The Illusion of Naturalness: How Categorization and Language Interfere with Normativity and Our Perception of Reality

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1. Introduction

"To change the very concept of a category is to change not only our concept of the mind but also our understanding of the world" (Lakoff 1994, p. 9). These are the words of the American linguist and philosopher George Lakoff (1994, p. 6) who argues in his book *Women, Fire and Dangerous Things* that our perception of reality is greatly influenced by our ability to sort the world into categories and how we express categorization through language. Interestingly, our ability to categorize is argued to be cognitively wired in us and tied to our linguistic capabilities. Categorization hereby raises the question that closely resembles the Sapir Whorf Hypothesis (Kay and Kempton 1984): does categorization modify our 'perception' of reality, or are categorizations an actual 'representation' or 'mirroring' of an external reality? The latter, called the objectivist paradigm, is present in all societies of the world and affects, among many other things, our social sphere, institutions and overall life. Drawing on experiments and case studies within the field of cognitive linguistics and with a focus on the objectivist paradigm, this article will explore how language affects categorization and to which extent cognitive and linguistic categorizations interfere with our perception of reality.

2. The cognitive development of categorization and the role of language

2.1 The significance of the naming explosion

Studies have shown that infants of about 10 months are able to detect categories, that is to say, detect a novel object in a specific class (Gopnik and Meltzoff 1987, p. 1523). This ability, however, develops rapidly at about 18 months of age where some children can actively sort objects or more

complex concepts into different categories, for example sort balls and boxes into two different groups. Previous experiments have also shown that there usually is a connection between a specific cognitive development and an equivalent linguistic development, for example 'object permanence' and the acquisition of 'disappearance words' like 'missing' (Corrigan 1978; Tomasello and Farrar 1984). With this in mind, researchers Alison Gopnik and Andrew Meltzoff (1987, p. 1524) led an experiment with the goal of figuring out if there is a relation between the cognitive ability to categorize and 'the naming explosion' which entails a rapid explosion in vocabulary and is a significant milestone in children's linguistic development. The experiment was conducted on monolingual English-speaking children with the mean age of 15,46 months at the start of the experiment, with the same children's mean age being 19,79 months at the end of the experiment. They were put through three cognitive tasks every three weeks with each task consisting of three levels. The tasks tested object permanence, means-end understanding and categorization. They were also monitored as to when they achieved a naming explosion. While no particular acquisition-time relation was observed between means-end understanding and the naming explosion, there was a slight relation between the latter and object-permanence. However, the results showed a significant relation between the development of the two-group categorization ability (level 3) and the naming explosion. Specifically, none of the children developed two-group categorization before the naming explosion, only during or not long after, indicating a strong acquisition-time relation between the two abilities (Gopnik and Meltzoff 1987, pp. 1525-1529). Gopnik's and Meltzoff's experiment results hereby suggest that the development of cognitive categorization and language is closely related. However, the above-mentioned results are not to say that language 'causes' categorization or vice versa, but rather that the two abilities might affect each other. This will be explored further in the next section.

2.2 Evidence from Aphasia

In an experiment by Lupyan and Mirman (2013), twelve patients with aphasia were tested alongside twelve control patients with matching educational status. All the test subjects were tasked with categorizing twenty images of objects in several sessions. Each session would have its own specific criterion on how the images should be categorized. Sometimes the criterion would be high-dimensional (HD), meaning that the category would involve things that shared a lot of their features, e.g. 'means of transport'. During other sessions, the criterion would be low-dimensional (LD), meaning that the objects in the category would only share one or very few features e.g. 'all things blue'. The results of the experiment showed that specifically the aphasia patients with naming impairment had difficulty with low-dimensional categorizing while the control patients did

not share the same amount of difficulty. Lupyan and Mirman (2013) argue that the reason the anomic aphasia patients had more difficulty with low-dimensional categorizing and not high-dimensional categorizing is because low-dimensional categorizing relies more on language and cognitive control. Take for example if an aphasia patient was asked to categorize a group of things with observably very different features (e.g. animals and computers) on the criterion of 'all things green'. According to Lupyan and Mirman (2013) this categorization task requires more cognitive processing, because the brain must filter out and detect one common feature from many others. Lupyan and Mirman (2013) theorize that naming impairment plays a role in this, because language arguably helps with higher cognitive control. Lupyan and Mirman's experiment suggests something crucial: If different kinds of categorization require a different degree of language abilities, then that must mean that language can affect 'how' we categorize, and make us see categories where, without the help of language, there is none.

