Index

Abduction, 13
Abductive reasoning, 4
Abney level, 48
Abscissa, 207
Abstract, 268, 276
Abstract symbols, 207
Academic journals, in geography, 259–260 (table)
Academic publishing, peer review system, xiv, 263–266, 277
Accretion, 57, 58
Accuracy, 30
Achilles and the tortoise, 25
Acidity. *See* pH
ACS. *See* American Community Survey
Active control, 205, 207
Active sensing, 239, 251
Active voice, 272 n7, 276
Activity checklist, 86, 105
Activity diary, 82–83, 105
Adaptation for use, 57, 58
Address matching, 244, 251
Adjective checklist, 86, 105
Aerial photographs, 239
Aerosol, 52, 58
Agency, 42
Albedo, 52, 59
Alkalinity. *See* pH
Alpha (α). *See p* Level
Alpha inflation, 223, 227
Alternative hypothesis (H_A), 168–169, 179
Alternatives, ranking of, 86
Altitude, 48, 59. *See also* Elevation
American Community Survey (ACS), 96, 105
Analysis scale, 30
Anecdotal record, 66, 79
Animations, 205, 207
Anonymity, 285–286, 290
Anthrosphere, 49–50, 59
Applied science, 13
Applied scientific research, 9–10
Archives, 37–38, 42, 69–70
Arithmetic mean, 159, 179
Aspect, 59
Assignment control, xii, 112, 132
Associative institutions, 1
ATLAS.ti, 77–78
Atmosphere, 49, 59
Attrition, 123, 132
Augmented reality, 205, 207

Bar graph, 194, 207
Barometer, 52, 59
Barometric heighting, 48, 59
Basic science, 14
Basic scientific research, 9
Behavior, 42, 66, 79
Behavioral observation, 37, 42, 66–69
Bell-shaped distribution, 161, 179
Belmont report, 285, 289–290
Beta (β), 172, 179, 223
Between-case design, 118–119, 132
Biogeographers, 55
Biophysical science. *See* Natural science
Biosphere, 49, 59
Biotic proxy, 53, 59
Blind review, 265, 276
Books (scientific literature), 260, 276
Boolean logic, 248, 251
Bottom-up approach (to classification), 71, 79
Boundary layer, 49, 59
Branching format, 85, 105
British Ordnance Survey, 48
Buffer, 248, 251
Byproduct of use, 57, 59

Calibration, 130–131, 133
Carbon-14, 53
Cartesian coordinate axes, 193 n6, 207
Cartographic projection, 200
Cartographic scale, 30
Case, 21, 30
Case study, 124, 133
Causality, 18–20, 31, 127
  cause, 18
  deterministic, 19
  effect, 18
  functional, 19
  mechanistic, 19
  probabilistic, 19
Cause, 18, 31
  necessary, 19
  sufficient, 19
CBD. *See* Central Business District
CBSA. *See* Core-based Statistical Areas
Census, 105
  blocks, 98, 99 (figure),105
  block groups, 98, 99 (figure), 105
  geographical units, 99 (figure)
  tracts, 98, 99 (figure), 105
  U.S., 95–101
Census Bureau, 96, 100, 101, 105
  web site, 98
Central Business District (CBD), 248
Central limit theorem, 167, 222 n4
Central place theory, 174
Central tendency, 159–160, 179
  mean, 159
  median, 159
  mode, 159
Certificate of confidentiality, 290
Change over time. *See* Developmental designs
Chaotic systems, 158
Choropleth maps, 203, 207
Circle diagram, 195, 207
Citations, 271, 276
Class intervals, 192, 207
Classification, 31, 71, 79, 251
  bottom-up approach, 71
  top-down approach, 71
Climate, 51, 59
Clinometer, 48, 59
Closed-ended items, 84–86, 105
  activity checklist, 86
  adjective checklist, 86
  alternatives, ranking of, 86
  forced-choice alternatives, 86
  major types, 86 (table)
  paired comparisons, 86
  rating scale, 86
  sorting task, 86
  triadic comparisons, 86
Cluster sampling, 143, 153
CMSA. *See* Consolidated Metropolitan Statistical Areas
Coding, 42, 71, 79
  example, 72–75
  reliability, 75–78
  validity, 75–78
Coding manual, 71, 79
Cohort, 122–123, 133
Cohort effects, 123, 133
Computational modeling, 38, 42, 125–131
  steps of, 129–131, 130 (table)
Conceptual models, 233, 251
Concurrent protocol analysis, 84
Condition, 133
Conference
  papers, 263, 276
  posters, 263 n3
  proceedings, 260, 276
Confidence interval, 168, 179
Confidentiality, 285–286, 291
Conflict of interest, 281, 291
Confound, 115, 133
Consolidated Metropolitan Statistical Areas (CMSA), 99
Constant, 22, 31
Construct, 20, 31
Construct validity, 220–222, 227
Content analysis, 71, 79
Context effects, 94, 105
Contingency table, 191, 195, 207
Contingent valuation, 83, 105
Continuous fields, spatial sampling from, 147–151
Continuous reality, 233
Continuous variable, 31
Control (as a goal of science), 8, 14
Control condition. *See* Control group
Control group, 116, 133
Convenience sampling, 140, 154
Convergent-discriminant validation, 221, 227
Coordinate system, 199, 207, 237, 252
Coordinate transformation, 252
Core-based Statistical Areas (CBSA), 99
Coriolis force, 53, 55
Correlation coefficient, 179
Countably infinite variable, 24, 31
Counterbalancing, 94, 105
Coverage, 232, 252
Coverage error, 97, 105

