Examples of non-conscious cognition (that could play into bias)

Inspired by reading
"*Unthought: the power of the cognitive non-conscious*" Chapter 1 by Katherine Hayles

Examples of non-conscious human categorization phenomena:

Basic Level effects : "Psychological studies have shown that, within hierarchical classification schemes, there appears to be a basic level preferred by human subjects. For example, in a hierarchy containing {animal, vertebrate, mammal, dog, collie}, subject behavior may indicate that "dog" lies at the basic level. Rosch, Mervis, Gray, Johnson, and Boyes-Braem (1976) used a target-recognition task to show that subjects are quicker to confirm that a test item is a member of such a basic category (e.g., dog) than they are for a superordinate (e.g., animal) or subordinate (e.g., collie) category. In a forced naming task (Jolicour, Gluck, & Kosslyn, 1984; Rosch et al., 1976), a subject is shown a picture of a particular item and asked to respond with its identity – most subjects respond with the basic level category name. Third, basic level category names typically have the shortest words (e.g., dog as apposed to animal and collie)."

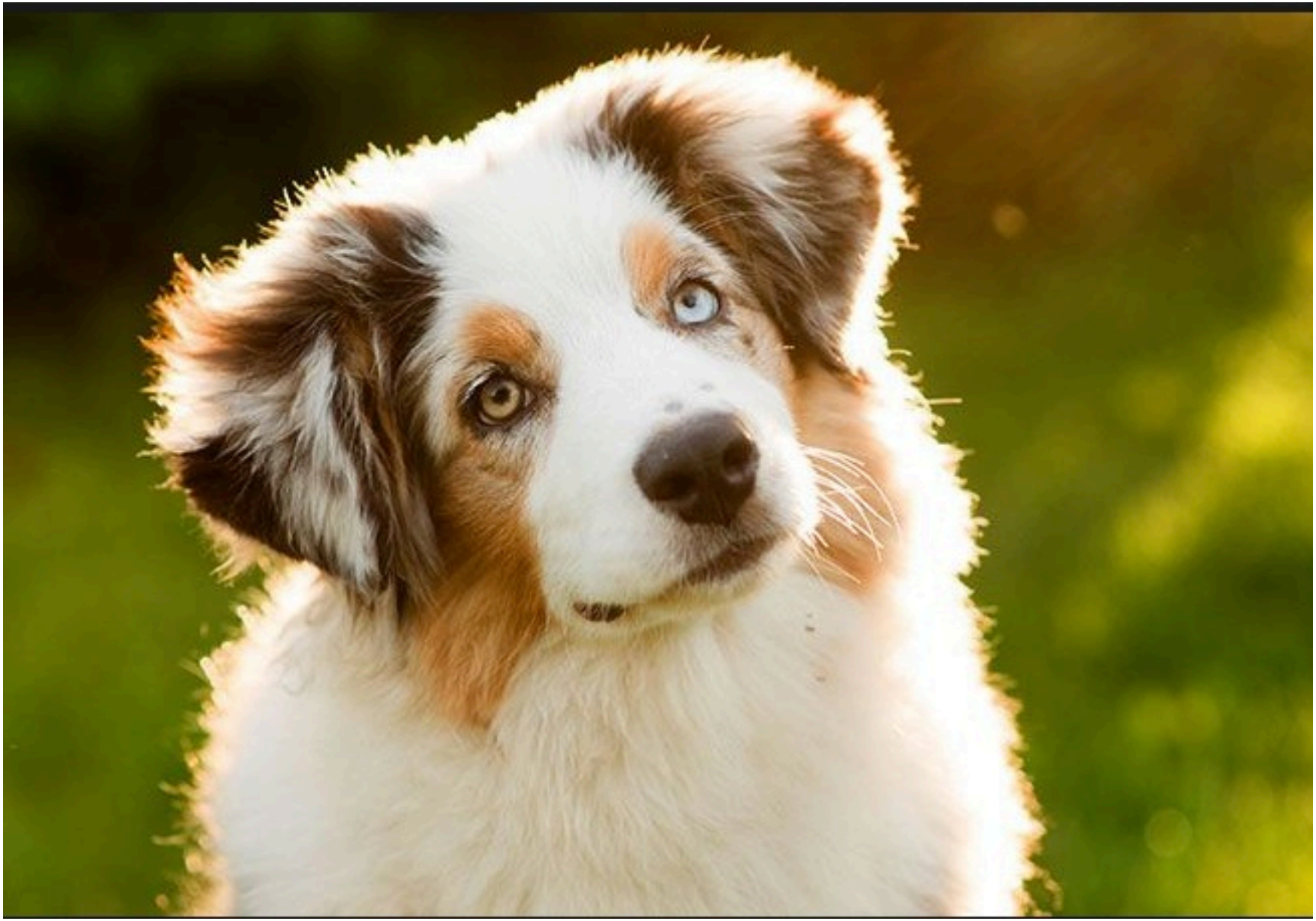
Typicality effects: "Psychological experiments have repeatedly shown that human subjects do not treat concept instances equally, but regard certain members as more typical than others. For example, in a target-recognition task, subjects must determine if a test instance is a member of a target category (e.g., "Is a robin a bird?"). Several studies (Rips, Shoben, & Smith 1973: Rosch & Mervis, 1975) indicate that subjects consistently respond affirmatively more quickly to certain positive instances than to others. For example, they may more quickly affirm that a robin is a bird than they will affirm that a chicken is a bird. The relative ranking of positive test items corresponds to a typicality ranking of category members, and this conclusion is bolstered by results in a variety of other experimental tasks (Mervis & Rosch 1981; Smith & Medin, 1981)." In a forced naming task, where instances of a concept are named by a subject, subjects tend to list names roughly from more typical to less typical.

