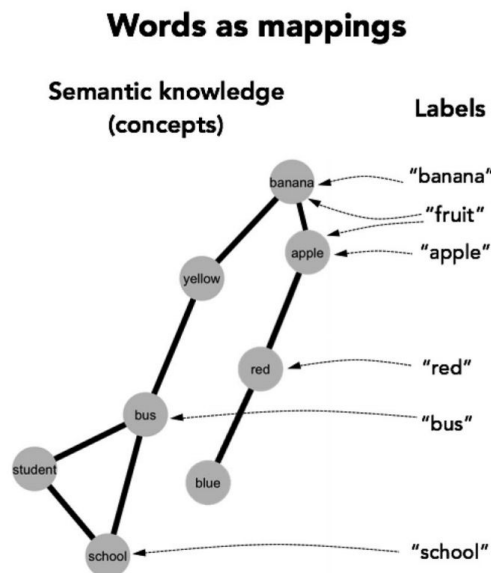


## How Language Affects Experience

Every person's experience of the world around them is legitimate. At the same time, however, it is often not faithful to reality: many barriers stand between one and "seeing the world clearly", such as opinions, past experiences, internal biases, assumptions, thoughts, and one's current mood. As it turns out, language is actually a distorting factor as well: just as mood affects your experience of the world, language can, too.

This is not obvious. On the contrary, it's rather counter to the obvious formulation of language. This formulation is essentially the idea that language is a tool of communication, and *just* a tool of communication. To reify this idea, we will borrow the "words-as-mappings" model of language, which is introduced in Lupyan and Lewis (2017). The idea behind words-as-mappings is that humans have an internal structure of ideas which exists *independent* of language. Then, language is built on top of this structure and acts merely to designate the pre-existing ideas.



*Words-as-mappings formulates terms as mere designators for independently-existing ideas. Figure from Lupyan and Lewis (2017).*

This formulation is clean, simple, and understandable, but ultimately wrong. The first evidence against words-as-mappings comes from Lupyan and Lewis' paper itself. The paper considers the following 6 sentences, all of which have the main verb "took":

The man took the candy

The man took the car.

The man took the picture.

The man took a seat.

The man took a stand.

The man took the stand.

The paper notes that that "took" seems to mean something different in each sentence. Let's suppose, for the sake of argument, that words-as-mappings is true. Then "took" designates a particular pre-existing idea in the mind. Further, either (A) the different uses of "took" designate the same idea or (B) the different uses of "took" designate different ideas. Unfortunately, neither choice is satisfactory. If they all designate the same internal idea, this doesn't account for the different meanings between the uses; however, if they all designate different ideas, this fails to reflect the likeness between these different uses. Both choices are suboptimal, lending evidence against words-as-mappings.

This is not the only argument against words-as-mappings. In fact, all effects of language that will be discussed in this paper are evidence against words-as-mappings, since they all describe effects of language beyond simply acting as labels for ideas. One effect in particular, however, is especially powerful evidence against words-as-mappings since it establishes that language, a high-level process, can affect a low-level process. This shows that language does not exist “on top of” or “after” other cognition, like words-as-mappings suggests. This effect is as follows:

*Language can aid or hinder awareness of an object in the visual field.* The study from Lupyan and Ward (2013) found that verbal prompting can affect awareness of objects in the visual field. Participants were given different stimuli in each eye: in the left eye, they were shown an object; in the right, they were presented with high-frequency flashes of light. The light flashing was designed to ‘drown out’ the awareness of the object in the left eye, so that participants are aware *only* of the flashing light. Interestingly, the researchers found that this ‘drowning out’ could be fought back against via language: by cueing a participant with a verbal label which matched the object in the left eye, the participant was more likely to pick up on the object, despite the flashing light. Further, the complement was also true: if the participant was cued with a verbal label that did *not* match the object, they were less likely to be aware of it. □

The choice by the experimenters to measure whether or not the participant picked up on the object *at all*, rather than measuring *what* they saw (i.e., how the information that was picked up was processed) was a deliberate one. The picking up on anything at all is a lower-level process than the processing of picked up information. Thus this experiment establishes that language, a rather high-level process, can affect low-level processes. Since words-as-mappings

only lends language the power to act as labels, strict conveyors of information, and does not include the possibility of effect on cognition, this effect is evidence against words-as-labels. The fact that the effect is observed on a low-level process makes this evidence even stronger.