Criterion variables, 163, 179
Cross-level fallacy, 179
Cross-sectional approach, 122
Cross-sectional design, 133
Cross-sectional profile, 50, 59
Cryosphere, 49, 59
Cumulative frequency, 191, 207
Cumulative relative frequency, 191, 208
Curve-fitting graphs, 195, 208

Data, 22, 31
  analysis, 157, 180, 187, 246–250
  collection, in geography, 36–38
  cooking, 281, 291
  cubes, 239, 252
  display, 185, 208, 244–246
  manipulation, 246–250
  models, 236–238, 237 (figure), 252
  numbers, 239
  query, 244–246
  set, 22
  structures, 236–238, 237 (figure), 252
Davisian model, 20
De facto census, 97, 105
De jure census, 97, 106
Debriefing, 287, 291
Debug, 131, 133
Deception, in research, 286, 291
Deduction, 14
Deductive reasoning, 4
Defense Meteorological Satellite Program's Operational Linescan System (DMSP OLS), 240
Degrees of freedom, 165 n6, 180
Deletion, 57, 59
DEM. *See* Digital Elevation Models
Dendrochronology, 53, 59
Denudation, 50, 60
Dependent variable (DV), 114, 133
Derived score, 161, 180
Description (as a goal of science), 8, 14
Descriptive index table, 191, 208
Descriptive statistics, 158–159, 180
Designing displays, guidelines for, 188–203
Deterministic, 19, 31, 158
Deterministic numerical model, 133
Deterministic processes, 128
Developmental designs, 122–124, 133
  cross-sectional approach, 122
  longitudinal design, 123
  sequential design, 123
Deviation from the mean, 160, 180
Diachronic design. *See* Longitudinal design
Dichotomous variable, 22, 31
Differential attrition, 123
Digital elevation models (DEM), 48, 60, 249–250
DIME files. *See* Dual Independent Map Encoding files
Discrete reality, 233
Discrete variable, 24, 31
Discussion section, 270, 276
Display of self, 57, 60
Dissociative institutions, 1–2, 20
Distance decay, 174, 180
Distinct number, 252
Distribution graph, 193, 208
Distribution table, 191, 208
Distributional assumptions, 180
DMSP OLS. *See* Defense Meteorological Satellite Program's Operational Linescan System
Doppler radar, 52, 60
Double blind review, 265, 276
Drifters, 55, 60
Dual Independent Map Encoding (DIME) files, 98, 106
DV. *See* Dependent variable

Earth systems, 49, 60
  physical measurements of, 49–56
Echo sounder, 50, 60
Ecological validity, 219–220, 227
Economic rationality, 126, 133
Edge detection, 248, 252
Effect, 18, 31
Effect size, 152, 154
Effective communication, 188–189
El Niño, 234
Electromagnetic spectrum, 239
Elevation, 48, 60. *See also* Altitude
Empirical, 14
  concepts, xi, 21–27
  control, 112, 133
  evidence, 3
  models, 128, 133
Empiricists, 4 n3
ENVI. *See* Environment for Visualizing Images
Environment for Visualizing Images (ENVI), 242
Environmental cabinet, 47, 60
Eolian process, 50
Epistemology, 5, 14
Erdas imagery, 242
Error of prediction, 164, 180
Estimation, 180
  and hypothesis testing, 168–173