Fan effects: "Observations with frequently encountered features may be more difficult to recognize than observations with relatively unique features, given that exposure across observations is relatively constant." Intuitively, its easier to remember that you have observed a rarely encountered thing that it is to recognize a frequently encountered thing. We explained fan effects as a degenerate case of typicality effects.

Much of AI study is largely unconcerned with learning and reasoning as people do, but there is a field of AI known as Cognitive Modeling that is very concerned with modeling human thinking, at least to an approximation. If interested in more, both about cognitive modeling methodology and the categorization phenomena above, see Doug's paper on "*The Structure and Formation of Natural Categories*" (all quotes above from this paper).

The class participated in the following exercises intended to illustrate basic level, typicality, and fan effects

What is this?



All answered (on an answer sheet)

“dog”

Dog is a basic level concept as identified through a convergence of behavioral data

What is this?

Most answered

“dog”

but about 5 answered

“Scottish Terrier” or “Scotty Dog”

A “Scotty” is a mildly atypical dog

The basic level may be “overridden” in the case of a moderately atypical instance

What is this?

All answered

“bird”

Bird is a basic level concept as identified through a convergence of behavioral data

What is this?

NO ONE ANSWERED

“bird”

All answered

“Ostrich”

An Ostrich” is a very atypical bird

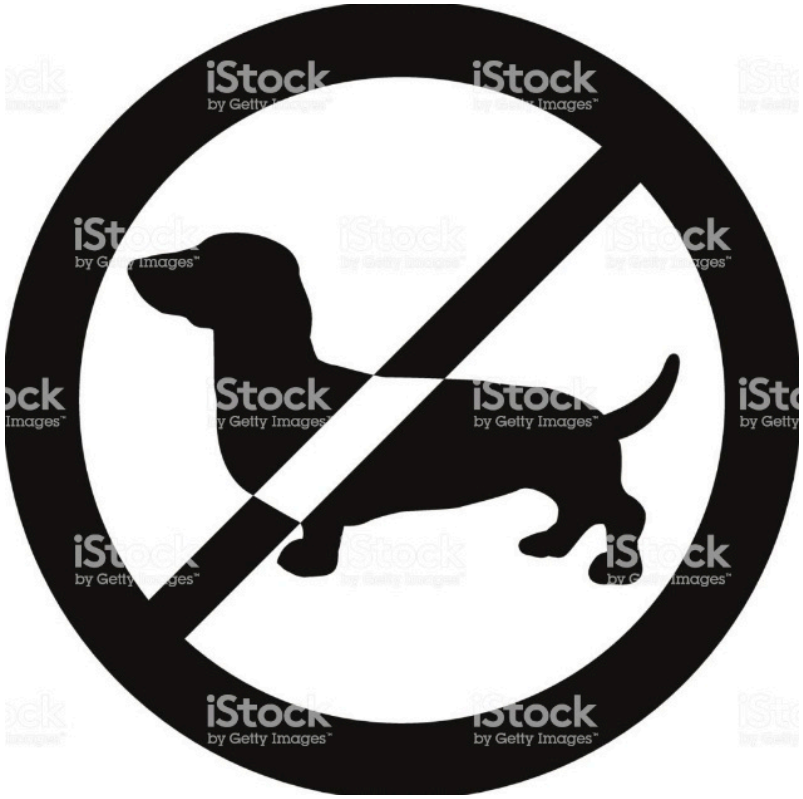
The basic level will almost always be “overridden” in the case of a very atypical instance

