METHODS

A Non-Exhaustive Overview of Tools Used in Sociological Research

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Methods common in sociological research

Not an exhaustive overview – applied examples from environmental sociology

All are tools in the toolbox

Research question → employed methods

Exploratory, hypothesis testing, inductive / deductive and "somewhere in-between"

Unit(s) of analysis

Primary and secondary data

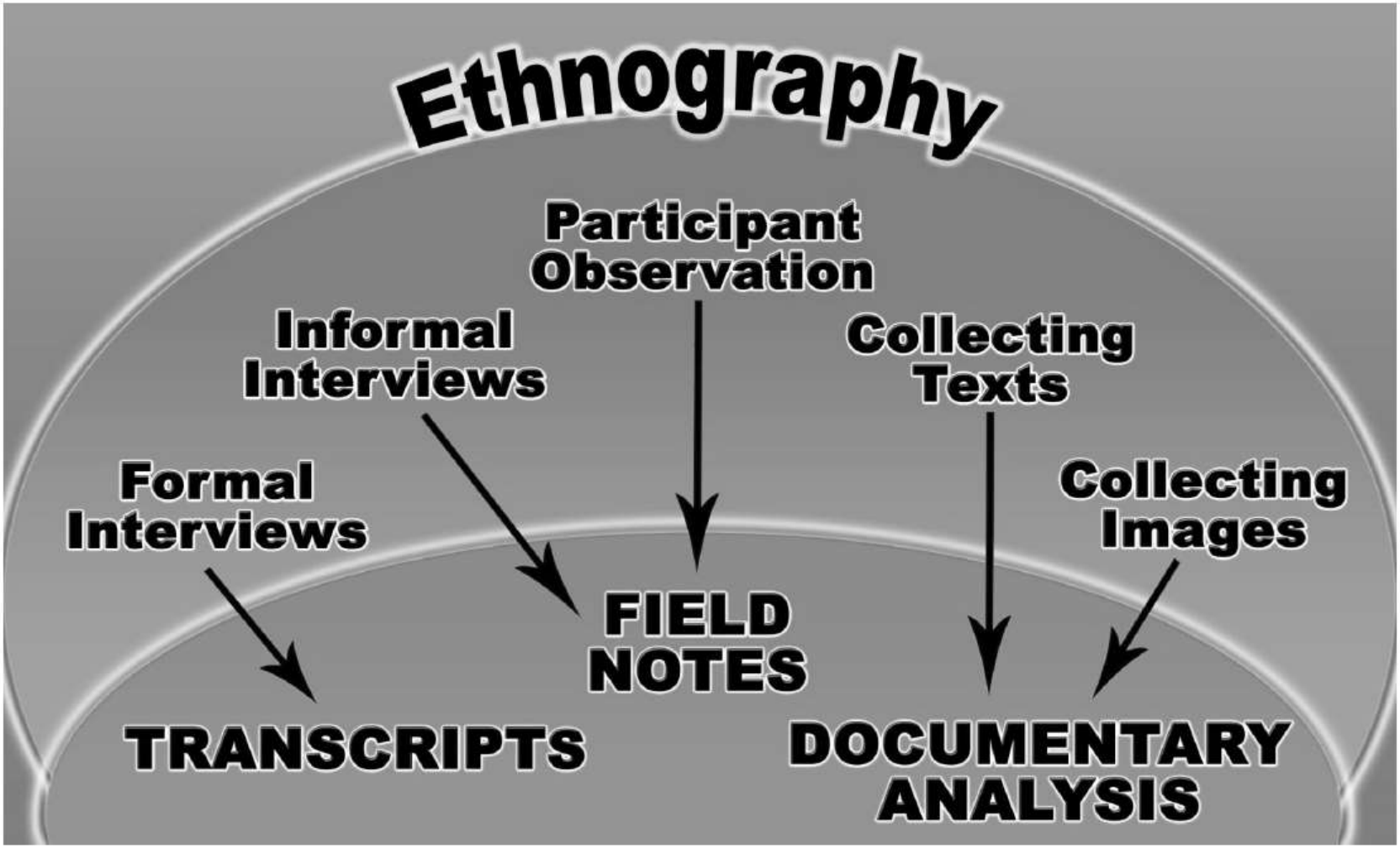
Merging of social and environmental / ecological data