Ethical treatment
human subjects, 284–290
cultural world, 282–284
natural world, 282–284
Ethics, 291
Event sampling, 67, 79
Exempt from review, 291
Exhaustive, 79
Expected value, 167, 180
Expedited review, 291
Experimental condition, 112–113
Experimental research design, 113
Experimental studies, 112, 133
Explanation, 8, 14, 112
Explicit experiments, 93–95
Explicit reports, 38, 42
administration of, 89–93
collecting, on the Internet, 91–93
format of, 84–89
instruments for, 82 (table)
limitations of, 101–103
Explicitness, 81, 106
Exploratory data analysis, 187, 208
External validity, 219–220, 227
Exurban areas, 240

Factorial design, 121, 133
Fallacy of affirming the consequent, 170, 180
Federal Wide Assurance, 287, 291
Feedback, 128, 134
Field, 134, 233, 252. *See also* Continuous fields
Field research, 46–47
Field setting, 117
Figures, 208
Filter, 248. *See also* Kernel function
First law of geography. *See* Distance decay
Fixed, 60
fMRI. *See* Functional Magnetic Resonance Imaging
Focus group, 83, 106
Follow-up questions, 85, 106
Forced-choice alternatives, 86, 106
Forcing, 128, 134
Form, 160, 180
Formal language, 125, 134
Formal observation schedule, 79
Free format, 85, 106
Fremont, John C., 70 n3
Frequency, 191, 208
cumulative, 191
cumulative relative, 191
relative, 191
Freud, Sigmund, 102
Full review, 291
Functional causality, 31
Functional magnetic resonance imaging (fMRI), 57, 60

Galton, Francis, 217
Generalizability, 144, 154
Generalization, 201–202, 208
Generic rating scale, 87, 106
Geo-referenced information, 243, 252
Geo-visualization, 205, 208
GEOBASE, 273
GEOBIB, 273
Geodesy, 11, 14, 47, 232
Geodetic measurement, 47–49, 60
Geographic information, 231–239, 252
remotely sensed, 239–242
storage of, 243
Geographic information science (GISci), 242 n5, 252
Geographic Information Systems (GIS), xiv, 98, 99, 113, 231, 234, 242–250, 252
Geographic opportunity, 56
Geographical Abstracts, 273–274
Geography, 10, 14
Geoid, 232, 252
Geological proxies, 53, 60
Geomorphology, 50, 60
Geospatial analysis, 173–178, 180
Geosphere. *See* Lithosphere
Geostatistics, 173 n10
Gerrymandering, 175–176, 177 (figure), 180
Gini coefficient, 175, 180
GIS. *See* Geographic Information Systems
GISci. *See* Geographic information science
Global Positioning Systems (GPS), xiv, 22, 48, 54 (figure), 55, 232, 243, 252, 288, 289
Goodness-of-fit test, 131, 134
GPM. . . PMT, 94, 95
GPS. *See* Global Positioning Systems
Graduated circles, 202, 208
Grant applications, 260–261, 276
Granularity, 253
Graphic displays, 188
Graphical models, 38
Graphing, principles of good, 194 (table)
Graphs, 192–199, 208
Graticule, 199, 208

Gravity model, 20
Ground surveying, 48, 60
Group dynamics, 83, 106

H_A, 181. *See also* Hypothesis, alternative
Hedonic valuation, 103, 106
Histogram, 195, 208
History effects, 123, 134
H_0, 181. *See also* Hypothesis, null
Hue, 208
Huff model, 20
Human geography, physical measurements in, 56–57
Human science. *See* Social science
Human subjects research, 288, 291
Humanities, 7, 14
Hume, David, 18
Hydrologic cycle, 49, 61
Hydrologic surveying, 50, 60
Hydrometry, 53, 61
Hydrosphere, 49, 53, 61
Hygrometer, 52, 61
Hypothesis, 18, 31
  alternative, 168–169
  null, 168
  testing of, 168, 181

