# Understanding by analogy: A computational-level analysis

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Imagine yourself in a crowded club with a band playing loud music. From a distance you see a friend making eye contact with you. Then she moves her fist in the air to the bass of the music after which she touches her head while she looks in pain. Following that she points to herself and then puts the fingertips of her hands together to form the shape of a roof. Despite the fact that your friend is using communicative signals that are novel, you immediately understand that the bass of the music is giving her a headache and that she is going home.

That conclusion, however, does not follow deductively from the signal and context, because there are no logical rules by which you can deduce your friend’s communicative intentions. In this example, you are trying to best 'guess' what her intended meaning might be. This form of inference is known as inference to the best explanation. Computational theories of inference to the best explanation all presuppose a set of 'guesses' from which to pick the best. This is theoretically problematic as we cannot assume that such a set is given. The example illustrates this point: Your friend is creating novel communicative signals on the spot, hence they meaning of those signals cannot be part of any predefined set. If they would be, the signal would not be novel.

In this talk I will illustrate a computational-level characterization of a process that can construct a set of candidate meanings. The characterization is based on the idea that people can re-conceptualize perceptual information and conceptual knowledge through analogical inferences. For example, the shape of the hands can be analogous to a roof, a roof can be analogous to a house, and a house can be analogous to a home. Hence, ‘home’ is a possible candidate meaning for the gesture. Recursively applying this analogical reconceptualization would allow a cognitive system to generate a set of candidate meanings that can contain even creative, novel communicative signals.