2.3 Other perspectives: the MD network and the causal effect of category labeling

However, whether language abilities are influencing cognitive categorization is a debated subject, and other research has suggested otherwise. Benn et al. (2023, pp. 10381-82) argue that research done on the above-mentioned theory involving aphasia patients is not providing sufficient evidence. Benn et al. (2023, p. 10381) refer to several experiments conducted by other scholars and highlight the inconsistencies of the results. For example, as opposed to Lupyan and Mirman (2013) where they found that low-dimensional categorization was affected by aphasia, another experiment (Koemeda-Lutz et al. 1987) showed that both high- and low-dimensional categorization was affected. Interestingly, another experiment (Hough 1993) has shown that neither low- nor high-dimensional categorization was affected. Based on these findings, Benn et al. (2023, p. 10382) argue that difficulty with low-dimensional categorization tasks may not come from a language deficit but instead from another cognitive deficit. Benn et al. point to a deficit in the 'multiple demand network' which is a part of the brain that is situated very close to the language center in the left hemisphere. It is argued that when researching aphasia-patients it is important to take into account that the MD network might be damaged just like the language center because of their adjacency. This could be a possible explanation for the inconsistency in test results across different scholars' experiments. Furthermore, it is argued that the MD network is strongly recruited during object-naming tasks as shown in research done on neurotypical adults with fMRI (Benn et al. 2023, pp. 10392-94). Benn et al. suggest the possibility that categorization may be more influenced by the MD network than the language center.

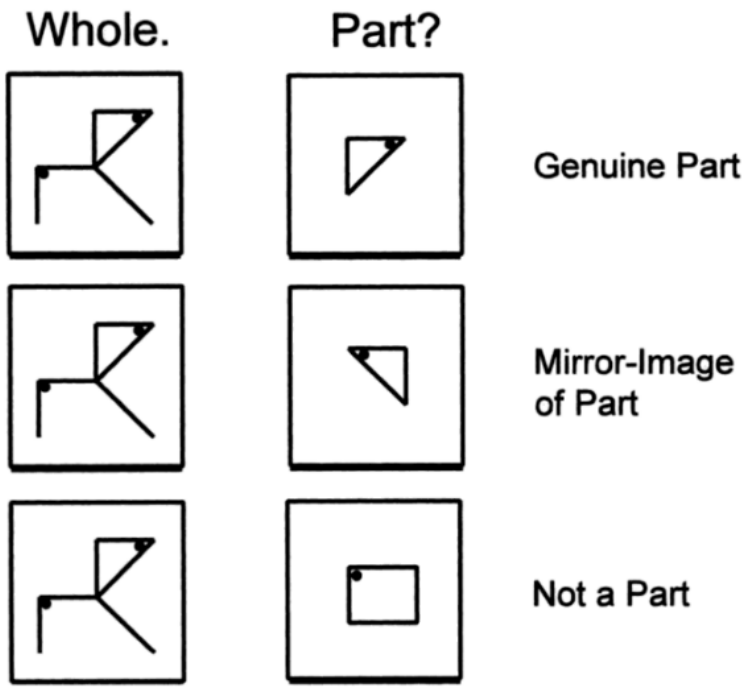
However, it is still worth examining the role of language and its role in categorization. The fMRI experiment Benn et al. (2023, p. 10390) refer to was conducted under a category-naming condition where the participants were instructed to accept or refuse images depending on a category label that was written and/or orally received. While the language network was recruited during both HD and LD categorization, it did not differ in amount of activity between the HD and LD conditions. Interestingly, the experiment indeed showed significant MD network recruitment during low-dimensional categorization and lower MD network recruitment during high-dimensional categorization. This is argued to be because LD categorization requires more cognitive processing (Benn et al. 2023, p. 10392). The category-naming is therefore a significant variable here. For example, it can be argued that when presented with different objects, being informed of a category label can affect whether HD or LD categorization is used to solve the task. Gary Lupyan and Lynn K. Perry explored this in a 2014 experiment where they found that different category labels would dictate the dimension of which categorization was done. Lupyan and Perry (2014, sec. 6) argue: "…although labeling supports selectively representing category-relevant information - necessary for low-dimensional categories - labeling comes with its own set of priors such that assigning even uninformative labels to novel categories may lead to abstracting over dimensions that are not generally diagnostic of real-world category distinctions". Lupyan and Perry hereby propose that language can have a causal relation as to what dimension we categorize on.

