**NDS Workshop Citations**

May 2022

(with annotations)

**Attractors, Pseudo-Attractors, and Trajectories**

Littleton, H., Ricca, B., Allen, A., & Benight, C. (in preparation). Recovery and adjustment patterns among hurricane Florence survivors: Analysis utilizing nonlinear dynamics. (Constructing trajectories and pseudo-attractors from data)

**Burstiness**

Goh, K.-I., & Barabási, A.-L. (2008). Burstiness and memory in complex systems. EPL (Europhysics Letters), 81(4), 48002. <https://doi.org/10.1209/0295-5075/81/48002> (The beginnings)

Karsai, M., Jo, H.-H., & Kaski, K. (2018). Bursty Human Dynamics. Springer International Publishing. <http://arxiv.org/abs/1803.02580> (A very complete treatment.)

Kim, E.-K., & Jo, H.-H. (2016). Measuring burstiness for finite event sequences. Physical Review E, 94(3), 032311. <https://doi.org/10.1103/PhysRevE.94.032311> (Mathematical, but it has the equations that are used in the package.)

Ricca & Jordan (under review). Dynamical Systems Measures of Group Functioning. Submitted to the International Journal of Complexity and Education (Example of using burstiness as a self-organization measure.)

**Catastrophe Theory**

Benight, C. C., Shoji, K., Harwell, A., & Felix, E. (2020). Non-linear Dynamic Shifts in Distress After Wildfires: Further Tests of the Self-Regulation Shift Theory. *Frontiers in Psychology*, *11*, 15.

Chen, D.-G. (Din), Lin, F., Chen, X. (Jim), Tang, W., & Kitzman, H. (2014). Cusp Catastrophe Model: A Nonlinear Model for Health Outcomes in Nursing Research. Nursing Research, 63(3), 211–220. https://doi.org/10.1097/NNR.0000000000000034 (An excellent overview of how to do cusp research.)

Gilmore, R. (1981). Catastrophe theory for scientists and engineers. J. WIley - Interscience. (A complete, mostly mathematical, treatment of catastrophe theory models. Dated but good.)

Guastello, S. (1985, May). Butterfly catastrophe model of motivation in organizations: Evaluation of an introductory psychology course. Annual Meeting of the Midwestern Psychological Association, Chicago, IL. (Example of a butterfly catstrophe)

Guastello, S. J., Correro, A. N., & Marra, D. E. (2018). Do emergent leaders experience greater workload? The swallowtail catastrophe model and changes in leadership in an emergency response simulation. Group Dynamics: Theory, Research, and Practice, 22(4), 200–222. <https://doi.org/10.1037/gdn0000091> (Example of swallowtail catastrophe)

Sguotti, C., Otto, S. A., Frelat, R., Langbehn, T. J., Ryberg, M. P., Lindegren, M., Durant, J. M., Chr. Stenseth, N., & Möllmann, C. (2019). Catastrophic dynamics limit Atlantic cod recovery. *Proceedings of the Royal Society B: Biological Sciences*, *286*(1898), 20182877. <https://doi.org/10.1098/rspb.2018.2877> (Fishing data available, and a decent approach to cusp catastrophe)

van der Maas HLJ, Kolstein R, van der Pligt J (2003). Sudden Transitions in Attitudes. Sociological Methods & Research, 23(2), 125152. (Data are in *cusp::attitudes* in R)

Zeeman, E. C. (1976). Catastrophe Theory. Scientific American, 234(4), 65–83. <https://doi.org/10.1038/scientificamerican0476-65> (An early overview of the topic)

**Early Warning Signals (including Entropy)**

Helmich, M. A., Olthof, M., Oldehinkel, A. J., Wichers, M., Bringmann, L. F., & Smit, A. C. (2021). Early warning signals and critical transitions in psychopathology: Challenges and recommendations. Current Opinion in Psychology, 41, 51–58. <https://doi.org/10.1016/j.copsyc.2021.02.008> (Some important things to keep in mind.)

