Coordination and communication is built fundamentally on inference. It is not the vague unquantifiable ostensive inference theorized by Sperber and Wilson, but a specific factorable relation of inference procedures that enables both highly flexible and highly regularized means of communication and coordination.

Communicative inference is causal

Communicative inference is modulated by signals

Signals can have few or many meanings and they can be clear or ambiguous

Signals can be compositional or they can be discrete

Signals are not a special class of actions, but actions used for signaling

Communication is causal inference. This causal inference proceeds like any other cognitive activity in that it involves interacting, both with cognitive capacities such as stored knowledge and representations as well as with the environment.

In this paper we illustrate how a common form of signaled communication involves all of these cognitive capacities.

This is in stark contrast to signaling system models and those that require signals to have explicit meanings.

It is also in contrast to Sperber and Wilson’s ostensive inferential model, not in that it does not involve ostension and inference, but that we provide a much more structured framework for analyzing such communication, a formal model of the process, and a space for signal meanings to come into play themselves.

Basically, there are things in common with signaling models and with Relevance models, as is expected, but this new framework unifies all of this in a much more motivated manner.

**In the case of high beam flashing, there is often no contextual implication as described by Sperber and Wilson, but an exploration process of causal inference.**

But maybe we can use it as a clear example of how we can model the inference that goes on in such a scenario.

Inference about signal meaning involves a number of internal and external processes. These processes have different cost structures, and the disambiguation occurs in a principled manner, with the highest expected [relevant information]/[cost] ratio processes explored first to disambiguate the meaning. However, disambiguation does not proceed to absolute terms, but just enough to enable success at the task at hand.

People do causal inference to interperet the meaning of expressions and signals. This causal inference is most explicit and interactive when the meaning of an utterance is ambiguous given knowledge.

It is often the case that drivers need to communicate with each other. When driving at night, much of the communication takes the form of a single signal: flashing your high beams. The relatively singular nature of the signal comes from the limited amount of signals that can come from a car as well as from a variety of reasons why horns are not often used at night and the difficulty in seeing another driver’s gestures at night.

Because of the limited variety of signal and the fact that the length of the high beam flash is not regularly modulated to signal different meanings, the meaning or communicative intention behind flashing one’s high beams is highly ambiguous.

Though many theories treat ambiguity in language and communication, they often appeal to a nonspecific and austere realm known as context for their explanations. Even when this is not the case, we will see that they do not accurately predict the behavior going on when signaling with high beams. We use this as a motivating example for a new theoretical framework for communication. Though of course we remain true to many ideas and principles present in prior frameworks, we believe that we can account for the wide range of communicative phenomena in a much more principled manner. Additionally, this framework is articulated such that it lends itself well to formalization in a rational Bayesian structure. In order to justify all of these claims, we must continue onwards and immerse ourselves in the minds of those drivers who are signaled by a flash of another driver’s high beams.

When at the receiving end of a flick of the “optical horn” or high beam lights, what do you do? It could mean any number of things: