

COST Action IC1205 on Computational Social Choice: STSM Report

- Applicant: Jacob Denolf
- Home institution: Ghent University
- Home country: Belgium
- Host: Ariane Lambert-Mogiliansky
- Host institution: Paris School of Economics
- Host country: France
- Dates: 19/06/2013 to 28/06/2013

In my stay at the Paris School of Economics, we started with looking at the problem of remembered probabilities. This problem was used as a first example on how the updating of beliefs can be modeled within a quantum regime. I constructed various models to fit this data, which we discussed. Some of these models had problems with interpretation and others did not seem to fit the data the way we wanted to.

While working on the previous mentioned problem of remembered probabilities, two main approaches within the field of quantum models in social sciences emerged. The first approach uses the concept of complementarity of measurements, to model how non-commuting measurements affect the state (and derived probabilities) of the system. The second approach uses the concept of quantum entanglement to model non-classical correlations. For some problems it seems that both approaches can be used to model the data. We took initial steps in comparing the two methods in terms of interpretation and fit of the data. Contrasting the advantages and disadvantages, we aim to construct a combined method, which uses the strength of both approaches in one framework. This work will result in paper which will be a chapter in my PhD thesis.

Next to purely scientific advances, the time spend in Paris was also used to discuss both the form and the future planning for my PhD thesis. In the role of co-supervisor of my PhD project, prof. Ariane Lambert-Mogiliansky proposed a 6 chapter format for my PhD thesis. Each of these chapters will borrow from different fields, including psychology, economy, physics and epistemology, but together will provide a coherent look at the use of the quantum formalism in the modeling of beliefs and updating. Some of these chapters will be stand alone enough to be published by themselves.

While working at my project, there were different meetings with other experts in this field. These meeting handled about both this project and projects the other experts were involved with. This way, much appreciated outside help came in, while also broadening the feeling and view concerning the quantum formalism in general. Among the experts we met were Bich-lien Doan and Zeno Toffano from Supelec, Francois Dubois from CNAM and Ismael Martinez-Martinez.