Ricca, B. P., Bowers, N., & Jordan, M. E. (2020). Seeking Emergence Through Temporal Analysis of Collaborative-Group Discourse: A Complex-Systems Approach. *The Journal of Experimental Education*, *88*(3), 431–447. <https://doi.org/10.1080/00220973.2019.1628691> (Using entropy as an EWS)

Schreuder, M. J., Hartman, C. A., George, S. V., Menne-Lothmann, C., Decoster, J., van Winkel, R., Delespaul, P., De Hert, M., Derom, C., Thiery, E., Rutten, B. P. F., Jacobs, N., van Os, J., Wigman, J. T. W., & Wichers, M. (2020). Early warning signals in psychopathology: What do they tell? BMC Medicine, 18(1), 269. https://doi.org/10.1186/s12916-020-01742-3

Schreuder, M. J., Wigman, J. T. W., Groen, R. N., Weinans, E., Wichers, M., & Hartman, C. A. (2022). Anticipating the direction of symptom progression using critical slowing down: A proof-of-concept study. BMC Psychiatry, 22(1), 49. https://doi.org/10.1186/s12888-022-03686-9

Wiltshire, T. J., Butner, J. E., & Fiore, S. M. (2018). Problem-Solving Phase Transitions During Team Collaboration. *Cognitive Science*, *42*(1), 129–167. <https://doi.org/10.1111/cogs.12482> (A second approach to using entropy as an EWS)

**Formal Theorizing Examples**

Cui, J., Olthof, M., Hasselman, F., Lichtwarck-Aschoff, A., & Li, T. (n.d.). From Metaphor to Computation: Constructing the potential landscape for the dynamics of panic disorder. (Constructing manifolds from data.)

Lo Schiavo, M., Prinari, B., Saito, I., Shoji, K., & Benight, C. C. (2019). A dynamical systems approach to triadic reciprocal determinism of social cognitive theory. *Mathematics and Computers in Simulation*, *159*, 18–38. <https://doi.org/10.1016/j.matcom.2018.10.006>

Robinaugh, D., Haslbeck, J., Waldorp, L., Kossakowski, J., Fried, E., Millner, A., McNally, R., van Nes, E., Scheffer, M., Kendler, K., & Borsboom, D. (Under Review). Advancing the Network Theory of Mental Disorders: A Computational Model of Panic Disorder. *Psychological Review*. (Goes with the Cui et al. above.)

van Geert, P., & Steenbeek, H. (2005). The dynamics of scaffolding. New Ideas in Psychology, 23(3), 115–128. <https://doi.org/10.1016/j.newideapsych.2006.05.003> (A simple but insightful equation based model of scaffolding.)

**Network Psychometrics**

Greene, T., Gelkopf, M., Epskamp, S., & Fried, E. (2018). Dynamic networks of PTSD symptoms during conflict. Psychological Medicine, 48(14), 2409–2417. <https://doi.org/10.1017/S0033291718000351> (A good example of how to use various correlation networks to learn things.)

Isvoranu, A-M., Epskamp, S., Waldorp, L., Borsboom, D. (2022). Network Psychometrics with R: A guide for behavioral and social scientists. Taylor & Francis. (An excellent introduction to networks, R, and psychometric networks.)

Mund, M., & Nestler, S. (2019). Beyond the Cross-Lagged Panel Model: Next-generation statistical tools for analyzing interdependencies across the life course. Advances in Life Course Research, 41, 100249. <https://doi.org/10.1016/j.alcr.2018.10.002> (Not quite as “next-generation” as Greene or Isvoranu, but still pretty good.)

**Orbital Decomposition**

Guastello, S. J. (n.d.). Orbital Decomposition: Identification of Dynamical Patterns in Categorical Data. In S. J. Guastello & R. A. M. Gregson (Eds.), *Nonlinear Dynamical Systems Analysis for the Behavioral Sciences Using Real Data* (pp. 499–516). CRC Press. (A very good introduction to orbital decomposition by the originator.)

**Philosophy of Science / Self-Organization**

Al-Hoorie, A. H., Hiver, P., Larsen-Freeman, D., & Lowie, W. (2021). From replication to substantiation: A complexity theory perspective. Language Teaching, 1–16. <https://doi.org/10.1017/S0261444821000409> (Some nice philosophy of science.)

