

Portland State University

PDXScholar

Systems Science Friday Noon Seminar Series

Systems Science

2-15-2019

Performativity of Models

Rajesh Venkatachalapathy
Portland State University

Follow this and additional works at: https://pdxscholar.library.pdx.edu/systems_science_seminar_series



Part of the Theory, Knowledge and Science Commons

Let us know how access to this document benefits you.

Recommended Citation

Venkatachalapathy, Rajesh, "Performativity of Models" (2019). *Systems Science Friday Noon Seminar Series*. 76.

https://pdxscholar.library.pdx.edu/systems_science_seminar_series/76

This Book is brought to you for free and open access. It has been accepted for inclusion in Systems Science Friday Noon Seminar Series by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: pdxscholar@pdx.edu.

Performativity of Models

Rajesh Venkatachalapathy

Systems Science Graduate Program
Portland State University
Portland, Oregon

Friday 15th February 2019

Outline

- ▶ What is performativity?
- ▶ Case study: economics and finance
- ▶ Case study: networks
- ▶ Why is performativity pervasive?
- ▶ Some examples

Inspiration

Kenneth Boulding

The willingness to make a fool of oneself should be a requirement for admission to the Society of General Systems Research....

A. Flexner and R. Dijkgraaf. *The Usefulness of Useless Knowledge*. Princeton University Press, 2017

Martin A. Schwartz. [The importance of stupidity in scientific research](#).

Journal of Cell Science, 121(11):1771–1771, 2008

MZ

System science education is all about knowing less and less about more and more until you know nothing about everything

Warm-up Examples

- ▶ Calculus (before Mandelbrot)
- ▶ Cybernetics (before chaos)
- ▶ Everything is *business!*

Hilary Putnam

In philosophy, one should be able to argue your way to the other side

In this talk, I'll

- ▶ start with French continental philosophy and end up in analytical philosophy
- ▶ formulate my argument in analytical philosophy and end up in avant garde 21st century phenomenology

Performativity

The performativity thesis is the claim that parts of contemporary economics and finance, when carried out into the world by professionals and popularizers, reformat and reorganize the phenomena they purport to describe, in ways that bring the world into line with theory....

Performativity emerges in epistemic communities when answering both epistemic and ontological questions

- ▶ science
- ▶ engineering

Performativity of Economics

D. MacKenzie, F. Muniesa, and L. Siu. *Do Economists Make Markets?: On the Performativity of Economics*.

Princeton University Press, 2008

- ▶ Financial instruments
- ▶ Market design
- ▶ Auctions
- ▶ Commodification

Performativity of Networks

Kieran Healy. *The performativity of networks.*

European Journal of Sociology, 56(2):175-205, 2015

- ▶ Network Science
- ▶ Design of Platforms

Different notions of performativity

- ▶ *generic performativity* means the active use of some bit of theory not just by economists but also by economic agents, policy makers and the like
- ▶ *effective performativity* requires that the use of theory must make a difference in practice
- ▶ *Barnesian performativity* requires that the use of economics actively alters the processes in ways that bear on the conformity to aspects of economics in question. That is, the model or theory must bring participants into line with its picture of the world.

What is performativity?

- ▶ Models become part of the way the modeler sees the world.
- ▶ It changes the world and integrates itself with agents in the world
- ▶ What starts out as cognitive prostheses becomes part of the world
- ▶ The world looks more and more like the model and obeys the theories the theories that the model is based on

Science as a Social Process

R.K. Merton and N.W. Storer. *The Sociology of Science: Theoretical and Empirical Investigations.*

Phoenix books. University of Chicago Press, 1973

S. Shapin. *Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority.*

Johns Hopkins University Press, 2010

D. Wootton. *The Invention of Science: A New History of the Scientific Revolution.*

Harper, 2015

- ▶ History matters
- ▶ Sociology matters

Social Construction of Knowledge

Alvin Goldman and Thomas Blanchard. [Social epistemology](#). In Edward N. Zalta, editor, *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, summer 2018 edition, 2018

P. Hedström and P. Bearman. [The Oxford Handbook of Analytical Sociology](#).

Oxford Handbooks. OUP Oxford, 2011

- ▶ Social primitives matter (just like all other social processes)
- ▶ Emotions, Belief, Preferences, Heuristics, Norms, Trust, etc., play a role

Cognitive Science of Knowledge Construction I

- ▶ Scientific activity requires common knowledge
- ▶ Models are artifacts

Paul Weirich. [Introduction: Interactive epistemology.](#)
Episteme, 8(3):201208, 2011 E. Margolis and S. Laurence.

Creations of the Mind: Theories of Artifacts and Their Representation.

Clarendon Press, 2007

Cognitive Science of Knowledge Construction II

- ▶ Common knowledge is different than private knowledge

J.Y. Halpern. *Reasoning about Uncertainty*.

The MIT Press. MIT Press, 2005 Kyle Thomas, Peter Descioli,

Omar Haque, and Steven Pinker. *The psychology of coordination and common knowledge*.

