Language is full of words with multiple meanings, a phenomenon known as polysemy. Body parts are a great example: we talk about a person's foot, hands, face, and head, but also about the foot of a mountain, the hands of a clock, a beer's head, and the head of the government. Remarkably, about 84% of English words are polysemous, with some researchers suggesting that virtually every word possesses some degree of polysemy. This might seem confusing at first glance, but polysemy is actually a clever adaptation to the challenges of communication.

Humans face an infinite number of things to talk about, yet we can only learn a finite number of words. One solution is using syntax to combine words in meaningful ways. Another is polysemy, where a single word can have multiple related meanings. For example, we use the word "mouse" for both the animal and a computer device due to their visual similarity. This adaptability makes language open-ended and versatile, allowing us to express new concepts as they arise. From an evolutionary perspective, this adaptability is crucial, making language a robust tool for communication in a dynamic and ever-changing environment.

This project explores how polysemy could have evolved through cultural interaction and cognitive processes like analogy. The study includes cross-cultural experiments to see how people extend word meanings based on their cultural backgrounds. For instance, Polish participants might associate the word "dragon" with "dangerous," while Chinese participants might think of "luck" and "wisdom." Understanding these cultural nuances is essential because it highlights how different societies might prioritize certain semantic associations over others, influencing the way polysemy develops.

Participants will engage in an artificial language learning experiment where they learn new words in a made-up language and then extend these words to new meanings. Eye-tracking technology will help us understand participants' initial reactions to these potential new word meanings, providing insights into the cognitive processes involved in learning and extending polysemous words. Another set of studies will use experimental semiotics, where participants communicate without natural language. This will show if they create a polysemous communication system by extending meanings to new, related concepts, thereby mimicking the natural evolution of languages in human societies.

The third part of the project uses the iterated learning paradigm, where each generation of participants learns from the previous one. This method has shown that systematic, structured semiotic systems emerge over time through cultural transmission. By introducing new referents in each generation that can be linked to previously learned items via semantic associations, researchers will test if a systematically structured polysemous system can develop. This aspect of the study is designed to lead to the emergence of more complex polysemous relations, mirroring the multifaceted nature of human languages.

In summary, this project combines cognitive and experimental approaches to understand how polysemy plays a role in the evolution of language. By examining how people from different cultures use and adapt language, this project aims to uncover the processes that make human communication so rich and flexible. This research not only sheds light on the origins of polysemy but also provides a deeper understanding of the cognitive and cultural mechanisms that sustain language as an adaptive tool. Understanding these processes can offer valuable insights into the nature of human cognition and the cultural factors that shape our communication systems.