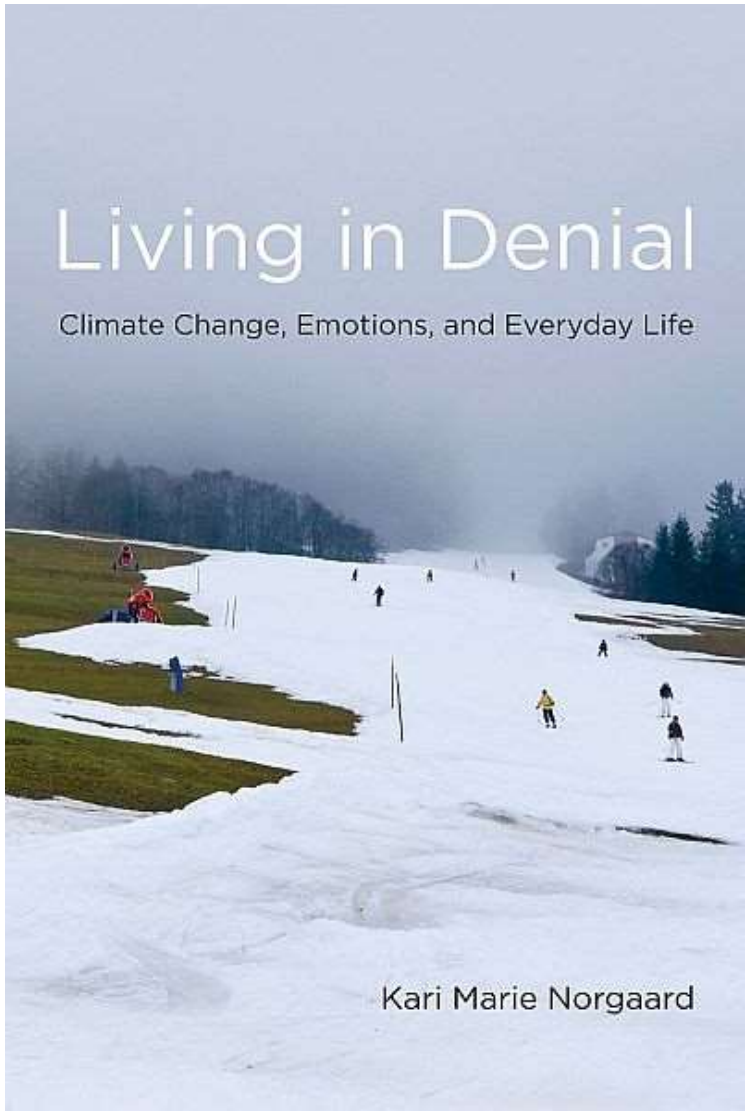
Ethnography

Ethnography - or field research - is a sociological method that explores how people live and make sense of their lives with one another in particular places.

The focus might be on people and the meaning they produce through everyday interactions, or places, and the organizational logics that guide our activities.

The Components of a Ethnography





MIT Press, 2011

Norgaard conducted an extensive ethnography among a population in Norway.

She spent a year living in a small town in the mountains of Western Norway in the early 2000s.

Involving herself in political groups, voluntary associations, street protest, and social life, she studied the rare instances in which the topic of climate change came up in conversation, noting the emotional and cognitive orientations of speakers in a range of institutional settings.

Case Studies (Historical and Contemporary)

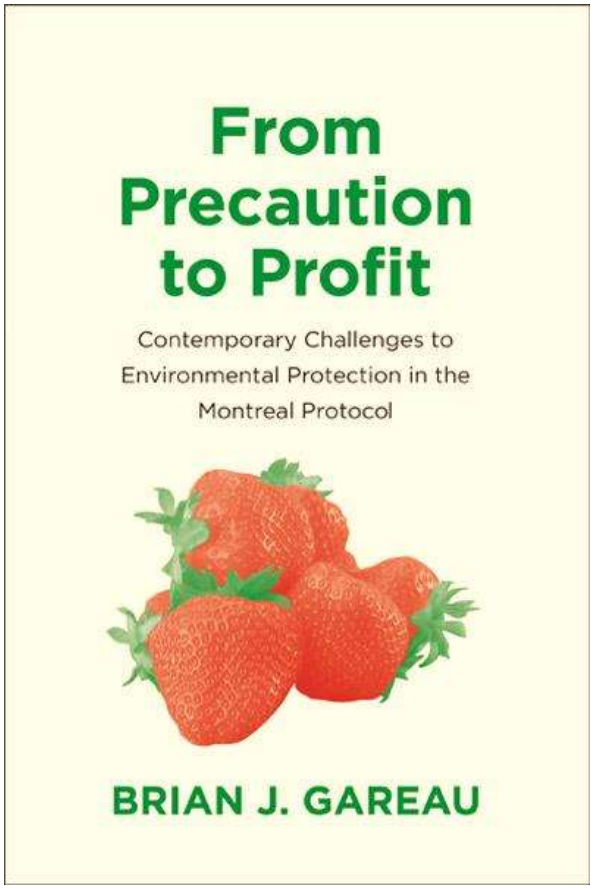
In-depth study of a particular case

When researchers focus on a single case, they can make detailed observations over a long period of time

