Adding-up property, 48 Aggregate WTP and nonuse value, 410 Akaike Information Criteria, 51, 72, 181 Alaskan oil spills minimization CV study, 225ff Alaskan sea otters CV study, 225ff Altruism, 437 See also: Warm glow effect, Moral satisfaction, Ethics. and benefit-cost analysis, 420-421 and Pareto improvement, 421, 433 and WTP, 396, 418, 418, 419-420 Anchoring, 190, 199, 209, 210, 211 Arthur Kill oil spill, 95 Articulated values and CV and economic choices, 296 and preference, philosophy of, 275, **47**4 Attitudes v. behavior, 33 Base rate information, 276 Basic values and preference, philosophy of, 275 Behavior v. attitudes, 33 consumer, 344-345 two-stage budgeting model, 347-348, 360 decision making, 276, 278 observed, 401 recreational demand, 346 transportation choice, 354, 361 Behavioral decision research v. CV research, 274 Benefit-cost analysis, 433 and altruistic values, 420-421 and contingent valuation, 29-31, 62, 307-308, 411 and nonuse value, 4, 308, 401, 445 and Pareto improvement, 419, 438 and pure economics, 438 Bequest value, 7-8, 32 Bergson-Samuelson welfare function, 472 Bias budget constraint, 219 compliance, and importance artifacts, 219 and embedding, 219 interviewer, 315

Bias (continued) noncommitment, 219, 224, 232 nonresponse, 169 in determining nonuse value, 377, 380 part-whole, See: also Embedding. part-whole, 219, 427 protest, 196 recall, 352, 364 response, 218, 219, 225, 262, 274, 289, 395, 410 self-selection, 315 starting point, 169, 175, 191, 209, 215, 315 statistical, in assessing existence value, 426-428 strategic, 169, 315 survey, 297 symbolic, 274 Bids protest, 154 structure of, and reliability, 112-113 Bob Marshall Wilderness, 45ff, 203 Bootstrapping, 155 Bounded reality, 424 Box-Cox transformation, 172 Budget constraint bias, 219 Budget context and response effects, 224, 232, 480-481 Budgeting models, two-stage for consumer behavior, 347-348, 360 for recreational demand, 347-348 Canarsie Kiddie Shop, Toys "Я" Us, Inc. v., court decision concerning survey evidence, 406 Cardinal utility and nonuse value, 409 Case-specific information, 276 CERCLA, 4, 165, 373, 392, 398, 410, Comprehensive Environmental Response, Compensation and Liability Act of 1980. and natural resource damage assessment regulations, 403-404 Charitable giving, 28-29, 34, 82-83 See also: Altruism, Warm glow effect. and CV, 272, 298, 326, 375, 473 Denver Community Chest study, 28, 35 for environmental protection, v. CV results, 326

Charitable giving (continued) free riding, 20-21 Indiana United Way study, 28 modelling of, 35 and nonuse values, 481 warm glow effect, 27 and WTP, 19-21, 395-396 Choice, economic, See: Economic preference. Cleaning of data, 99, 204, 229 Clean Water Act of 1972, 373 Clean Water Act of 1977, 4 Closed-ended questions, 166 v. open-ended questions, in protocol analysis, 298 Cognitive psychology, 272, 278, 473-474 Commodities estimation of value, 83 estimation of value, of unfamiliar, 295 hypothetical, 13-14 traditional, 360 Common sense of CV results, 306 Compensable value of a resource, 409 Compensated variation, 170-172 Hicksian, 13, 33, 402 Hicksian, nonuse value as, 409 Compensation and damages, 392-393, 394, 397-399, 403, 411, 446, 453, 475, 481 for ethical values, 481 Completeness and theory of economic preference, 479 Compliance bias, 219 Comprehensive Environmental Response, Compensation and Liability Act of 1980. See: CERCLA. Concurrent verbal protocols, 278 Conjoint analysis, 166, 224, 262 Consistency of CV results, 306 Constructive preference, 275 Consumer behavior, 344-345 two-stage budgeting model, 347-348 Consumer sovereignty, 166, 424 Consumer surplus, 472 actual and recreational demand, 350 and trip allocation, 357-358 defined, 342 Hicksian, 272 hypothetical and recreational demand, 350 and trip allocation, 357-358 computation of, 361 for measuring use value, 342-344 per-trip and trip allocation, 357, 361 and psychological theory, 474 and recreational demand, 349, 365