Guastello, S. (2011). Frequency distributions and error functions. In S. Guastello & R. Gregson (Eds.) *Nonlinear Dynamical Systems Analysis for the Behavioral Sciences Using Real Data* (pp 33-72). CRC Press. (Not everything is normal! The whole book is useful.)

Molenaar, P. C. M. (2004). A Manifesto on Psychology as Idiographic Science: Bringing the Person Back Into Scientific Psychology, This Time Forever. Measurement: Interdisciplinary Research & Perspective, 2(4), 201–218. <https://doi.org/10.1207/s15366359mea0204_1>

Prigogine, I., & Stengers, I. (1984). *Order out of Chaos*. (A book for the non-specialist that provides key insights into non-equilibrium thinking, and how it is different from equilibrium approaches.)

Royall, R. (1997). *Statistical evidence: A likelihood paradigm*. (Probably more than you want, but will certainly help you be careful with the classes of questions you ask. Get at least the first chapter.)

Thelen, E., & Smith, L. B. (1994). A dynamic systems approach to the development of cognition and action. MIT Press. (An excellent introduction to how to think differently.)

**Power Laws**

Harwell, A., Benight, C., Ricca, B., Taylor, E., & Pincus, D. (in preparation). Nonlinear changes in facial affect and posttraumatic growth: Assessment of ecological momentary assessment video data.

Pincus, D., Ortega, D., & Metten, A. (2011). Orbital Decomposition for Multiple Time-Series Comparisons. In S. J. Guastello & R. A. M. Gregson (Eds.), Nonlinear Dynamical Systems Analysis for the Behavioral Sciences Using Real Data (0 ed., pp. 531–552). CRC Press. <https://doi.org/10.1201/9781439820025-25> (An excellent example of how to proceed with power law research)

Pincus, D., Ricca, B., Jenkins, B., Boehm, J., Berardi, V., Moors, C., Frederick, D. (in preparation). Emotional Balance and Resilience at the Start of the Covid-19 Pandemic

Ricca & Jordan (under review). Dynamical Systems Measures of Group Functioning. Submitted to the International Journal of Complexity and Education (Example of using burstiness as a self-organization measure.)

**Recurrence Quantification Analysis and Recurrence Plots**

Jenkins, B. N., Hunter, J. F., Richardson, M. J., Conner, T. S., & Pressman, S. D. (2020). Affect variability and predictability: Using recurrence quantification analysis to better understand how the dynamics of affect relate to health. Emotion, 20(3), 391–402. <https://doi.org/10.1037/emo0000556> (A good example of how to do this.)

Marwan, N., & Webber, C. L. (2015). Mathematical and Computational Foundations of Recurrence Quantifications. In C. L. Webber, & N. Marwan (Eds.), Recurrence Quantification Analysis (pp. 3–43). Springer International Publishing. <https://doi.org/10.1007/978-3-319-07155-8_1> (Probably more than you want, but very complete…pretty much anything Marwan does with RQA and RP is good. This one has a really complete list of metrics that may be useful.)

**State Space Grids**

Hollenstein, T. (2013). State Space Grids: Depicting Dynamics Across Development. Springer US. <https://doi.org/10.1007/978-1-4614-5007-8> (The main reference.)

Pennings, H. J. M., & Hollenstein, T. (2020). Teacher-Student Interactions and Teacher Interpersonal Styles: A State Space Grid Analysis. The Journal of Experimental Education, 88(3), 382–406. <https://doi.org/10.1080/00220973.2019.1578724> (A nice example.)

**Statistics**

Clauset, A., Shalizi, C. R., & Newman, M. E. J. (2009). Power-law distributions in empirical data. *SIAM Review*, *51*(4), 661–703. <https://doi.org/10.1137/070710111>(A heavily mathematical derivation of how to fit power laws. These results are in the R package poweRlaw.)

**Topological Data Analysis**

Zhang, M., Kalies, W. D., Kelso, J. A. S., & Tognoli, E. (2020). Topological portraits of multiscale coordination dynamics. Journal of Neuroscience Methods, 339, 108672. <https://doi.org/10.1016/j.jneumeth.2020.108672> (TDA and RQA together!)