

The goal of our project is to develop a new theory of meaning (semantics) for natural language quantifiers (expressions such as *every student* or *most books*), with an eye toward gaining a greater understanding of the mechanisms of language (its structure and dynamics). One major observation is that quantificational sentences are ambiguous with different readings corresponding to how various quantifier phrases (QPs) are scopally related in the sentence. For example,

(1) Some teacher gave every student most books

admits of six different readings, and in general a simple sentence with  $n$  QPs will be (at least)  $n!$  ways ambiguous. Another fundamental insight is that quantificational sentences have the ability to change contexts by setting up new referents and anaphoric pronouns have the ability to refer back to them. To illustrate with an example

(2) Most men love two women. They (each) kiss them.

The way to understand the second sentence in (2) is that every man who loves two women kisses the women he loves rather than those loved by someone else. Thus the first sentence in (2) must deliver a dependency between each of the men and the women they love that can be elaborated upon in further discourse. Such scopal and dynamic aspects of natural language quantification have been at the center of both philosophy of language and formal semantics

Our project builds on our earlier work, where we have adopted a modern type-theoretic approach to semantics for natural language quantification. Our semantic system combines in a novel way formal tools of modern semantic frameworks (generalized quantifiers, dependent types). This combination of elements has allowed us to account in a principled and uniform manner for a number of puzzles concerning scopal and anaphoric properties of natural language quantifiers. The main objective of our current project is to integrate our dependent type semantics into a continuation-passing framework. This will lead to a uniform non-movement (in situ) semantics that is sufficient to account for a broad range of existing readings for multi-quantifier sentences, including simple sentences and more complex syntactic environments such as inverse linking. The dynamics will be powered by the type-theoretical notion of context that can get extended by possibly dependent types. Our more specific goals include: (i) using category theory to assess major scope-assignment strategies for simple multi-quantifier sentences; (ii) developing a new uniform dependent type account of the two puzzling scope facts occurring in complex syntactic environments: inverse linking and long-distance indefinite readings. Our project falls at the intersection of philosophy of language, linguistics and logic. We believe that this kind of interdisciplinary research combining humanities with mathematics will push forward the boundaries of our understanding of the overall language design.