Consumer surplus (continued) and recreational demand, models, 346 travel-cost method for determining, 401, 411 and trip allocation models, 356 and use value losses, 368 Consumer theory, and existence value, 423 Context effects, 187-188, 276 Contingent valuation (CV) and benefit-cost analysis, 29-31, 307-308, 411 and compensatory damages, 4, 29-31 critique of, 373-377, 450-454, 454-456, 479-483, 467-477 defense of, 445-450 defined, 372, 446-447 to determine damages, 477 and economic theory of preference, transitivity, completeness, and convexity conditions, 479 and emotional distress, measurement of, 396-397 and environmental law, 399-404 and Exxon Valdez oil spill, 413 and fines, 30 history of, 372 and the law, 389ff and legislation, 4, 373 and liability, 371, 373 and litigation, 450, 453-454 and litigation, not related to natural resources, 373 methods, 447-448 for natural resource damage assessments, 92, 165, 372 for natural resource damage assessments, Nestucca oil spill, 322 plausibility of, 455-456, 469 precision of, 469 psychometric robustness of, 482-483 and public policy, 312, 371, 377-379, 452, 467-468 v. recreational use losses, 358-359 and recreational use value, 372 referendum studies, 448 and regulations, 389ff for natural resource damage assessments, 4, 165 reliability of, 469 reliability of, statistical, 482-483 research, v. behavioral decision research, 274 statistical reliability of, 482-483 as survey evidence in court, 406 validity of, 446-447 visual materials' effects on, 215 and welfare economics, 468, 470-475

Contingent valuation studies Alaskan sea otters, 225ff analyses and critiques of, 306-325 consistency and common sense of nonuse values from, 306 criticism of answers reflect factors unrelated to valuations, 375 individuals lack incentive to answer carefully, 375 individuals misrepresent beliefs, 374-375 individuals unable to estimate or understand values, 374 responses depend on how questions are posed, 376 warm glow effect, 375 direct articulation in, 232 discrete choice methods for, 457-458 Exxon Valdez oil spill, 384 farmers in India, 33 goose hunting permit, 19, 34, 167 Grand Canyon visibility, 23, 34, 41, 41-43, 82, 225, 376, 426 critique of, 306-307, 308-311, 326, 330, 333-335 and the Navajo Generating Station, 308-311, 330 wintertime visibility impacts study, critique of, 308-311 internal plausibility of results, 306 Kakadu (Australia) Conservation Zone critique of, 307, 317-322, 328-329, 335-336 Maine woods and hunters, 372 migratory waterfowl, 18, 24, 94ff, 115-138, 150-152, 153, 160-164, 273 critique of, 449-450 protocol analysis, 279-288 minimization of Alaskan oil spills, 225ff Montana Nature Conservancy, 20 Nestucca oil spill, 32, 33, 413 critique of, 307, 322-325, 326, 331, 334 plausibility of results from, 384 northern spotted owl critique of, 307, 311-314, 326, 330-331 oil-spill response, 24, 139-149, 150-152, 153, 161-162 Ontario lakes fish, 24 plausibility of nonuse values from, 376-377, 380-381, 451-452, 455-456, 469 plausibility of nonuse values from, Nestucca oil spill, 384

Contingent valuation studies (continued) precision of nonuse values from, 306, 469 protest responses, 422 reliability of nonuse values from, 306, 376-377, 380-381, 452, 469 southwest parklands, 308 strawberries, 19, 34 survey design for, problems with, 373-377 and survey research, 217-219 variability of nonuse values from, 306, 376-377, 380-381 whooping crane preservation critique of, 307, 314-317, 326-327 wilderness areas, 23, 28, 43ff, 178-180, 203-204 wilderness areas, statistical procedures, 67-76 Convergent validity, 93, 95, 105, 106, 108, 109 Convexity and theory of economic preference, 479 Count-regression count model for recreational demand specification, 349 Count models count-regression, for recreational demand specification, 349 fixed-effects, for recreational demand specification, 350 for recreational demand specification, 360 Court decision Ohio v. Department of the Interior and compensatory damages, 400 natural resource damage assessment, and CV, 165, 372-373, 386, 391, 403-404, 412 concerning survey evidence Pittsburgh Press Club v. United States, 406 Toys "Я" Us, Inc. v. Canarsie Kiddie Shop, 406 Zippo Manufacturing Co. v. Rogers Imports, Inc., 406 Covariates and WTP, 186 Crystallized preference, 291 Cumulative distribution function and WTP, 196, 206 CV, See: Contingent valuation. CWA, See: Clean Water Act. Damages assessment of using CV, 391-392 ex ante, 391

ex post, 391 using panel data, 346 Damages, assessment of (continued) using recreational demand models. 346-350 and recreational use losses for the Exxon Valdez oil spill, 350 and compensation, 392-393, 394, 397-399, 403, 411, 446, 453, 475 and contingent valuation, 4, 29-31 rules of compensatory damages. 399-400 defined, 389 determination of, using CV, 477 deterrence value of, 453 and emotional distress, 411 and ethical values, compensation for, 481 and market and nonuse values, 301-302 and market value, 403 and moral satisfaction, 302 nonuse measurement of, 402 and welfare economics, 475 nonuse damages, 391-399 via CV, 405 defined, 390 ex ante, 410 ex post, 410 derived from nonuse values, 389 v. ordinary damages, 391-399 ordinary damages, calculation of, 394 effects of publicity on, 393-394 punitive, 302 and restoration, 392, 397-399, 403, 411, 446, 475 and compensation, 303 v. use value, 415 and tort law, 381, 382, 384, 386-387, 410 use of CV, 391-392 exclusion of hard-to-measure loss values, 379 and warm glow effect, 302 Data analysis, 167-168 cleaning, 99, 204, 229 collection, 98, 166-167, 229 panel for assessment of damages, 346 for recreational demand models, 352 from surveys, and recreational use losses, 352-355 travel-cost, and recreational use losses, 352-355 trimming, 54-55, 74 Decision making behavior, 278 psychology, 276