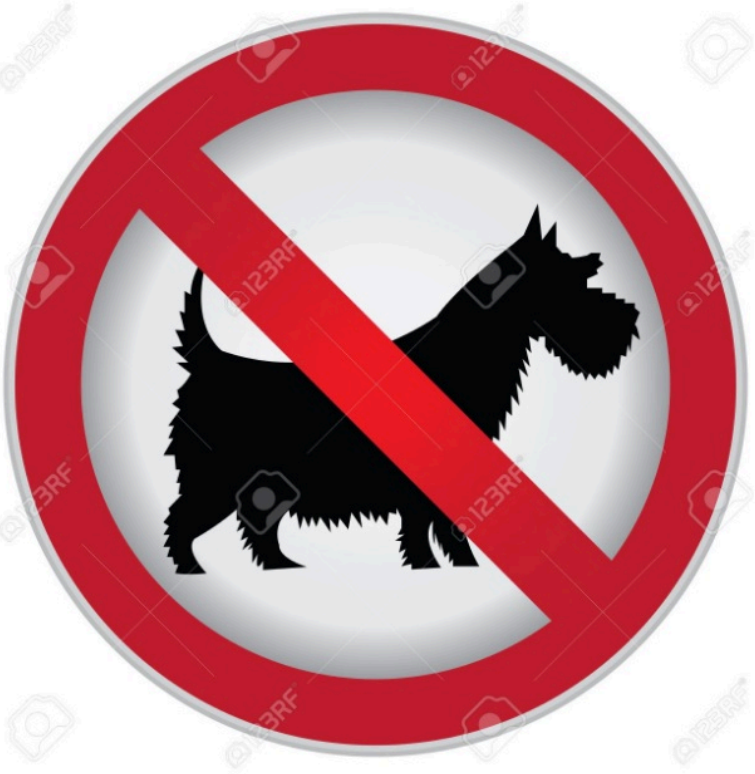
The basic level varies with "expertise" and experience

The basic level for a judge of "Best in Show" might include individual dog breeds, rather than "dog"

The basic level (if we could measure) for a brand new infant might include "Mom-entity" plus animate, rather than specializing below that to dogs, cats, etc

What strikes you as funny (or interesting) about each of these "No Dogs Allowed" signs?





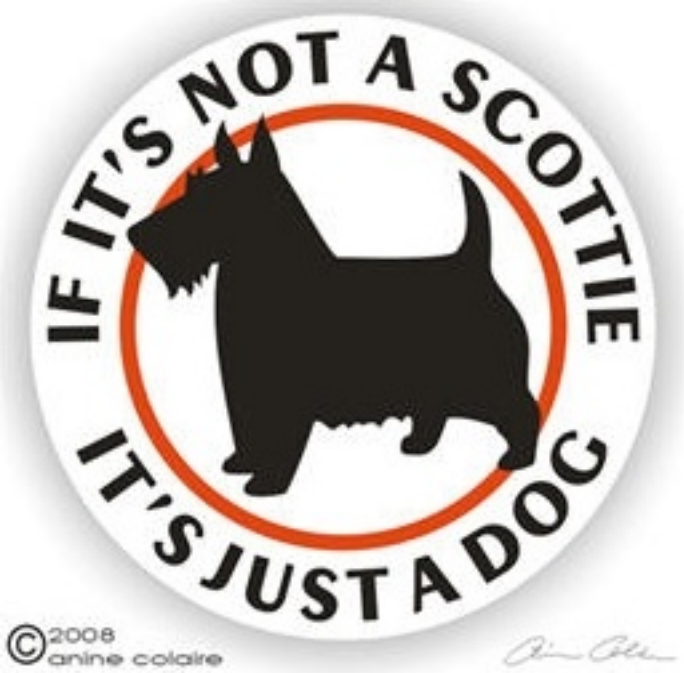
Either that atypical breeds are used to represent the basic level ‘dog’ (interesting)

