is from east to west, an indicator of the passage time. The Kuuk Thaayorre language certainly didn’t make its speakers come up with this idea!

The comment on literate English speakers arranging left to right and literate Hebrew speakers arranging right to left is indicative of how vacuous these claims are. The direction that writing systems go has nothing at all to do with language structure at any level! Yiddish, which uses the Hebrew alphabet, is written right to left whereas German, which uses the Roman alphabet, is written left to right. Yet these languages are essentially mutually intelligible. Do speakers of languages that use boustrophedon writing view time as weaving back and forth?! Like the direction that writing systems go, the notion of “direction” of time flow is a culturally learned convention. The very fact that the experiment of laying out cards in temporal sequence did not even involve language demonstrates this.

Supposedly English speakers use different body language from Aymara speakers when referring to temporal concepts because for English speakers, “future” is “ahead” and “past” is “behind” whereas just the opposite is the case for Aymara speakers. Fine, this is the way these respective languages distribute particular relational words when the same words are used for dimensions of time vs. dimensions of space. Obviously, neither I nor the Boroditskies of the world know exactly what is going on inside people’s heads when they talk, but I submit that cognitively, both English and Aymara speakers think of past events as being “over and done, water under the bridge, irreversible, etc.” and of future events as “something that has not come into reality, something potentially avoidable, etc.” The way these languages metaphorically distribute the use of the spatial terms meaning “ahead” and “behind” has nothing to do with knowledge of basic facts of the universe.
Language structure affecting memory: The experiment described here, works from the following premise:

“English speakers tend to phrase things in terms of people doing things, preferring transitive constructions like ‘John broke the vase’ even for accidents. Speakers of Japanese or Spanish, in contrast, are less likely to mention the agent when describing an accidental event. In Spanish one might say ‘Se rompió el florero,’ which translates to ‘the vase broke’ or ‘the vase broke itself.’”

I’m actually doubtful about this sweeping claim concerning preferences for types of linguistic structures. To have any validity, it would have be based on a statistical sample of sentences over a large range of discourse, and it would have to be controlled for discourse style and maybe even individual preference (the latter being relevant when talking about subjects in a psycholinguistic experiment). The claim about the experiment is that after being shown events, some involving intentional actions, some involving accidents, English speakers did better at recalling who did what to whom in the accidental events than did Spanish and Japanese speakers, who tended to phrase such events impersonally, leaving out the actor.

I will admit that if one accepts the results as described here, this does sound like a real case of language structure directly affecting behavior. To critique this in an objective way, I would have to study the report of the experiment and probably even try to replicate the experiment, which I have not done and don’t intend to do. Nonetheless, I am skeptical of the whole scenario. How many subjects were there for each language? What were the backgrounds of the subjects? How many events were there to be described? To what extent did the subjects actually use the structures that the article vaguely implies that they would use? How did the statistics on recall actually stack up between subjects (a huge gap? barely statistically significant? just a tendency that wasn’t submitted to statistical analysis?)? How consistently did the inability to recall actors correlate with the linguistic structures used? Are there alternative explanations for the results that do not directly involve linguistic structure? In short, I will sort of give Boroditsky this one, but if this is the best she has to offer, I’m not about to change my tune.

Language affecting acquisition of base-10 numerical systems: Boroditsky presents two cases that she claims to be evidence that “the structures of languages can make it easier or harder for us to learn new things”. The first has to do with how quickly one can learn to manipulate the base-10 number system. The presence in a language of special words like ‘eleven’ in English instead of “one-teen” and long expressions (presumably like French quatre-vingt dix ‘90’ instead of nonante as is used in Switzerland) are claimed to make it harder to learn a base ten system than is the case in a language that uses short, transparent terms. I simply don’t believe this claim. It may take longer for children to learn to recite multiplication tables in French than in Mandarin (though I am skeptical), but this is a far cry from one’s native language being a possible help or hindrance in computing $2 \times 10 = ?$, $100/10 = ?$. Understanding how a base-10 system works has nothing to do with language. We might learn to talk about base-10 calculations using language, but

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3 Pinker, pages 56-57, describes a comparable experiment that claimed to demonstrate a language-based difference in the ability of English-speaking subjects vs. Mandarin-speaking subjects to understand narratives that contained counter-to-fact clauses (“if I were rich, I’d eliminate world poverty”, but unfortunately, I’m not rich). When skeptics raised the kinds of questions about experimental design that I raise here and actually reran the experiment, they found there was no demonstrable difference between the two sets of subjects.
once the base-10 system is understood, language plays no role in using it. (See below, however, for a suggestion that language may well influence doing math.)