Demand for new products, 221-222 recreational behavior, 346 and consumer surplus, 349, 365 and consumer surplus, actual and hypothetical, 350 count-regression model for specification of, 349 decisions by individuals, 344-345 defined. 343 and Exxon Valdez oil spill, 350-359 models Note: this entry is used for travel-cost models. and consumer surplus, 346 for damages, 346-350 data required by, 352 individual-level models, 344 multinomial choice models, 348 number of trips model, 350, 360, 366, 368 panel data for, 352 for recreational use value. 344-346 and site substitution, 345 travel costs and times for, 352-358 trip allocation, 349 for Exxon Valdez oil spill, 355-358 two-stage budgeting, 347-348 and welfare loss, 352 price index for, 347, 349, 350 survey design for, 352 trip allocation, 348-349 trip allocation models, and Exxon Valdez oil spill, 355-358 Demographics and WTP, 76 Density functions normal, 176 probability gamma, 51, 176 log-normal, 51, 176, 319-320 Weibull, 51, 83, 177, 319-320, 331 Denver Community Chest charitable giving study, 28, 35 Department of the Interior Ohio v., court decision and compensatory damages, 400 natural resource damage assessment and CV, 165, 372-373, 386, 391, 403-404, 412 regulations for natural resource damage assessments, 4, 165, 372-373 Deterrence value of damages, 453

public policy, 377-379

Development of resources considering nonuse values, 401 Dichotomous choice, 12, 15, 33, 34, 95-96, 103-105, 106, 108, 109-110, 111, 112, 114, 139-149, 153, 154, 155, 156, 166, 274, 315 v. open-ended questions, 428 Direct articulation CV surveys, 232 Disaggregation, top-down, 224-232, 383 and sequencing effects, 268 v. single focus surveys, 235-236 of WTP, 25 Discrete choice methods for CV studies, 457-458 Distress, emotional, measurement of by CV, 396-397 Distributions gamma, 51, 176 log-normal, 51, 176, 319-320 normal, 176 Weibull, 51, 83, 177, 319-320, 331 Door-to-door surveys, 317 Economic choice, See: Economic preference. Economic incentives, and environmental safety, 412 Economic preference, 9, 472 theory of, 479 Economic rationality and existence and nonuse values, 405 Economic sense of CV, 170 Economic theory of preference, 33 and protocol analysis, for determining WTP, 287-288 utility theory, 169 and WTP, 449 Elasticity of price, cross-price elasticity, 360 Embedding and bias, 219, 427 in CV studies, 461 in CV surveys, 25, 58-61, 82, 189, 202, 206, 219, 225, 262, 268, 274, 307, 321, 396, 480 in CV surveys, and protocol analysis, 298 perfect in CV surveys, 58, 60, 461 Emotional distress and damages, 411 measurement of, by CV, 396-397 Environmental law and contingent valuation, 399-404 Environmental litigation, 407-408 Environmental risk assessment, 382

Environmental safety and economic incentives, 412 Estimation models, 155 parametric and nonparametric for WTP, 318, 331 and reliability, 110-113 Ethical preference, 472 Ethics See also: Moral satisfaction, Altruism, Warm glow effect. and CV responses, 272 and compensation for, 481 and preference, 9, 11 and WTP, 395-396 Evidence, legal survey evidence contingent valuation as, 406 Pittsburgh Press Club v. United States, 406 Toys "Я" Us, Inc. v. Canarsie Kiddie Shop, 406 Zippo Manufacturing Co. v. Rogers Imports, Inc., 406 Ex ante damage assessment, 391 nonuse damages, 410 nonuse studies, 91 total valuation, 113 value, 96 WTP, 153 Existence value, 382-383 See also: Nonuse value. and consumer theory, 423 defined, 272, 409, 417 and economic rationality, 405 history, 32 v. nonuse value, 433 statistical bias in determining, 426-428 application of theory for, 425-426 Experimental design, 93-96 Ex post damage assessment, 391 nonuse damages, 410 total valuation, 113 Externality, 8, 32 Extreme values of CV responses, 422 for use value losses, 365 of WTP, 51, 56, 58, 69, 192, 315 of WTP, and double referendum survey format, 193 Exxon Valdez oil spill, 95 and CV, 384, 413 recreational use losses from, 350-359 and trip allocation models for recreational demand, 353, 355-358

