Psychology from inquiry to understanding 3rd edition pdf free

Admissions Tests Predict Grades?......Page 366 College Admissions Tests: What Do They Measure?......Page 367 Reliability of IQ Scores: Is IQ Forever?......Page 368 Validity of IQ Scores: Predicting Life Outcomes......Page 369 A Tale of Two Tails: From Mental Retardation to Genius......Page 370 Exploring Genetic Influences on IQ......Page 373 Exploring Environmental Influences on IQ......Page 375 evaluating Claims: IQ Boosters......Page 378 Group Differences in IQ: The Science and the Politics......Page 379 Sex Differences in IQ and Mental Abilities......Page 380 Racial Differences in IQ......Page 382 Creativity......Page 386 Interests and Intellect......Page 387 Wisdom......Page 388 from inquiry to understanding: Why Smart People Believe Strange Things......Page 389 Your Complete Review System......Page 391Chapter 10: Human Development: Childhood, Adolescence, and Adulthood: How and why we change......Page 395 Keeping an Eye on Cohort Effects......Page 398 The Influence of Early Experience......Page 399 Clarifying the Nature–Nurture Debate......Page 400 The Developing Body: Physical and Motor Development......Page 401 Conception and Prenatal Development: From Zygote to Baby......Page 402 Infant Motor Development: How Babies Get Going......Page 403 Physical Maturation in Adolescence: The Power of Puberty......Page 405 evaluating Claims: Anti-Aging Treatments......Page 407 Theories of Cognitive Development......Page 409 Cognitive Landmarks of Early Development......Page 413 psychomythology: The Mozart Effect, Baby Einstein, and Creating "superbabies"......Page 414 from inquiry to understanding: Why is Science Difficult?......Page 415 Cognitive Changes in Adolescence......Page 418 Cognitive Function in Adulthood......Page 419 Social Development in Infancy and Childhood......Page 420 Social and Emotional Development in Adolescence......Page 430 Life Transitions in Adulthood......Page 433 Your Complete Review System......Page 437Chapter 11: Emotion, Self-Esteem, and Motivation: What moves us ......Page 441 Theories of Emotion: What Causes Our Feelings?......Page 443 Discrete Emotions Theory: Emotions as Evolved Expressions......Page 444 Cognitive Theories of Emotion: Think First, Feel Later......Page 447 Unconscious Influences on Emotion......Page 450 from inquiry to understanding: Why Do We Cry?......Page 452 Nonverbal Expression of Emotion: The Eyes, Bodies, and Cultures Have It......Page 453 Body Language and Gestures......Page 454 Lying and Lie Detection......Page 455 psychomythology Is: "Truth Serum" Really a Truth Serum?......Page 458 Happiness and Self-Esteem: Science Confronts Pop Psychology......Page 459 What Makes Us Happy: Myths and Realities......Page 460 Forecasting Happiness......Page 463 Self-Esteem: Important or Overhyped?......Page 464 Positive Psychology: Psychology's Future or Psychology's Fad?......Page 465 Motivation: A Beginner's Guide......Page 466 Hunger, Eating, and Eating Disorders......Page 469 evaluating Claims: Diets and Weight-Loss Plans......Page 472 Sexual Motivation......Page 473 Social Influences on Interpersonal Attraction......Page 478 Love: Science Confronts the Mysterious......Page 482 Hate: A Neglected Topic......Page 484 YourComplete Review System......Page 485Chapter 12: Stress, Health, and Coping with Stress: The Mind–Body Interconnection ......Page 489 Stress in the Eye of the Beholder: Three Approaches......Page 492 No Two Stresses are Created Equal: Measuring Stress......Page 494 The Mechanics of Stress: Selye's General Adaptation Syndrome......Page 495 The Diversity of Stress Responses......Page 496 psychomythology: Are Almost All People Traumatized by Highly Aversive Events?......Page 497 How Stress Impacts Our Health......Page 498 Psychoneuroimmunology: Our Bodies, Our Environments, and Our Health......Page 499 Stress-Related Illnesses: A Biopsychosocial View......Page 500 from inquiry to understanding: Morgellons Disease: How Can Healthy People Become Convinced they are Seriously Ill?......Page 501 Social Support......Page 504 Gaining Control......Page 505 Individual Differences in Coping: Attitudes, Beliefs, and Personality......Page 507 Flexible Coping......Page 508 Toward a Healthy Lifestyle......Page 509 evaluating Claims: Stress Reduction and Relaxation Techniques......Page 514 Complementary and Alternative Medicine......Page 516 Your Complete Review System......Page 521Chapter 13: Social Psychology and Social Behavior: How Others Affect Us......Page 525 What is Social Psychology?......Page 527 Humans as a Social Species......Page 528 from inquiry to understanding: Why are Yawns Contagious?......Page 531 The Fundamental Attribution Error: The Great Lesson of Social Psychology......Page 532 Conformity: The Asch Studies......Page 534 Deindividuation: Losing Our Typical Identities......Page 536 Groupthink......Page 538 Obedience: The Psychology of Following Orders......Page 541 Helping and Harming Others: Prosocial Behavior and Aggression......Page 545 Safety in Numbers or Danger in Numbers? Bystander Nonintervention......Page 546 Social Loafing: With a Little Too Much Help From My Friends......Page 547 Prosocial Behavior and Altruism......Page 548 Aggression: Why We Hurt Others......Page 550 Attitudes and Behavior......Page 553 Origins of Attitudes......Page 554 Attitude Change: Wait, Wait, I Just Changed My Mind......Page 555 Persuasion: Humans as Salespeople......Page 556 Stereotypes......Page 560 The Nature of Prejudice......Page 562 Discrimination......Page 563 Prejudice "Behind the Scenes"......Page 564 Combating Prejudice: Some Remedies......Page 565 Your Complete Review System......Page 567Chapter 14: Personality: Theories and Assessment: Who We Are......Page 571 Personality: What is It and How Can We Study It?......Page 573 Investigating the Causes of Personality: Overview of Twin and Adoption Studies......Page 574 Behavior-Genetic Studies: A Note of Caution......Page 577 Freud's Psychoanalytic Theory of Personality......Page 579 The Id, Ego, and Superego: The Structure of Personality......Page 580 Stages of Psychosexual Development......Page 583 Psychoanalytic Theory Evaluated Scientifically......Page 585 Freud's Followers: The Neo-Freudians......Page 587 Behavioral Views of the Causes of Personality......Page 589 Social Learning Theories of Personality: The Causal Role of Thinking Resurrected......Page 590 Behavioral and Social Learning Theories Evaluated Scientifically......Page 591 Rogers and Maslow: Self-Actualization Realized and Unrealized......Page 592 Humanistic Models Evaluated Scientifically......Page 593 Trait Models of Personality: Consistencies in Our Behavior......Page 594 The Big Five Model of Personality: The Geography of the Psyche......Page 595 Can Personality Traits Change?......Page 598 Trait Models Evaluated Scientifically......Page 599 Famous—and Infamous—Errors in Personality Assessment......Page 600 Structured Personality Tests......Page 601 Projective Tests......Page 604 Common Pitfalls in Personality Assessment......Page 607 psychomythology: How Accurate is Criminal Profiling?......Page 608 evaluating Claims: Online Personality Tests......Page 610 Your Complete Review System......Page 611Chapter 15: Mental Disorders: When Adaptation Breaks Down......Page 615 Conceptions of Mental Illness: Yesterday and Today......Page 617 What is Mental Illness? A Deceptively Complex Question......Page 618 Historical Conceptions of Mental Illness: From Demons to Asylums......Page 619 Psychiatric Diagnoses Across Cultures......Page 620 Special Considerations in Psychiatric Classification and Diagnosis......Page 622 Psychiatric Diagnosis Today: DSM-5......Page 624 evaluating Claims: Online Tests for Mental Disorders......Page 626 psychomythology: The Insanity Defense: Free Will Versus Determinism......Page 627 Anxiety-Related Disorders: The Many Faces of Worry and Fear......Page 629 Panic Disorder: Terror That Comes Out of the Blue......Page 630 Posttraumatic Stress Disorder: The Enduring Effects of Experiencing Horror......Page 631 Obsessive-Compulsive and Related Disorders: Trapped in One's Thoughts and Behaviors......Page 632 The Roots of Pathological Anxiety, Fear, and Repetitive Thoughts and Behaviors......Page 633 from inquiry to understanding: More Than a Pack Rat: Why Do People Hoard?......Page 634 Major Depressive Disorder: Common, But Not the Common Cold......Page 636 Explanations for Major Depressive Disorder: A Tangled Web......Page 637 Bipolar Disorder: When Mood Goes to Extremes......Page 640 Suicide: Facts and Fictions......Page 641 Personality Disorders......Page 643 Dissociative Disorders......Page 645 Symptoms of Schizophrenia: The Shattered Mind......Page 648 Explanations for Schizophrenia: The Roots of a Shattered Mind......Page 650 Autistim Spectrum Disorders......Page 653 Attention-Deficit/Hyperactivity Disorder and Early-Onset Bipolar Disorder......Page 655 Your Complete Review System......Page 657Chapter 16: Psychological and Biomedical Therapies: Helping People Change......Page 661 Who Seeks and Benefits from Treatment?......Page 663 Who Practices Psychotherapy?......Page 664 Psychoanalytic and Psychodynamic Therapies: Freud's Legacy......Page 666 Humanistic Therapies: Achieving Our Potential......Page 669 Group Therapies: The More the Merrier......Page 671 Controlled Drinking and Relapse Prevention......Page 672 Family Therapies: Treating the Dysfunctional Family System......Page 673 Systematic Desensitization and Exposure Therapies: Learning Principles in Action......Page 674 Operant and Classical Conditioning Procedures......Page 677 Cognitive-Behavioral and Third Wave Therapies: Learning to Think and Act Differently......Page 678 The Dodo Bird Verdict: Alive or Extinct?......Page 682 How Different Groups of People Respond to Psychotherapy......Page 683 from inquiry to understanding: Why Can Ineffective Therapies Appear to Be Helpful? How We Can Be Fooled......Page 684 Empirically Supported Treatments......Page 685 evaluating Claims: Psychotherapies......Page 686 psychomythology: Are Self-Help Books Always Helpful?......Page 687 Psychopharmacotherapy: Targeting Brain Chemistry......Page 688 Electrical Stimulation: Conceptions and Misconceptions......Page 692 Psychosurgery: An Absolute Last Resort......Page 694 Your Complete Review System......Page 695Glossary......Page 699Your Complete Review System Answer Key......Page 709Evaluating Claims Answer Key......Page 717References......Page 720Name Index......Page 799Subject Index......Page 814Credits......Page 829 Citation preview Psychology From Inquiry to Understanding For these Global Editions, the editorial team at Pearson has collaborated with educators across the world to address a wide range of subjects and requirements, equipping students with the best possible learning tools. This Global Edition preserves the cutting-edge approach and pedagogy of the original, but also features alterations, customization and adaptation from the North American version. Global edition Global edition Global edition Psychology From Inquiry to Understanding Third edition Third edition Third edition Scott O. Lilienfeld Steven Jay Lynn Laura L. Namy Nancy J. Woolf Lilienfeld • Lynn • Namy • Woolf This is a special edition of an established title widely used by colleges and universities throughout the world. Pearson published this exclusive edition for the benefit of students outside the United States and Canada. If you purchased this book within the United States or Canada you should be aware that it has been imported without the approval of the Publisher or Author. Pearson Global Edition LILIENFELD_1292058846_mech.indd 1 17/04/14 4:52 PM THIRD EDITION global EDITION PSYCHOLOGY from inquiry to understanding A01_LILI8849_03_SE_FM.indd 1 5/26/14 4:36 PM This page is intentionally left blank. A01_LILI8849_03_SE_FM.indd 2 5/23/14 9:17 PM Scott O. Lilienfeld Emory University Steven Jay Lynn Binghamton University Laura L. Namy Emory University Nancy J. Woolf University of California at Los Angeles THIRD EDITION global EDITION PSYCHOLOGY from inquiry to understanding Boston Amsterdam Delhi A01_LILI8849_03_SE_FM.indd 3 Cape Town Columbus Dubai Mexico City Indianapolis London São Paulo New York Madrid Sydney Milan Hong Kong San Francisco Munich Paris Upper Saddle River Montréal Seoul Singapore Taipei Toronto Tokyo 5/26/14 5:08 PM Executive Editor: Stephen Frail Head of Learning Asset Acquisition, Global Edition: Laura Dent Editorial Assistant: Caroline Beimford Director of Development: Sharon Geary Senior Development Editor: Julie Swasey Director of Marketing: Brandy Dawson Marketing Manager: Nicole Kunzmann Marketing Assistant: Frank Alarcon Senior Managing Editor: Linda Behrens Project Manager, Production: Sherry Lewis Senior Operations Specialist: Diane Peirano Acquisitions Editor, Global Edition: Vrinda Malik Assistant Project Editor, Global Edition: Sinjita Basu Media Producer, Global Edition: Vikram Kumar Senior Manufacturing Controller, Production, Global Edition: Trudy Kimber Cover Designer: PreMediaGlobal Cover Photo: Shutterstock/Valentina Photos Senior Art Director: Leslie Osher Digital Media Director: Brian Hyland Digitial Media Manager: Peggy Bliss Digital Media Project Manager: Pamela Weldin Full-Service Project Management: GEX Publishing Services Cover Printer: Ashford Colour Press Pearson Education Limited Edinburgh Gate Harlow Essex CM20 2JE England and Associated Companies throughout the world Visit us on the World Wide Web at: www.pearsonglobaleditions.com © Pearson Education Limited 2015 The rights of Scott O. Lilienfeld, Steven Jay Lynn, Laura L. Namy, and Nancy J. Woolf to be identified as the authors of this work have been asserted by them in accordance with the Copyright, Designs and Patents Act 1988. Authorized adaptation from the United States edition, entitled Psychology: From Inquiry to Understanding, 3rd edition, ISBN 978-0-205-95998-3, by Scott O. Lilienfeld, Steven Jay Lynn, Laura L. Namy, and Nancy J. Woolf, published by Pearson Education © 2014. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without either the prior written permission of the publisher or a license permitting restricted copying in the United Kingdom issued by the Copyright Licensing Agency Ltd, Saffron House, 6–10 Kirby Street, London EC1N 8TS. All trademarks used herein are the property of their respective owners. The use of any trademark in this text does not vest in the author or publisher any trademark ownership rights in such trademarks, nor does the use of such trademarks imply any affiliation with or endorsement of this book by such owners. ISBN 10: 1-292-05884-6 ISBN 13: 978-1-292-05884-9 ISBN 13: 978-1-292-08312-4 (Print) (PDF) British Library Cataloguing-in-Publication Data A catalogue record for this book is available from the British Library 10 9 8 7 6 5 4 3 2 1 14 13 12 11 10 Typeset in Minion Pro 10/12.5 by PreMediaGlobal. Printed and bound by Ashford Colour Press in the United Kingdom. A01_LILI8849_03_SE_FM.indd 4 5/19/14 7:07 AM Brief Contents 1 Introduction to Psychology a framework for everyday life 32 2 Research Methods in Psychology safeguards against error 72 3 Brain and Behavior bridging the levels of analysis 112 4 Sensation, Perception, and Reality how we sense and conceptualize the world 154 5 States of Consciousness expanding the boundaries of psychological inquiry 198 6 Learning and Conditioning how nurture changes us 234 7 Memory Processes constructing and reconstructing our pasts 274 8 Cognition: Thinking, Decision Making, and Language getting inside our talking heads 318 9 Intelligence and Intelligence Testing controversy and consensus 350 10 Human Development: Childhood, Adolescence, and Adulthood how and why we change 394 11 Emotion, Self-Esteem, and Motivation what moves us 440 12 Stress, Health, and Coping with Stress the mind–body interconnection 488 13 Social Psychology and Social Behavior how others affect us 524 14 Personality: Theories and Assessment who we are 570 15 Mental Disorders when adaptation breaks down 614 16 Psychological and Biomedical Therapies helping people change 660 5 A01_LILI8849_03_SE_FM.indd 5 5/19/14 7:07 AM Contents 1 Introduction to Psychology a framework for everyday life 32 What Is Psychology? Science Versus Intuition 34 Psychology and Levels of Analysis 35 What Makes Psychology Distinctive—and Fascinating 35 Why We Can't Always Trust Our Common Sense 36 Psychology as a Science 38 Metaphysical Claims: The Boundaries of Science 40 Recognizing That We Might Be Wrong 41 Psychological Pseudoscience: Imposters of Science 42 The Amazing Growth of Popular Psychology 42 What Is Pseudoscience? 43 The Dangers of Pseudoscience: Why Should We Care? 49 from inquiry to understanding Why Do We Perceive Patterns Even When They Don't Exist? 45 psychomythology The Hot Hand: Reality or Illusion? 47 Scientific Thinking: Distinguishing Fact From Fiction 51 Scientific Skepticism 51 A Basic Framework for Scientific Thinking 51 evaluating Claims Health Benefits of Fruits and Vegetables 56 Psychology's Past and Present: What a Long, Strange Trip It's Been 57 Psychology's Early History 57 The Great Theoretical Frameworks of Psychology 59 The Multifaceted World of Modern Psychology 62 The Great Debates of Psychology 64 How Psychology Affects Our Lives 65 Your Complete Review System 68 2 Research Methods in Psychology Safeguards Against Error 72 The Beauty and Necessity of Good Research Design 75 Why We Need Research Designs 75 How We Can Be Fooled: Two Modes of Thinking 76 The Scientific Method: Toolbox of Skills 78 Naturalistic Observation: Studying Humans "In the Wild" 79 Case Study Designs: Getting to Know You 79 Self-Report Measures and Surveys: Asking People about Themselves and Others 80 Correlational Designs 84 Experimental Designs 89 from inquiry to understanding How Do Placebos Work? 93 psychomythology Laboratory Research Doesn't Apply to the Real World, Right? 95 Ethical Issues in Research Design 97 Tuskegee: A Shameful Moral Tale 97 Ethical Guidelines for Human Research 97 Ethical Issues in Animal Research 98 Statistics: The Language of Psychological Research 100 Descriptive Statistics: What's What? 100 Inferential Statistics: Testing Hypotheses 102 How People Lie with Statistics 102 Evaluating Psychological Research 105 Becoming a Peer Reviewer 105 Most Reporters Aren't Scientists: Evaluating Psychology in the Media 106 evaluating Claims Hair-Loss Remedies 107 Your Complete Review System 108 3 Brain and Behavior Bridging the Levels of Analysis 112 Nerve Cells: Communication Portals 115 Neurons: The Brain's Communicators 115 Glial Cells 117 Electrifying Thought 117 Chemical Communication: Neurotransmission 118 Neural Plasticity: How and When the Brain Changes 121 The Brain–Behavior Network 123 The Central Nervous System: The Command Center 124 The Peripheral Nervous System 132 from inquiry to understanding How Do We Recognize Faces? 128 The Endocrine System 134 The Pituitary Gland and Pituitary Hormones 134 The Adrenal Glands and Adrenaline 135 Sexual Reproductive Glands and Sex Hormones 136 Mapping the Mind: The Brain in Action 136 A Tour of Brain-Mapping Methods 137 How Much of Our Brain Do We Use? 140 Which Parts of Our Brain Do We Use for What? 141 Which Side of Our Brain Do We Use for What? 141 psychomythology Are Some People Left-Brained and Others Right-Brained? 142 evaluating Claims Diagnosing Your Brain Orientation 143 Nature and Nurture: Did Your Genes—or Parents—Make You Do It? 144 How We Come to Be Who We Are 144 Behavioral Genetics: How We Study Heritability 146 Your Complete Review System 150 6 A01_LILI8849_03_SE_FM.indd 6 5/19/14 7:07 AM Contents 7 4 Sensation, Perception, and Reality How we Sense and Conceptualize the World 154 Two Sides of the Coin: Sensation and Perception 156 Sensation: Our Senses as Detectives 157 The Role of Attention 159 The Binding Problem: Putting the Pieces Together 160 from inquiry to understanding How Does Magic Work? 161 Seeing: The Visual System 162 Light: The Energy of Life 162 The Eye: How We Represent the Visual Realm 163 When We Can't See or Perceive Visually 167 Hearing: The Auditory System 169 Sound: Mechanical Vibration 169 The Structure and Function of the Ear 170 When We Can't Hear 172 Smell and Taste: The Sensual Senses 172 What Are Odors and Flavors? 173 Sense Receptors for Smell and Taste 173 Olfactory and Gustatory Perception 174 When We Can't Smell or Taste 175 Our Body Senses: Touch, Body Position, and Balance 176 The Somatosensory System: Touch and Pain 176 Proprioception and Vestibular Sense: Body Position and Balance 179 Ergonomics: Human Engineering 180 psychomythology Psychic Healing of Chronic Pain 178 Perception: When Our Senses Meet Our Brains 181 Parallel Processing: The Way Our Brain Multitasks 181 Perceptual Hypotheses: Guessing What's Out There 181 When Perception Deceives Us 186 Subliminal and Extrasensory Perception 188 evaluating Claims Subliminal Persuasion CDs 189 Your Complete Review System 194 5 States of Consciousness Expanding the Boundaries of Psychological Inquiry 198 The Biology of Sleep 201 The Circadian Rhythm: The Cycle of Everyday Life 201 Stages of Sleep 202 Lucid Dreaming 205 Disorders of Sleep 205 Dreams 208 Freud's Dream Protection Theory 209 Activation–Synthesis Theory 210 Dreaming and the Forebrain 210 Neurocognitive Perspectives on Dreaming 211 evaluating Claims Dream Interpretations 211 Other Alterations of Consciousness and Unusual Experiences 212 Hallucinations: Experiencing What Isn't There 212 Out-of-Body and Near-Death Experiences 213 Mystical Experiences 216 Hypnosis 217 from inquiry to understanding Why Do We Experience Déjà Vu? 215 psychomythology Age Regression and Past Lives 220 Drugs and Consciousness 221 Substance Use Disorders 222 Depressants 224 Stimulants 226 Narcotics 227 Psychedelics 228 Your Complete Review System 230 6 Learning and Conditioning How Nurture Changes Us 234 Classical Conditioning 237 Pavlov's Discovery of Classical Conditioning 238 Principles of Classical Conditioning 239 Higher-Order Conditioning 241 Applications of Classical Conditioning to Daily Life 241 psychomythology Are We What We Eat? 244 Operant Conditioning 245 Distinguishing Operant Conditioning from Classical Conditioning 246 The Law of Effect 246 B. F. Skinner and Reinforcement 247 Terminology of Operant Conditioning 248 Schedules of Reinforcement 251 Applications of Operant Conditioning 253 Putting Classical and Operant Conditioning Together 256 from inquiry to understanding Why Are We Superstitious? 254 Cognitive Models of Learning 257 Latent Learning 258 Observational Learning 259 Mirror Neurons and Observational Learning 262 Insight Learning 262 Biological Influences on Learning 263 Conditioned Taste Aversions 263 Preparedness and Phobias 264 Instinctive Drift 266 Learning Fads: Do They Work? 266 Sleep-Assisted Learning 267 Accelerated Learning 268 Discovery Learning 268 Learning Styles 269 evaluating Claims Sleep-Assisted Learning 267 Your Complete Review System 270 S-O-R Psychology: Throwing Thinking Back into the Mix 258 A01_LILI8849_03_SE_FM.indd 7 5/19/14 7:07 AM 8 Contents 7 Memory Processes Constructing and Reconstructing Our Pasts 274 How Memory Operates: The Memory Assembly Line 276 The Paradox of Memory 277 The Reconstructive Nature of Memory 278 The Three Systems of Memory 279 The Three Processes of Memory 288 Encoding: The "Call Numbers" of the Mind 289 Storage: Filing Away Our Memories 292 Retrieval: Heading for the "Stacks" 294 psychomythology Smart Pills 291 evaluating Claims Memory Boosters 293 The Biology of Memory 297 The Neural Basis of Memory Storage 297 Where Is Memory Stored? 298 The Biology of Memory Deterioration 301 The Development of Memory: Acquiring a Personal History 302 Memory over Time 303 Infants' Implicit Memory: Talking with Their Feet 303 from inquiry to understanding Why Can't We Remember the First Few Years of Our Lives? 304 False Memories: When Good Memory Goes Bad 305 False Memories 305 Implanting False Memories in the Lab 307 Generalizing from the Lab to the Real World 309 Suggestibility and Child Testimony 311 Learning Tips: Getting the Science of Memory to Work for Us 312 Your Complete Review System 314 8 Cognition: Thinking, Decision Making, and Language Getting Inside Our Talking Heads 318 Thinking and Reasoning 320 Cognitive Economy—Imposing Order on Our World 320 Heuristics and Biases: Double-Edged Swords 321 Top-Down Processing 324 from inquiry to understanding Why Do We Worry About the Wrong Things? 323 Thinking at Its Hardest: Decision Making and Problem Solving 325 Decision Making: Choices, Choices, and More Choices 325 Problem Solving: Accomplishing Our Goals 326 Models of the Mind 328 How Does Language Work? 330 The Features of Language 330 How and Why Did Language Come About? 332 How Do Children Learn Language? 333 Critical Periods for Language Learning 335 Special Cases of Language Learning 336 Theoretical Accounts of Language Acquisition 338 Nonhuman Animal Communication 339 psychomythology Do Twins Have Their Own Language? 339 Communication and the Mind: Connecting Thinking, Language, and Reading 341 Do We Think in Words? The Relation Between Language and Thought 341 Reading: Recognizing the Written Word 343 Does Speed-Reading Work? 344 evaluating Claims Speed-Reading Courses 345 Your Complete Review System 346 9 Intelligence and Intelligence Testing controversy and consensus 350 What Is Intelligence? Definitional Confusion 352 Intelligence as Sensory Capacity: Out of Sight, Out of Mind 352 Intelligence as Abstract Thinking 353 Intelligence as General versus Specific Abilities 354 Fluid and Crystallized Intelligence 355 Multiple Intelligences: Different Ways of Being Smart 356 Biological Bases of Intelligence 358 Intelligence Testing: The Good, the Bad, and the Ugly 361 How We Calculate IQ 361 The Eugenics Movement: Misuses and Abuses of IQ Testing 362 IQ Testing Today 363 College Admissions Tests: What Do They Measure? 366 Reliability of IQ Scores: Is IQ Forever? 367 Validity of IQ Scores: Predicting Life Outcomes 368 A Tale of Two Tails: From Mental Retardation to Genius 369 psychomythology Do College Admissions Tests Predict Grades? 365 A01_LILI8849_03_SE_FM.indd 8 Genetic and Environmental Influences on IQ 372 Exploring Genetic Influences on IQ 372 Exploring Environmental Influences on IQ 374 evaluating Claims IQ Boosters 377 Group Differences in IQ: The Science and the Politics 378 Sex Differences in IQ and Mental Abilities 379 Racial Differences in IQ 381 The Rest of the Story: Other Dimensions of Intellect 385 Creativity 385 Interests and Intellect 386 Emotional Intelligence: Is EQ as Important as IQ? 387 Wisdom 387 from inquiry to understanding Why Smart People Believe Strange Things 388 Your Complete Review System 390 5/19/14 7:07 AM Contents 9 10 H uman Development: Childhood, Adolescence, and Adulthood how and why we change 394 Special Considerations in Human Development 397 Post Hoc Fallacy 397 Bidirectional Influences 397 Keeping an Eye on Cohort Effects 397 The Influence of Early Experience 398 Clarifying the Nature–Nurture Debate 399 The Developing Body: Physical and Motor Development 400 Conception and Prenatal Development: From Zygote to Baby 401 Infant Motor Development: How Babies Get Going 402 Growth and Physical Development Throughout Childhood 404 Physical Maturation in Adolescence: The Power of Puberty 404 Physical Development in Adulthood 406 evaluating Claims Anti-Aging Treatments 406 The Developing Mind: Cognitive Development 408 Theories of Cognitive Development 408 Cognitive Landmarks of Early Development 412 Cognitive Changes in Adolescence 417 Cognitive Function in Adulthood 418 psychomythology The Mozart Effect, Baby Einstein, and Creating "Superbabies" 413 from inquiry to understanding Why Is Science Difficult? 414 The Developing Personality: Social and Moral Development 419 Social Development in Infancy and Childhood 419 Social and Emotional Development in Adolescence 429 Life Transitions in Adulthood 432 Your Complete Review System 436 11 Emotion, Self-Esteem, and Motivation what moves us 440 Theories of Emotion: What Causes Our Feelings? 442 Discrete Emotions Theory: Emotions as Evolved Expressions 443 Cognitive Theories of Emotion: Think First, Feel Later 446 Unconscious Influences on Emotion 449 from inquiry to understanding Why Do We Cry? 451 Nonverbal Expression of Emotion: The Eyes, Bodies, and Cultures Have It 452 The Importance of Nonverbal Cues 453 Body Language and Gestures 453 Personal Space 454 Lying and Lie Detection 454 psychomythology Is "Truth Serum" Really a Truth Serum? 457 Happiness and Self-Esteem: Science Confronts Pop Psychology 458 What Happiness Is Good For 459 What Makes Us Happy: Myths and Realities 459 Forecasting Happiness 462 Self-Esteem: Important or Overhyped? 463 Positive Psychology: Psychology's Future or Psychology's Fad? 464 Motivation: Our Wants and Needs 465 Motivation: A Beginner's Guide 465 Hunger, Eating, and Eating Disorders 468 Sexual Motivation 472 evaluating Claims Diets and Weight-Loss Plans 471 Attraction, Love, and Hate: The Greatest Mysteries of Them All 477 Social Influences on Interpersonal Attraction 477 Love: Science Confronts the Mysterious 481 Hate: A Neglected Topic 483 Your Complete Review System 484 12 Stress, Health, and Coping with Stress the Mind-Body Interconnection 488 What Is Stress? 491 Stress in the Eye of the Beholder: Three Approaches 491 No Two Stresses Are Created Equal: Measuring Stress 493 How We Adapt to Stress: Change and Challenge 494 The Mechanics of Stress: Selye's General Adaptation Syndrome 494 The Diversity of Stress Responses 495 psychomythology Are Almost All People Traumatized by Highly Aversive Events? 496 How Stress Impacts Our Health 497 The Immune System 498 Psychoneuroimmunology: Our Bodies, Our Environments, and Our Health 498 Stress-Related Illnesses: A Biopsychosocial View 499 Coping With Stress 503 Social Support 503 Gaining Control 504 Individual Differences in Coping: Attitudes, Beliefs, and Personality 506 Flexible Coping 507 Promoting Good Health—and Less Stress! 508 Toward a Healthy Lifestyle 508 Complementary and Alternative Medicine 515 evaluating Claims Stress Reduction and Relaxation Techniques 513 Your Complete Review System 520 from inquiry to understanding Morgellons Disease: How Can Healthy People Become Convinced They Are Seriously Ill? 500 A01_LILI8849_03_SE_FM.indd 9 5/23/14 2:15 PM 10 Contents 13 Social Psychology and Social Behavior How Others Affect Us 524 What Is Social Psychology? 526 Humans as a Social Species 527 The Fundamental Attribution Error: The Great Lesson of Social Psychology 531 from inquiry to understanding Why Are Yawns Contagious? 530 Social Influence: Conformity and Obedience 533 Conformity: The Asch Studies 533 Deindividuation: Losing Our Typical Identities 535 Groupthink 537 Obedience: The Psychology of Following Orders 540 Helping and Harming Others: Prosocial Behavior and Aggression 544 Safety in Numbers or Danger in Numbers? Bystander Nonintervention 545 Social Loafing: With a Little Too Much Help From My Friends 546 Prosocial Behavior and Altruism 547 Aggression: Why We Hurt Others 549 psychomythology Is Brainstorming in Groups a Good Way to Generate Ideas? 547 Attitudes and Persuasion: Changing Minds 552 Attitudes and Behavior 552 Origins of Attitudes 553 Attitude Change: Wait, Wait, I Just Changed My Mind 554 Persuasion: Humans as Salespeople 555 evaluating Claims Work-From-Home Jobs 559 Prejudice and Discrimination 559 Stereotypes 559 The Nature of Prejudice 561 Discrimination 562 Roots of Prejudice: A Tangled Web 563 Prejudice "Behind the Scenes" 563 Combating Prejudice: Some Remedies 564 Your Complete Review System 566 14 Personality: Theories and Assessment Who We Are 570 Personality: What Is It and How Can We Study It? 572 Investigating the Causes of Personality: Overview of Twin and Adoption Studies 573 Behavior-Genetic Studies: A Note of Caution 576 from inquiry to understanding Where Is the Environmental Influence on Personality? 576 Psychoanalytic Theory: The Controversial Legacy of Sigmund Freud and His Followers 578 Freud's Psychoanalytic Theory of Personality 578 The Id, Ego, and Superego: The Structure of Personality 579 Stages of Psychosexual Development 582 Psychoanalytic Theory Evaluated Scientifically 584 Freud's Followers: The Neo-Freudians 586 Behavioral and Social Learning Theories of Personality 588 Behavioral Views of the Causes of Personality 588 Social Learning Theories of Personality: The Causal Role of Thinking Resurrected 589 Behavioral and Social Learning Theories Evaluated Scientifically 590 Humanistic Models of Personality: The Third Force 591 Rogers and Maslow: Self-Actualization Realized and Unrealized 591 Humanistic Models Evaluated Scientifically 592 Trait Models of Personality: Consistencies in Our Behavior 593 Identifying Traits: Factor Analysis 594 The Big Five Model of Personality: The Geography of the Psyche 594 Basic Tendencies versus Characteristic Adaptations 597 Can Personality Traits Change? 597 Trait Models Evaluated Scientifically 598 Personality Assessment: Measuring and Mismeasuring the Psyche 599 Famous—and Infamous—Errors in Personality Assessment 599 Structured Personality Tests 600 Projective Tests 603 Common Pitfalls in Personality Assessment 606 psychomythology How Accurate Is Criminal Profiling? 607 evaluating Claims Online Personality Tests 609 Your Complete Review System 610 15 Mental Disorders When Adaptation Breaks Down 614 Conceptions of Mental Illness: Yesterday and Today 616 What Is Mental Illness? A Deceptively Complex Question 617 Historical Conceptions of Mental Illness: From Demons to Asylums 618 Psychiatric Diagnoses Across Cultures 619 Special Considerations in Psychiatric Classification and Diagnosis 621 Psychiatric Diagnosis Today: DSM-5 623 evaluating Claims Online Tests for Mental Disorders 625 psychomythology The Insanity Defense: Free Will Versus Determinism 626 A01_LILI8849_03_SE_FM.indd 10 Anxiety-Related Disorders: The Many Faces of Worry and Fear 628 Generalized Anxiety Disorder: Perpetual Worry 629 Panic Disorder: Terror That Comes Out of the Blue 629 Phobias: Irrational Fears 630 Posttraumatic Stress Disorder: The Enduring Effects of Experiencing Horror 630 Obsessive-Compulsive and Related Disorders: Trapped in One's Thoughts and Behaviors 631 The Roots of Pathological Anxiety, Fear, and Repetitive Thoughts and Behaviors 632 5/23/14 2:15 PM Contents 11 from inquiry to understanding More Than a Pack Rat: Why Do People Hoard? 633 Mood Disorders and Suicide 635 Major Depressive Disorder: Common, But Not the Common Cold 635 Explanations for Major Depressive Disorder: A Tangled Web 636 Bipolar Disorder: When Mood Goes to Extremes 639 Suicide: Facts and who speed-reading Atresearched the end of each major topic heading, we provide an Assess Your Knowledge: comprehension, retention, and relays nerve at colleges and universities around the signals to recall with our course." Fact world." or Fiction? Corpus callosum review of selected material to further reinforce concept cerebral The All classes to improve your grades, and research "professionals" and how they conducted their students' ability to distinguish psychological fact from f hension and foster action. shows that speed-reading has negative Cerebellum research? consequences on comprehension. Regulates balance and Throughout the text, MyPsychLab icons direct students to additional online study "Our course will teach you how to skim body control "Learn how to double or triple your excessively detailed documents," and review material such as videos, simulations, and practice quizzes and customized Brain stem reading speed in under 15 minutes." This claim acknowledges that most of the Regulates control What kind of evidence would you need success of "speed-reading" actually comes of involuntary study plans. to support this extraordinary claim? from skimming—that is, not reading some functions such as material at all. Reading and Your Complete Review System, located at the end of every chapter, includes heart rate a summary, quiz questions, and visual activities, all organized by the major chapter fIGure 3.10 The Cerebral Hemispheres and brain and spinal cord. A clear liquid, called Central sulcus Parietal subsections andCallosum. (cont)This chapter learning objectives. Apply Your Scientific Thinking the Corpus callosum Frontal lobe cerebrospinal fluid (CSF), runs through Assess your Knowledge FAcT or FIcTioN? connects the two cerebral hemispheres. these ventricles and bathes our brain Principles questions challenge students to research and evaluate current event topics. and spinal cord,whether providing nutrients and 1. We can't determine the fine distinctions limits make among different kinds of snow are cause or injury. a consequence thesmany terms for snow for this cushioning usaagainst This fol and Further Your Learning highlights for students these key online learning sets that language. True / False the CNS's shock absorber, allowing us to and Review the Pre-Test and Flashcards at myanthab movewho outspeak heads bumping our brains. True / False generate our thoughts, fooling, and behavi. Whole wordsFigure recognition the most cent reading strategy for fluent readers and the ices (see 3.9). is We'll beginfour guided test evaluate such Thinking, and Further Your Learning. Here are your Knowledge of chapter material. MyPsychLab Video Series, with Internal brain damage. Occipital colors apart.sustaining True / False lobe we review diff brain regions. MyPsychLab Simulations, 3. The StroopAs color-naming taskerent demonstrates that reading is automatic. True / False Read and Listen to Chapter 2 at myanthab and MyPsychLab Writing Assessments. Answers are located at the end of the text. fIGure 3.9 The Human Forebrain (including Corpus callosum cerebral cortex) Bundle of nerve Brain: A Simple Map. The site of most fibers connecting (Source: Modified from of the brain's the cerebrum's conscious two hemispheres (Sorting Kindersley) How much time do you spend readingfunctions textbooks, lecture notes, and other course materials? Probably a lot. Wouldn't it be great to cut that time in half—or even more—and spend Hypothalamus thecularies, which are more time hanging out with your friends? Let's evaluateParty somecontrols of these body's endocrine, modified after several advertisements for speed-reading courses. Study and Review in MyPsychLab 4. bear in mind that although they serve differ-Thalamus: The memory turn, the cortex contains four regions called lobes, each associated with somewhat different regions with highly integrated cortex means "bark," as the cortex surrounds the hemispheres much like bark on a tree. In functions Apply your Scientific Thinking skills to. Compare the digitation to show the many subtypes of explicit and How memory operates: The memory turn, the cortex contains four regions called lobes, each associated with somewhat different regions with the unique intellectual capacity. (p. 287) corpus callosum (276–288) Assembly like your scientific thinking skills to answer the following questions, referencing specific scientific thinking principles and common errors fIGure 3.11 Each of our hemispheres contains the same four lobes; they functions (see large band of fibers connecting the two to reasoning whenever possible. (a) and Review Pre-Test and Flashcards at myanthab areStudy the next steps that do in our tour. Explicit cerebral hemispheres collect scientific evidence that explains why such a thing happens, 1. As we've learned, our memories are often not as accurate as we ?1 1 IdentifyThe ways ThatThe vary. (p. 78) (How are 2 reproduction? 6 and Don't do 3) THE CEREBRAL CORTEX. your complete review system as acc your accurate ourcTry reflect? evReferences. Long-Term Memory Memories caused the lasting. Remembers were limited. Such as prepared a few long periods of Read to Chapter 2 at myanthab time, but tend to be reconstructive rather than reproductive. 1. A(n) ___________ is a false but subjectively compelling Listen (p. to 278) the Audio File at myanthab memory. 2. Our memories are far more (reproductive/reconstructive) rather than (reproductive/reconstructive). (p. 278) View the Image at myanthab 7.2 reflAm The funcTion, sPan, and durATIon of each of the Three MeMory sysTeMs. Watch the Video at myanthab Sensory memory, short-term memory, and long-term memory are three systems of information processing that vary in how much information Read Document at retain atmanthab they hold and for how long they hold it. • Short-term memory has a limited span of seven plus or minus two pieces of information. Its capacity can be extended by grouping things into larger, meaningful units called chunks. Map the Concepts at myanthab 3. The major types of memory are measured by ______________ for ______ of how much information each system can hold, and Explore the myanthab ___________ or Concept how long aapperiod of time the system can hold information. (p. 279) 4. Map out the three-memory model process proposed by Atkinson Simulate the Experiment at myanthab and Shiffrin depicting memory flow. (p. 279) (c) (d) Implicit (e) Read the Document at myanthab Sample Document Title Test f I The Three Processes ofConcepts memory (288-297) Map the at myanthab Sample Concept Title Test 7.4 IdenTIfy MeThods for connecTInG new InforMaTIon To exIsTInG knowledge. Mnemonics are memory aids that link new information to more familiar knowledge. There are many kinds of mnemonics; they take effort to use but can assist recall. (b) Loss DifferenTIaTe The subTyPes of lonG-TerM MeMory. Explicit memory subtypes include semantic and episodic memory. Implicit memory types include procedural and priming memory. 9. __________ memory is the process of recalling information intentionally, and __________ memory is the process of recalling information when we don't remember deliberately. (p. 286) 14 A02_LILI8849_03_SE_FM_Preface.indd 19 Such that also interference is the major factor in forgetting. Which factors do you think play a role in short-term memory loss? 3. Locate at least three magazine articles or Internet sites that discuss repressed and recovered memory. What arguments do they make to support the existence and accuracy of these memories? Are these arguments supported by scientific knowledge? Are there any final thoughts to consider? Explain your answers. Further your Understanding aS Extend your knowledge with The MyPsychLab Video series The Big Picture: The Woman Who Cannot Forget Hear the story of Jill Price, a woman with a phenomenal ability to remember things. Margin sample Read the Document at myanthab memory in the brief storage of perceptual information Sample Document Title Test before it's passed to ___________ memory. (p. 279) Read the 7.5 IdenTIfy The roLe That scheMas Play in the sToraGe of Document 6. ___________ is a type of memory that applies To the MeMory. The page Concepts at myanthab Title of the Document Sample Conceptvision. Title Text(p. 280) Schemas equip us with frames of reference for interpreting new Goes Here at myanthab situations. Nevertheless, they can sometimes lead to memory 7. To extend the span of short-term memory, we organize information into meaningful groupings using a process called errors. ____________. (p. 283) 14. Organized knowledge structures store what we stored in memory are 8. The tendency to remember words at the beginning of a list better called ___________. (p. 292) than those in the middle of the list is known as the ___________________. (p. 285) 7.6 dIsTinGuish ways of MeasurInG MeMory. 7.3 2. Sometimes people find it difficult to remember phone numbers Read thejust heard. Search the Internet or consult some books to that they 11. The three major processes of memory are ___________, ___________, and ___________. (p. 288) Rehearsal (a) assume. Think back to an early memory of an event (such as a childhood vacation) that you shared with friends or family. Write down as many details of the memory as you can. Now ask those friends or family members to write down their memories of the same event. In what ways do the memories differ? How can you Margin sample explain the differences given what you now know about memory? esPreferce PsychoSocial research wIth MyPsychLab aStudioTmis Access these simulations in MyPsychLab. Follow the "Simulations" link. Digit Span Use chunking to increase your working memory capacity and recall series of digits and letters. Serial Position Effect Test the limits of your working memory with lists. What Do You Remember? Participate in a survey to discover what you find memorable and the strategies you use to aid long- and short-term memory. APPly your crITIcal ThInkInG skills with MyPsychLab wriTInG assessMenTs Complete these writing assignments in MyPsychLab. You are reading your text and studying for an upcoming exam in psychology. Identify and describe each step in the process required for remembering information from your text in order to do well on the exam. Discuss a strategy for improving memory and provide an example of how it could help you on the exam. Recall requires generating previously encountered information on our own, whereas recognition simply requires selecting the correct information from an array of choices. How quickly we relearn material previously learned and forgotten provides another measure of memory. 15. ___________ is the reactivation or reconstruction of experiences from our memory. (p. 294) 317 5/19/14 12:13 PM Preface 17 Putting Scientific Thinking to the Test: Innovative and Integrated Supplements Psychology: From Inquiry to Understanding is accompanied by a collection of teaching and learning supplements designed to reinforce the scientific thinking skills from the text. These supplements "put scientific thinking to the test" by reinforcing our framework for evaluating claims and assessing students' ability to think scientifically in a variety of psychological and real-world situations. Teaching Resources The Instructor's Resource Center (www.pearsonhighereducation.com/Lilienfeld) provides information and the following downloadable supplements. Test Bank This test bank contains over 3,000 multiple-choice, true/false, matching, short-answer, and essay questions, each referenced to the relevant page in the textbook. All test items are mapped to the chapter learning objectives. An additional feature for the test bank is the inclusion of rationales for the conceptual and applied multiple-choice questions. The rationales help instructors to evaluate the questions they are choosing for their tests and give instructors the option to use the rationales as an answer key for their students. A Total Assessment Guide chapter overview makes creating tests easier by listing all of the test items in an easy-to-reference grid. All multiple-choice questions are categorized as factual, conceptual, or applied, and are correlated to each of the chapter's learning objectives. The Test Bank is available for download. Instructor's Resource Manual The Instructor's Resource Manual includes a detailed Chapter Lecture Outline, list of key terms, learning objectives for each chapter, Standard Lecture PowerPoint Slides PowerPoint slides with lecture notes, photos, and figures are also available for download. Pearson Assessment Bank for the APA Guidelines for the Undergraduate Psychology Major 2.0 A unique bank of assessment items allows instructors to assess student progress against the American Psychological Association's (APA) Guidelines for the Undergraduate Psychology Major 2.0 (2013). APA Correlation Guide This detailed correlation guide, which appears in the Instructor's Manual, shows how the learning outcomes in the text and the test bank questions correspond to the APA Learning Goals and Outcomes. Test Item File FOR YOUR LEARNING MANAGEMENT SYSTEM For instructors who only need the test item file, we offer the complete test item file at www.pearsonhighereducation.com/Lilienfeld. Online Options for Instructors and Students The new MyPsychLab delivers proven results in helping students succeed, provides engaging experiences that personalize learning, and comes from a trusted partner with educational expertise and a deep commitment to helping students and instructors achieve their goals. MyPsychLab has a wealth of instructor and student resources, including the following: MyPsychLab Video Series is a comprehensive, and cutting edge set of more than 100 original videos clips covering the most recent research, science, and applications across the of general A02_LILI8849_03_SE_FM_Preface.indd 17 5/19/14 12:13 PM 18 Preface psychology curriculum, many using the latest in film and animation technology. Each 4–6 minute video clip has automatically graded assessment questions tied to it. MyPsychLab Writing Assessments provide students with instant feedback on both content and mechanics, helping to improve their writing and assess their knowledge of important psychological concepts. A collection of conceptual and applied writing prompts corresponding with videos from the MyPsychLab video series across the general psychology curriculum. MyPsychLab Simulations allow students to participate in online simulations of virtual classic psychology experiments and research-based inventories, helping to reinforce what they are learning in class and in their book. A02_LILI8849_03_SE_FM_Preface.indd 18 5/19/14 12:13 PM Preface 19 MyPsychLab Brain is an interactive virtual brain designed to help students better understand neuroanatomy, physiology, and human behavior. Fourteen virtual brain modules bring to life challenging topics. An audio version of the textbook increases accessibility of the textbook. A personalized study plan for each student, based on Bloom's Taxonomy, arranges content from lower order thinking—such as remembering and understanding—to higher order thinking—such as applying and analyzing the material. This layered approach promotes better critical thinking skills and helps students succeed in the course and beyond. Assessment tied to videos, applications, and every chapter enables both instructors and students to track progress and get immediate feedback. With results feeding into a powerful grade book, the assessment program helps instructors identify student challenges early— and find the best resources with which to help them. An assignment calendar allows instructors to assign graded activities with specific deadlines, and measure student progress. MyPsychLab with eText MyPsychLab for BlackBoard and Your Campus Learning Management System MyPsychLab and text-specific instructor resources such as the test bank are available for integration with a number of Learning Management Systems, including Blackboard. Please contact your Pearson representative to learn more. A02_LILI8849_03_SE_FM_Preface.indd 19 5/19/14 12:13 PM 20 Preface * Textbooks Online is an exciting new choice for students looking to save money. Students can subscribe to the same content online and save up to 50 percent off the suggested list price of the print text. Students can search the text, make notes online, print out reading assignments that incorporate lecture notes, and bookmark important passages for later review. For more information, or to subscribe to the CourseSmart eTextbook, visit www.coursesmart.com. Customize Psychology: From Inquiry to Understanding to meet the needs of your course Pearson offers the broadest array of options for you to customize your adopted text to suit the unique needs of your course. Pearson Custom Library For enrollments of at least 25, you can create your own textbook by combining chapters from a library of best-selling Pearson textbooks and readings. To begin building your custom text, please contact your Pearson representative. Pearson Custom Editions Working with a dedicated Pearson Custom editor, create your ideal text by publishing your own original content or mixing and m atching Pearson content. Contact your Pearson Publisher's Representative to get started. Customize MyPsychLab for your c ampus Learning Management System MyPsychLab and text-specific instructor resources such as the test bank are available for integration with a number of Learning Management Systems, including Blackboard, Canvas, D2L, Moodle, and OpenClass. Please contact your Pearson representative to learn more. A Final Word & Thanks For the authors, writing this book has been a great deal of work, but it's also been a labor of love. When we began this undertaking, we as authors could never have imagined the number of committed, selfless, and enthusiastic colleagues in the psychology community who would join us on this path to making our textbook a reality. During the long months of writing and revising, the feedback and support from fellow instructors, researchers, and students helped keep our energy high and our minds sharp. We stand in awe of their love of the discipline and the enthusiasm and imagination each of these individuals brings to the psychology classroom every day. This text is the culmination of their ongoing support from first to final draft and then subsequent revision, and we are forever grateful to them. In addition, the authors would like to extend our heartfelt gratitude and sincere thanks to a host of people on the Pearson team. We consider ourselves remarkably fortunate to have worked with such an uncommonly dedicated, talented, and genuinely kind group of people. Needless to say, this project was a monumental team effort, and every member of the team played an invaluable role in its inception. We owe special thanks to Stephen Frail, Executive Editor, for the enthusiasm, creativity, and support he brought to the project; Sharon Geary, our production manager, for her high-quality work and wonderful attitude; Sharon Geary, Director of Development; and to Julie Swasey, our developmental editor, for their unending encouragement, good cheer, and invaluable assistance in polishing our prose and sharpening our ideas. We also thank Anne Malaktaris for her invaluable help with tracking down references and permissions and Heidi Aguiar for coordinating the production. Steven Lynn extends his deepest appreciation to Fern Pritikin Lynn for her discerning editorial assistance, and to Jessica Lynn for her helpful comments and insights concerning preliminary versions of the manuscript. *This product may not be available in all markets. For more details, please visit www.coursesmart.co.uk or contact your local Pearson representative. A02_LILI8849_03_SE_FM_Preface.indd 20 5/19/14 12:13 PM Preface 21 Last but by no means least, we thank the countless others who helped in small but significant ways in bringing this text to fruition. The feedback from users of the text has been especially helpful and we welcome others to share their experiences using the Third Edition by writing to Scott Lilienfeld at We dedicate this book to Barry Lane Beyerstein (1947–2007), great scholar and valued friend. My deepest gratitude to David Lykken, Paul Meehl, Tom Bouchard, Auke Tellegen, and my other grad graduate mentors for an invaluable gift that I will always cherish: scientific thinking. —Scott Lilienfeld To Fern Pritikin Lynn, my heart and my soul. —Steven Jay Lynn To DJ, who inspires me every day. —Laura Namy To Larry, Lawson, and Ashley. —Nancy Woolf A02_LILI8849_03_SE_FM_Preface.indd 21 5/19/14 12:13 PM 22 Preface Our Review Panel We are indebted to the members of our Review Panel from the Third and previous Editions who evaluated chapters and provided expert analysis on critical topic areas. Others served on an advisory council, participated in focus groups, conducted usability studies, ran class testing of chapters, and attended our faculty forums for the text. Their input proved invaluable to us, and we thank them for it. Eynav Accortt, Miami University Marlene Adelman, Norwalk Community College Luis Aguerrevere, Stephen F. Austin State University Mark Alkiyama, Diablo Valley College David Alfano, Community College of Rhode Island Catty Alsman, IvyTech Community College of Indiana Nicole D. Anderson, Grant MacEwan College Gina Andrews, Volunteer State Community College Whitney Anthony Community College-Manassas Pamela Ansburg, Metropolitan State College Denver Clarissa Arms-Chavez, Auburn University- Montgomery Renee Babcock, Central Michigan University Lucas E. Bandeer, Northeastern University Ted Barker, Northwest Florida State College Jason Barker, University of Illinois at Springfield Jack Barnhardt, Wesley College Robert Barry Stennett, Gainesville State College Tammy D. Barry, University of Southern Mississippi Mark Basham, Regis University David Baskind, Delta College Scott C. Bates, Utah State University James Becker, Pulaski Technical College Matt Bell, Santa Clara University Stefanie M. Bell, Pikes Peak Community College Jennifer Bellingtier, University of Northern Iowa Michael Benhar, Suffolk County Community College Dr. Martin van den Berg, California State University, Chico Joy Berrenberg, University of Colorado Denver Sylvia Beyer, University of Wisconsin–Parkside John Bickford, University of Massachusetts– Amherst John Billimek, California State University–Long Beach Joseph Bilotta, Western Kentucky University A02_LILI8849_03_SE_FM_Preface.indd 22 Belinda Blevins-Knabe, University of Arkansas– Little Rock Christopher Bloom, Providence College Tracie Blumentritt, University of Wisconsin– LaCrosse Fred Bonato, St. Peter's College Ronald Boothe, University of Washington– Tacoma Michael C. Boyle, Sam Houston State University Ronna Bral, Kirkwood Community College Michele Y. Breault, Truman State University Eric Bressler, Westfield State University Robert Brill, Moravian College Nathan Brody, Wesleyan University Gayle L. Brosnan Walters, University of Minnesota Charles Brown, University of South Alabama Jay Brown, Southwest Missouri State University Veda Brown, Prairie View A&M University Brad Brubaker, Indiana State University Eric L. Bruns, Campbellsville University Susan Buckelew, University of Tennessee at Martin Amy Buddie, Kennesaw State University Susan R. Burns, Morningside College Allyson Burnss Glover, Pacific University Glenn Callaghan, San Jose State University Catherine Camilletti, University of Texas at El Paso David E. Campbell, Humboldt State University Thomas Capo, University of Maryland Elard Cardenas, University of Lund Cheryl Carmichael, Brooklyn College Jessica Carpenter, Elgin Community College Francis Catano, Southern New Hampshire University Richard Catrambone, Georgia Institute of Technology Robin Cautin, Manhattanville College Christopher Chabris, Union College Shawn Charlton, University of Central Arkansas Monali Chowdhury, Ohio State University Jennifer Cina, Barnard College Rachel Clark, University of Minnesota–Twin Cities Jeff Clement, Daytona Beach Community College Andrew Clements, Eastern Tennessee State University Mark Cloud, Lock Haven University Gerry Cohen, University of Minnesota Lorry Cology, Owens Community College Luis A. Cordon, Eastern Connecticut State University Katherine Corker, Michigan State University Keith D. Corodimas, Lynchburg College Gregory M. Corso, Georgia Institute of Technology Barbara Corbisier, Mason Area Technical College Kathryn Demitrakis, Central New Mexico Community College Ben Denkinger, Hamline University/Augsburg University Bruce J. Diamond, William Paterson University Anastasia Dimitropoulos White, Case Western Reserve University G. William Domhoff, University of California– Santa Cruz Dale Doty, Monroe Community College Vicki Dretchen, Volunteer State Community College Michael Dreznick, Our Lake of the Lake College Perri B. Druen, York College of Pennsylvania Michael G. Dudley, Southern Illinois University- Edwardsville Kimberley Duff, Cerritos College Robert Dushay, Morrisville State College Jane Dwyer, Rivier College David Echevarria, University of Southern Mississippi Garia Edwards, Northwest Missouri State University Naomi V. Ekas, Texas Christian University David R. Entwistle, Malone College Audrey M. Ervin, Delaware County Community College Youssef Ezbouni, University of Arkansas–Little Rock Matthew Fanetti, Missouri State University Allison Fanneri Fenstermacher, University of Pennsylvania Barbara Erickson, Sam Houston State University Joseph R. Ferrari, DePaul University Donald Fischer, Missouri State University Bethany Fleck, University of Tampa Christine Floether, Centenary College Stephen Flora, Youngstown State University Roy Fontaine, Pennsylvania College of Technology Johnathan Forbey, Ball State University William F. Ford, Bucks County Community College Daniel J. Fox, Sam Houston State University Janet Frick, University of Georgia Dr. Michael B. Frisch, Baylor University Chelsea Fry, Midlands Technical College Lana Fry, West Texas A&M University Ellen Furlong, Ohio State University Deborah Garfin, Georgia State University Doug Gentile, Iowa State University Marjan A Getz, Bradley University Bryan Gibson, Central Michigan University Vicki Gier, University of South Florida Ann Gilbert, Midwestern State University Tyler Gillgren, Mountain View Community College Nigel Grasar, University of Illinois Jeffrey Goodman, Ohio State University Dr. Timothy Goodwin, Northern Michigan University Jacob Goldberg, Brandeis University Diana Goldman, Shady Grove Community College Laura K. Hickey, Central Washington Community College Jennifer Grossheim, University of Northern Iowa Laura Gruntmeir, Redlands Community College Amy Hackney-Hansen, Georgia Southern University Kelly Hagan, Bluegrass Community and Technical College Erin Hardin, Texas Tech University Richard Hass, Rowan University Robert Hayes, Westfield State University Traci Haynes, Columbus State Community College Bert Hayslip, Jr., University of North Texas Rebecca Hendrix, Northwest Missouri State University Jeffrey B. Henriques, University of Wisconsin–Madison Robert Hensley, Mansfield University Rebecca Hester, Western Carolina University Michael Hirsch, Winchester Vocational Institute Robert Hines, University of Arkansas–Little Rock Matthew Holahan, Carleton University Mark Hollier, ODC, Okanagan Shaheen Holly, Providence College Lynne Hoon, Grand Valley State University Angela Hosier, Kansas City Kansas Community College Julie Hovey, Winnipeg James Johnson, Illinois State University James R. Johnson, Central New Mexico Community College Brian Johnson, University of Tennessee at Martin Kevin W. Jolly, University of Texas at El Paso Samuel Jones, Jefferson State Community College Melissa Kelly, Millsaps College Colin Key, University of Tennessee at Martin Girwan Khadka, Washington State University Shelia Kennison, Oklahoma State University Gerry Kamal, SUNY Cortland Kevin King, University of Washington Katherine Kipp, Gainesville State College Cynthia Koenig, St. Mary's College of Maryland Brenda E. Koneczny, Lake Superior College Elissa Koplik, Bloomfield College Shannon Kundey, Hood College Caleb W. Lack, University of Central Oklahoma Travis Langley, Henderson State University G. Daniel Lassiter, Ohio University Natalie Lawrence, James Madison University Timothy J. Lawson, College of Mount St. Joseph Lindette Lent Baas, Arizona Western College Tera Letzring, Idaho State University Mary B. Lewis, Oakland University Robin Lightner, University of Cincinnati Linda Lockwood, Metropolitan State College of Denver Susan D. Lonborg, Central Washington University Christopher K. Long, Ouachita Baptist University Christopher Lowry, BYU Idaho Don Lucas, Northwest Vista College Margaret Lynch, San Francisco State University Amy Mabry, University of Tennessee at Martin Na'im Madyun, University of Minnesota–Twin Cities Sonya Major, Acadia University Mike Majors, Delgado Community College Joanne Malkani, SUNY Adirondack Jean Mandernach, University of Nebraska at Kearney Mike Mangan, University of New Hampshire Julia Manor, University of Minnesota David Marcus, Washington State University Leonard Mark, Miami (Ohio) University Howard Markowitz, Hawaii Pacific University Nicole Martin, Kennesaw State University Robert Martinez, University of the Incarnate Word Cindy Mattes, Ohio University Ricardo Matos, University of Nevada–Las Vegas McClain, West Liberty State College William McIntosh, Georgia Southern University Michael McIntyre, University of Winnipeg Ann McKim, Goucher College Jessica McManus, Kansas State University Barbara McMasters, University of Cincinnati–Raymond Walters College Steven E. Meier, University of Idaho Joe Melcher, St. Cloud State University Richard Miller, Western Kentucky University Robin Morgan, Indiana University Southeast Jason Moses, El Paso Community College Thomas J. Mount, Yakima Valley Community College Martin Murphy, University of Akron Stephanie Nash-Hirschner, Neal Oborn, University of Illinois Norbert Nordstrom, Southern Illinois University– Edwardsville Larry Normansell, Muskingum University Peggy Norwood, Red Rocks Community College Mark O'Dekirk, Meredith College Cynthia O'Dell, Indiana University Northwest Kim O'Neil, Carleton University Tony Obradovich, Portland Community College Caroline Olko, Nassau Community College Ayla Odom, Rollins College John Osborne, Upper Iowa University Kevin Parker, University of Texas at San Antonio Carol Pandey, Pierce College, Los Angeles Dominic Parrott, Georgia State University Joseph Peterson, Saginaw Valley State University Jennifer Peralta, University of the Incarnate Word Marc Penwell, McLennan Community College Jill Perry, University of Wisconsin–Eau Claire Michelle Pilati, Rio Hondo College Greg Pope, Jefferson County Community College Emily Pozich, Westfield State University Stephen Shaw, Charles Lowell University Laura Phelps, Lakeland Community College Laura Dolan, Montgomery County Community College Terry F. Pettijohn, Coastal Carolina University Brady J. Phelps, South Dakota State University Jacqueline Pickrell, University of Washington Julie Piercy, Central Virginia Community College Lloyd R. Pilkington, Midlands Technical College Alan Pope, University of West Georgia Gary Popoli, Stevenson University Michael Poulin, SUNY Buffalo Barbara Radigan, Community College of Allegheny County Kenneth Prince, Kennesaw State University Sean Rastogi, University of Arkansas Arkansas Little Rock Carrie Rebarcy, Western Kentucky University Peggy Reese, Southwestern Community College Reeza Forderstrom, Tanya Renner, Kapi'olani Community College Anna Reece, Saddleback College Kimberly Richard, Northern Virginia Community College Harvey Richman, Columbus State University Sheldon Rifkin, Kennesaw State University Michelle Rivera, University of Maine Jermaine Robertson, Florida A&M University 5/19/14 12:13 PM 24 Preface Christopher Robinson, University of Alabama– Birmingham Wayne Robinson, Monroe Community College James Rodgers, Hawkeye Community College Scott Roesch, San Diego State University Wade C. Rowatt, Baylor University Claire Rubman, Suffolk County Community College Linda Ruehlman, Arizona State University John Ruscio, The College of New Jersey Melinda Russell-Stamp, Northwest Missouri State University Ron Salazar, San Juan College Catherine Sandhofer, University of California– Los Angeles Sherry Schnake, Saint Mary-of-the-Woods College David A. Schroeder, University of Arkansas Caitlin Schultz, University of North Dakota Nicholas Schwab, University of Northern Colorado Lisa Scott, Winston-Salem State University Rebecca Shaw, Chowan University Joseph Sclafani, University of Tampa Eric Seemann, University of Alabama– Huntsville Layton Seth Curl, Metropolitan State College of Denver Amy Shapiro, University of Massachusetts Dartmouth Heidi Shaw, Yakima Valley Community College Wayne Shebilske, Wright State University Laura Sherrick, Front Range Community College–Westminster Elisabeth Sherwin, University of Arkansas– Little Rock Mark Sibicky, Marietta College Lawrence Siegel, Palm Beach State College Randy Simonson, College of Southern Idaho Royce Simpson, Spring Hill College Lisa Sinclair, University of Winnipeg Amy Skinner, Gordon College John Skowronski, Northern Illinois University Dale Smith, Olivet Nazarene University Vivian Smith, Lakeland Community College Valerie T. Smith, Collin County Community College Patrice Smith, Carleton University Todd Smitherman, University of Mississippi Jeanne Spaulding, Houston Community College–Town and Country Susan Spooner, McLennan Community College Jennifer Steeves, York University Jakob Steinberg, Fairleigh Dickinson University James Stringham, University of Georgia Colleen Sullivan, Worcester State University Richard Topolski, Augusta State University Christopher Stanzione, Georgia Perimeter College Robert Stickgold, Harvard Medical School Kenneth Steele, Appalachian State University Kevin Sumrall, Montgomery College Marla Stauffer, Wayne State University Kimberly Stark-Wroblewski, University of Central Missouri Jennifer Stokes, Florida State University Sumner Richard, Walla Walla College Larry Taggart, Western Kentucky University Peter Thomas, San Antonio College Ashley E. Thompson, University of Minnesota Duluth Ryan Tornsey, New York University Joseph Troisi, Saint Anselm College Patrice Tomkies, University of Houston Jennifer Trudeau, Christian Brothers University Kristine Turko, University of Mary Washington Bill Tyler, Santa Fe College Jill Van Wert, University of Wisconsin–Milwaukee Derek Mace, Kennesaw State University Marco Varela, Northern Virginia Community College Nancy Voorhees, Washtenaw Community College Jacob Wade, Ohio State University Amanda Walker, Wright State University Eric Wallace, University of Utah Kris Wenzel, University of Alaska Sharon Wiederstein, Blinn College–Bryan Lillian Wilkins, Columbus State Community College Thomas W. Williams, Western Kentucky University Richard Stockton College of New Jersey Kevin W. P. Weller, Rogers State University Roger Wessel Wilber, Mary Baldwin College Eastern Washington University Keith Young, Rochester College, Rowan University Karen Yanowitz, Arkansas State University Jennifer Yanowitz, Utica College Dean Yoshizumi, Sierra College Michael Zinser, University of Colorado– Denver Michael Zickar, Bowling Green State University Melissa Zaragoza, Fort Lewis College Iowa State University Amé Venter, University of Notre Dame Carrie Veronica Smith, University of Delaware Jamie Vidic, University of Rio Grande Anton Villado, Rice University Paul Vonnahme, New Mexico State University Jeffrey Wagman, Illinois State University Mark Walter, Salisbury University Jason Warnick, Arkansas Tech University Charles Weaver, Baylor University Lisa Weinberg, Florida State University Todd Wiebers, Henderson State University Fred W. Whitford, Montana State University Sandra Wilcox, California State University– Dominguez Hills Leonard Williams, Rowan University Kevin Williams, SUNY Albany Clint Winfrey, Brazosport College Chris Ziegler, Washington Jeff Wurst, University of North Dakota Nambrath Rajkumari Wesley, Brookdale Community College Mark West, Rutgers University Virginia Wickline, Miami University David R. Widman, Juniata College Sharon Wiederstein, Blinn College–Bryan Lillian Wilkins, Columbus State Community College Thomas W. Williams, Western Kentucky University Richard Stockton College of New Jersey Kevin W. P. Weller, Kent State University Christine Wood, Mercy College Clint Wynn, St. Edward's University Paul Vonnahme, Sprague at Chicago Julie Allen, Bloomsburg University of Pennsylvania Adam Wright, Wayne State University Robin Lightner, University of Cincinnati Jacquelyn Phill New Delhi A02_LILI8849_03_SE_FM_Preface.indd 24 5/19/14 12:13 PM Meet the Authors Scott O. Lilienfeld received his B.A. in psychology from Cornell University in 1982 and his Ph.D. in clinical psychology from the University of Minnesota in 1990. He completed his clinical internship at Western Psychiatric Institute and Clinic in Pittsburgh, Pennsylvania, from 1986 to 1987. He was Assistant Professor in the Department of Psychology at SUNY Albany from 1990 to 1994 and now is Professor of Psychology at Emory University. He is a Fellow of the Association of Psychological Science and was the recipient of the 1998 David Shakow Award from Division 12 (Clinical Psychology) of the American Psychological Association for Early Career Contributions to Clinical Psychology. Most recently, he has been named the recipient of the James McKeen Cattell Award from the Association for Psychological Science for outstanding career contributions to applied psychology. Dr. Lilienfeld is a past president of the Society for a Science of Clinical Psychology within Division 12 and is current president of the Society for the Scientific Study of Psychopathy. He is the founder and editor of the Scientific Review of Mental Health Practice, Associate Editor of Applied and Preventive Psychology, and a regular columnist for the Scientific American Mind magazine. He has authored or coauthored seven books and over 300 journal articles and chapters. Dr. Lilienfeld has also been a participant in Emory University's "Great Teachers" lecturer series, as well as the Distinguished Speaker for the Psi Chi Honor Society at the American Psychological Association and numerous other national conventions. Steven Jay Lynn received his B.A. in psychology from the University of Michigan and his Ph.D. in clinical psychology from Indiana University. He completed an NIMH Postdoctoral Fellowship at Lafayette Clinic, Detroit, Michigan, in 1976 and is now Distinguished Professor of Psychology at Binghamton University (SUNY), where he is the director of the Psychological Clinic. Dr. Lynn is a fellow of numerous professional organizations, including the American Psychological Association and the American Psychological Society, and he was the recipient of the Chancellor's Award of the State University of New York A02_LILI8849_03_SE_FM.indd 25 5/19/14 12:13 PM for Scholarship and Creative Activities. Dr. Lynn has authored or edited 19 books and more than 300 other publications, and was named on a list of "Top Producers of Scholarly Publications in Clinical Psychology Ph.D. Programs" (2000–2004/Stewart, Wu, & Roberts, 2007, Journal of Clinical Psychology). Dr. Lynn is the founder and editor of Psychology of Consciousness: Theory, Research, and Practice (APA), and he has served on 11 other editorial boards, including the Journal of Abnormal Psychology. Dr. Lynn's research has been supported by the National Institute of Mental Health and the Ohio Department of Mental Health. Laura L. Namy received her B.A. in philosophy and psychology from Indiana University in 1993 and her doctorate in cognitive psychology at Northwestern University in 1998. She is now Associate Professor of Psychology and Core Faculty in Linguistics at Emory University. At Emory, she is Director of the Emory Child Study Center and Associate Director of the Center for Mind, Brain, and Culture. Her research focuses on the origins and development of verbal and nonverbal symbol use in young children, sound symbolism in natural language, and the role of comparison in conceptual development. Nancy J. Woolf received her B.S. in psychobiology at UCLA in 1978 and her Ph.D. in neuroscience at UCLA School of Medicine in 1983. She is Adjunct Professor in the Department of Psychology at UCLA. Her specialization is behavioral neuroscience, and her research spans the organization of acetylcholine systems, neural plasticity, memory, neural degeneration, Alzheimer's disease, and consciousness. In 1990 she won the Colby Prize from the Sigma Kappa Foundation, awarded for her achievements in scientific research in Alzheimer's disease. In 2002 she received the Academic Advancement Program Faculty Recognition Award. She also received a Distinguished Teaching Award from the Psychology Department at UCLA in 2008. Dr. Woolf is currently on the editorial boards of Science and Consciousness Review and Journal of Nanoneuroscience. 5/19/14 12:13 PM APA Correlation The APA Guidelines for the Undergraduate Psychology Major Version 2.0 APA Learning Outcomes and Objectives Text Learning Objectives and Features MyPsychLab Videos, Simulations and Assessments GOAL 1: Knowledge Base in Psychology Demonstrate fundamental knowledge and comprehension of major concepts, theoretical perspectives, historical trends, and empirical findings to discuss how psychological principles apply to behavioral problems. 1.1 Describe key concepts, principles, and overarching themes in psychology 1.1a Use basic psychological terminology, concepts, and theories in psychology to explain behavior and mental processes Learning Objectives: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10 ... Chapter 7: From Inquiry to Understanding: Why Do We Perceive Patterns Even When They Don't Exist? ... Psychomythology: Are Almost All People Traumatized By highly Adverse Events? ... 1.1 Explain why psychology is a science with the primary objectives of describing, understanding, predicting, and controlling behavior and mental processes ... MyPsychLab Video Series The Big Picture: Asking the Tough Questions ... Chapter 2: Evaluating Claims: Hair-Loss Remedies, Chapter 3: Evaluating Claims: Diagnosing Your Own Brain Orientation ... GOAL 2: Scientific Inquiry and Critical Thinking ... Chapter 4: Evaluating Claims: Subliminal Persuasion, Chapter 5: Evaluating Claims: Dream Interpretations ... Chapter 9: Psychomythology: Do College Admissions Tests Predict Grades? ... A03_LILI8849_03_SE_APA.indd 27 5/19/14 7:07 AM ... A03_LILI8849_03_SE_APA.indd 28 5/19/14 7:07 AM APA Correlation 29 (continued) The APA Guidelines for the Undergraduate Psychology Major Version 2.0 APA Learning Outcomes and Objectives Text Learning Objectives and Features ... GOAL 3: Ethical and Social Responsibility in a Diverse World ... Chapter 13: Psychomythology: Is Brainstorming in Groups a Good Way to Generate Ideas? ... GOAL 4: Communication ... GOAL 5: Professional Development ... Chapter 4: Psychomythology: Are There Really Two Sides to Stress and Your Health? ... A03_LILI8849_03_SE_APA.indd 29 5/19/14 7:07 AM APA Correlation 30 ... Chapter 11: Psychomythology: Do Diets Work? ... employers 1.5d Recognize how rapid social change influences behavior and affects one's value in the workplace GOAL 5: Knowledge Base in Psychology Demonstrate fundamental knowledge and comprehension of major concepts, theoretical perspectives, historical trends, and empirical findings to discuss how psychological principles apply to behavioral problems. 5.1 Describe key concepts, principles, and overarching themes in psychology 5.1a Use basic psychological terminology, concepts, and theories in psychology to explain behavior and mental processes Learning Objectives: 1.7, 3.5, 3.10, 4.9, 6.2, 6.4, 7.1, 7.2, 7.3, 8.5, 9.1, 9.2, 9.6, 10.4, 10.5, 10.6, 11.9, 11.10, 12.1, 13.9, 15.1, 15.4 5.1b Explain why psychology is a science with the primary objectives of describing, understanding, predicting, and controlling behavior and mental processes Learning Objectives: 1.1, 3.1, 3.2, 3.3, 4.5, 4.7, 5.2, 5.9, 7.8, 7.9, 11.8 Chapter 13: From Inquiry to Understanding: Why Are Yawns Contagious? 5.1c Interpret behavior and mental processes at an appropriate level of complexity Learning Objectives: 4.1, 4.3, 4.4, 4.6, 8.11 5.1d Recognize the power of the context in shaping conclusions about individual behavior Learning Objectives: 4.14 5.1e Identify fields other than psychology that address behavioral concerns Learning Objectives: 6.11, 10.10 Chapter 5: Evaluating Claims: Dream Interpretations 5.2 Develop a working knowledge of the content domains of psychology 5.2a Identify key characteristics of major content domains in psychology (e.g., cognition and learning, developmental, biological, and sociocultural) Learning Objectives: 5.3, 6.1, 6.5, 7.5, 8.6, 8.7, 10.7, 10.8, 15.5, 15.6, 15.7, 15.8, 15.9, 15.10, 16.8, 16.9 MyPsychLab Video Series The Big Picture: Asking the Tough Questions How to Answer Psychological Questions My Brain Made Me Do It Genes, Evolution, and Human Behavior Taking in the World Around Us States of Consciousness What Does it Mean to Learn? The Woman Who Cannot Forget Different Perspectives on the World I Am, Therefore I Think What is Intelligence? Motivation and Emotion What is Personality? The Power of Sex Health Psychology The Social World What Does it Mean to Have a Mental Disorder? Basics: Diverse Perspectives How the Brain Works Genetic Mechanisms and Behavioral Genetics In Full Appreciation of the Cookie Rhythms of Consciousness (continued) A03_LILI8849_03_SE_APA.indd 30 5/19/14 7:07 AM APA Correlation 31 (continued) The APA Guidelines for the Undergraduate Psychology Major Version 2.0 APA Learning Outcomes and Objectives Text Learning Objectives and Features 5.2b Identify principle research methods and types of questions that emerge in specific content domains Learning Objectives: 4.1 5.2c Recognize major historical events, theoretical perspectives, and figures in psychology and their link to trends in contemporary research Learning Objectives: 1.8, 5.4, 5.5, 11.1, 11.7, 12.3, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 16.3, 16.4, 16.5 5.2d Provide examples of unique contributions of content domain to the understanding of complex behavioral issues Learning Objectives: 1.9, 4.2 5.2e Recognize content domains as having distinctive sociocultural origins and development Learning Objectives: 7.11, 10.12 Chapter 7: From Inquiry to Understanding: Why Can't We Remember Anything from the First Few Years of Our Lives? 5.3 Describe applications that employ discipline-based problem solving 5.3a Describe examples of relevant and practical applications of psychological principles to everyday life Learning Objectives: 1.10, 3.6, 6.3, 6.8, 7.4, 10.1, 12.8, 12.9, 12.10 Chapter 3: From Inquiry to Understanding: How Do We Recognize Faces?, Chapter 12: Psychomythology: Are Almost All People Traumatized By highly Adverse Events? 5.3b Summarize psychological factors that can influence the pursuit of a healthy lifestyle Learning Objectives: 5.1, 9.11, 11.5, 12.5, 12.6 Chapter 2: Evaluating Claims: Hair-Loss Remedies, Chapter 3: Evaluating Claims: Diagnosing Your Own Brain Orientation, Chapter 11: Evaluating Claims: Diets and Weight-Loss Plans, Chapter 12: Evaluating Claims: Stress Reduction and Relaxation Claims, Chapter 16: Psychomythology: Are Self-Help Books Always Helpful? 5.3c Correctly identify antecedents and consequences of behavior and mental processes Learning Objectives: 5.8, 6.6, 6.7, 11.2, 12.11, 12.12 5.3d Predict how individual differences influence beliefs, values, and interactions with others, including the potential for prejudicial and discriminatory behavior in oneself and others Learning Objectives: 7.12, 8.8, 9.9, 9.10, 10.9, 10.13, 10.14, 13.3, 13.11, 13.12 Chapter 9: Psychomythology: Do College Admissions Tests Predict Grades? A03_LILI8849_03_SE_APA.indd 31 MyPsychLab Videos, Simulations and Assessments Classical Conditioning: An Involuntary Response Operant Conditioning: Learning from Consequences Do You Remember When...? How Thinking Develops Attachment The Mind is What the Brain Does Theories of Intelligence Theories of Emotion and Motivation Personality Theories Sex and Gender Differences Stress and Your Health Under the Influence of Others Living with a Disorder Therapies in Action Special Topics: The Plastic Brain Epigenetics: A Revolutionary Science Recognizing Faces Sleep Disorders Learning to Overcome Phobias When Memory Fails Risky Behavior and Brain Development Mental Imagery: In the Mind's Eye Intelligence Testing, Then and Now Detecting Lies Twins and Personality Cultural Norms and Sexual Behavior Health Disparities Mental Shortcuts in a Social Context Diagnosing Mental Disorders 5/19/14 7:07 AM Chapter 1 Introduction to Psychology a framework for everyday life What Is Psychology? Science Versus Intuition 34 • Psychology and Levels of Analysis • What Makes Psychology Distinctive—and Fascinating • Why We Can't Always Trust Our Common Sense • Psychology as a Science • Metaphysical Claims: The Boundaries of Science • Recognizing That We Might Be Wrong Psychological Pseudoscience: Imposters of Science 42 • The Amazing Growth of Popular Psychology • What Is Pseudoscience? • The Dangers of Pseudoscience: Why Should We Care? from inquiry to understanding Why Do We Perceive Patterns Even When ťe y Don't Exist? 45 psychomythology ťe H ot Hand: Reality or Illusion? 47 Scientific ťin king: Distinguishing Fact From Fiction 51 • Scientific Skepticism • A Basic Framework for Scientific Thinking evaluating claims Health Benefits of Fruits and Vegetables 56 Psychology's Past and Present: What a Long, Strange Trip It's Been 57 • Psychology's Early History • The Great Theoretical Frameworks of Psychology • The Multifaceted World of Modern Psychology • The Great Debates of Psychology • How Psychology Affects Our Lives Your Complete Review System 68 M01_LILI8849_03_SE_C01.indd 32 5/19/14 12:13 PM M01_LILI8849_03_SE_C01.indd 33 5/19/14 12:13 PM Think About It Is psychology mostly just common sense? Should we trust most self-help books? Is psychology really a science? Listen in MyPsychLabto chapter audio Test of Popular Psychology Knowledge 1. Most people use only about 10 percent of their brain capacity. True / False 2. Newborn babies are virtually blind and deaf. True / False Are claims that can't be proven wrong scientific? 3. Hypnosis enhances the accuracy of our memories. True / False Are all clinical psychologists psychotherapists? 5. In general, it's better to express anger than to hold it in. True / False 4. All people with dyslexia see words backward (like tac instead of cat). True / False 6. The lie-detector (polygraph) test is 90–95 percent accurate at detecting falsehoods. True / False 7. People tend to be romantically attracted to individuals who are opposite them in personality and attitudes. True / False 8. The more people present at an emergency, the more likely it is that at least one of them will help. True / False 9. People with schizophrenia have more than one personality. True / False 10. All effective psychotherapies require clients to get to the root of their problems in childhood. True / False Watch in MyPsychLab the Video: Thinking Like a Psychologist: Debunking Myths For most of you reading this text, it's your first psychology course. If you're like most people, much of what you've learned about psychology comes from watching television programs and movies, listening to radio call-in shows, reading self-help books and popular magazines, surfing the Internet, and talking to friends. In short, most of your psychology knowledge probably derives from the popular psychology industry: a sprawling network of everyday sources of information about human behavior. Take a moment to review the preceding ten questions. Beginning psychology students typically assume that they know the answers to most of them. That's hardly surprising, as these assertions have become part of popular psychology lore. Yet most students are surprised to learn that all ten of these statements are false! This little e xercise illustrates a take-home message we'll emphasize throughout the text: Although common sense can be enormously useful for some purposes, it's sometimes completely wrong (Chabris & Simons, 2010). This can be especially true in psychology, a field that strikes many of us as self-evident, even obvious. In a sense, we're all psychologists, because we deal with psychological phenomena like love, friendship, anger, stress, happiness, sleep, memory, and language in our daily lives (Lilienfeld et al., 2009). As we'll discover, everyday experience can often be helpful in allowing us to navigate the psychological world, but it doesn't necessarily make us an expert (Kahneman & Klein, 2009). Each of these panels from everyday life poses a different psychological question: (1) Why do we fall in love? (2) Why do some of us become depressed for no apparent reason? (3) What makes us angry? Although the science of psychology doesn't provide easy answers to any of these questions, it does offer valuable insights into them. What Is Psychology? Science Versus Intuition 1.1 Explain why psychology is more than just common sense. 1.2 Explain the importance of science as a set of safeguards against biases. William James (1842–1910), often regarded as the founder of American psychology, once described psychology as a "nasty little subject." As James noted, psychology is difficult to study, and simple explanations of behavior are few and far between. If you M01_LILI8849_03_SE_C01.indd 34 5/19/14 12:14 PM What Is Psychology? Science Versus Intuition 35 enrolled in this course expecting cut-and-dried answers to psychological questions, such as why you become angry or fall in love, you might emerge disappointed. But if you enrolled in the hopes of acquiring more insight into the hows and whys of human behavior, stay tuned, because a host of delightful surprises are in store. When reading this textbook, prepare to find many of your preconceptions about p -