Based on the findings by Lupyan and Perry (2014) and Lupyan and Mirman (2013), it would therefore be worth examining if the results of Benn's et al. experiment would be different if participants solve the categorization task in the following two conditions. The first condition being the participants having to categorize images with no assigned category label to guide them. In the other condition they would receive the same number of images and then a category label simulating either a LD or HD categorization. Of course, these conditions would require image groups where both LD and HD categorization is possible in the same group, and the images would all have to be presented at the same time. Here it would be interesting to look at fMRI scans of the participants during the processes to see if the MD network is just as activated during the naming-condition as the no-naming condition. A suggested hypothesis could be that in the no-naming condition the participants would be more prone to categorizing based on eye-catching perceptual shared features or common thematic-features indicating high-dimensional categorization and therefore resulting in lower MD network recruitment. Whereas the participants in the naming-condition would be more susceptible to low-dimensional categorization resulting in higher MD network recruitment. This hypothesis would support the argument that language, although supposedly not wholly responsible for categorization, can still function as an important 'activator' of different category

dimensions and more frequent LD categorization causing significant recruitment of the MD network for higher cognitive control.

2.4 Linguistic relativity and its effect on 'naturalness'

If we dive deeper into the theory that categorization is affected by language abilities, we might ask the question: Can language affect what we perceive as natural more than our senses can? The linguistic anthropologist Danziger (2005) explored this exact question in the following experiment by the Cognitive Anthropology Research Group of the Max Planck Institute. This experiment involved test subjects from ten different language communities and six different language families. Some of these test subjects were literate in the roman alphabet while others were non-literate in the roman alphabet. Each test subject was instructed to rate images of two-dimensional figures as acceptable or non-acceptable during the experiment. More specifically, they were asked if one figure could be found inside the other. They were shown two images every round with three rounds in total:



(Danziger 2005, 74)

Interestingly, results showed that the non-literate adults[1] were more prone to accept the mirror image part than the literate adults. Danziger (2005, pp. 73-75) discusses why this can be, using the example of school children when they first start to learn writing. Children might reverse

[1] In this context, "Non-literate adults" refer to adults who are non-literate specifically in the roman alphabet.

the letters, so a [b] looks like a [d], or they might write from right to left. In school, the children will learn the conventions of writing with the roman alphabet, and they will be told that reversed letters are wrong. The children learn that reversed letters do not function the same as 'correct-facing letters', so essentially the children learn what is 'natural' in writing and what is 'unnatural'. More specifically, this right-left conceptualization causes children to view the world in a different way than before and this carries into adulthood. However, this specific right-left conceptualization is not the case in all languages, hence why the adults who were non-literate in the roman alphabet were more accepting of the mirror-image part than the literate adults. This example of linguistic relativity has been documented in several cross-linguistic experiments, arguing that language can influence how non-linguistic cognitive tasks are performed (Pederson et al. 1998, p. 586).