Journal of personality and social psychology, 107, 08 2014

- ▶ Cognitive niche construction is natural
- ▶ Models and theories are constructed niches
- ▶ These niches are *ecologically rational*

Cognitive Science of Knowledge Construction III

Atsushi Iriki and Miki Taoka. Triadic (ecological, neural, cognitive) niche construction: a scenario of human brain evolution extrapolating tool use and language from the control of reaching actions.

Philosophical Transactions of the Royal Society B: Biological Sciences, 367(1585):10–23, 2012

Steven Pinker. The cognitive niche: Coevolution of intelligence, sociality, and language.

Proceedings of the National Academy of Sciences, 107(Supplement 2):8993–8999, 2010 Gerd Gigerenzer. The bias bias in behavioral economics.

Review of Behavioral Economics, 5(3-4):303–336, 2018

Cognitive Science of Knowledge Construction IV

- ▶ *Ecologically rational* cognitive niches can be biased
- ▶ Bias bias bias

My claim: Flawed niche construction ~~causes~~ explains performativity

Other Examples I

- ▶ General Systems Theory (think counterperformativity!)
- ▶ Signal Processing
- ▶ Neuroscience (firing rate models, fMRI,)
- ▶ Let's not forget *deep* learning and machine learning

Theodore Holmes Bullock. *How do brains work?: papers of a comparative neurophysiologist.*

Springer, 1993

- ▶ Bayesian models of cognition

Brenden M. Lake, Tomer D. Ullman, Joshua B. Tenenbaum, and Samuel J. Gershman. *Building machines that learn and think like people.*

Behavioral and Brain Sciences, 40:e253, 2017

Other Examples II

- ▶ Quantum models of cognition

J.R. Busemeyer and P.D. Bruza. *Quantum Models of Cognition and Decision*.

Quantum Models of Cognition and Decision. Cambridge University Press, 2012

- ▶ Sociological methods

Andrew Abbott. *Transcending general linear reality*. *Sociological Theory*, 6(2):169–186, 1988

Conclusion

- ▶ Performativity is unavoidable in epistemic communities
- ▶ There is nothing one can do about it
- ▶ Just be self-aware

Reference I



Andrew Abbott.

Transcending general linear reality.

Sociological Theory, 6(2):169–186, 1988.



Theodore Holmes Bullock.

How do brains work?: papers of a comparative neurophysiologist.

Springer, 1993.



J.R. Busemeyer and P.D. Bruza.

Quantum Models of Cognition and Decision.

Quantum Models of Cognition and Decision. Cambridge University Press, 2012.



A. Flexner and R. Dijkgraaf.

The Usefulness of Useless Knowledge.

Princeton University Press, 2017.

Reference II



Gerd Gigerenzer.

The bias bias in behavioral economics.

Review of Behavioral Economics, 5(3-4):303–336, 2018.



Alvin Goldman and Thomas Blanchard.

Social epistemology.

In Edward N. Zalta, editor, *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, summer 2018 edition, 2018.



J.Y. Halpern.

Reasoning about Uncertainty.

The MIT Press. MIT Press, 2005.



Kieran Healy.

The performativity of networks.

European Journal of Sociology, 56(2):175–205, 2015.

Reference III



P. Hedström and P. Bearman.

The Oxford Handbook of Analytical Sociology.
Oxford Handbooks. OUP Oxford, 2011.



Atsushi Iriki and Miki Taoka.

Triadic (ecological, neural, cognitive) niche construction: a scenario of human brain evolution extrapolating tool use and language from the control of reaching actions.

Philosophical Transactions of the Royal Society B: Biological Sciences, 367(1585):10–23, 2012.



Brenden M. Lake, Tomer D. Ullman, Joshua B. Tenenbaum, and Samuel J. Gershman.

Building machines that learn and think like people.

Behavioral and Brain Sciences, 40:e253, 2017.

Reference IV



D. MacKenzie, F. Muniesa, and L. Siu.

Do Economists Make Markets?: On the Performativity of Economics.

Princeton University Press, 2008.



E. Margolis and S. Laurence.

Creations of the Mind: Theories of Artifacts and Their Representation.

Clarendon Press, 2007.



R.K. Merton and N.W. Storer.

The Sociology of Science: Theoretical and Empirical Investigations.

Phoenix books. University of Chicago Press, 1973.

Reference V



Steven Pinker.

The cognitive niche: Coevolution of intelligence, sociality, and language.

Proceedings of the National Academy of Sciences, 107(Supplement 2):8993–8999, 2010.



Martin A. Schwartz.

The importance of stupidity in scientific research.

Journal of Cell Science, 121(11):1771–1771, 2008.



S. Shapin.

Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority.

Johns Hopkins University Press, 2010.

Reference VI



Kyle Thomas, Peter Descioli, Omar Haque, and Steven Pinker.

The psychology of coordination and common knowledge.
Journal of personality and social psychology, 107, 08 2014.



Paul Weirich.

Introduction: Interactive epistemology.
Episteme, 8(3):201–208, 2011.



D. Wootton.

The Invention of Science: A New History of the Scientific Revolution.
Harper, 2015.