If we thus accept words-as-mappings to be false, it would be appropriate to introduce an alternative. One alternative—though not our final destination—comes in the form of a theory called words-as-cues, which is introduced by the same paper as words-as-mappings. The idea behind words-as-cues is that a word, instead of being a label for a pre-existing idea, is defined by how the word affects one's mental state. "Just as seeing a raspberry is made meaningful by our prior interaction with it (we learn what they taste like, that red ones are ripe, etc.), so hearing or seeing the word "raspberry" is made meaningful by activating the same types of mental states" (Lupyan and Lewis, 2017). Words-as-cues is a good stepping stone in the right direction. It rightfully lends words more power than words-as-mappings, allowing them to have effects on cognition. However, even words-as-cues cannot necessarily account for all effects of words that will be introduced in this paper. Therefore, it will not be our running theory.

Instead, our running theory will be relatively simple, but undetailed. Essentially, it will be the stark opposite of words-as-mappings: we will assert that, unlike predicted by words-as-mappings, language is *ingrained* into cognition; the two affect each other deeply and cannot be easily pulled apart. This is evidenced by the previously established interaction between language and a low-level process. Additionally, effects that we will look at in this paper will be evidence against words-as-mappings and for language being ingrained. Let us examine these effects now.

*Having a different term for two colors makes them easier to tell apart.* Russian separates the English concept of “blue” into two categories: *goluboy*, for light blues, and *siniy*, for dark blues (Boroditsky, 2009; Lupyan and Lewis, 2017). There is no Russian word for both blues. According to Boroditsky (2009), Russian speakers are able to differentiate between the two quicker than English speakers due to this terminology. This was proven by redoing the trials while first placing the subjects under verbal interference—asking them to recite something aloud—and then placing subjects under spatial interference—asking them to mentally retain an object. The verbal interference levelled the playing field, so that English and Russian speakers were as quick to distinguish the colors. The spatial interference, however, did not. □

*Grammatical gender gets associated with social gender.* Many languages group words by *gender*, categorizations of the words which may or may not have semantic significance. For instance, Spanish groups words into *masculine* and *feminine* groups, so that paper, “papel”, is masculine, but house, “casa”, is feminine. The choice of calling these groups “gender” is arbitrary, as is the choice of calling the groups in Spanish “masculine” and “feminine”. However, it is not without effect. Speakers associate masculine words with traditionally masculine traits and feminine words with traditionally feminine traits. A study in Boroditsky (2009) was conducted with speakers of Spanish and German, another language which groups words into masculine and feminine genders. Both groups were asked to describe a key, a word which is feminine in Spanish and masculine in German. The Spanish-speaking group used words like “golden”, “intricate”, “little”, “lovely”, “shiny”, and “tiny” where the German-speaking group used “hard”, “heavy”, “jagged”, “metal”, “serrated”, and “useful” (Boroditsky, 2009).

An association between grammatical and social gender also shows in art. When personifying death, an artist has a choice whether to depict death as a masculing creature or a feminine creature. As it turns out, 85% of the time the artist's choice matches the "grammatical gender of [death] in the artist's native language" (Boroditsky, 2009). □

*Language can affect perception of time.* English and Swedish speak about time through a length metaphor, so a movie is "long" or "short". Greek and Spanish, on the other hand, use a size metaphor: that same movie would be described as "big" or "small". Interestingly, this difference seems to have an effect on the perception of time. When shown two lines on a screen that take the same time to expand to different lengths, English and Swedish speakers mistakenly perceived the longer line as having moved for a longer time (Casasanto, et. al., 2004). A similar effect is seen with Greek and Spanish speakers, using containers filling up rather than lines expanding. Interestingly, Swedish-Spanish bilinguals would exhibit only one phenomenon at a time: if they were primed in Swedish, then they would be beholden to the line misperception, but if they were primed in Spanish, then they would be beholden to the container misperception. In both cases, they did not exhibit the misperception of the language that they were not primed in. This gives good evidence that this effect is indeed caused by the language, rather than, for example, the culture associated with that language. □

The previous three discussed effects—language on distinguishing colors, association of linguistic and grammatical gender, and language on time perception—all offer decent, but not perfect, evidence against words-as-mappings and for language being ingrained. If words-as-mappings were true, none of these effects would have been predicted. However, all of these studies have an unfortunate flaw stemming from them being cross-linguistic: it is possible

that the effects are cultural rather than linguistic. It *may* so happen, for instance, that the reason that Spanish-speakers think of the word ‘key’ in a more feminine way than German speakers is due to a cultural difference, and the parallel linguistic difference is mere consequence. However, given that we see all three of these effects present, given that some of the studies partially accounted for this, and given the context of the evidence given by the rest of this paper, it seems that it would be a mighty consequence for these effects to be coincidental. Thus, we will accept them as legitimate evidence against words-as-mappings and for language being ingrained.