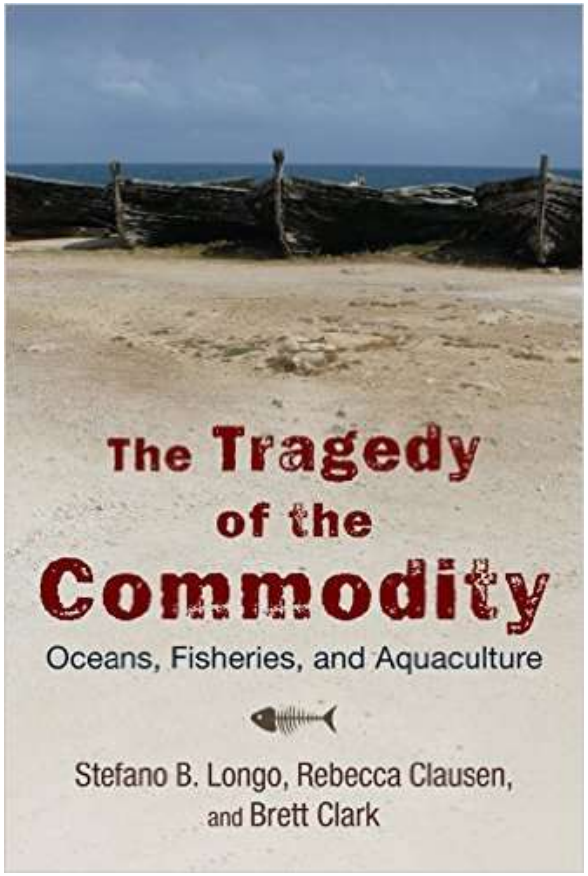
Multiple methods often employed

- Fieldwork
- Primary Data Collection
- Secondary Data Analysis
- Archival Research

Historical and Contemporary Case Studies



Yale University Press, 2013



Rutgers University Press, 2015

Multivariate Regression Techniques

Regression Analysis: methods of explaining or predicting the variability of a dependent variable using information about one or more independent variables

> "What values in the dependent variable can we expect given certain values of the independent variables?"

Cross-sectional vs longitudinal

- Between and within variation

Multilevel

Path analysis & structural equation modeling (SEM)

Multivariate Regression Techniques

Various kinds, largely depends on the dependent variable

- Linear Regression
- Logistic Regression (binary outcomes)
- Multinomial Logistic Regression (categorical outcome, more than two categories)
- Ordinal Regression (ordinal outcomes)
- Poisson and Negative Binomial Regression (count outcomes)
- Event History Analysis / Cox Regression (non-repeatable events)