Iconic symbols, 208
Idea concepts, x–xi, 17–21, 27, 31
  causality, 18
  construct, 20
  hypotheses, 18
  theory, 17–18
Idiographic approach, 125, 134
IKONOS, 240
Impression management, 193
Inadequate power, 223, 227
Independence of scores, 181
Independent spatial sampling, 149–151, 154
Independent variable (IV), 114, 119, 134
Induction, 14
Inductive reasoning, 4
Inferential statistics, 164, 181. *See also* Statistical inference
Information visualization, 205, 208
Informed consent, 286, 291
Insolation, 51–52, 61
Institutional review boards (IRBs), 287, 291
Instrumentation, 123, 134
Instruments, 84, 106
Inter-rater reliability, 75, 77, 228
Interactional artifacts, 224–225, 227
Interactions, 122, 134
Interdisciplinary, 14
Internal consistency reliability, 227
Internal validity, 217–219, 228
Interoperability, 236, 253
Interruption tics, 209
Intersect, 249, 253
Interval measurement, 23, 32
Interview, 82, 106
Introduction section, 269, 276
IRBs. *See* Institutional review boards
Isotropic plain, 126, 134
Item-total correlation, 228
Items, 84, 106
  closed-ended, 85
  open-ended, 85
  standardized, 85
IV. *See* Independent variable

Journals (scientific literature), 258–260, 276
Journal manuscript, basic structure, 267–273
  abstract, 268
  citations, 271
  discussion section, 270
  introduction section, 269
  method section, 269
  reference section, 270–271
  results section, 269–270
  title page, 267–268

Kernel function, 248, 253
Keywords, 274, 277

Laboratory, 117, 134
Landsat, 36
  imagery, 240, 242, 249
Latent variable, 21, 32
Latin square, 94 n5
Laws, 18, 32
Levels of variable, 134
Library, for scientific research, 273–275
Likert scales, 87, 106
Line graphs, 195, 209
Linear relationship, 161, 181
Lines, 236, 253
Lithosphere, 49, 61
Log. *See* Activity diary
Long form, 96, 106
Longitudinal design, 123, 134
  history effects, 123
Longitudinal profile, 50, 61

Manifest variable, 21, 32
Manipulated variable. *See* Independent variable
Manipulation, 113, 134
Maps, 199–203, 209
  abstract symbolic representation, 202
  algebra, 248, 253
  elements, 203, 209
  iconic symbolic representation, 202
Matching, 113, 134
MAUP. *See* Modifiable Areal Unit Problem
Mean, 159, 167, 181
Measurement, 22, 32
  accuracy of, 24–26, 27 (figure)
  geodetic, 47–49
  level, 22–24, 32
  precision of, 24–26, 27 (figure)
Mechanistic causality, 32
Median, 159, 181
Mercator projection, 200
Meta-analysis, 152, 258 n1, 277
Method section, 269, 277
Metric, 23–24
Metric measurement, 32
Metropolitan Statistical Areas (MSA), 99
Microstar, 54 (figure)
Milgram, Stanley, 284
Minimal mapping unit, 99, 106
Modality, 160, 181
Mode, 159, 181
Model, 20, 32
  Davisian, 20
  empirical, 128
  graphical, 38
  gravity, 20
  Huff, 20
  numerical, 128
  outputs, 126–127, 134
  physical, 47
  statistical, 38
Model parameters, 130, 135
  calibration, 130–131
Modifiable Areal Unit Problem (MAUP), 176, 181
Modification, 57, 61
Modus tollens, 169, 170, 181
Mono-method bias, 222, 228
Monotonic, 164, 181
Monte Carlo models, 128–129, 222 n4. *See also* Stochastic numerical models
Morphology, 50, 61
Mortality. *See* Attrition
Motionless runner, 25
MSA. *See* Metropolitan Statistical Areas
Multidisciplinary, 14
Multistage area sampling, 143–144, 154
Multivariate, 181
Multivariate analysis, 163 n4
Mutually exclusive, 79