Farmers in India CV study, 33 Fines, 409 and contingent valuation, 30 Fixed effects model count model, for recreational demand specification, 350 Poisson, for number of trips and use value losses, 357-358 Focus groups, 96 Free-riding charitable giving and WTP, 20-21 and CV surveys, 203 and determining WTP, 168-169 Free riding, and CV surveys, 476 Functional form flexible, 155 and reliability, 111-112, 113, 114, 155 Gamma distribution, mixed, 51, 176 Geographic nesting and site substitution, 349 Goose hunting permit CV study, 19, 34, 167 Grand Canyon visibility CV study, 23, 34, 41, 41-43, 82, 225, 376, 426 critique of, 306-307, 308-311, 326, 330, 333-335 and the Navajo Generating Station, 308-311, 330 wintertime visibility impacts study, critique of, 308-311 Hard-to-measure loss value, 475 exclusion of, and tort law and damages, 379 Hicksian compensated variation, 12, 33, 402 nonuse value as, 409 Hicksian consumer surplus, 272 Importance artifacts and compliance bias, 219 In-home interviews, 317 Incentive compatibility, 154 Incentives, economic, and environmental safety, 412 Income effect, 21, 41, 43, 63, 65, 82, 83, 181-186, 291 defined, 42 and sequence aggregation, 44 and WTP, 471, 480 Income elasticity, 82, 185, 209 Independence of irrelevant alternatives (IIA) property and standard multinomial models for recreational demand, 348 Indiana United Way charitable giving

Indian farmers CV study, 33 Indirect utility, 476 functions, 63, 212, 266 Inferred WTP, 389 Information base rate, 276 case-specific, 276, 276 effect on damages, 393-394, 409-410 display effects, 215, 274 effect on nonuse value, 482 imperfect, 424, 433 effect on nonuse value, 10 Interviewer bias, 315 Interviews context of, and survey design, 219 in-home, 317 mail, 461 personal, 308 telephone, 461 Intrinsic value, See: Nonuse value, Existence value. Invariance, procedural, 277 Kakadu (Australia) Conservation Zone CV study critique of, 307, 317-322, 328-329, 335-336 Kaplan-Meier algorithm, for nonparametric testing, 331 Kruskall-Wallis test procedure, 69, 83 Law and contingent valuation, 389ff environmental, and contingent valuation, 399-404 of torts damages, 381, 382, 384, 386-387, 410 use of CV, 391-392 exclusion of hard-to-measure loss values from, 379 Legislation and contingent valuation, 4, 373, 391 and natural resource damage, 398, 406-407, 410 Liability and contingent valuation, 371-379, 373, 377-379 for natural resource damages, 398 Litigation and contingent valuation, 450, 453-454, 477 for natural resource damage, 382, 384, 386-387, 403-404, 406-408, 412, 446 not natural resource related, and contingent valuation, 373 Log-normal distribution, 319-320 mixed, 51, 176, 187

study, 28

Logit models, multinomial nested for trip allocation, 360-361 and site substitution, 356 standard and independence of irrelevant alternatives property, 348 for transportation choice for recreational use losses, 354 standard and nested for recreational demand, 348, 350 for trip allocation, 356-359 Mail surveys for CV studies, 312, 313, 315, 322, 461 for recreational demand, 353 Maine woods and hunters CV study, 372 Majority-rule value, 194-195, 206 Mall-intercept surveys, 98, 233 Marketing research, 220-224, 267 Market value and damages, 398, 403 and use value, 404, 412 Methodology for CV, 447-448 discrete choice methods, 457-458 Migratory Bird Act, 390 Migratory waterfowl CV study, 18, 24, 94ff, 115-138, 150-152, 153, 160-164, 273 critique of, 449-450 protocol analysis, 279-288 Mixed density functions, 51, 176-177 Mixed distributions, 51, 176-177 Monetization of nonuse values, 402-403 Montana Nature Conservancy CV study, 20 Moral satisfaction, 298 See also: Altruism, Warm glow effect, Ethics. and CV responses, 272, 274 and damages, 302 and WTP, 289, 395-396, 419 Multinomial choice models nested logit model for recreational demand, 348, 350 for trip allocation, 356-359, 360-361 standard logit model for recreational demand, 348, 350 for transportation choice, for recreational use losses, 354 for trip allocation, 356 Multivariate models, 154 Natural resource damage assessments, 99 contingent valuation for, 92, 372, 382 contingent valuation for, Nestucca

Natural resource damage (continued) and nonuse values, 372-373 and Ohio v. Department of the Interior court decision, 165, 372-373, 386, 391, 403-404, 412 regulations for and contingent valuation, 4, 272-273 Natural resources, calculation of value, 404 Navajo Generating Station and Grand Canyon visibility, 308-311, 330 Negligence, 382 Nestucca oil spill, 95 CV study, 32, 33, 413 critique of, 307, 322-325, 326, 331, 334 plausibility of results of, 384 natural resource damage assessment, 322 Noncommitment bias, 219, 224, 232 Nonmarket valuation, 445 Nonparametric tests, 190, 318 Kaplan-Meier algorithm, 331 v. parametric tests, 195-201 Nonresponse bias, 169 Nonuse damages via CV, 405 defined, 390 ex ante, 410 ex post, 410 measurement of, 402 derived from nonuse values, 389 and welfare economics, 475 Nonuse preference, 476 Nonuse value See also: Existence value. aggregate, 410 and benefit-cost analysis, 4, 401, 445 and cardinal utility, 409 consistency and common sense of, from CV studies, 306 and damages ex ante, 391, 410 ex post, 391, 410 defined, 153, 272, 389, 395, 417 and development of resources, 401 and economic rationality, 405 examples of, 3 ex ante studies, 91 v. existence value, 433 the hard-to-measure component of total value, 377-379, 383-384 as a Hicksian compensated variation, 409 history, 5, 32 effect of information on, 10 loss of, 367 measurement of, 6, 341-342

oil spill, 322

Nonuse value (continued) monetization of, 402-403 and natural resource damage assessments, 372-373 of natural resources, defined, 371 nonuse damages derived from, 389 and ordinal utility, 409 plausibility of from CV studies, 376-377, 380-381, 451-452, 455-456, 469 from *Nestucca* oil spill CV study, 384 precision of from CV studies, 306, 469 public goods model, for measuring, 423 reliability of from CV studies, 306, 376-377, 380-381, 452, 469 societal recognition of, 381 theoretical validity of, 93-94, 101-103, 113, 305 and total valuation, 8 types of, 6 v. use value, 163 variability of from ČV studies, 306, 376-377, 380-381 Normal distribution, 176 Northern spotted owl CV study critique of, 307, 311-314, 326, 330-331 NRDA, See: Natural resource damage assessments. Number of trips model and recreational demand, 350, 360, 366, 368 Observed preference, 6, 401 Observed WTP, 389 Offsite use, 446 Ohio v. Department of the Interior, court decision and compensatory damages, 400 natural resource damage assessment and CV, 165, 372-373, 386, 391, 403-404, 412 Oil-spill response CV study, 24, 95ff, 139-149, 150-152, 153, 161-162 Oil Pollution Act of 1990, 4, 373 Oil spill Arthur Kill, 95 Exxon Valdez, 95 and CV, 413 CV study, 384 recreational use losses from, 350-359 and trip allocation models for recreational demand, 353, 355-358

Oil spill (continued) Nestucca CV study, 32, 33, 413 critique of, 307, 322-325, 326, 331, 334 plausibility of results, 384 natural resource damage assessment, 322 response, 95 Zoe Colocotroni, and restoration, 415 Onsite use, 446 Ontario lakes fish CV study, 24 OPA, See: Oil Pollution Act of 1990. Open-ended questions, 34, 35, 92, 95-96, 99-103, 106, 108, 109-110, 153, 166, 169, 206, 213 v. closed-ended questions, in protocol analysis, 298 v. dichotomous choice, 428 and protest responses, 192 for protocol analysis, 291 Opinions polls, 16-17 reversals of, in opinion polls, 17 standing, in opinion polls, 16 uncertain, in opinion polls, 17 Option value, 7, 32, 153, 205, 404 Ordinal utility and nonuse value, 409 Outliers, 150, 19, 69, 99, 154 Panel data for determining damages, 346 for recreational demand models, 352 Parametric models, 168, 180 Parametric tests, 51-54, 155, 318 v. nonparametric tests, 195-201 Pareto improvement and altruism, 421, 433 and benefit-cost analysis, 419, 438 Pareto optimal reallocation, 192 and public policy, 419 Part-whole bias, 219, 225, 427 See also: Embedding. Passive use, 446 Payment card and CV surveys, 12, 309, 323 Payment rule, 447 Payment vehicle, 274 and CV surveys, 12, 14, 203, 318, 410, 428 Perfect embedding, 58, 60, 461 Permutations test, 154 Personal interviews, 308 Pittsburgh Press Club v. United States, court decision concerning survey evidence, 406

Plausibility of CV results, 306, 325-326, 373-377, 380-381, 451-452, 455-456, 469 Nestucca oil spill, 384 Poisson model, fixed effects, for number of trips and use value losses, 357-358 Polls, opinion, 16-17 Postaccident WTP, 410 Preaccident WTP, 410 Precision of CV results, 306, 325, 469 Preference, 170, 393 and articulated values, 275, 296, 474 and basic values, 275 construction of, v. retrieval of, 275-276 constructive, 275 crystallized, 291 and CV methodology, 202 and decision behavior, 276 economic, 9, 61, 472 theory of, 33, 479 elicitation of, 476 and ethics, 9, 11, 472 measurement, 47 conjoint analysis, 166, 224, 262 trade-off analysis, 166, 224, 262 models, 476-477 nonuse, 476 observed, 6, 401 response modes for determining, 274 revealed, 3, 13, 32, 217, 294, 305, 474 revealed, and recreational use losses, 367 reversal, 277, 291, 474 stated, 166, 205, 217, 277, 305 stated, and context of choice, 167 theory of, 476-477 transitivity of, 471 true, 166 unobserved, 350 unobserved, and recreational demand, 345 and welfare economics, 474 Pretests, 96, 204, 461 Price elasticity, cross-price elasticity, 360 Price index computation of, for trips, 357 for recreational demand, 350 defined, 347, 349 Procedural invariance, 277 Protest bias, 196 Protest bid, 154 Protest responses, 192, 422 Protest zeros, 19, 34, 54-55, 83, 99, 150, 154, 226, 262, 315, 323 treatment of, 229, 230

Protocol analysis, 18, 110, 154, 277ff, 278-299 See also: Verbal protocols, Thinking aloud. concurrent protocols, 278 and CV studies, 473-474, 482 and economic theory and WTP, 287-288 and economic variables, 295 methodology, 280-282, 291 retrospective protocols, 278 and use value loss determination, 364 for determining WTP, 283-288 Psychology cognitive, 272, 278, 473-474 decision making, 276 of preferences, 276-279 theory of, and consumer surplus, 474 Psychometric robustness of CV, 170, 210, 482-483 Public goods, 165 defined, 417-418 model, for measuring nonuse value, 423 Publicity effect on damages, 393-394, 409-410 Public policy and contingent valuation, 312, 371, 377-379, 408, 452, 467-468 and Pareto optimality, 419 Purchase-intention studies and CV, 212 Quantity cues and WTP, 449 Quasi-option value, 7 Question framing and CV surveys, 14 Questionnaires, 96-98, 203-204 See also: Survey design. closed-ended questions, 166 design, 15-16, 44, 225-226 design, for protocol anlysis, 279-280 dichotomous choice, 12, 15, 33, 34, 95-96, 103-105, 106, 108, 109-110, 111, 112, 114, 139-149, 153, 154, 155, 156, 166, 315 dichotomous choice, v. open-ended questions, 428 direct articulation, 232 discrete choice methods, 457-458 embedding, 25, 58-61, 82, 202, 206, 219, 225, 262, 268, 274, 307, 321, 396, 461 perfect, 461 and protocol analysis, 298 open-ended questions, 34, 35, 92, 95-96, 99-103, 106, 108, 109-110, 153, 166, 169, 206, 213 open-ended questions, for protocol analysis, 291 open-ended questions v. dichotomous choice, 428

Questionnaires (continued) perfect embedding, 58, 60 question framing, and CV surveys, 14 for recreational demand, 353 top-down disaggregation, 224-232, 383 top-down disaggregation, and sequencing efffects, 268 Rational choice, theory of, 479 Recall bias, 352, 364 Recreational demand behavior, 346 and consumer surplus, 349, 365 and consumer surplus, actual and hypothetical, 350 count-regression model, for specification of, 349 decisions by individuals, 344-345 defined, 343 and Exxon Valdez oil spill, 350-359 models *Note:* this entry is used for travel-cost models. and consumer surplus, 346 for damages, 346-350 data required by, 352 individual-level models, 344 multinomial choice models, 348 number of trips model, 350, 360, 366, 368 panel data for, 352 for recreational use value, 344-346 and site substitution, 345 travel costs and times for, 352-358 trip allocation, 349 and Exxon Valdez oil spill, 355-358 two-stage budgeting, 347-348 and welfare loss, 352 price index for, 347, 349, 350 survey design for, 352 trip allocation, 348-349 trip allocation, models and the Exxon Valdez oil spill, 355-358 Recreational use losses for Exxon Valdez oil spill, 350-359 and revealed preferences, 367 value for natural resources defined, 341 measurement of, 341-346 recreational demand model for 344-346 Referenda, 16-17, 33, 166, 168, 267 for contingent valuation, 448, 456 double, 169, 178 single, 178

Regulations and contingent valuation, 389ff for natural resource damage assessments and contingent valuation, 4, 165, 372-373 Reliability and bid structure, 112-113 of CV results, 306, 325, 373-377, 380-381, 452, 469 and estimation models, 110-113 and functional form, 111-112, 113, 114, 155 statistical, 93, 153 Representative consumer models, 344 Response bias, 218, 219, 225, 262, 274, 289, 395, 410 effects, 218, 262, 483 and budget context, 224, 232 v. sampling effects, 262 studies of, 220-224, 262 errors, 218 extreme, in CV studies, 422 modes of eliciting preference, 274, 277 protest, 422 Restoration and damages, 392, 397-399, 403, 411, 446, 475 of natural resources, defined, 411 v. use value, and damages, 415 and Zoe Colocotroni oil spill, 415 Retrospective verbal protocols, 278 Revealed preference, 3, 13, 32, 217, 294, 305, 474 and recreational use losses, 367 Risk, environmental, assessment of, 382 Robustness psychometric of CV, 170, 210, 482-483 statistical procedures for, 73-74, 83 Rogers Imports, Inc., Zippo Manufacturing Co. v., court decision concerning survey evidence, 406 Safety, environmental, and economic incentives, 412 Sampling effects v. response effects, 262 Samuelson-Bergson welfare function, 472 SARA, See: Superfund Amendments and Reauthorization Act of 1986. Scarcity of resources, 32 Screening protocols for data, 98 Sea otters (Alaska) CV study, 225ff Self-selection bias, 315