Baseline Cross-Sectional Linear Models of US Chemical Plant Emissions

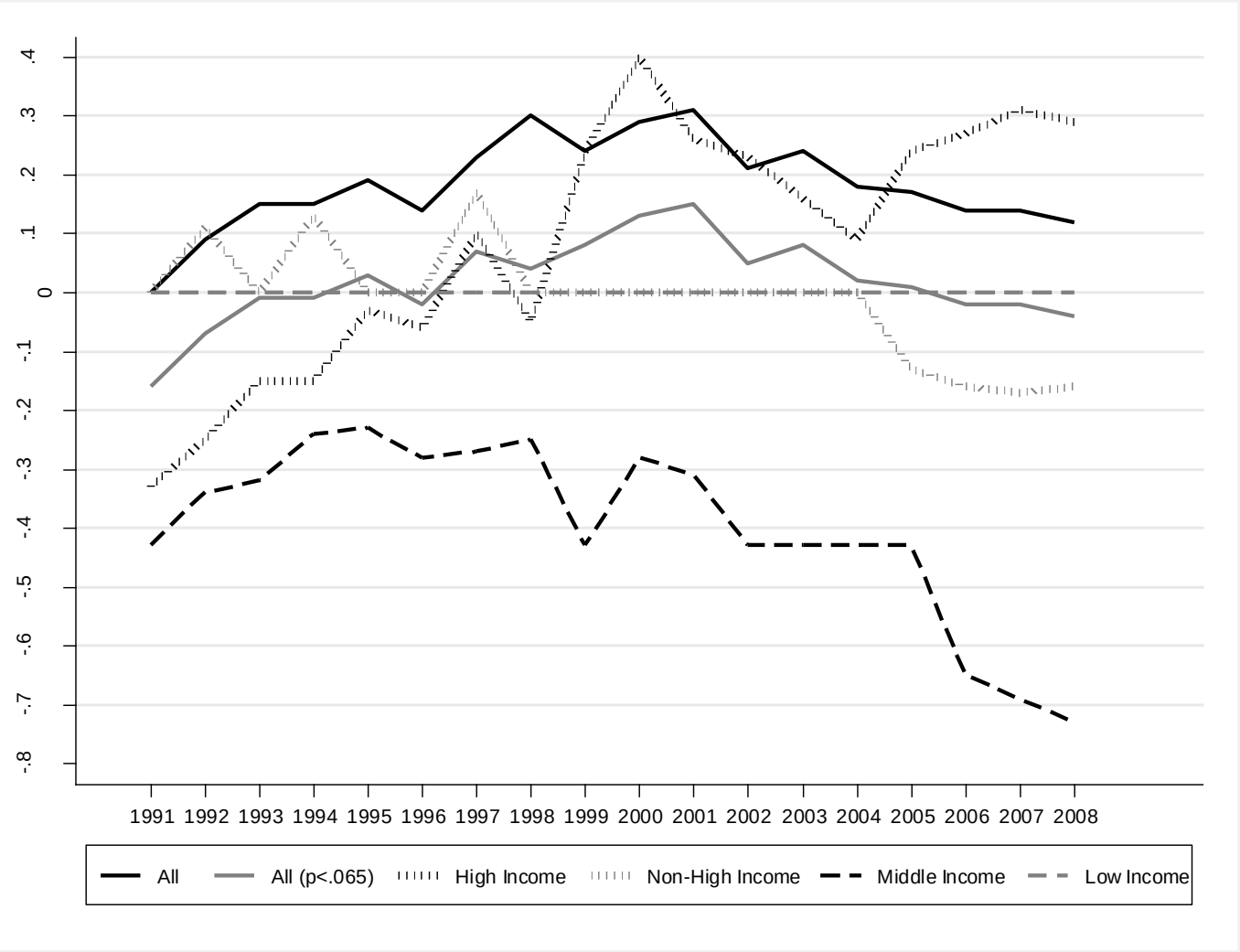
(emissions data from EPA's Risk-Screening Environmental Indicators)

	Highly Risky Emissions			
	(1)	(2)	(3)	(4)
% African American	58.347*	55.652*	59.821*	59.060*
	(26.350)	(29.375)	(30.353)	(31.036)
% Latino	103.582**	102.209**	84.765*	131.261**
	(33.750)	(34.318)	(41.152)	(38.403)
Median Household Income		−.010	.020	.033
		(.044)	(.060)	(.065)
% Manufacturing			198.683*	290.067**
			(112.627)	(115.712)
Metropolitan Area (1 = yes)			1366.048	1288.062
			(1403.682)	(1829.026)
Property Value			−.017	−.014
			(.014)	(.015)
Facility Size				1.685*
				(1.003)
Branch Plant				3206.049*
				(1462.837)
Subsidiary				1247.190
				(1761.026)
Constant	399.032	869.685	−3607.327	−7369.662
R^2	.031	.033	.054	.076
N	2,053	2,053	2,053	2,053

* $p < .05$; ** $p < .01$ (one-tailed test).

Grant et al., 2010, *American Sociological Review*

Estimated Effects of Domestic Income Inequality on Consumption-Based CO_2 Emissions



Derived From Two-Way Fixed Effects Longitudinal Models For 70 Nations

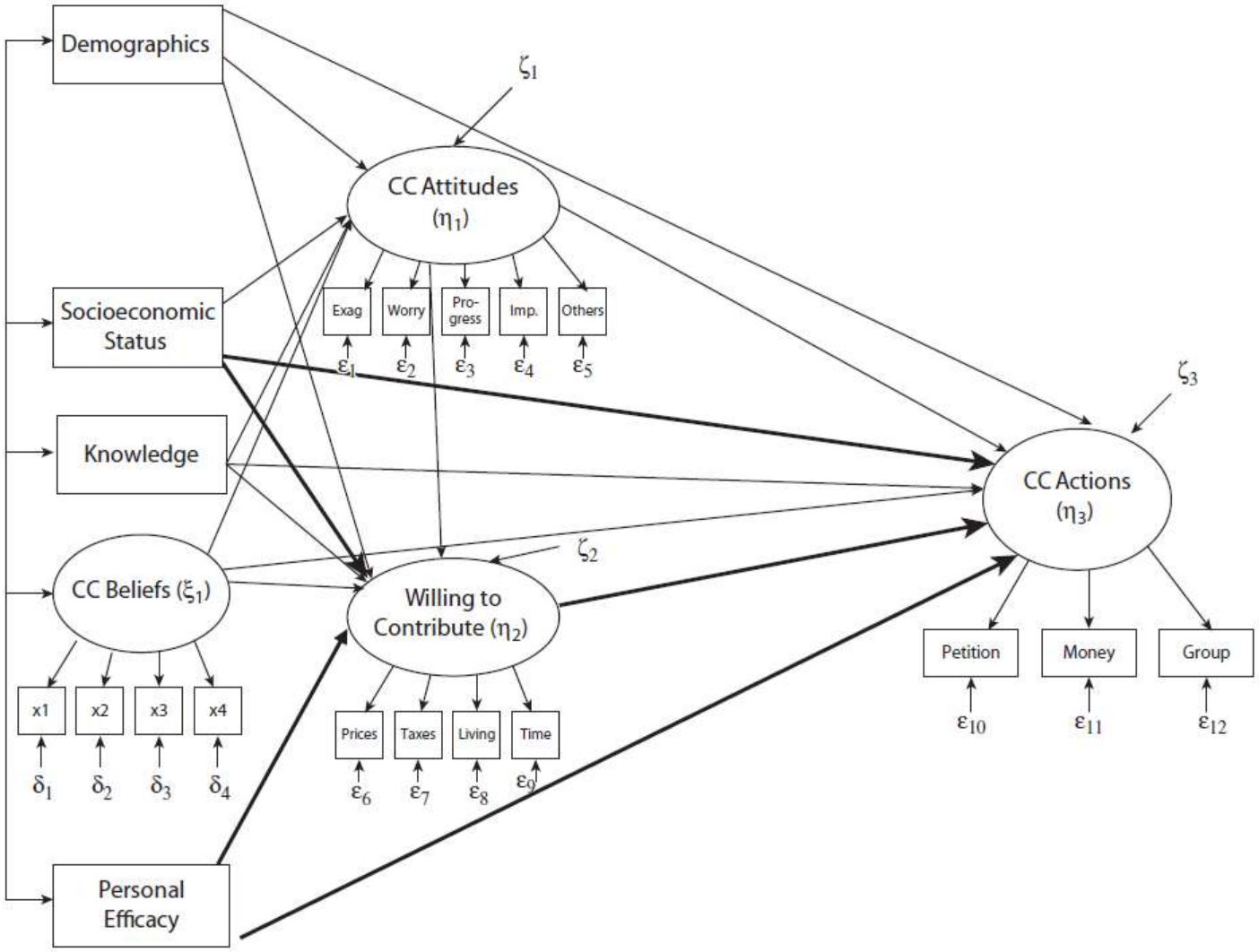
Jorgenson et al., Forthcoming, *Sociological Forum*

Multilevel Logistic Regression Analysis of Environmental Concern for 48k Individuals in 37 Nations

	Model 1	Model 2	Model 3	Model 4	Model 5
Country level					
GDP per capita (ln)		−0.277*	−0.267*	−0.287**	−0.279*
		0.758*	0.766*	0.751**	0.756*
		−2.719	−2.417	−2.880	−2.602
CO2 per capita (ln)		0.056	0.085	0.060	0.091
		1.057	1.089	1.062	1.095
		0.507	0.764	0.558	0.845
Exports/GDP		−0.006	−0.008(*)	−0.007(*)	−0.009*
		0.994	0.992(*)	0.993(*)	0.991*
		−1.469	−1.858	−1.727	−2.179
EINGOs/population			0.387*		0.411*
			1.472*		1.509*
			2.466		2.697
Environmental ministry				0.300	0.329(*)
				1.350	1.390(*)
				1.683	1.890
Individual level					
Air pollution a problem	0.378***	0.376***	0.377***	0.376***	0.378***
	1.459***	1.456***	1.458***	1.457***	1.459***
	8.704	8.693	8.730	8.688	8.731
Class	0.051*	0.050*	0.051*	0.051*	0.051*
	1.052*	1.052*	1.052*	1.052*	1.052*
	2.636	2.612	2.622	2.622	2.631
Education	0.047*	0.048*	0.048*	0.048*	0.048*
	1.048*	1.049*	1.049*	1.049*	1.049*
	2.325	2.367	2.364	2.368	2.358
Age	0.014***	0.014***	0.014***	0.014***	0.014***
	1.014***	1.014***	1.014***	1.014***	1.014***
	9.085	9.105	9.097	9.105	9.087
Health	0.100*	0.099*	0.101*	0.099*	0.101*
	1.105*	1.104*	1.106*	1.104*	1.106*
	2.593	2.544	2.603	2.540	2.598
Female	0.045*	0.045*	0.045*	0.045*	0.045*
	1.046*	1.046*	1.046*	1.046*	1.046*
	2.265	2.280	2.265	2.284	2.264
Intercept	−0.631***	1.702*	1.509(*)	1.611*	1.412*
	0.532***	5.486*	4.523(*)	5.008*	4.103*
	−4.603	2.182	1.797	2.114	1.742