3. The Objectivist Paradigm

3.1 The idea of categories existing in external reality

Some of the above-mentioned studies support the argument that language functions as a modifier to our cognitive categorization abilities. This argument is popular among cognitive linguists and challenges another view on categorization called 'The Objectivist Paradigm'. The Objectivist Paradigm is the belief that categories in the world already exist, and we are merely there to name them, so that our language functions not as a modifier but as a 'mirror' to an external reality (Lakoff 1994, p. 162). The linguist Noam Chomsky even argued that categories are engrained in our DNA and present from birth (Danziger 2005, p. 65). The Objectivist Paradigm is very much present in all societies of the world and arguably influences us more than we might think. This paradigm essentially resembles how we are prone to think that rationalism exists 'outside' of us which we also see in the growing trust and dependence on artificial intelligence and other technology. George Lakoff (1994, p. xvi) argues: "It is important that we have discovered that rational thought goes well beyond the literal and the mechanical. It is important because our ideas about how human minds should be employed depend on our ideas of what a human mind is". Lakoff (1994, p. xvi) is arguing that if we view the human mind merely as something that can be found elsewhere, then we are in danger of devaluing important research and education on the human mind. Hence, the dangerous thing about the Objectivist Paradigm can be argued to be the devaluation of human intelligence, experience and critical thinking.

A common argument tied to The Objectivist Paradigm is the idea that we acquire our categories through accurate sense perceptions of the world (Lakoff 1994, p. 164). Take for example if someone is asked why a duck is a duck and a seal is a seal. They might simply answer that the duck has the DNA of a duck and the seal the DNA of a seal. If they were asked how they know

what DNA the animals have, a common argument would be because of the duck and seal's perceptive appearances. If asked the same question again, but this time the duck would 'act' like a seal and the seal vice versa, the person's answer would likely still be the same. And if the duck went to a surgery room and was surgically made to look like a seal, would it still be a duck? Most people would still answer yes (Neufeld 2022, sec. 2.3). These answers are examples of psychological essentialism, the belief that all natural kinds[2] are the holders of a "hidden underlying inner essence" which is the defining factor of their belonging to a specific category. (Neufeld 2022, sec. 1). Psychological essentialism has also been argued to be the core thinking behind social prejudice and stereotyping because it can manifest as a strong bias that is not easily broken. (Neufeld 2022, sec. 3.2 - 7).

4. The Causal Status Hypothesis in language and society

4.1 Societal implications

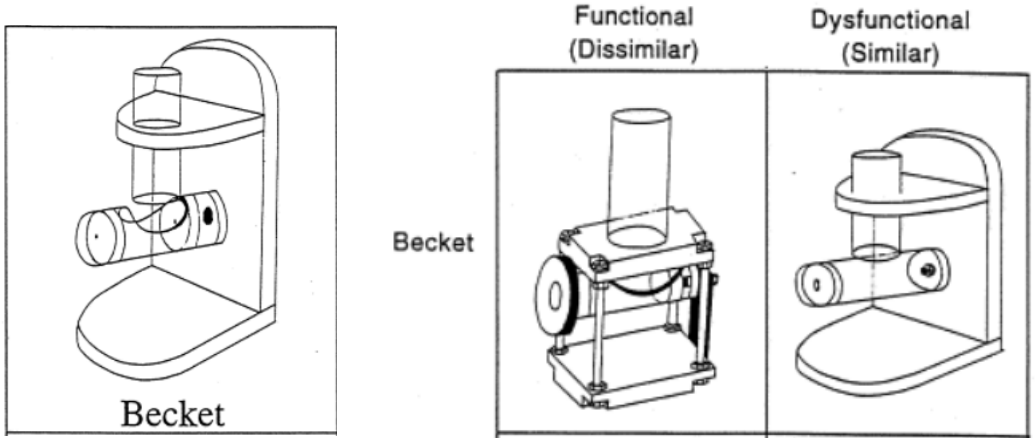
One of the reasons why psychological essentialism has such a grip on social prejudice is argued to be because of the Causal Status Hypothesis. This hypothesis involves the theory that when we categorize, we tend to value the 'cause' of a concept as more important than the 'function'. In other words, the essence of a category has so much 'causal power' that it is believed to be responsible for the category-specific features (Ahn and Luhmann 2005, p. 278; Neufeld 2022, sec. 1). The Casual Status Hypothesis can be used as a tool to explain how prejudice works and occurs towards societal groups. Let us take for example the prejudice against Greenlandic people in Denmark. One prejudiced belief is that Greenlandics drink a lot of alcohol: "Hvis jeg på studiet for eksempel fortæller, at jeg har været ude at drikke en øl med min mor i solen efter arbejde, bliver jeg mødt med kommentarer som 'ja selvfølgelig, gjorde du det. Du er jo Grønlænder[3]' "(Institut for Menneskerettigheder 2023) In the above-mentioned situation it is implied that it is in the Greenlandic person's nature to drink just because they are Greenlandic. When explaining prejudice against Greenlandics, it is therefore not based on what each and every Greenlandic does or acts like (their 'function') but instead an essentialist belief in Greenlandics having an unchangeable 'inner essence' that is 'the cause' of their function'. Essentialist thinking like this is commonly criticized. Neufeld (2020, sec. 7) even argues that when we categorize based on essentialist thinking it can in the most extreme instances lead to dehumanization. She states: "we deny their agency and represent them as inherently constrained in their capacity for self-determination *qua* member of a