Selway Bitterroot Wilderness, 45ff, 178-180, 192-201, 203 Sequence aggregation, 82 and income effect, 42 problems, 41 and substitution effect, 43 Sequencing effects and top-down disaggregation, 268 Single-focus surveys v. top-down disaggregation, 235-236 Southwest parklands CV study, 308 Specification test, 72 Standing opinions in opinion polls, 16 Starting point bias, 169, 175, 191, 209, 215, 315 Stated preference, 166, 205, 217, 277, 305 and context of choice, 167 Statistical bias, in assessing existence values, 426-428 Statistical procedures, for CV surveys, 67-76 Statistical reliability of CV, 307ff, 482-483 Statistical reliability of CV, 170 Strategic bias, 169, 315 Strategic responses, 217 Strawberries CV study, 19, 34 Substitution effect, 41-42, 43, 46, 63. 291 defined, 43 and sequence aggregation, 43 and WTP, 480 Substitution of sites and geographic nesting, 349 and independence of irrelevant alternatives property, of standard multinomial models, 348 nested multinomial logit models, and trip allocation, 356-357 and recreational demand models, 345 unique v. nonunique sites, 11 and use value losses, 364-366 Superfund Amendments and Reauthorization Act of 1986, 4, 373 Survey biases, 297 Survey data and recreational use losses, 352-355 Survey design, 44, 96-98, 203-204 See also: Questionnaires. bias, 297, 315, 426-428, 218 budget constraint bias, 219 closed-ended questions, 166 closed-ended questions, and protocol analysis, 298 compliance bias, 219 criticism of, for CV studies, 373-377

Survey design (continued) dichotomous choice, 95-96, 103-105, 106, 108, 109-110, 111, 112, 114, 139-149, 153, 154, 155, 156, 166, 315 dichotomous choice, v. open-ended auestions, 428 direct articulation, 232 discrete choice methods, 457-458 door-to-door surveys, 317 effects of, on CV answers, 410 effects on responses, 187-190 embedding, 25, 58-61, 82, 202, 206, 219, 225, 262, 268, 274, 307, 321, 396, 461 perfect, 58, 60, 461 and protocol analysis, 298 importance artifacts, 219 in-home interviews, 317 interview context, 219 mail surveys, 312, 313, 315, 322, 461 mail surveys, for recreational demand, 353 mall-intercept surveys, 98, 233 noncommitment bias, 219, 224 open-ended questions, 92, 95-96, 99-103, 106, 108, 109-110, 153, 166, 169, 206, 213 v. dichotomous choice, 428 and protocol analysis, 291, 298 perfect embedding, 58, 60 personal interviews, 308 for protocol analysis, 279-282, 291 for protocol analysis, open v, closed questions, 298 for recreational demand models, 352 response bias, 218, 219, 225, 262, 274, 289 effects, 218, 220-224, 232, 262 sensitivity of survey measures, 428-429 telephone surveys, 203-204, 211-212, 461 telephone surveys, for recreational use losses, 353 top-down disaggregation, 224-231, 383 top-down disaggregation, v. single-focus surveys, 235-236 Survey evidence, legal CV as, 406 Pittsburgh Press Club v. United States, 406 Toys "Я" Us, Inc. v. Canarsie Kiddie Shop, 406 Zippo Manufacturing Co. v. Rogers Imports, Inc., 406 Survey research, 220-224 consumer purchasing anticipations, 220-221

Survey research (continued) and CV surveys, 217-219 new product demand, 221-222 new transportation services, 222 Symbolic bias, 274 Telephone surveys, 203-204, 211-212, 461 for recreational use losses, 353 Theoretical validity, 93, 94, 101, 102, 103, 113, 305 Thinking aloud, 18, 110, 154, 277ff, 278-299 See also: Protocol analysis, Verbal protocols. and CV studies, 473-474, 482 and economic theory and WTP, 287-288 and economic variables, 295 methodology, 280-282, 291 and use value loss determination, 364 for determining WTP, 283-288 Top-down disaggregation, 224-232, 383 and sequencing effects, 268 v. single-focus surveys, 235-236 of WTP, 25 Tort law, and damages, 381, 382, 384, 386-387, 410 use of CV, 391-392 exclusion of hard-to-measure loss values from, 379 Total valuation, 98, 167, 305 ex ante, 113 of existence values, by CV, 417 ex post, 113 hard-to-measure component, 377-379, 383-384 of a resource, 409 of use and nonuse values, 8, 91, 322, 382 of use losses, 367-368 Toys "Я" Us, Inc. v. Canarsie Kiddie Shop, court decision concerning survey evidence, 406 Trade-off analysis, 166, 224, 262 Transitivity of preference, 471 and theory of economic preference, 479 Transportation choice behavior, 354, 361 model, multinominal logit and recreational use losses, 354 Travel-cost data, and recreational use losses, 352-355 method, 6, 33, 172 for determining consumer surplus, 401, 411 models, See: Recreational demand,