Givens et al., 2013, *Social Science Research*

Example of Full SEM with Latent Variables Path Model



Based on Marquart-Pyatt 2012

Logistic Regression of Belief in Climate Change for 5k Individuals in New Hampshire

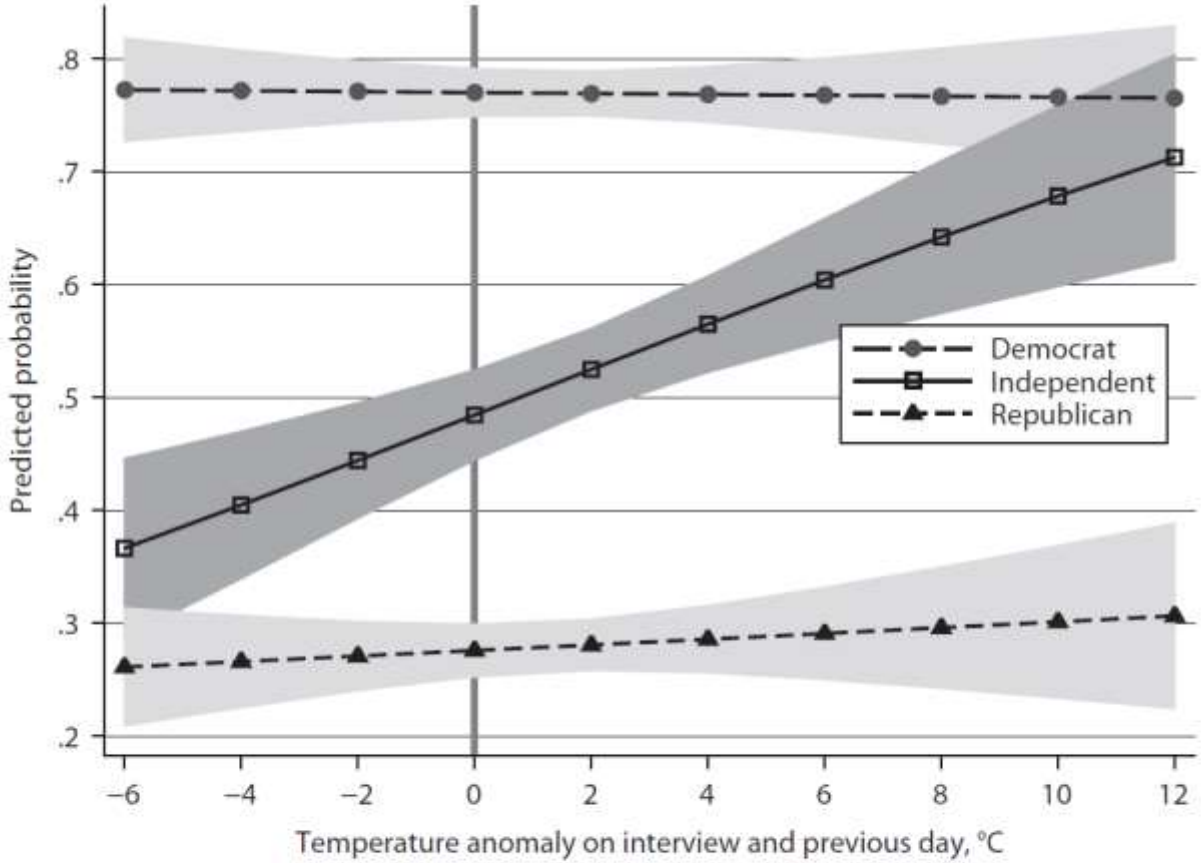


Figure 12.2 Belief in Anthropogenic Climate Change By Political Party and Temperature Anomaly

From: Hamilton and Stampone 2013

Negative Binomial Regression of "Extremely Dangerous Sites" and "Less Dangerous Sites" for 3130 US Counties

(ordnance = bombs, shells, grenades, land mines, etc.)