National Geographic approach. *See* Regional geography
Natural science, 4, 15
Necessary cause, 19, 32
Negative feedback, 128, 135
Negative relationship, 161, 181
Noise, 214, 228
Nominal measurement, 22–23, 32
Nominal variable, 24
Nomothetic approach, 125, 135
Nonexperimental research design, 113
Nonexperimental studies, 112, 135
Nonindependent spatial sampling, 150, 154
Noninteractional artifacts, 225, 228
Nonlinear relationship, 164, 181
Nonmanipulated variable. *See* Dependent variable
Nonparametric statistical tests, 167, 182
Nonparticipation bias, 146–147, 154
Nonprobability sampling, 140–141, 154
  convenience sampling, 140, 154
  snowball sampling, 141
Nonreactive measures, 56, 61
Nonresponse bias, 96, 106
Nonsignificance, 182
Nonstandardized items, 107
Normal distribution, 161, 182
NUD*IST, 77–78
Null hypothesis (H_0), 168, 182
Numerical models, 128, 135
  deterministic, 128
  stochastic, 128
Nuremberg Trials, 284

Objects, 233, 253
Oblate spheroid, 232, 253
Occam's Razor, 6 n5
OLS regression. *See* Ordinary least squares regression
One-tailed test, 168 n9
Ontology, 5, 15, 235, 236, 253
Open-ended items, 84–85, 107
Open-ended records, 70
Operational definition, 21 n2, 32
Opisometer, 47–48, 48
Oral communication, 261–263
Order effects, 94, 107

Ordinal measurement, 23, 32
Ordinal variable, 24
Ordinary least squares (OLS) regression, 164
Ordinate, 209–210
Orogenesis, 50, 61
Outliers, 186, 209
Overcount, 97, 107
Overlay, 253

p level, 171, 179, 182
Paired comparison ratings, 86, 87, 107
Paleoclimatology, 53, 61
Parameters, 158–159, 182
Parametric statistical tests, 167, 182, 222
Paranormal, 8
Parsimony, 6, 15, 126
Participant observation, 66, 79
Passive sensing, 239, 253
Passive voice, 272 n7, 277
Pearson correlation coefficient, 2
Peer review system, xiv, 263–266, 277
People, ethics of tracking, 288–290
Percentile, 182
Percentile rank, 161
pH, 51, 53, 61
Phenomenon scale, 32
Photographs, aerial, 239
Physical control, 112, 135
Physical geography, 46–56
Physical materials, 46, 61, 71
Physical measurement, 37, 42, 46–56
Physical models, 47, 61
Physical traces, 46, 56, 57, 61
Pie chart, 195. *See also* Circle diagram
Pilot study, 94, 107
Pixels, 234, 253
Plagiarize, 281, 291
Planimetric information, 48, 61
PMSA. *See* Primary Metropolitan Statistical Areas
Point estimate, 168, 182
Point-in-polygon, 249, 253
Points, 236, 253
Polar coordinate axes, 193 n6, 209
Pollen analysis, 53, 61
Polygons, 236, 253
Popper, Karl, 6 n6
Population, xii, 138, 140 (figure), 154
Population cartogram, 203, 209
Positive feedback, 128, 135
Positive relationship, 161, 182
Positivism, 15
Positivist geographers, 12
Post-positivism, 12, 15
Posters, 263, 277
Posttest-only design, 120, 135
Power, 172, 182
Power analysis, 152, 154, 172, 223
Precision analysis, 152, 154
Precision of estimation, 168, 182
Precision of measurement, 32
Prediction, 8, 15
Predictor variables, 163, 182
Pretest-posttest design, 120–121, 135
Primary data, 36, 42
Primary Metropolitan Statistical Areas (PMSA), 99
Probabilistic, 18, 32
  inferences. *See* Statistical inference
  processes, 128
Probability sampling, 140, 154
  simple random, 141
  stratified random, 141–143
  systematic random, 141
Projection, 209
Prometheus, 282
Protocol analysis, 83–84, 107
Proxy measure, 53, 62
Public message, 57, 62

Quadrats, 149, 154
Qualitative methods, 38–41, 42
Quantitative methods, 38–41
Quantitative revolution, 11–12, 40–41, 42
Quasi-experiments, 122, 135

Radiocarbon dating, 53, 62
Radiocarbon. *See* Carbon-14
Rain gauge, 52, 62
Random assignment, 113, 116–117, 135
Random component, 214, 228
Random sampling, 116–117
Random sequences, generating for sampling, 142 (box)
Range, 160, 182
Ranging pole, 50, 62
Ranking of alternatives, 107
Raster (data model), 236–237, 253
Rasters, 234
Rating scales, 86, 87–89, 107
  generic, 87
  types of, 88 (table)
Ratio measurement, 23–24, 32
Rationalists, 4 n3
Reactance, 56, 62, 66, 68, 225
Realism, 15