[2] Natural Kinds: "fundamental distinctions found in nature" (Neufeld 2022, 1. table 1).
[3] "If I, for instance, am talking to my peers at university and I mention that after work I was out in the sun having a beer with my mom, I am often met with comments like 'Yeah of course you did. You're Greenlandic after all'" (My translation).

social kind". Neufeld (2020, sec. 7) stresses that causal categorization can cause category boundaries that are so extreme, that the category features are no longer based on observable reality, but instead a strong belief in the presupposed category essence. This makes it nearly impossible for the targeted group to break out of the attached 'subhuman essence'. Some scholars even draw on the holocaust and other genocides in history as examples of extreme consequences of essentialist thinking and categorization. Furthermore, social prejudice often manifests in the language as slurs which strengthen the essentialist thinking and the causal status effect by forcing an 'essence' on a group with a linguistic label (Neufeld 2022, sec. 3.2 - 7).

4.2 The significance of intended function

Studies conducted on the causal status effect show that it is a processing bias that manifests early in life and has been detected in young children. Additionally, it has also been hypothesized that the causal status effect is more present when categorizing natural kinds as opposed to artifacts where 'function' seems to be more important than 'essence'. However, Ahn and Luhmann argue that although the latter might be true in some instances, the categorization of artifacts based on function still seems to be connected to the causal status effect (Ahn and Luhmann 2005, pp. 281-283). This theory was explored in an experiment conducted by Kemler et al. (2000) where thirty-two preschool children were presented with novel artifacts with specific functions, e.g. a structure made to shoot out a ball. In the first part of the experiment, the children would learn the intended function- and a novel label referencing the specific object. In the second part, the children would be presented with two new objects. One of the objects was perceptually similar to the original object but dysfunctional, while the other object presented was perceptually dissimilar but functional.



(Kemler et al. 2000, 2)

The results showed that the children were more likely to categorize based on functionality than appearance. In another version of the experiment the same procedure was used, except this time the children would receive no information about the functionality of the object. In this condition, where the children received no information about the functionality, they were more prone to choose the dysfunctional but perceptually similar option (Kemler et al. 2000, sec. 5.1-6.2.2). What this experiment shows is that intended function matters a great deal when categorizing artifacts, but also that the intended function is often tied to or even dependent on the physical appearance/causal status of the object. According to Ahn and Luhmann this is arguably another case of the casual status effect, demonstrating how a processing bias like this can influence our perception of objects and concepts in more ways than we might initially be aware of (Ahn and Luhmann 2005, pp. 281-283).