Table 3. Determinants of Count of Sites with Unexploded Ordnance

	Count of Sites with Unexploded Ordnance			
	Extremely Dangerous Sites		Less Dangerous Sites	
Independent Measures and Control Variables	Coefficient	(SD)	Coefficient	(SD)
Acres of Native American land (natural log)	.06**	(.03)	–.00	(.01)
Total area, 1940 (natural log)	.08	(.10)	.33***	(.04)
Total population, 1940 (natural log)	.04	(.08)	.32***	(.04)
Founding of military bases (count)				
Pre-Civil War (1776–1850)	–.04	(.09)	.04	(.03)
Civil War era (1851–1875)	.06	(.08)	.02	(.04)
Late 19th Century (1876–1900)	–.07	(.09)	–.03	(.04)
World War I era (1901–1925)	.04	(.03)	.04	(.02)
World War II era (1926–1950)	.05**	(.02)	.06	(.01)
Post-World War II era (1951–1975)	.04**	(.02)	.04	(.01)
Farm population (percentage of total)	–.03***	(.00)	–.02	(.00)
Pseudo r^2	0.26		.21	

Note: Data show negative binomial regression of 3,130 counties in the contiguous 48 states. To control for the spatial context, dummy variables for 180 of the 181 Bureau of Economic Analysis (BEA) economic areas included in these analyses are also included in this estimation. The Army Corps of Engineers inspected and assigned a rating (see text) to each site at which unexploded ordnance was found. The most dangerous sites are those that are assigned the three highest ratings, indicating that the sites pose an immediate danger.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Hooks and Smith, 2004, *American Sociological Review*

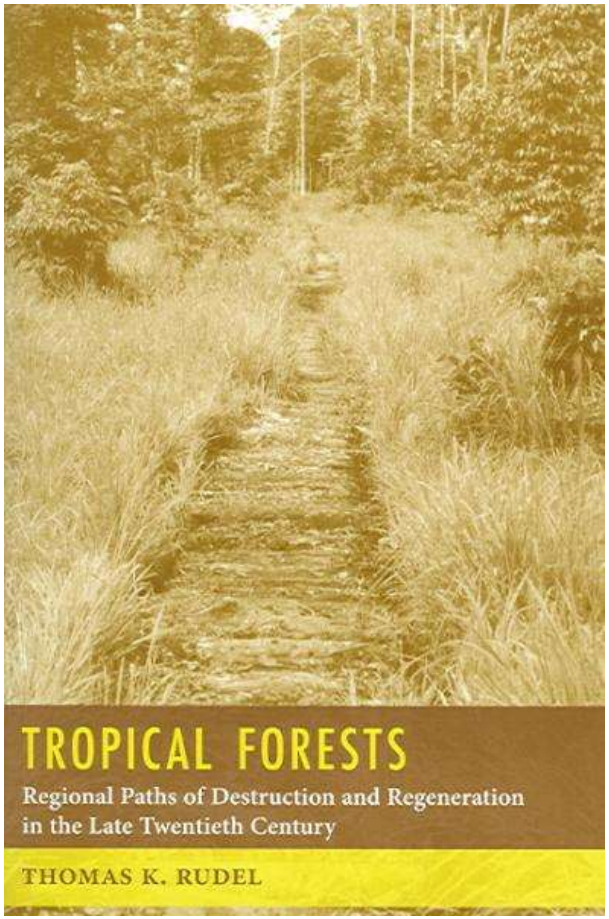
Qualitative Comparative Analysis (QCA)

Determines which of several possible combinations of factors are most relevant for an outcome

“Different recipes” for the same outcome

QCA takes the idea of equifinality into account, allowing different subsets of cases to produce the same outcome

Qualitative Comparative Analysis (QCA)



Columbia University Press, 2005

Reduced Configurations for Highly Risky Emissions

Optimal Solution
AF-AMER*LOWINC
AF-AMER*LATINO
AF-AMER*SIZE*BRANCH
LATINO*LOWINC*BRANCH

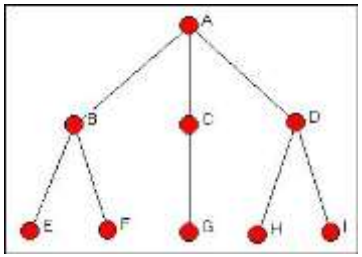
Grant et al., 2010, *American Sociological Review*