science and religion are entirely different and nonoverlapping realms of understanding the world. Science deals with testable claims about the natural world that can be answered with data, whereas religion deals with untestable claims about moral values that can't be answered with data. Although not all scientists and theologians accept Gould's model, we adopt it for the purposes of this textbook. (Source: Gould, 1997) Answer: Image on the left is probably pseudoscientific because it makes extreme claims that aren't supported by evidence. Image on right is metaphysical because it makes a claim that science cannot test. This point doesn't mean that metaphysical claims are wrong, let alone - nimportant. To the contrary, some scholars would contend that questions concerning u the existence of God are even more significant and profound than scientific questions are. Moreover, regardless of our beliefs about religion, we need to treat these questions with respect. But it's crucial to understand that there are certain questions about the world that science can—and can't—answer (Gould, 1997; Novella, 2013). Science has its limits. So it needs to respect the boundaries of religion and other metaphysical domains. Testable claims fall within the province of science; untestable claims don't (see FIGURE 1.4). Moreover, according to many (although admittedly not all) scholars, there's no inherent conflict between science and the vast majority of religious claims (Dean, 2005). One can quite comfortably adhere to one's religious views while embracing psychology's scientific tools (see Chapter 2) and findings. 5/19/14 12:14 PM 42 Chapter 1 Introduction to Psychology Yet as Carl Sagan (1995) observed, the best scientists hear a little voice in their heads that keeps repeating the same words: "but I might be wrong." Science forces us to question our findings and conclusions and encourages us to ferret out mistakes in our belief systems (O'Donohue, Lilienfeld, & Fowler, 2007). Science also forces us to attend to data that aren't to our liking, whether or not we want to—and often we don't. Study and Review in MyPsychLab Assess Your Knowledge FACT or FICTION? 1. Psychology involves studying the mind at one specific level of explanation. True / False 2. Science is a body of knowledge consisting of all of the findings that scientists have Study and Review the Pre-Test and Flashcards at myanthrolab discovered. True / False 3. Scientific theories are general explanations, and hypotheses are specific predictions derived from these explanations. True / False Read and Listen to Chapter 2 at myanthrolab View the Image at myanthrolab Watch the Video at myanthrolab Read the Document at myanthrolab 5. Metaphysical claims are not testable. True / False Answers: 1. F (p. 35); 2. F (p. 38); 3. T (p. 38); 4. F (p. 39); 5. T (p. 40) Listen to the Audio File at myanthrolab 4. Good scientists are confident they're right, so they don't need to protect themselves against confirmation bias. True / False Psychological Pseudoscience: Imposters of Science 1.3 Describe psychological pseudoscience and distinguish it from psychological science. 1.4 Identify reasons we are drawn to pseudoscience. Of course, you might have enrolled in this course to understand yourself, your friends, or a boyfriend or girlfriend. If so, you might well be thinking, "But I don't want to become Map the Concepts at myanthrolab a scientist. In fact, I'm not even interested in research. I just want to understand people." Actually, we're not trying to persuade you to become a scientist. Instead, our goal is Explore the Concept at myanthrolab to persuade you to think scientifically: to become aware of your biases and to take advantage of the tools of the scientific method to try to overcome them. By acquiring these skills, you'll Simulate the Experiment at myanthrolabmake better educated choices in your everyday life, such as what weight loss plan to choose, what psychotherapy to recommend to a friend, and maybe even what potential romantic partner to pursue. You'll also learn how to avoid being tricked by bogus claims. Not everyone needs to become a scientist, but just about everyone can learn to think like one. The Amazing Growth of Popular Psychology Subliminal self-help tapes supposedly influence by means messages delivered to Read behavior the Document at of myanthrolab Sample Document Title Text the unconscious. But do they really work? Map the Concepts at myanthrolab Sample Concept Title Text M01_LILI8849_03_SE_C01.indd 42 Distinguishing real from bogus claims is crucial, because the popular psychology industry is huge and growing rapidly. On the positive side, this fact means that the American public has unprecedented Margin sample access to psychological knowledge. On the negative side, the remarkable growth of popular psychology has led not only to an information explosion, but also to a m isinformation explosion because there's scant quality control over what this industry produces. Read the Document The about 3,500 self-help books are published every year (Arkowitz & For example, Title of the Document Lilienfeld, 2006; see Chapter 16). Some of these books are effective for treating depression, Goes Here at myanthrolab anxiety, and other psychological problems, but about 95 percent of all self-help books are untested (Gould & Clum, 1993; Gregory et al., 2004; Rosen, 1993) and recent evidence suggests that a few may even make people worse (Haeffel, 2010; Rosen, 1993; Salerno, 2005). Coinciding with the rapid expansion of the popular psychology industry is the enormous growth of treatments and products that claim to cure almost every imaginable psychological ailment. There are well over 500 "brands" of psychotherapy (Eisner, 2000), with new ones being added every year. Fortunately, as we'll learn in Chapter 16, research shows that some of these treatments are helpful for numerous psychological problems. 5/19/14 12:14 PM Psychological Pseudoscience: Imposters of Science 43 Yet the substantial majority of psychotherapies remain untested, so we don't know whether they help (Baker, McFall, & Shoham, 2009). Some may even be harmful (Lilienfeld, 2007). Some self-help books base their recommendations on solid research about psychological problems and their treatment. We can often find excellent articles in the New York Times, Scientific American Mind, and Discover magazines and other media outlets that present high-quality information regarding scientific psychology. In addition, hundreds of websites provide helpful information and advice concerning numerous psychological topics like memory, personality testing, and psychological disorders and their treatment. The websites of such organizations as the Association for Psychological Science (www.psychologicalscience.org), American Psychological Association (www.apa.org), Canadian Psychological - Association (www.cpa.ca), and National Institute of Mental Health (www.nimh.nih.gov/index.shtml) are good starting points for obtaining accurate information regarding human behavior. In contrast, many other websites contain misleading or erroneous information, so we need to be armed with accurate knowledge to evaluate them. What Is Pseudoscience? These facts highlight a crucial point: we need to distinguish claims that are genuinely scientific from those that are merely imposters of science. An imposter of science is pseudoscience: a set of claims that seems scientific but isn't. In particular, pseudoscience lacks the safeguards against confirmation bias and belief perseverance that characterize science. We must be careful to distinguish pseudoscientific claims from metaphysical claims, which, as we've seen, are untestable and therefore lie outside the realm of science. In principle, at least, we can test pseudoscientific claims. Pseudoscientific and other questionable beliefs are widespread. A recent survey of the U.S. public shows that 41 percent of us believe in extrasensory perception (ESP); over 30 percent of us in haunted houses, ghosts, and telepathy; and 25 percent of us in astrology (Musella, 2005). The fact that many Americans entertain the possibility of such beliefs isn't by itself worrisome, because a certain amount of open-mindedness is essential for scientific thinking. Instead, what's troubling is that many Americans appear convinced that such claims are correct even though the scientific evidence for them is weak, as in the case of ESP, or essentially nonexistent, as in the case of astrology. Moreover, it's troubling that many poorly supported beliefs are more popular, or at least more widespread, than well-supported beliefs. To take merely one example, there are about 20 times as many astrologers as astronomers in the United States (Gilovich, 1991); as a consequence, the general public may often have a difficult time distinguishing accurate from inaccurate claims regarding astronomy. The same principle may hold for other sciences, including psychology. Simulate in MyPsychLab the Experiment: The Pseudoscience of Astrology Pseudoscientific and otherwise questionable claims have increasingly altered the landscape of modern life. WARNING SIGNS OF PSEUDOSCIENCE. Numerous warning signs can help us distinguish science from pseudoscience; we've listed some of the most useful ones in TABLE 1.1 (see page 44). They're extremely helpful rules of thumb, so useful in fact that we'll draw on many of them in later chapters to help us become more informed consumers of psychological claims. We can—and should—also use them in everyday life. None of these signs is by itself proof positive that a set of claims is pseudoscientific. Nevertheless, the more of these signs we see, the more skeptical of these claims we should become. Here, we'll discuss three of the most crucial of these warning signs. Overuse of ad hoc immunizing hypotheses: yes, we know this one is a mouthful. But it's actually not as complicated as it appears, because an ad hoc immunizing hypothesis is just an escape hatch or loophole that defenders of a theory use to protect this theory from being disproven. For example, some psychics have claimed to perform remarkable feats of ESP in the real world, like reading others' minds or forecasting the future. But when brought into the laboratory and tested under tightly controlled conditions, most have bombed, performing no better than chance. Some of these psychics and their proponents have invoked an ad hoc immunizing M01_LILI8849_03_SE_C01.indd 43 pseudoscience set of claims that seems scientific but isn't ad hoc immunizing hypothesis escape hatch or loophole that defenders of a theory use to protect their theory from falsification 5/19/14 12:14 PM 44 Chapter 1 Introduction to Psychology TABLE 1.1 Some Warning Signs That Can Help Us Recognize Pseudoscience. SIGN OF PSEUDOSCIENCE EXAMPLE Overuse of ad hoc immunizing hypotheses The psychic who claimed to predict the future failed all controlled tests in the lab, but that's because the experimenters inhibited his extrasensory powers. Exaggerated claims Three simple steps will change your love life forever! Overreliance on anecdotes This woman practiced yoga daily for three weeks and hasn't had a day of depression since. Absence of connectivity to other research Amazing new innovations in research have shown that eye massage results in reading speeds 10 times faster than average! Lack of review by other scholars (called peer review) or replication by independent labs Fifty studies conducted by the company all show overwhelming success! Lack of self-correction when contrary evidence is published Although some scientists say that we use almost all our brains, we've found a way to harness additional brain power previously undiscovered. Meaningless "psychobabble" that uses fancy scientific-sounding terms that don't make sense Sine-wave filtered auditory stimulation is carefully designed to encourage maximal orbitofrontal dendritic development. Talk of "proof" instead of "evidence" Our new program is proven to reduce social anxiety by at least 50 percent! hypothesis to explain away these failures: the s keptical "vibes" of the experimenters are somehow interfering with psychic powers (Carroll, 2003; Lilienfeld, 1999c). Although this hypothesis isn't necessarily wrong, it makes the psychics' claims essentially impossible to test. Lack of self-correction: as we've learned, many scientific claims turn out to be wrong. That may seem like a weakness of science, but it's actually a strength. That's because in science, wrong claims tend to be weeded out eventually, even though it often takes a while. In contrast, in most pseudosciences, wrong claims never seem to go away, because their proponents fall prey to belief perseverance, clinging to them stubbornly despite c ontrary evidence. Moreover, pseudoscientific claims are rarely updated in light of new data. Most forms of astrology have remained almost identical for about 4,000 years (Hines, 2003) despite the discovery of outer planets in the solar system (Uranus and Neptune) that were unknown in ancient times. Overreliance on anecdotes: there's an old saying that "the plural of anecdote isn't fact" (Park, 2003). A mountain of numerous anecdotes may seem impressive, but it shouldn't persuade us to put much stock in others' claims. Most anecdotes are I know a person who assertions (Nisbett & Ross, 1980; Stanovich, 2009). This kind of secondhand evidence— "I know a person who says his self-esteem skyrocketed after receiving hypnosis" —is commonplace in everyday life. So is firsthand evidence—"I felt less depressed after taking this herbal remedy"—that's based on subjective impressions. Pseudosciences tend to rely heavily on anecdotal evidence. In many cases, they base claims on the dramatic reports of one or two individuals: "I lost 85 pounds in three weeks on the Matzo Ball Soup Weight Loss Program." Compelling as this anecdote may appear, it doesn't constitute good scientific evidence (Davison & Lazarus, 2007; Loftus & Guyer, 2002). For one thing, anecdotes don't tell us anything about cause and effect. Maybe the Matzo Ball Soup Weight Loss Program caused the person to lose 85 pounds, but maybe other factors were responsible. Perhaps he went on an additional diet or started to exercise frantically during that time. Or perhaps he underwent drastic weight loss surgery during this time but didn't bother to mention it. Anecdotes also don't tell us anything about how representative the cases are. Perhaps most people who went on the Matzo Ball Soup Weight Loss Program gained weight, but we never heard from them. Finally, anecdotes are often difficult to verify. Do we really know for sure that he lost 85 pounds? We're taking his word for it, which is a risky idea. Simply put, most anecdotes are extremely difficult to interpret as evidence. As clinical psychologist Paul Meehl (1995) put it, "The clear message of history is that the anecdotal method delivers both wheat and chaff, but it does not enable us to tell which is which" (p. 1019). M01_LILI8849_03_SE_C01.indd 44 5/19/14 12:14 PM Psychological Pseudoscience: Imposters of Science 45 WHY ARE WE DRAWN TO PSEUDOSCIENCE? There are a host of reasons why so many of us are drawn to pseudoscientific beliefs. Perhaps the central reason stems from the way our brains work. Our brains are predisposed to make order out of disorder and find sense in nonsense. This tendency is generally adaptive, as it helps us to simplify the often bewildering world in which we live (Alcock, 1995; Pinker, 1997; Shermer, 2011). Without it, we'd be constantly o verwhelmed by endless streams of information we don't have the time or ability to process. Yet this adaptive tendency can sometimes lead us astray because it can cause us to perceive meaningful patterns even when they're not there (Carroll, 2003; Davis, 2009). from inquiry to understanding Why Do We Perceive Patterns Even When They Don't Exist? Our tendency to see patterns in meaningless data is so profound that one science writer, Michael Shermer (2008), gave it a name: patternicity. Although patternicity can lead to errors, it probably stems from an evolutionarily adaptive tendency (Reich, 2010). If we eat a specific food, say a bacon cheeseburger, for lunch tomorrow and become violently ill soon afterward, we'll tend to avoid bacon cheeseburgers for a while (Chapter 6). We'll do so even though there's a very good chance that the link between the cheeseburger and our becoming ill was purely coincidental. No matter—our brains tend to seek out patterns and connections among events, because of a basic evolutionary principle: "better safe than sorry." All things being equal, it's usually better to assume that a connection between two events exists than