Testing theories of irony processing using eye-tracking and ERPs

Purpose of the visit:
The purpose of the visit was the analysis of the event-related brain potential (ERP) experiment of on-line irony processing.

Description of work carried out during the visit
The ERP analyses performed during the visit included the following:
- EEG data averaging
- filtering and re-referencing of averaged signals (ERPs)
- eye movement correction
- artefact exclusion,
- measurement of ERP amplitudes and latencies
- creation of ERP graphs and topographic plots

In addition, since some participant with too many EEG artifacts had to be excluded, additional participants were recruited and tested.

Following the ERP preprocessing and data analysis, we statistically tested the hypotheses of the different theoretical views of online irony processing. That is, according to the standard pragmatic view, ironic target words should require additional processing regardless of whether or not they are familiar ironies. The direct access view predicts no differences between ironic and non-ironic target words in either case, whereas the graded salience hypothesis predicts that processing difficulty should be experienced for unfamiliar but not familiar ironies.

Description of main result obtained
The ERP analyses revealed a waveform that was characterised by late posterior positivity (LPP)following about 500-700 ms after the onset of the critical word, whereas no preceding N400 component was evident. The two independent variables, Irony and Familiarity, clearly influenced the LPP. Firstly, LPP amplitude was larger for familiar than unfamiliar items over posterior electrodes. Secondly, and most importantly, there was an interaction of irony and familiarity on LPP amplitude in such a way that for familiar items, the LPP was larger for ironic than control sentences, whereas this effect was reversed for unfamiliar items. This result argues against the direct access view of irony processing, as this predicted no differences between ironic and non ironic target words in either case, which was clearly not observed. Moreover, our LPP findings seem not to support the standard pragmatic view according to which ironic target words require additional processing regardless of whether or not they are familiar ironies, that is, a larger P600 for ironic target words for both familiar and unfamiliar ironies. Finally, also the graded salience hypothesis faces problems to account for LPP findings, although one might assume that the LPP modulation is produced by an overlapping ERP negativity that is sensitive to the on-line sentence processing demands.

Future Collaboration
Given the success of this project, we plan to continue the collaboration by applying for a bilateral (UK-Germany) research grant.

Projected publications
We are currently preparing a full manuscript that reports both eye movement and ERP data for submission to an international journal of high impact (e.g., Journal of Cognitive Neuroscience, Journal of Memory and Language, Psychophysiology).