Network Analysis

The process of investigating social structures through the use of network and graph theories

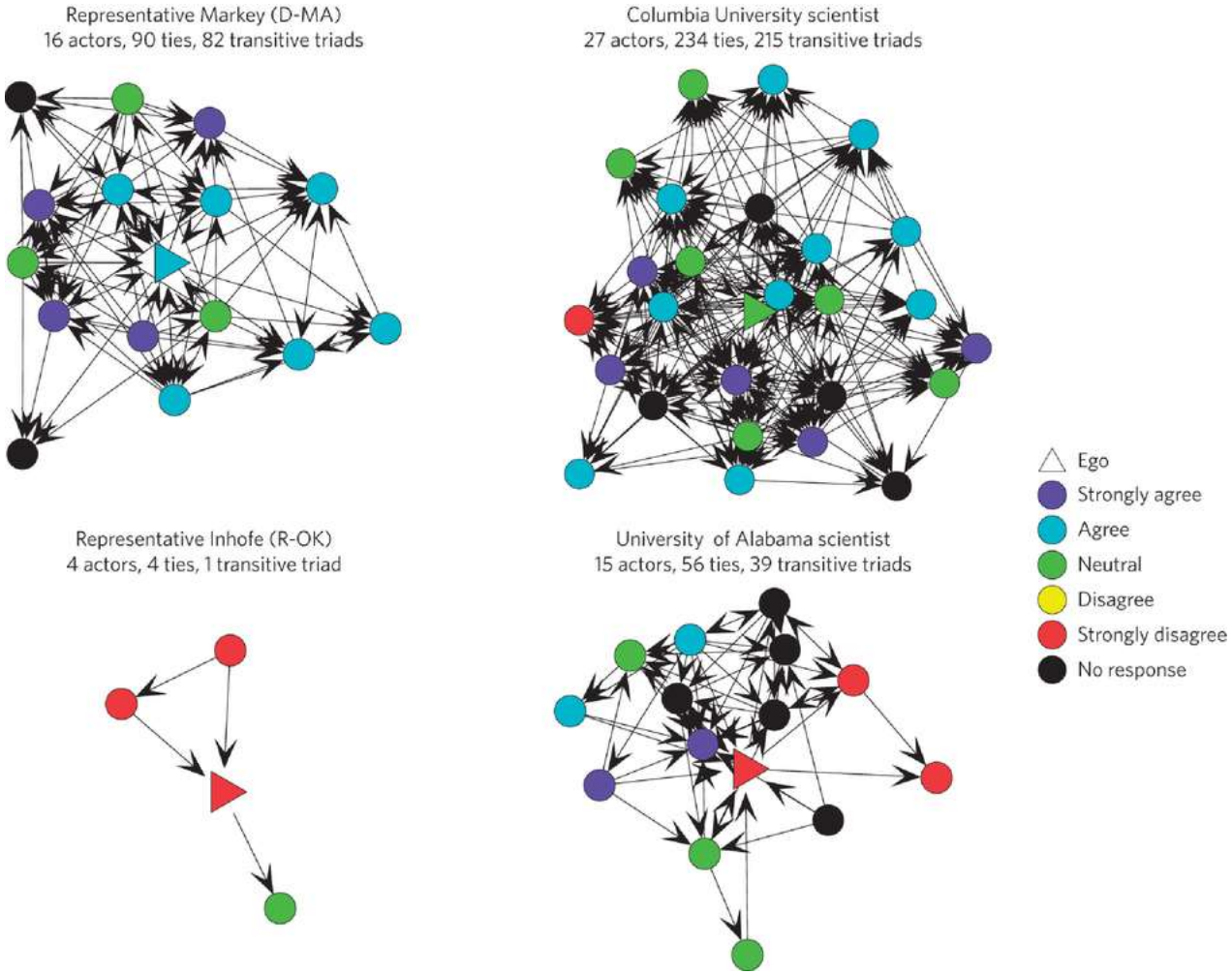
Characterizes networked structures in terms
of nodes (individual actors, people, etc.) and
the ties (relationships or interactions) that connect them

Analysis of relational data



Networks are often visualized through sociograms in which nodes are represented as points and ties as lines

An Empirical Examination of Echo Chambers in US Climate Policy Networks



Jasny et al., 2015, *Nature Climate Change*

Conclusion

This was not an exhaustive overview

Sociological research methods are diverse

The best work lets the research question determine the employed method(s)

The environmental sociology community embraces methodological pluralism

Multimethod studies becoming increasingly common

Thanks!