Reality
augmented, 205, 207
continuous, 233
discrete, 233
virtual, 205, 210
Reasoning, 4
Reciprocal causality, 135
Record, 79
coding of open-ended, 70–78
Reference maps, 199–200, 209
Reference section, 270–271, 277
Regional geography, 11, 15
Regression analysis, 162–164, 182
Relationship, 161, 182
graphs, 193–194, 209
linear, 161
negative, 161
positive, 161
strength of, 161, 182
Relative frequency, 191, 209
Reliability, xiii, 213–216, 228
inter-rater, 75, 77, 215–216
internal consistency, 215
remeasurement, 215, 228
Remotely sensed geographic information, 254
Repeatability. *See* Reliability
Repeated-measures design. *See* Within-case design
Representativeness, 144, 154
Resampling, 246, 254
Research
empirical control in, 112–118
generating ideas for, 28–29
subjects, 281
Research design, 111, 120 (table), 135
basic, 118–125
between-case, 118–119, 132
multiple-case, 124–125
single-case, 124–125
specific, 119–122
within-case, 118–119, 136
Researcher-case artifacts, 224–226, 228
Residues. *See* Physical traces
Resolution, 233, 254. *See also* Granularity
Response sets, 86, 107
Results section, 269–270, 277
Retrospective protocol analysis, 84
Reversal design, 124, 135
Review (academic)
blind and double blind, 265, 276
exempt from, 291
expedited, 291
full, 291
institutional boards, 287, 291
peer review system, xiv, 263–266, 277
Rounding, 26 n7, 33
Running record. *See* Specimen record

Sample, xii, 138, 140 (figure), 155. *See also* Physical materials
Sample size, 151–152
Sampling, 67, 138, 155
debate, 96 (figure), 107
designs, 139–144, 154–155
distribution, 166–168, 183
error, 165, 183
frame, xii–xiii, 139–147, 140 (figure), 148, 155, 166
theorem, 151
Space imaging corporation, 240
Saturation, 209
Scale, 33
analysis, 27–28
cartographic, 27–28
concept of, in geography, 27–28
hierarchy of, 28, 31
phenomenon, 27–28
Scatterplot, 195, 209
Scholarship, 273, 277
Schulman, Edmund, 282
Science, 3
caveats, 10
control, 8
description, 8
empirical concepts in, 31
explanation, 8
goals of, 8–10, 14
prediction, 8
Scientific approach, 3, 15
Scientific literature, 258–260, 277
Scientific research, xiv, 2–3, 15
Scientific writing, 271–273
Scientists, characteristic metaphysical beliefs of, 5–7, 14
Secondary data, 36, 42, 69
Secondary source, 95
Segmentation, 71, 80
Selecting, 142 (box), 155
Selectivity, 200, 209
Self-selection bias. *See* Volunteer bias
Semantic, 41, 42
Semantic differential, 87, 107
Semiotic, 41, 42
Sensing
active, 239
passive, 239
Sensitivity analysis, 128, 135

