



Introduction to Sequence Analysis

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DESCRIPTION:

This set of readings is meant to provide a gentle introduction into sequence analysis. The term implies subjecting a sequence of discrete events to alignment and distance computation. The analytic method has its origins in the biomedical sciences but has gained newfound attention in the social sciences by scholars applying the technique to categorical data. The primary goal in reviewing the method is to brainstorm uses for the technique in political science. Particularly, it promises to yield new information about political sequencing, democratization, and regime transition.

Though relatively new within political science, myriad applications of sequence analysis can be found elsewhere. This set of readings is therefore not exhaustive, but merely covers some of the more basic articles. Abbott (1995) is generally considered to be a pioneer in sequence analysis. His brief review covers some applications of sequence analysis across social sciences. Liu et al. (1999) provide some basic insights into the methods, while at the same time demonstrating the application of sequence analysis in the hard sciences, from where the technique originated.

Scherer (2001) and Assave et al. (2007) are good basic examples from sociology, which is the most immediate source of data manipulation for political scientists. Traditionally, sequence analysis has been used in sociology to identify patterns of employment and life-change among members of a cohort (Assave et al. 2007; Scherer 2001). Exposure to sequence analysis was given to me by Philippe Blanchard, who has taught the technique at the University of Lausanne (sociology) and who is currently writing a book on the subject *via* Palgrave-Macmillan. Examples of his work are Blanchard (2005) and Fillieule and Blanchard (2011).

As a preface to the discussion of applications in political science, Pierson (2000) and Grzymala-Busse (2011) discuss more generally the importance of timing and sequencing in politics, which leaves off precisely where we hope to pick up. *What are relevant sequences in political science? For what research question is sequence analysis a potentially valuable method?* The work of Schrodtt and Gerner (2000) address the problem of analyzing discrete temporal data in the form of event data, using the Levant, Markovian techniques, and cluster analysis. More specifically, Casper and Wilson (2015) explore the utility of sequence analysis.

After focusing on the applicability of sequence analysis in political science, we turn to the method itself. Fillieule and Blanchard (2011) provide a gentle description of some of the more basic methods in their appendix. Gilbert et al. lay out specific code by which one can exercise the skill in the TraMineR program in R, although similar programs exist for Stata. Finally, a recently published textbook (Blanchard et al. 2014) provides advanced applications of the method and discusses further conceptual issues.

Additional readings and statistical information are available upon request.

REQUIRED READINGS (*in order of reading*):

- Abbott, Andrew. 1995. "Sequence Analysis: New Methods for Old Ideas." *Annual Review of Sociology*, 21: 93-113.
- Liu, Jun S., Andrew F. Neuwald, and Charles E. Lawrence. 1999. "Markovian Structures in Biological Sequence Alignments." *Journal of the American Statistical Association*, 94 (445): 1-15.
- Scherer, Stefani. 2001. "Early Career Patterns: A Comparison of Great Britain and West Germany." *European Sociological Review*, 17 (2): 119-144.
- Assave, Arnstein, Francesco C. Billari, and Raffaella Piccarreta. 2007. "Strings of Adulthood: A Sequence Analysis of Young British Women's Work-Family Trajectories." *European Journal of Population*, 23 (3): 369-388.
- Blanchard, Philippe. 2005. "Multi-dimensional biographies. Explaining disengagement through sequence analysis." Conference presentation, 3rd ECPR Conference, 8-10 September.
- Pierson, Paul. 2000. "Not Just What, but When: Timing and Sequence in Political Processes." *Studies in American Political Development*, 14: 72-92.
- Grzymala-Busse, Anna. 2011. "Time Will Tell? Temporality and the Analysis of Causal Mechanisms and Processes." *Comparative Political Studies*, 44(9):1267--1297.
- Schrodt, Philip A., and Deborah J. Gerner. 2000. "Cluster-based Early Warning Indicators for Political Change in the Contemporary Levant." *American Political Science Review*, 94 (4): 803-817.
- Casper, Gretchen and Matthew Charles Wilson. 2015. "Using Sequences to Model Crises." *Political Science Research and Methods*, 3(2): 381-397.
- Fillieule, Olivier, and Philippe Blanchard. 2011. "Appendix." from "Fighting Together: Assessing Continuity and Change in Social Movement Organizations Through the Study of Constituencies' Heterogeneity." University of Laussane Political Science Working Paper.
- Gabadinho, Alexis, Gilbert Ritschard, Matthias Studer, and Nicolas S. Müller. 2011. Mining sequence data in R with the TraMineR package: A user's guide. Version 1.8. <http://mephisto.unige.ch/pub/TraMineR/doc/TraMineR-Users-Guide.pdf>
- Blanchard, Philippe, Jacques-Antoine Gauthier, and Felix Bühlmann (Eds.). 2014. *Advances in Sequence Analysis: Methods, Theories and Applications*. New York: Springer.