4.3 Language as an activator of causal-based categorization

Additionally, there is a third version of Kemler's et al. (2000) experiment which involved a naming and a no-naming condition. In the no-naming condition three- and four-year-old children still received information on the object's function, but the object was not named. The results were quite interesting, as the four-year old's acceptance of the functional but dissimilar objects was enhanced by the naming-condition. The opposite happened for the three-year-olds, as they were instead more accepting of the dysfunctional but similar object in the naming-condition (Kemler et al. 2000, sec. 6.11). Notice how these results draw an interesting parallel to the experiment by Lupyan and Mirman (2013) mentioned in section 2.2 where language matters a great deal as to how categorizing is done. Kemler et al. (2000, sec. 6.3.2) argue: "As to the facilitative effect of naming, one possibility is that naming prompts more conceptual processing in 4-year-olds, and a concomitant tendency for their categorization to be drawn away from the competing pull of superficial appearances". Kemler's et al. argument prompts the notion that language can act like an 'activator' for categorization in the sense that when the object is named as opposed to unnamed, the 'naming' sends a strong signal to our brain to make predictions about the labelled object. This could possibly result in more thorough cognitive processing when categorizing. Additionally, note how the theory of naming as an 'activator' of categorization is complementary to Lupyan's category-label theory and the effect of using slurs to categorize, mentioned in section 4.1.

Kemler's et al. (2000) experiment results suggest that it is possible for naming and higher language skills to cause more cognitive processing which allows for more use of low-dimensional and sometimes function-based categorization. All the while, naming and less advanced-language skills in this experiment shows more use of high-dimensional and causal-based categorization.

However, if we apply Benn's et al. (2023) theory that language skills are noninfluential when it comes to categorization, it is also possible that the results are because of a difference in cognitive development in the multiple demand network. Further research would have to be done to determine what is causing this result-gap between the 3- and 4-year-olds in Kemler's et al. experiment.

5. Conclusion

Based on the above-mentioned studies it can be concluded that cognitive categorization is not dependent on language and that categorization is a separate cognitive process as shown in the fMRI results from Benn' et al. (2023) experiment. However, as shown in the study by Gopnik and Meltzoff (1987), language does have a certain developmental relationship with categorization. Lupyan (2014), Ahn and Luhmann (2005) and Danziger (2005) show that language can have an effect as to 'how' we categorize and category-dimensionality. Additionally, the fMRI scans by Benn et al (2023) where the MD network is significantly more active during LD categorization while the language network has the same amount of activity for both dimensions, suggest that language can steer the cognitive process of categorization in a certain direction. This implies that language does not dictate how we categorize but merely can affect it. The ability of language to 'activate' different category-dimensions therefore shows that language can serve as a powerful influence on our perception of reality.

Furthermore, in the experiments by Lupyan (2014) and Kemler et al. (2000), language figuratively functions like a flashlight in the dark; it highlights things that the test subjects would maybe not otherwise notice or think about, but the flashlight at the same time limits them to what it points at, leaving other things in the dark so that they would have to work harder to see them. In other words: language can create categories and concepts where there otherwise would be none, but language can therefore also sometimes be a slippery slope to processing biases like essentialist and causal-status thinking. Furthermore, as seen in Danziger's (2005) study on categorization and linguistic relativity it can be concluded that although the ability to categorize is cognitively wired in us, it does not make it so that (if presented with a categorization task) every human individual would categorize the same way. Instead, it is concluded that categories can be 'taught' by language, again, making categorization subjective (but not limited) to language, instead of a universal external objective reality as The Objectivist Paradigm suggests.

The influence of language on categorization is partly what makes The Objectivist Paradigm and essentialist thinking thrive. It can explain why we look for objective truth and reason outside of ourselves and what we view as 'natural'. Additionally, it can explain why algorithmic technology is

so popular, or why we have objective regulations and laws for nearly everything. These are indicators of the distrust of human bias and human judgement, so we search for an objective reality elsewhere (Lakoff 1994, 184). In conclusion: Categorization is an innate cognitively wired ability which makes us naturally search for reason and truth while language has the influential power to determine what we find.

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