Language affecting knowing whether you are a boy or a girl: The second example of language affecting speed of learning is that “Language can even affect how quickly children figure out whether they are male or female.” What on earth could this mean?! The example languages are Hebrew (which systematically marks nouns and pronouns for gender), Finnish (which has no gender marking at all), and English somewhere between. “Accordingly, children growing up in a Hebrew-speaking environment figure out their own gender about a year earlier than Finnish-speaking children; English-speaking kids fall in the middle.” Does this mean that little Finnish boys and girls take longer to figure out that they are different from each other than do Hebrew-speaking boys and girls?! What complete nonsense! The only thing that I can understand this to mean is that it takes the Finnish kids longer to correctly use the words “boy” and “girl” when referring to a referent’s sex, but if this is true (which I have trouble believing), it is certainly not a case of language influencing thought, which is the claim that is being made. What Hebrew and Finnish children of a particular age see and know about sex differences has to be identical. The problems they confront have to do with sorting out how the language applies to observed differences in the real world. This claim reminds me of Marylou Bettencourt who lived across the street from our family when I was about six. Marylou, who was probably between four and five, called my mother “Mr. Schuh”, which I, the wise six-year old, thought was humorous. Marylou obviously knew the difference between my mom and my dad. She just hadn’t figured out that “Mr.” is a polite term of reference used only for adult males.

Thinking back to the “uncle on 42nd street”, a more apt example than figuring out “boy” vs. “girl” would be the one mentioned there, comparing speed of acquisition of terms for, say, “aunt” and “uncle” in languages/cultures that have a simple binary distinction (“sister of parent” vs. “brother of parent”) with that for languages/cultures that distinguish matrilineal vs. patrilineal relations and/or even age relationships between parents and their siblings. Almost surely, it takes longer for children from the latter situation to sort things out, but again, this has to do with working out how to apply linguistic terms to the cultural context. The culture influences the language, making the language harder to learn in this respect. Learning a special term for “younger paternal uncle” does not influence the learner in recognizing this relationship. The child has heard the term and has had to figure out how to use it correctly.

Language affecting the ability to distinguish colors: The section “WHAT SHAPES WHAT” is one muddled idea after another, none of which provide any evidence at all for the fundamental claim of the Whorf hypothesis, viz. the structure of one’s native language shapes the way that one organizes reality. Boroditsky says, “Teaching people new color words, for instance, changes their ability to discriminate colors. And teaching people a new way of talking about time gives them a new way of thinking about it.” The key phrase here is “gives them a new way of thinking about it”. Obviously, if I give you a bunch of color swatches and give you names for them that you didn’t know before, you are made aware of distinctions that you had probably not thought about. But what I taught you was something about the world, and along with that I gave you a way to talk about. It would be a ludicrous experiment to give a bunch of terms for colors, then ask you to apply them to a bunch of color swatches. One would like to think that any class in
school, from kindergarten through the PhD, provides “new ways of thinking about things”, typically with some vocabulary to label those new things, but teaching you words like “cyan”, “double helix”, or “myxolidian mode” didn’t cause you to see things that you were previously blind to! It just gave you a way to label a distinction that you hadn’t thought about before or hadn’t had a label for.

Language affecting ethnic attitudes: The section on one’s attitude toward ethnicities (in this case Arabs and Jews) being affected by hearing and/or speaking a particular language has nothing to do with the Whorf hypothesis. The Whorf hypothesis is about the effect of the structure of the language that one is speaking on world views. Modern Semitic languages (in this case, Israeli Hebrew and probably Palestinian Arabic) are structurally quite similar, but whether they are similar or different is irrelevant. The attitudinal effects mentioned here could come from the utterance of one word, one sentence, a whole speech, maybe utterances that the hearer couldn’t even understand. The same attitudes would be evoked by someone’s dress, skin color, and all kinds of stuff that has nothing to do with language.