to assume that it doesn't, especially when one of the events is physically dangerous. We all fall prey to patternicity from time to time. If we think of a friend with whom we haven't spoken in a few months and immediately afterward receive a phone call from him or her, we may jump to the conclusion that this striking co-occurrence stems from ESP. Well, it might. But it's also entirely possible, if not likely, that these two events happened at about the same time by chance alone. For a moment, think of the number of times one of your old friends comes to mind and then think of the number of phone calls you receive each month. You'll realize that the laws of probability make it likely that at least once over the next few years, you'll be thinking of an old friend at about the same time he or she calls. Another manifestation of patternicity is our tendency to detect eerie coincidences among persons or events. To take one example, read through each of the uncanny similarities between Abraham Lincoln and John F. Kennedy, two American presidents who were the victims of assassination, listed in TABLE 1.2 (see page 46). Pretty amazing stuff, isn't it? So extraordinary, in fact, that some writers have argued that Lincoln and Kennedy are somehow linked by supernatural forces (Leavy, 1992). In actuality, though, coincidences are everywhere. They're s urprisingly easy to detect if we make the effort to look for them. Because of patternicity, we may attribute paranormal significance to - coincidences that are due to chance. (The term paranormal describes phenomena like ESP that fall outside the boundaries of traditional science.) Moreover, we often fall victim to confirmation bias and neglect to consider evidence that doesn't support our hypothesis. Because we typically find coincidences to be far more interesting than - noncoincidences, we tend to forget that Lincoln was a Republican whereas Kennedy was a Democrat; that Lincoln was shot in Washington, D.C., whereas Kennedy was shot in Dallas; that Lincoln had a beard, but Kennedy didn't; and on and on. Recall that scientific thinking is designed to counteract confirmation bias. To do so, we must M01_LILI8849_03_SE_C01.indd 45 Conspiracy theories are manifestations of patternicity. Believers in conspiracies often claim to detect hidden interconnections among powerful people and institutions. patternicity the tendency to detect meaningful patterns in random stimuli 5/19/14 12:14 PM 46 Chapter 1 Introduction to Psychology Factoid The Nobel Prize–winning physicist Luis Alvarez once had an eerie experience: Upon reading the newspaper, he read a phrase that reminded him of an old childhood friend he had not thought about for decades. A few pages later, he came upon that person's obituary! Initially stunned, Alvarez (1965) performed some calculations and determined that given the number of people on earth and the number of people who die every day, this kind of strange coincidence probably occurs about 3,000 times across the world each year. Factoid Conspiracy theories can sometimes lead us to hold two logically inconsistent beliefs. For example, many people who are convinced that Princess Diana (who died in a car accident in Paris in 1997) was the victim of an intentional murder plot are also convinced that she faked her own death and is still alive (Wood, Douglas, & Sutton, 2012). Patternicity can lead us to perceive meaningful people or objects in largely random stimuli. The "nun bun," a cinnamon roll resembling the face of nun Mother Teresa, was discovered in 1996 in a Nashville, Tennessee, coffee shop. M01_LILI8849_03_SE_C01.indd 46 seek out evidence that contradicts our ideas. In extreme forms, patternicity leads us to embrace conspiracy theories, in which individuals detect s upposedly hidden connections among numerous largely or entirely unrelated events (Douglas & Sutton, 2011). TABLE 1.2 Some Eerie Commonalities Between Abraham Lincoln and John F. Kennedy. ABRAHAM LINCOLN JOHN F. KENNEDY Was elected to Congress in 1846 Was elected to Congress in 1946 Was elected President in 1860 Was elected President in 1960 The name "Lincoln" contains seven letters The name "Kennedy" contains seven letters Was assassinated on a Friday Was assassinated on a Friday Lincoln's secretary, named Kennedy, warned him not to go to the theater, where he was shot Kennedy's secretary, named Lincoln, warned him not to go to Dallas, where he was shot Lincoln's wife was sitting beside him when he was shot Kennedy's wife was sitting beside him when he was shot John Wilkes Booth (Lincoln's assassin) was born in 1839 Lee Harvey Oswald (Kennedy's assassin) was born in 1939 Was succeeded by a president named Johnson Was succeeded by a president named Johnson Andrew Johnson, who succeeded Lincoln, was born in 1808 Lyndon Johnson, who succeeded Kennedy, was born in 1908 Booth fled from a theater to a warehouse Oswald fled from a warehouse to a theater Booth was killed before his trial Oswald was killed before his trial A final reflection of patternicity is our tendency to see meaningful images in eaningless visual stimuli. Any of us who's looked at a cloud and perceived the vague shape m of an animal has experienced this version of patternicity, as has any of us who's seen the oddly misshapen face of a "man" in the moon. A more s tunning example comes from the photograph in F IGURE 1.5a. In 1976, the Mars Viking Orbiter snapped an image of a set of features on the Martian surface. As we can see, these features bear an eerie resemblance to a human face. So eerie, in fact, that some individuals maintained that the "Face on Mars" offered conclusive proof of intelligent life on the Red Planet (Hoagland, 1987). In 2001, during a mission of a different spacecraft, the Mars Global Surveyor, the National A eronautics and Space Administration (NASA) decided to adopt a scientific approach to the face on Mars. NASA was open-minded but demanded evidence. It swooped down much closer to the face and pointed the Surveyor's cameras directly at it. If we look at FIGURE 1.5b, we'll see what NASA found: absolutely nothing. The patternicity in this instance was a consequence of a peculiar configuration of rocks and shadows present at the angle at which the - photographs were taken in 1976, a camera artifact in the original photograph that just happened to place a black dot where a nostril should be, and perhaps most important, our innate tendency to perceive meaningful faces in what are basically random visual stimuli (see Chapter 11). 5/19/14 12:14 PM Psychological Pseudoscience: Imposters of Science 47 psychomythology THE HOT HAND: REALITY OR ILLUSION? Because we're meaning-seeking organisms, we find it almost impossible not to detect patterns in random data. If we flip a coin four times and it comes up heads all four times, we may begin to think we're on a streak. Instead, we're probably just being fooled by randomness (Mlodinow, 2008; Taleb, 2004). The same phenomenon extends to sports. Basketball players, coaches, and fans are fond of talking about the "hot hand." Once a player has made three or four shots in a row, he or she is "hot," "in the zone," and "on a roll." One television basketball announcer, former star center Bill Walton, once criticized a team's players for not getting the ball to a fellow player who'd just made several consecutive baskets ("He's got the hot hand—get him the ball!"). It certainly seems as though basketball players go on streaks. Do they? To find out, Thomas Gilovich and his colleagues got hold of the shooting records of the 1980–1981 Philadelphia 76ers, then the only basketball team to keep precise records of which player made which shot in which order (Gilovich, Vallone, & Tversky, 1985). Let's look at TABLE 1.3, which displays the results of two representative players on the 76ers (you b asketball fans out there may recognize "Erving" as the famous "Dr. J," widely regarded as one of the greatest players of all time). There we can see six rows, with h standing for a hit, that is, a successful shot, and m standing for a miss, that is, an unsuccessful shot. As we move from top to bottom, we see six different probabilities (abbreviated with P), starting with the probability of a successful shot (a hit) following three misses, then the probability of a s uccessful shot - following two misses, all the way (in the sixth and final row) to the probability of a successful shot following three successful shots. If the hot hand is real, we should see the probabilities of a successful shot increasing from top to bottom. Once a player has made a few shots in a row, he should be more likely to make another. But as we can see from the data on these two players, there's no evidence for the hot hand. The proportions don't go up and, in fact, go down slightly (perhaps we should call this the "cool hand"?). Gilovich and his colleagues found the same pattern for all the other 76ers players. Perhaps the absence of a hot hand is due to the fact that once a player has made several shots in a row, the defensive team makes adjustments, making it tougher for him to make another shot. To rule out this possibility, Gilovich and his colleagues examined foul shots, which are immune from this problem because players attempt these shots without any interference from the defensive team. Once again, they found no hint of "streaky" shooting. Later researchers have similarly found little or no evidence for "streaky performance" in a host of other sports and games, including golf, pool, and baseball (Avugos et al., 2012; Bar-Eli, Avugos, & Raab, 2006; Clark, 2005; Mlodinow, 2008). Still, belief perseverance makes it unlikely that these findings will shake the convictions of dyed-in-the-wool hot-hand believers. When told about the results of the Gilovich hot-hand study, late Hall of Fame basketball coach Red Auerbach replied, "Who is this guy? So he makes a study. I couldn't care less." The hot hand may be an illusion, but it's a remarkably stubborn one. Finding Comfort in Our Beliefs. Another reason for the popularity of - seudoscience is motivational: we believe in part because we want to believe. As the old p saying goes, "hope springs eternal": Many pseudoscientific claims, such as astrology, may give us comfort because they seem to offer us a sense of control over an often unpredictable world (Shermer, 2002). Research suggests that we're especially prone to - patternicity when we experience a loss of control over our surroundings. Jennifer Whitson and Adam Galinsky (2008) deprived some participants of a sense of control—for example, by having them try to solve an unsolvable puzzle or recall a life experience in which they lacked control—and found that they were more likely than other participants to perceive conspiracies, embrace superstitious beliefs, and detect patterns in meaningless visual stimuli (see FIGURE 1.6 on page 48). These results may help to explain why so many of us believe in astrology, ESP, and other belief systems that claim to foretell the future: they lend us a sense of control over the uncontrollable (Wang, Whitson, & Menon, 2012). M01_LILI8849_03_SE_C01.indd 47 (a) (b) FIGURE 1.5 Face on Mars. At the top (a) is the remarkable "Face on Mars" photo taken by the Mars Viking Orbiter in 1976. Some argued that this face provided conclusive proof of intelligent life on other planets. Below (b) is a more detailed photograph of the Face on Mars taken in 2001, which revealed that this "face" was just an illusion. TABLE 1.3 Is the Hot Hand a Reality or an Illusion? Let's look at the data from these two players on the Philadelphia 76ers to help us find out. ERVING TONEY P(h/mmm) 0.52 0.52 P(h/mm) 0.51 0.53 P(h/m) 0.51 0.51 P(h/h) 0.53 0.43 P(h/hh) 0.52 0.40 P(h/hhh) 0.48 0.32 (Source: Based on data from Gilovich, 1991) 5/19/14 12:14 PM 48 Chapter 1 Introduction to Psychology FIGURE 1.6 Regaining Control. Do you see an image in either of these pictures? Participants in Whitson and Galinsky's (2008) study who were deprived of a sense of control were more likely than other participants to see images in both pictures, even though only the picture on the bottom contains an image (a faint drawing of the planet Saturn). Factoid "Streaks" of several consecutive heads (H) or tails (T) in a row when flipping a coin, like HTTHTTTTTHHHTHHTTHH, are more common than we believe. Moreover, they're inevitable in long random sequences. Indeed, the sequence above is almost perfectly random (Gilovich, 1991). Because we tend to underestimate the probability of consecutive sequences, we're prone to attributing more significance to these sequences than they deserve ("Wow . . . I'm on a winning streak!"). According to terror management theory, reminders of our death can lead us to adopt comforting worldviews—in some cases, beliefs in the paranormal. M01_LILI8849_03_SE_C01.indd 48 According to terror management theory, our awareness of our own inevitable death leaves many of us with an underlying sense of fear (Solomon, Greenberg, & Pyszczynski, 2000; Vail et al., 2012). We cope with these feelings of terror, advocates of this theory propose, by adopting cultural worldviews that reassure us that our lives possess a broader meaning and purpose—one that extends well beyond our vanishingly brief existence on this planet. Can terror management theory help to explain the popularity of certain paranormal beliefs, such as astrology, ESP, and communication with the dead? Perhaps. Our society's widespread beliefs in life after death and reincarnation may stem in part from the terror that stems from knowing we'll eventually die (Lindeman, 1998; Norenzayan & Hansen, 2006). Two researchers (Morier & Podlipentseva, 1997) found that compared with other participants, participants who were asked to contemplate death reported higher levels of beliefs in the paranormal, such as ESP, ghosts, reincarnation, and astrology, than did other participants. It's likely that such beliefs are comforting to many of us, especially when confronted with reminders of our demise, because they imply the existence of a dimension beyond our own. Terror management theory doesn't demonstrate that paranormal claims are false; we still need to evaluate these claims on their own merits. Instead, this theory suggests that we're likely to hold many paranormal beliefs regardless of whether they're correct. To avoid being seduced by the charms of pseudoscience, we must learn to avoid commonplace pitfalls in reasoning. Students new to psychology commonly fall prey to logical fallacies: traps in thinking that can lead to mistaken conclusions. It's easy for us to make these errors, because they seem to make intuitive sense. We should remember that scientific thinking often requires us to cast aside our beloved intuitions, although doing so can be extremely difficult. Here we'll examine three especially important logical fallacies that are essential to bear in mind when evaluating psychological claims; we can find other useful fallacies in TABLE 1.4. All of them can help us separate science from pseudoscience. THINKING CLEARLY: AN ANTIDOTE AGAINST PSEUDOSCIENCE. Emotional Reasoning Fallacy. "The idea that day care might have negative - emotional effects on children gets me really upset, so I refuse to believe it." The emotional reasoning fallacy is the error of using our emotions as guides for evaluating the validity of a claim (some psychologists also refer to this error as the affect heuristic; Kahneman, 2011; Slovic & Peters, 2006). If we're honest with ourselves, we'll realize that findings that challenge our preexisting beliefs often make us angry, whereas findings that confirm these beliefs often make us happy or at least relieved. We shouldn't make the mistake of assuming that because a scientific claim makes us feel u ncomfortable or indignant, it must be wrong. In the case of scientific questions concerning the p - sychological effects of day care, which are scientifically controversial (Belsky, 1988; Hunt, 1999), we need to keep an open mind to the data, regardless of whether they confirm or disconfirm our preconceptions. Bandwagon Fallacy. "A lot of people I know believe in astrology, so there's got to be something to it." The bandwagon fallacy is the error of assuming that a claim is correct just because many people believe it. It's an error because popular opinion isn't a dependable guide to the accuracy of an assertion. Prior to 1500, almost everyone believed the sun revolved around the earth, rather than vice versa, but they were woefully mistaken. Not Me Fallacy. "My psychology professor keeps talking about how the scientific method is important for overcoming biases. But these biases don't apply to me, because I'm objective." The not me fallacy is the error of believing that we're immune from errors in thinking that afflict other people. This fallacy can get us into deep trouble, because it can lead us to conclude mistakenly that we don't require the safeguards of the scientific method. Many pseudoscientists fall into this trap: they're so certain their claims are right— and uncontaminated by mistakes in their thinking—that they don't bother to conduct scientific studies to test these claims. 