

Moretti's "Simulation in Sociology" highlights the potential of simulation as a tool for doing social science research and explores the importance of establishing validity with regards to multi-agent systems and cellular automata. Specifically, she indicates that as both these models assume that individuals are homogenous actors and are bounded by certain rules, but in reality, individuals change constantly and do not act consistently, these models may not be a thorough representative of reality. To elaborate, she discusses how multi-agent systems and cellular automata both assume that the agents will perform by the rules of rationality (which is defined by the researchers conducting the study)- for example, some simulations in anthropology assume that individuals will act according to the specific concept of bounded rationality. However, assuming that all individuals will act rationally may be a gross simplification of reality, as individuals act and adapt to situations differently from each other. Therefore, this disparity between reality and the assumption that all individuals act rationally, may affect the validity of the study. As for cellular automata, she goes further by noting two additional points that may affect the validity of the study: Firstly, she discusses how cellular automata assumes synchronous updating of states, that is, researchers assume that all agents are updated simultaneously based on a global clock. However, this is different from reality, as individuals modify their assumptions and attitudes at different times. She also explores how this type of model assume that individuals interact only with a subset of the whole population. Although this may be a reasonable assumption, as it is indeed difficult for an individual to interact with all individuals in a population, interactions that take place among individuals who are not physically close to each other, like through the media, is not accounted for under this type of model. As such, these assumptions under cellular automata may not be an accurate representation of reality.

Secondly, Moretti highlights how computer simulation is useful in analyzing "dynamic feedback", which is where some initial stimulus changes behavior and that change, in turn, creates new stimuli which cause further behavioral change. Specifically, she notes an example of dynamic feedback in sociology in Doran et al's paper "The EOS Project: Modelling Upper Paleolithic Social Change", in which researchers have studied the circumstances that influence the formation of hierarchies in social groups.

A possible research question in political science that would use dynamic feedback is the following: "In a two-party system, what are the effects of an "extremist" (very liberal or very conservative) president winning the presidential election, on the issue position of the party of the president and the issue position of the other party in the next election?". Assuming that all liberal-conservative issues are on a spectrum, in one possible scenario, the election of a political leader with extreme conservative views could influence the party of the president (Party "A") to be more conservative. In response to this, the other party (Party "B"), may either be more conservative (to "steal" votes from Party "A"), or be more liberal (to obtain more votes from very liberal individuals who did not show up to vote previously). If Party "B" chooses to do the former, and shift towards a more conservative stance, then the political landscape, as a result, shift towards conservatism. In contrast, if Party "B" chooses to be more liberal as a response, then the political landscape becomes more polarized. Because this research question studies the complicated process between the responses of Party "A" and Party "B", and simulation models is an effective means to explore "dynamic feedback", I believe simulation models will be a useful method to explore this research question.