Travel-cost (continued) and travel times, for recreational demand models, 352-358 Trimmed means, 74, 193, 309-310 Trimming methods for data, 54-55, 74 Trip allocation and consumer surplus, 357-358, 361 models and consumer surplus, 356 for recreational demand, 349 for Exxon Valdez oil spill, 353, 355-358 for recreational demand, 348-349 site substitution, and nested multinomial logit models, 356 standard and nested multinomial logit models for, 356-357 True preference, 166 Uncertain opinions in opinion polls, 17 United States, Pittsburgh Press Club v., court decision concerning survey evidence, 406 Unobserved preference, 350 and recreational demand, 345 Use offsite, 446 onsite, 446 passive, 446 recreational, loss of v. contingent valuation, 358-359 for Exxon Valdez oil spill, 350-359 and revealed preferences, 367 telephone surveys for, 353 transportation choice, multinominal logit model for, 354 recreational, value of for natural resources defined, 341 measurement of, 341-346 recreational demand model for 344-346 and recreational demand, 343 Use losses measurement of, 349 recreational, because of Exxon Valdez oil spill, 350-358 Use value loss of, 341-359 and consumer surplus, 342-344, 368 extreme values of, 365 and site substitution, 364-366 total use losses, 367-368 and market value, 404 measurement of, 6, 341-346 measurement of, using consumer surplus, 342-344

models.

Use value, loss of (continued) v. nonuse value, 163 recreational. for natural resources defined, 341 measurement of, 341-346 and recreational demand, 343 recreational, and site substitution, 345 v. restoration, and damages, 415 and total valuation, 8 Utility cardinal, and nonuse value, 409 functions, 170-172 indirect, 171, 212 specification of, 172-175 indirect, 476 ordinal, and nonuse value, 409 Value(s), See: Nonuse value, Use value,

Existence value, Bequest value, Total valuation, Extreme values, Hard-to-measure loss value, Market value, Option value, Quasi-option value, Recreational use value, Majority-rule value.

- Variability of CV results, 306, 314, 325-326, 376-377, 380-381
- Verbal protocols, 18, 110, 154, 272ff, 278-299
- See also: Protocol analysis, Thinking aloud.
 - concurrent, 278
- and CV studies, 473-474, 482
- and economic theory and WTP, 287-288
- and economic variables, 295
- methodology, 280-282, 291
- retrospective, 278
- and use value loss determination, 364 for determining WTP, 283-288
- Visibility, at the Grand Canyon
- CV studies, 23, 34, 41, 41-43, 82, 225, 426 critique of, 306-307, 308-311, 326,
 - 330, 333-335 and the Navajo Generating Station,
- 308-311, 330 in wintertime, CV studies, 308-311
- Visual material, effects on CV, 215
- Wald test, 190
- Warm glow effect, 82, 83, 272, 274, 298, 375, 472-473, 476 See also: Altruism, Moral Satisfaction. and damages, 302 and nonuse values, 481 and WTP, 27, 48, 60, 289, 395-396 Washakie Wilderness, 45ff, 203

Weibull distribution, 83, 319-320, 331 mixed, 51, 177 Weighting of responses, 262 Welfare analysis, and recreational demand and use value, 344 Bergson-Samuelson function, 472 economics and contingent valuation, 468, 470-475, 475 and nonuse damages, 475 and preferences, 474 loss, 366 data required to estimate, 352-355 for natural resources defined, 341 measurement of, 342 and recreation demand models, 352 and nonuse damages, 390 and use value losses, 366 Whooping crane preservation CV study critique of, 307, 314-317, 326-327 Wilcoxon test, 69 Wilderness areas CV study, 23, 24, 43ff, 178-180, 203-204 statistical procedures for, 67-76 Wintertime visibility impacts CV study, Grand Canyon visibility, critique of, 308-311 WTA Willingness to accept. defined, 21, 171 disparity with WTP, 429-431 v. WTP, 21-22, 65-66, 82-83, 433, 480-481 WTP Willingness to pay. aggregate, 410 and altruism, 396 calculation of, 192-195 and charitable giving, 19-21, 272, 298, 326, 395-396 and covariates, 186 and cumulative distribution function, 196, 206 and demographics, 76 disparity with WTA, 429-431 and economic theory, 449 and ethics, 395-396 ex ante, 153 extreme values, 51, 56, 58, 69, 193, 315 to prevent harm, v. value of a good, 394-395 and income effect, 471 and individual values, 395-397 inferred, 389

WTP (continued) Kaplan-Meier nonparametric algorithm for estimating, 331 and moral satisfaction, 289, 395-396 observed, 389 postaccident, 410 preaccident, 410 and quantity cues, 449 and top-down disaggregation, 25 verbal protocols for determining, 283-288 and warm glow effect, 395-396 v. WTA, 21-22, 65-66, 82-83, 433, 480-481 Zero responses in CV studies, 26 protest zeros, 19, 34, 54-55, 83, 99, 150, 154, 226, 229, 230, 262, 315, 323 Zippo Manufacturing Co. v. Rogers Imports, Inc., court decision concerning survey evidence, 406 Zoe Colocotroni oil spill, and restoration, 415