Monica **Tamariz,** monicatamariz@gmail.com
Max Planck Institute for Psycholinguistics
Jon **Carr**, j.w.carr@ed.ac.uk
University of Edinburgh, United Kingdom

Co-evolutionary interactions between signals and meanings: an experimental approach

This study explores the origin and evolution of an open-ended experimental semiotic system which, starting off as only one form-meaning mapping, expands both in the form space (typed descriptions) and in the meaning space (drawings) through communicative usage. We explore whether the evolution of the system is symmetrical and ask: Do form innovations affect the evolution of meanings in the same way that meaning innovations affect the evolution of forms?

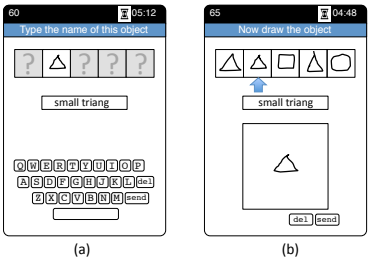

Figure 1. Two snapshots of the director's (a) and matcher's (b) ipads during the communicative task

We use a novel experimental semiotic task in which a pair of participants play a communicative task. In each game, the director is given a target drawing and he has to type its description for the matcher (Fig. 1a). The description can be written in English, but has a limit of 16 characters and includes only lower-case letters and spaces. The matcher tries to guess the target from an array of drawings, and then produces a copy of the target drawing to let the director know which of the array drawings she has chosen (Fig. 1b). Finally, the director has to guess from the matcher's drawing which of the array drawings she understood. For each correct guess, the pair scores 5 points. Additionally, If both guesses are correct, indicating common ground about label and drawing has been established, the drawing is added to the world, and can appear in the context or as a target in future games.

The result for each pair is a tree of signals and meanings (Fig. 2) where each drawing produced has a description and descends from a parent --the target in the game where it was produced. We coded three such trees with 120 drawings each, to identify meaningful features in descriptions and in drawings. E.g. in Fig. 2, 'loops' in the description and circles in the drawing are associated features. If forms and meanings affect each other in a symmetrical fashion, we should expect similar levels of (a) changes in drawing features following related changes in description features and (b) changes in the description features following related changes in the drawing features. We find, however, that changes in the system originate in drawings while descriptions tend to follow. We discuss the impact of the discrete/continuous difference between typed words and drawings, and the nature of the communicative task.

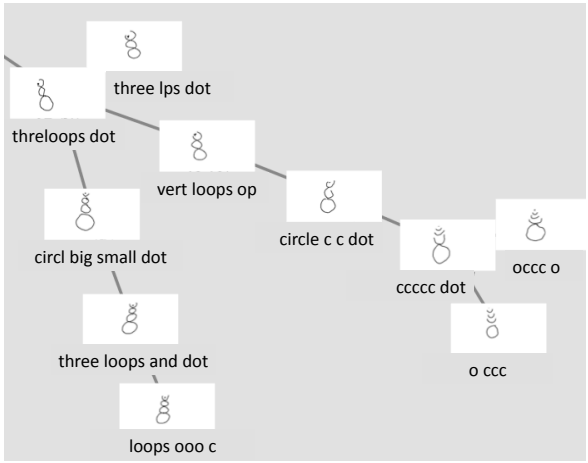

Figure 2