

# Exploration of contact behaviour during scientific conferences

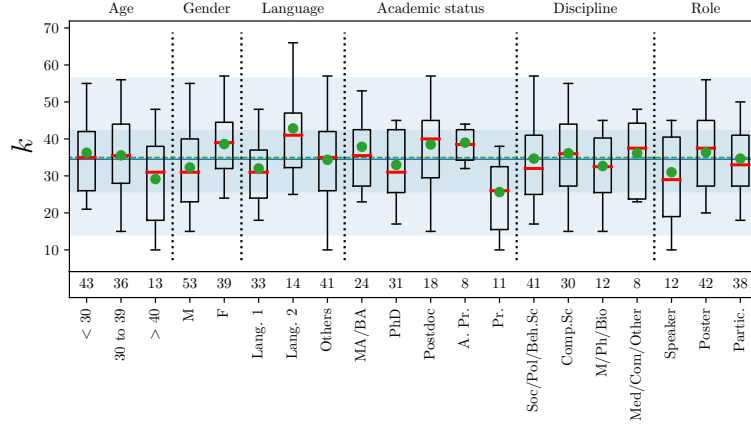
*Keywords: Social interactions, Temporal networks, Data analysis, Sociophysics, Personality*

## Extended Abstract

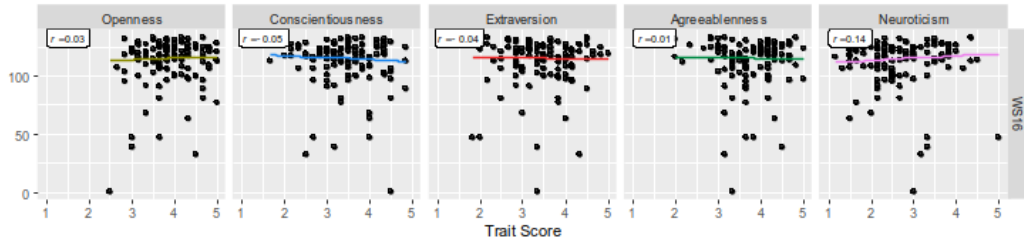
We present a collection of four datasets about social interactions between scientists during conferences. These datasets gather both contacts between participants of the events and extensive information about the individuals, including sociodemographics, academic situation and personality as measured by the BigFive Model [1]. Contacts were collected using the SocioPatterns platform [2] and are thus defined as a close, face-to-face physical proximity, which does not fully correspond to the sociological definition of an interaction [3] but which has proven to be a very good proxy for the study of social structures in a crowd [4]. We present three results from the quantitative analysis of this data. First, we characterise of a phenomenon related to academic seniority (see Fig. 1a) and interdisciplinarity, in which we show that in a new, emerging field of research, connecting behaviour appears to occur mostly through young researchers, in contrary from established communities where the seniority effect seems to be counterbalanced by an existing structure of relationships. Second, we present results indicating that personality appears to be at best a very weak predictor for behaviour during such events (Fig. 1b). Third, extending the discussion to other datasets collected with the same setup, we explore some evidence for the presence of general, underlying mechanisms for human interactions, notably regarding their dynamics (Fig. 1c). Finally, the goal is also to share these very rich data with the CSS community, and to invite researchers to use them for their own research.

## References

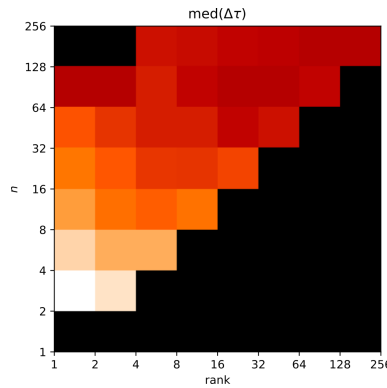
- [1] Génois, Zens, Oliveira, Lechner, Schaible, Strohmaier. *Combining sensors and surveys to study social contexts: Case of scientific conferences*. Personality Science (in production). ArXiv:2206.05201.
- [2] Cattuto, Van den Broeck, Barrat, Colizza, Pinton, Vespignani. *Dynamics of person-to-person interactions from distributed RFID sensor networks*. PLOS ONE 5, e11596 (2010).
- [3] Malik. *Bias and beyond in digital trace data*. PhD dissertation, Carnegie Mellon University School of Computer Science (2018).
- [4] Schaible, Oliveira, Zens, Génois. *Sensing close-range proximity for studying face-to-face interaction*. in *Handbook of Computational Social Science, Volume 1 - Theory, Case Studies and Ethics*. Routledge (2022).



(a) **Differences in connecting behaviour between different sociodemographic groups.** For each partition of the crowd according to one axis of study, we compute for each group in the partition the distribution of connectivities  $k$ , which are then compared with each other: redline is the median, boxplots indicate the Q1 and Q3 quartiles, whiskers extend to the 5 and 95 percentiles, green dot is the mean. Blue line, blue shaded areas and green dashed line indicate the same measures for the entire crowd.



(b) **Correlation between connecting behaviour and personality scores.** Each dot is an individual participant, for which we calculated its degree in the aggregated network and its score according to a BigFive personality test. Coloured lines indicate the linear regression computed from the data points. Values in the white boxes are the corresponding correlation coefficients.



(c) **Median intercontact duration as a function of the number of contacts and the rank of the event.** This plot illustrates how intercontact durations decrease both with the number of interactions between participants, and with the rank of the event, indicating the presence of two different mechanisms for the dynamics of interactions.

Figure 1: Results for the WS16 dataset, collected during the 2016 GESIS Winter Symposium on Computational Social Science. Connectivities  $k$  for (a) and (b) are obtained from aggregating the temporal contact network while filtering out all interactions which lasted less than one minute.