The next effect of language is from a study that is not split on language, and thus does not have this issue:

*Framing facts differently can affect how people interact with them.* A study in Thibodeau and Boroditsky (2013) examined the effect of describing a crime epidemic as a “beast” compared to as a “virus”. Participants were given a description of a city with a crime problem and then asked what should be done to help reduce crime. The description of the city was identical between the groups, except that one group got a description in which the issue was called a “beast”, and the other group got a description in which the issue was called a “virus”. Even when this difference only existed at one point in the paper, there were clear effects. Participants in the “beast” group were “more likely to rank one of the enforcement-oriented responses as the best [than] those” in the “virus” group (Thibodeau and Boroditsky, 2013). □

Thus we have seen several instances in which language plays a deeper role in cognition than simply conveying information. We will continue examining effects as evidence against words-as-mappings and for language being ingrained, but the upcoming effects will also serve as evidence for a theory of emotion called Conceptual Act Theory. We start with describing

established effects of language and creation of abstractions/categories, and we will then apply this to Conceptual Act Theory.

*Language helps create abstractions/categories.* Our view of the world around us is mediated heavily by abstractions. Sensation of the world consists of very simple attributes, such as seeing colors or feeling heat. We learn to categorize this experience in order to understand it; for instance, we learn to categorize tall, slim, round, clear objects as ‘plastic bottles’ since such a categorization is relevant to our lives.

An obvious role of language in creation of categories is dissemination of knowledge: virtually no modern individual would have categorized numbers into ‘even’ and ‘odd’ groups without the category being explicitly given to them via education. However, there is evidence that language has a more fundamental role in category building beyond information dissemination. A study in Xu (2002) found that using two labels for two different objects helped infants recognize the objects as distinct; vitally, the same effect was *not* seen when using “two distinct tones, two distinct sounds, or two distinct emotional expressions”. □

*Language helps learn emotional categories.* This role of language in building categories extends to the learning of emotional categories. One study (Fugate, et. al., 2010) tested participants’ abilities to categorize the facial expressions of Chimpanzees. Even when participants were knowledgeable about the subject, they were unable to do the categorization. What allowed them to succeed instead was the attachment of a verbal label to the emotions, even though this label was nonsense. Besides this study, Lindquist, et. al. (2015) states that children are unable to distinguish between anger, disgust, fear, and sadness until they begin to learn the



verbal categories for these ideas. The paper does note, however, that this claim is not universally accepted. □

These two effects are, already, nice evidence against words-as-mappings and for language being ingrained. As it turns out, though, it may be the case that language has an even stronger role in emotion than just what's been described so far. This role comes from a theory of emotion known as Conceptual Act Theory (CAT). CAT lends power to emotion categories, thus also lending power to the language that helps build them.

CAT, presented in Lindquist, et. al. (2015), models emotions essentially as an interpretation of a sensation within a particular context:  $\text{emotion} = \text{sensation} + \text{context}$ . The 'context' consists of our internal bodily state, our 5 senses, and, importantly, what we know about emotions, such as knowing that fear "involves a beating heart, sweaty palms, a knot in the stomach, an urge to flee, and threatening contexts related to various objects (e.g., snakes, bears, cliffs, intruders, etc.)" (Lindquist, et. al., 2015).

One effect of CAT is that emotions become context-dependent: when giving a speech, the paper notes, sweaty palms may indicate fear; in a sauna, though, they are just due to the heat. Similarly, CAT predicts the existence of emotional misinterpretation: "a person might conceptualize her unpleasant feelings around dinner time as anger toward her spouse as opposed to hunger for the impending meal" (Lindquist, et. al., 2015).

Relevant to this discussion, though, the importance of CAT is that it grants increased significance to the particular emotional categories that an individual possesses. If it were the case that the emotional categories that an individual possesses acted only to label pre-existing emotions, then these categories would be of little importance. However, CAT instead asserts that

the category helps to *create* the emotion. Exactly *by* categorizing a sensation as ‘anger’, we are giving life to ‘anger’ as an emotion. Thus emotional categories play a fundamental role in creating emotion. And, as we have established, language plays a fundamental role in creating emotional categories. What this means is that language has a nontrivial role in the construction of emotion.

Thus we have seen many observed effects of language on cognition and experience, as well as one theorized effect of language on the creation of emotion. All of these effects serve as evidence against the idea that language is “just a tool for communication” and for the assertion that language is deeply involved in cognition and has surprising and nontrivial effects on human experience.

It is not immediately clear what to do with this information. Besides now knowing that a Russian-speaking friend has a small superpower, the applications to daily life aren’t obvious. Essentially, there are two opposite routes one could take:

On the one hand, a crafty (or devious) reader may look into utilizing these effects of language for their advantage. In particular, the “beast vs virus” study hints at power in language for manipulation. Should one want to influence their friends, enemies, or even themselves and subtly shape thinking, a tool is thus provided: language.

On the other (more pleasant) hand, the reader may want to become aware of effects of language and then account for or fight back them, both those mentioned in this paper and those beyond. This would grant them a greater ability to see the world around them without bias—to see things as they are.

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