In short, there is nothing in the Boroditsky article that provides any support for the basic Whorf hypothesis, that is, that the structural properties of one’s language shape the way one organizes reality. In most of the cases presented, properties of the languages mentioned are irrelevant. Subjects are exhibiting conventionalized cultural behaviors that, in some cases, happen to come out in language.

When I read papers like this, I wonder why it is so important to the writers to demonstrate that language influences thought. Elaborate experiments are constructed to produce results that are typically irrelevant to the issue, or if relevant, like the structure-affecting-recall example, that are modest at best and, more typically, equivocal. Of course these people can ask me why it is so important to me to demonstrate the fallacy of Whorfian-type claims. In fact, it is not very important to me, and if there were any hard evidence for such claims, I would be quite happy to buy into them. But I am a scientist. To do science, one has to use data that is relevant (the direction that writing systems go is NOT relevant), the results of the experiments must address the claims (arranging pictures of sequences of events where language is not involved in the task don’t address claims about language), and they must be replicable. What gripes me is that sexy ideas, like language shaping thought rather than reverse, get out into the popular media and become accepted as proven “fact” (another case in point is the belief that chimpanzees and gorillas can be taught to communicate using human languages). I suppose that I could submit a critique like this one to Scientific American, but even if they published it, who would care? It’s just a wet blanket, not something for cocktail party chat.

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4 Pinker, page 55, makes this same point: “The thirty-five years of research [of testing the Whorfian claim] from the psychology laboratory is distinguished by how little it has shown. Most of the experiments have tested banal ‘weak’ versions of the Whorfian hypothesis, namely that words can have some effect on memory or categorization.” Pinker goes on to critique such experiments along the same lines that I have done here. In this quote, Pinker mentions “thirty-five years of research” (now more like fifty years, since Pinker’s book was first published in 1994). In the paragraph quoted at the beginning of my critique, Boroditsky says “a solid body of empirical evidence showing how languages shape thinking has finally emerged”. “Finally”, after fifty years?! What has emerged is just more of the same banal (to use Pinker’s term) results, which are equivocal at best and, more often than not, irrelevant to demonstrating the Whorfian claim.
What is unfortunate is that the time and effort spent on trying to demonstrate the undemonstrable distracts from the potentially more interesting issue of understanding the range of cognitive processes that can be encoded in language. Discovering such processes is one of the goals of advocates for studying endangered languages, now a prominent issue in the field of linguistics. As an example, K. David Harrison, in his book *When Languages Die* (Oxford UP, 2007) discusses many unusual features (“unusual” from the point of view of the world’s “big” languages) of small, isolated languages that are in danger of disappearing, if they haven’t already disappeared. Such languages have ways of encoding concepts of time, space, numerical systems, natural phenomena, and the like that, without having studied such languages, no one could have guessed human languages could do. To me, as a linguistic scientist, it is far more interesting to try to account for such phenomena in an over-arching theory of human cognition than to approach these phenomena with the idea that these people are thinking in ways that are unimaginable to a English speaker.

I conclude with one case where it seems to me that language may well have a direct effect on thought but that I have never seen discussed in this context. This is in doing math. I am a native speaker of English, but I am, or have been a pretty fluent speaker of Hausa and French, both of which I started learning in the 1960’s and which I have used extensively for periods ranging from a few months to a couple of years in areas where those were the main languages. I can (or maybe “could” at one time) discuss most topics fairly easily in both languages, but I never acquired the ability to do arithmetic in either. Saying, “Seven times eight equals fifty-six,” in English directly translates, in my mind, to \(7 \times 8 = 56\). Saying, “Bakwai sau takwas hamsin da shida ke nan,” in Hausa does not. I first have to mentally convert it into English. That is, in my native language, there is a direct connection between the language and the abstract meaning that is not there in either Hausa or French. I have not surveyed native speakers of other languages about whether they have the same experience, but informally I have observed such speakers, who were also fluent speakers of English, doing arithmetic calculations orally in their first language. I have no explanation, linguistic or otherwise for this. Given my belief in the speciousness of the Whorf hypothesis, I would like to believe that there is some other explanation than language directly affecting thought, but at this time I have no plausible evasion!