**A small step from ministep to twostep: Analysing the co-evolution of network structures and behaviour by relaxing the ministep assumption from ‘RSiena’ with ‘RsienaTwoStep.’**

The stochastic actor-oriented model, as implemented in RSiena, is widely used to analyse the evolution of networks. It has brought tremendous success to the community, helping disentangle selection and influence processes, and identifying crucial network statistics (e.g., transitivity) that drive network dynamics. However, like all theoretical and statistical models, it relies on certain assumptions. A critical assumption of the SAOM of RSiena is the so-called ministeps, wherein only one actor at a time is allowed to create or terminate one outgoing tie or change its behaviour. The consequence of this tie-change or behaviour-change for this actor is evaluated only at one time-point—the immediate future. Although the developers of RSiena state that they are not committed to a specific theory of action, the ministep seems to exclude coordination processes in which two actors decide on one or more tie- or behaviour-changes together or strategic actions by which a tie- or behaviour-change of one actor may only turn out to be beneficial after one or more additional tie-changes of this actor.

In this contribution, we introduce the R package RsienaTwoStep (<https://jochemtolsma.github.io/RsienaTwoStep/>). RsienaTwoStep closely follows the logic (and implementation) of the original SAOM in RSiena but is able to analyse the co-evolution of network structures and behaviour by relaxing the ministep assumption. The SAOM of RsienaTwoStep is able to simulate the transition of the network from one wave to the next according to different (combinations of) ‘theories of action.’ It can simulate the evolution of networks and behaviour according to the ministep assumption and by relaxing the ministep assumption by allowing for ‘twosteps’ and ‘simsteps.’ With twosteps, two actors make one tie-change each simultaneously or may coordinate their tie-changes, according to pre-set rules (e.g., being connected within distance two). With simsteps, we allow one actor to make two tie-changes simultaneously and hence incorporate some form of strategic action.

We will demonstrate that when the real data-generation process (DGP) is unknown, or more precisely, when we do not know how prevalent coordinated and strategic actions were in reality, researchers can use RsienaTwoStep to assess the extent to which model estimates obtained by RSiena are sensitive to violations of the ministep assumption. We furthermore show, through a simulation study, that when the DGP did not follow the logic of the ministep, using RSiena may lead to poor goodness of fit and convergence issues, but that with RsienaTwoStep, researchers are more likely to discover the true DGP.