Sentient, 15
Sequential design, 123, 135
Sexist language, 272, 277
Short form, 96, 107
Sieve analysis, 51, 62
Significance, 183
Simple random sampling, 141, 155
Simplicity. *See* Parsimony
Simplifying assumptions, 126, 136
Simulated 3D, 199, 209
Single-case experiment, 124, 136
Sinusoidal projection, 200
Skew, 159–161, 162 (figure), 183
Small multiples, 199, 210
SMSA. *See* Standard Metropolitan Statistical Area
Snowball sampling, 141, 155
Social desirability, 86, 107
Social science, 4, 15
Sociometric rating, 82, 107
Soil
  horizon, 51, 62
  orders, 51, 62
  profile, 51, 52 (figure), 62
  texture, 51, 62
Sonifications, 205, 210
Sorting task, 86, 108
Sounding line, 50, 62
Spatial functions
  aggregation, 254
  autocorrelation, 174, 183
  central tendency, 174
  filtering, 254
  interpolation, 150, 155
  lag, 136
  sampling, 147–151
Spatial statistics, 173 n10
Spatialization, 205, 210
Specimen record, 67, 80
Spectral resolution, 239, 254
Spiritual knowledge, 8
Spurious causality, 115, 136
Spurious precision, 26, 33
Stacked bar graphs, 197 n7, 210
Standard deviation, 160, 167, 183
Standard error, 167, 183
Standard Metropolitan Statistical Area (SMSA), 98–99, 108
Standardized items, 85, 108
Statistical data analysis, 183
  conclusion validity, 222–224, 228
  control, 113, 136
  description, 158–164. *See also* Descriptive statistics
  hypothesis testing, 171 (figure)
  inference, 8, 138, 150, 164–173
  models, 38
  nonsignificance, 171
  regression to the mean, 217, 228
  significance, 171
Statistics, 165, 183
Stem-and-leaf display, 190, 191 (figure), 210
Stereoscopic, 62
Stochastic numerical models, 19, 128–129, 136, 142 (box). *See also* Probabalistic
Stratified random sampling, 141–143, 155
Studies, 3–4, 15, 35, 42
Studywise alpha (α), 223, 224, 228
Subjects, 291
Sufficient cause, 19, 33
Survey, 82, 108
Surveying, ground, 48
Symmetry, 161, 162 (figure), 183
Synchronic approach. *See* Cross-sectional approach
Systematic component, 214, 229
Systematic geography, 11, 15
Systematic random sampling, 141, 155

Tables, 190–192, 210
  contingency, 191
  descriptive index, 191
  distribution, 191
Tactilizations, 205, 210
Temporal autocorrelation, 121 (figure), 136
Temporal lag, 136
Temporal scale, 123–124
Ternary diagram, 195–197, 197 (figure), 210
Tessellate, 236, 254
Test, 38, 84, 108
Test statistics, 167 n8, 183
Thematic maps, 200, 204 (figure), 210
Themes, 27, 33, 235, 254
Theodolites, 48, 50, 62
Theory, 17, 33
Thermocline, 55, 62
Thermometer, 52, 62
Tic marks, 193, 210
TIGER files. *See* Topologically Integrated Geographic Encoding and Referencing files
Time sampling, 80
Time-series design, 121 (figure), 136
Title page, 267–268
Top-down approach, 80

Topologically Integrated Geographic Encoding and Referencing (TIGER) files, 98, 108
Traffic recorder, 68, 80
Transaction log, 68, 80
Transects, 148, 155
Transformation, 164, 183
Traverse, 48, 62
Trends, 150, 155
Triadic comparisons, 86, 107
Triangle plot. *See* Ternary diagram
Triangulation, 48, 63
Trilateration, 48, 63
Trilinear plot. *See* Ternary diagram
Tropopause, 51
Troposphere, 49
Truth value. *See* Validity
Two-tailed test, 168 n9
Type I error, 171, 183, 223
Type II error, 172, 183, 223

U.S. Census, 95, 96
U.S. Constitution, 95
U.S. Geological Survey (USGS), 48
UA. *See* Urban area
UC. *See* Urban cluster
Undercount, 97, 108
Unidimensional, 93, 108
Union, 254
United Nations, 95
Univariate, 183
Univariate analysis, 163 n4
Urban area (UA), 99–100, 108
Urban cluster (UC), 99–100, 108
USGS. *See* U.S. Geological Survey

Validity, xiii–xiv, 216–224, 229
Value, 210
Variability, 160, 184
Variable, 21–22, 33
  continuous, 31
  countably infinite, 24, 31
  dependent, 114, 133
  dichotomous, 22, 31
  independent, 114, 119, 134
  latent, 21, 32
  levels of, 118, 134
  manifest, 21, 32
  measurement level of, 22
  nominal, 24
  ordinal, 24
Variance, 160, 184
Variogram, 174, 184
Vector (data model), 236–237, 254
Vegetation assemblage, 55, 63
Verisimilitude. *See* Ecological validity
Virtual reality (VR), 205, 210
Visual variables, 203, 210
Visualization, new trends, 203–206
Volumes, 254
Volunteer bias, 146–147, 155
VR. *See* Virtual reality

Weather, 51, 63
Wetlands, 103
William of Ockham, 6 n5
Within-case design, 118–119, 136
World Wide Web, 91

X-axis, 193, 210. *See also* Abscissa

Y-axis, 193, 210. *See also* Ordinate

z Score, 161, 167 n8, 184, 191
Zeno of Elea, 25
Zeno's Paradoxes, 25–26