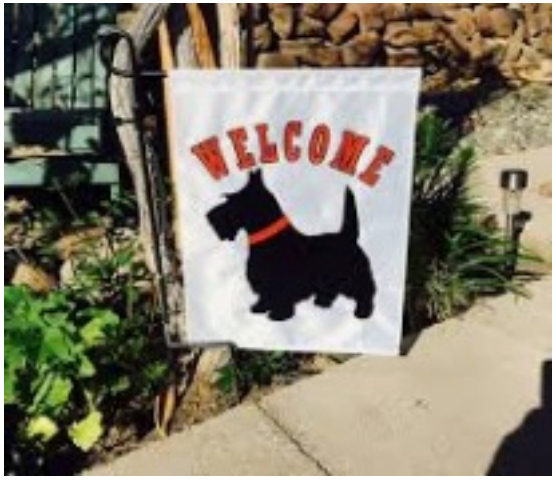
or

that its only the atypical breeds that are banned (funny)

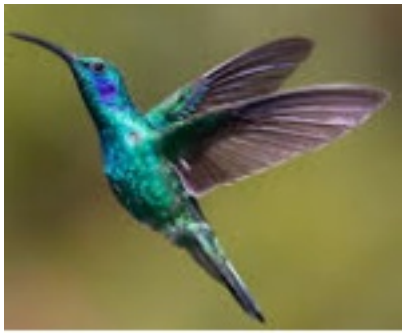
More fun with (a)typicality and meaning

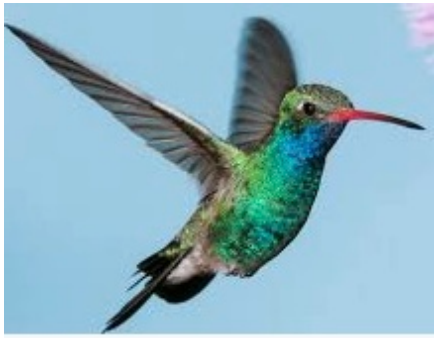
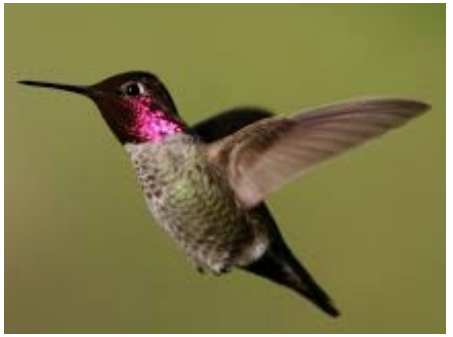
???

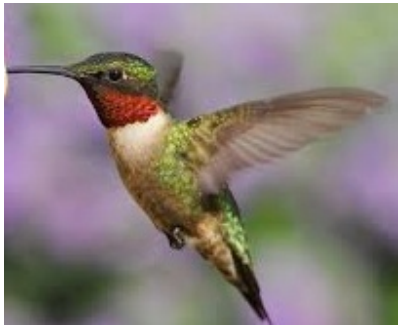




Study these images for a few seconds.
You will be asked to say whether you have seen an image or not



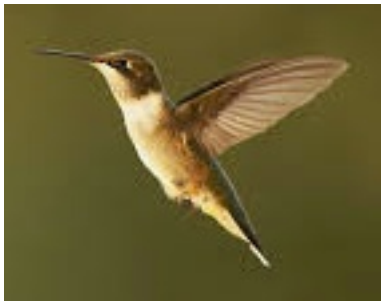





Have you seen this image?

Yes! Its easier to recognize that an entity of a infrequent entity was observed or not (fan effects)

Have you seen this image?



No? Its harder to recognize whether an entity of a frequent class was observed or not (fan effects)

Complete aside:

Fan effects seem intuitive when viewed in an evolutionary context of survival
similar looking and frequent things (your villagers)
are glossed over as you walk about, but anomalies (possible threats) stand out

But fan effects may seem less than optimal from a "computational" standpoint – shouldn't it be easier to recognize those things that are normative and more common than it is to recognize those things that are rare?

Taking both the evolutionary perspective and the computational standpoint into account,
Fan effects may drive category formation

What might this and other non-conscious cognition have to do with bias (or not)?