5/19/14 12:14 PM Psychological Pseudoscience: Imposters of Science 49 TABLE 1.4 Logical Fallacies to Avoid When Evaluating Psychological Claims. LOGICAL FALLACY EXAMPLE OF THE FALLACY Error of using our emotions as guides for evaluating the validity of a claim (emotional reasoning fallacy) "The idea that day care might have negative emotional effects on children gets me really upset, so I refuse to believe it." Error of assuming that a claim is correct just because many people believe it (bandwagon fallacy) "A lot of people I know believe in astrology, so there's got to be something to it." Error of framing a question as though we can only answer it in one of two extreme ways (either-or fallacy) "I just read in my psychology textbook that some people with schizophrenia were treated extremely well by their parents when they were growing up. This means that schizophrenia can't be due to environmental factors and therefore must be completely genetic." Error of believing we're immune from errors in thinking that afflict other people (not me fallacy) "My psychology professor keeps talking about how the scientific method is important for overcoming biases. But these biases don't apply to me, because I'm objective." Error of accepting a claim merely because an authority figure endorses it (appeal to authority fallacy) "My professor says that psychotherapy is worthless; because I trust my professor, she must be right." Error of confusing the correctness of a belief with its origins or genesis (genetic fallacy) "Freud's views about personality development can't be right, because Freud's thinking was shaped by sexist views popular at the time." Error of assuming that a belief must be valid just because it's been around for a long time (argument from antiquity fallacy) "There must be something to the Rorschach Inkblot Test, because psychologists have been using it for decades." Error of confusing the validity of an idea with its potential realworld consequences (argument from adverse consequences fallacy) "IQ can't be influenced by genetic factors, because if that were true, it would give the government an excuse to prevent low-IQ individuals from reproducing." Error of assuming that a claim must be true because no one has shown it to be false (appeal to ignorance fallacy) "No scientist has been able to explain away every reported case of ESP, so ESP probably exists." Error of inferring a moral judgment from a scientific fact (naturalistic fallacy) "Evolutionary psychologists say that sexual infidelity is a product of natural selection. Therefore, sexual infidelity is ethically justifiable." Error of drawing a conclusion on the basis of insufficient evidence (hasty generalization fallacy) "All three people I know who are severely depressed had strict fathers, so severe depression is clearly associated with having a strict father." Error of basing a claim on the same claim reworded in slightly different terms (circular reasoning fallacy) "Dr. Smith's theory of personality is the best, because it seems to have the most evidence supporting it." Social psychologists have recently uncovered a fascinating phenomenon called bias blind spot, which means that most people are unaware of their biases but keenly aware of them in others (Pronin, Gilovich, & Ross, 2004). None of us believes that we have an accent because we live with our accents all of the time. Similarly, few of us believe that we have biases, because we've grown accustomed to seeing the world through our own psychological lenses. To see the not me fallacy at work, watch a debate between two intelligent people who hold extremely polarized views on a political issue. More likely than not, you'll see that the debate participants are quite adept at pointing out biases in their opponents, but entirely oblivious of their own equally glaring biases. People who are highly intelligent are just as prone to bias blind spot as are other people (West, Meserve, & Stanovich, 2012), so we shouldn't assume that more knowledge, education, or sophistication make us immune to this error. Bias blind spot reminds us yet again that we all need to be humble and that science can assist us in this regard. The Dangers of Pseudoscience: Why Should We Care? Up to this point, we've been making a big deal about pseudoscience. But why should we care about it? After all, isn't a great deal of pseudoscience, like astrology, pretty harmless? In fact, pseudoscience can be dangerous, even deadly. This point applies to a variety of questionable claims that we encounter in everyday life. There are three major reasons we should all be concerned about pseudoscience. • Opportunity Cost: What We Give Up . Pseudoscientific treatments for mental disorders can lead people to forgo opportunities to seek effective treatments (Lazar, 2010; Lilienfeld, Lynn, & Lohr, 2003). As a consequence, even treatments M01_LILI8849_03_SE_C01.indd 49 The bandwagon fallacy reminds us that the number of people who hold a belief isn't a dependable barometer of its accuracy. terror management theory theory proposing that our awareness of our death leaves us with an underlying sense of terror with which we cope by adopting reassuring cultural worldviews 5/19/14 12:14 PM 50 Chapter 1 Introduction to Psychology that are themselves harmless can cause harm indirectly by causing people to forfeit the chance to obtain a treatment that works. For example, a major community survey (Kessler et al., 2001) revealed that Americans with severe depression or anxiety attacks more often received scientifically unsupported treatments than scientifically supported treatments like cognitive-behavioral therapy (see Chapter 16). The unsupported treatments included acupuncture, which hasn't been shown to work for depression despite a few scattered positive findings; laughter therapy, which is based on the untested notion that laughing can cure depression; and energy therapy, which is based on the untestable notion that all people possess invisible energy fields that influence their moods. Although some future research might reveal some of these treatments to be helpful in certain cases, consumers who seek them out are rolling the dice with their mental health. Candace Newmaker was a tragic victim of a pseudoscientific treatment called rebirthing therapy. She died of suffocation at age 10 after her therapists wrapped her in a flannel blanket and squeezed her to simulate birth contractions. • Direct Harm. Pseudoscientific treatments sometimes do dreadful harm to those who receive them, causing psychological or physical damage—on rare occasions, even death (Barlow, 2010; Lilienfeld, 2007). The tragic case of Candace Newmaker, a 10-year-old child who received treatment for her behavioral problems in Evergreen, Colorado, in 2000, illustrates this point (Mercer, Sarner, & Rosa, 2003). Candace received a treatment called rebirthing therapy, which is premised on the scientifically doubtful notion that children's behavioral problems are attributable to difficulties in forming attachments to their parents that stem from birth—in some cases, even before birth. During rebirthing, children or adolescents reenact the trauma of birth with the "assistance" of one or more therapists (Mercer, 2002). During Candace's rebirthing session, two therapists wrapped her in a flannel blanket, sat on her, and squeezed her repeatedly in an effort to simulate birth contractions. During the 40-minute session, Candace vomited several times and begged the therapists for air, complaining desperately that she couldn't breathe and felt as though she was going to die. When Candace was unwrapped from her symbolic "birth canal," she was dead (Mercer, Sarner, & Rosa, 2003). • An Inability to Think Scientifically as Citizens. Scientific thinking skills aren't just important for evaluating psychological claims—we can apply them to all aspects of our lives. In our increasingly complex scientific and technological society, we need scientific thinking skills to reach educated decisions about global warming, genetic engineering, stem cell research, novel medical treatments, and parenting and teaching practices, among dozens of other claims (Mooney & Kirshenbaum, 2010). The take-home message is that pseudoscience matters. That's what makes scientific thinking essential: although far from foolproof, it's our best safeguard against errors to which we're all prone. Stem cell research is controversial on both scientific and ethical grounds. To evaluate this and other controversies properly, we need to be able to think critically about the potential costs and benefits of such research. Assess Your Knowledge FACT or FICTION? 1. Most self-help books and psychotherapies have been tested. True / False 2. Humans' tendency to see patterns in random data is entirely maladaptive. True / False 3. According to terror management theory, our fears of death are an important reason for pseudoscientific beliefs. True / False 4. The fact that many people believe in a claim is a good indicator of its validity. True / False 5. Pseudoscientific treatments can cause both direct and indirect harm. True / False Answers: 1. F (p. 42); 2. F (p. 45); 3. T (p. 48); 4. F (p. 48); 5. T (p. 49) Study and Review in MyPsychLab Study and Review the Pre-Test and Flashcards at mypsychlab M01_LILI8849_03_SE_C01.indd 50 5/19/14 12:15 PM Scientific Thinking: Distinguishing Fact From Fiction 51 Scientific Thinking: Distinguishing Fact From Fiction 1.5 Identify the key features of scientific skepticism. 1.6 Identify and explain the text's six principles of scientific thinking. Given that the world of popular psychology is chock-full of remarkable claims, how can we distinguish psychological fact—that is, the body of psychological findings that are so dependable that we can safely regard them as true—from psychological fiction? The approach we'll emphasize throughout this text is scientific skepticism. To many people, skepticism implies closed-mindedness, but nothing could be further from the truth. The term skepticism derives from the Greek word skeptikos, meaning "to consider carefully" (Shermer, 2002). The scientific skeptic evaluates all claims with an open mind but insists on persuasive evidence before accepting them. As astronomer Carl Sagan (1995) noted, to be a scientific skeptic, we must adopt two attitudes that may seem contradictory but aren't: (1) a willingness to keep an open mind to all claims and (2) a willingness to accept claims only after researchers have subjected them to careful scientific tests. Scientific skeptics are willing to change their minds when confronted with evidence that challenges their preconceptions. At the same time, they change their minds only when this evidence is persuasive. The motto of the scientific skeptic is the Missouri principle, which we'll find on many Missouri license plates: "Show me" (Dawes, 1994). Another feature of scientific skepticism is an unwillingness to accept claims on the basis of authority alone. Scientific skeptics evaluate claims on their own merits and refuse to accept them until they meet a high standard of evidence. Of course, in everyday life we're often forced to accept the word of authorities simply because we don't possess the expertise, time, or resources to evaluate every claim on our own. Most of us are willing to accept the claim that our local government keeps our drinking water safe without conducting our own chemical tests. While reading this chapter, you're also placing trust in us—the authors, that is—to provide you with accurate information about psychology. Still, this doesn't mean you should blindly accept everything we've written hook, line, and sinker. Consider what we've written with an open mind, but evaluate it skeptically. If you disagree with something we've written, get a second opinion by asking your instructor. A Basic Framework for Scientific Thinking The hallmark of scientific skepticism is critical thinking. Many students misunderstand the word critical in critical thinking, assuming incorrectly that it entails a tendency to attack all claims. In fact, critical thinking is a set of skills for evaluating all claims in an open-minded and careful fashion. We can also think of critical thinking in psychology as scientific thinking, as it's the form of thinking that allows us to evaluate scientific claims not only in the laboratory, but also in everyday life (Willingham, 2007). Just as important, scientific thinking is a set of skills for overcoming our own biases, especially confirmation bias, which, as we've learned, can blind us to evidence we'd prefer to ignore (Alcock, 1995). In particular, in this text, we'll be emphasizing six principles of scientific thinking (Bartz, 2002; Lett, 1990). We should bear this framework of principles in mind when evaluating all psychological claims, including claims in the media, in self-help books, on the Internet, in your introductory psychology course, and, yes, even in this textbook. These six scientific thinking principles are so crucial that beginning in Chapter 2, we'll indicate each of them with a different-colored arrow you'll see throughout the text. M01_LILI8849_03_SE_C01.indd 51 The welcome sign for the state of Missouri captures the central motto of scientific skepticism. You'll probably forget many of the things you learn in college. But you'll be able to use the approach of scientific skepticism throughout your life to evaluate claims. (© Science CartoonsPlus.com) scientific skepticism approach of evaluating all claims with an open mind but insisting on persuasive evidence before accepting them critical thinking set of skills for evaluating all claims in an open-minded and careful fashion Scientific thinking involves ruling out rival hypotheses. In this case, do we know that this woman's weight loss was due to a specific diet plan? What might be some alternative explanations for her weight loss? (See answer upside down at bottom of page.) Answer: During this time, she might have exercised or used another diet plan. Or perhaps the larger pants she's holding up were never hers to begin with. 5/19/14 12:15 PM 52 Chapter 1 Introduction to Psychology Whenever one of these principles arises in our discussion, we'll display that arrow in the margin to remind you of the principle that goes along with it (see FIGURE 1.7). Most psychological findings we'll hear about on television or read about online lend themselves to multiple explanations. Yet more often than not, the media report only one explanation. We shouldn't automatically assume it's correct. Instead, we should ask ourselves: is this the only good explanation for this finding? Have we ruled out other important competing explanations (Huck & Sandler, 1979; Platt, 1964)? Let's take a popular treatment for anxiety disorders: eye movement d esensitization and reprocessing (EMDR; see Chapter 16). Introduced by Francine Shapiro (1989), EMDR asks clients to track the therapist's back-and-forth finger movements with their eyes while imagining distressing memories that are the source of their anxiety, such as the recollection of seeing someone being killed. Proponents of EMDR have consistently maintained that it's far more effective and efficient than other treatments for anxiety disorders. Some have claimed that these eye movements somehow synchronize the brain's two hemispheres or stimulate brain mechanisms that speed up the processing of emotional memories. Here's the problem: almost all well-controlled studies show that the eye movements of EMDR don't contribute to its effectiveness. EMDR works just as well when people stare straight ahead at an immobile dot while thinking about the source of their anxiety (Davidson & Parker, 2001; Lohr, Tolin, & Lilienfeld, 1998). Most EMDR advocates neglected to consider a rival explanation for EMDR's success: EMDR asks patients to expose themselves to a anxiety-provoking imagery. R esearchers and t herapists alike have long known that prolonged exposure itself can be therapeutic (Bisson et al., 2007; Lohr et al., 2003; see Chapter 16). By not excluding the rival hypothesis that EMDR's effectiveness stemmed from exposure rather than eye movements, EMDR advocates made claims that ran well ahead of the data. The bottom line: whenever we evaluate a psychological claim, we should ask ourselves whether we've excluded other plausible explanations for it. SCIENTIFIC THINKING PRINCIPLE #1: RULING OUT RIVAL HYPOTHESES. Correlation isn't always causation. (Family Circus © Bil Keane, Inc. King Features Syndicate) SCIENTIFIC THINKING PRINCIPLE #2: CORRELATION ISN'T CAUSATION. Perhaps the most common mistake psychology students make when interpreting studies is to conclude that when two things are associated with each other—or what psychologists call "correlated" with each other—one thing must cause the other. This point leads us to one of the most crucial principles in this book (put your highlighters out for this one): correlational designs don't permit causal inferences, or, putting it less formally, correlation isn't causation. When we conclude that a correlation means causation, we've committed the correlation–causation fallacy. This conclusion is a fallacy because the fact that two variables are correlated doesn't necessarily mean that one causes the other (see Chapter 2). Incidentally, a variable is anything that can vary, such as height, IQ, or extraversion. Let's see why correlation isn't causation. If we start with two variables, A and B, that are correlated, there are three major explanations for this correlation. 1. A S B. It's possible that variable A causes variable B. 2. B S A. It's possible that variable B causes variable A. So far, so good. But many people forget that there's also a third possibility, namely, that 3. C S A C S B In this third scenario, there's a third variable, C, that causes both A and B. This scenario is known as the third variable problem. It's a problem because it can lead us to conclude mistakenly that A and B are causally related to each other when they're not. For example, researchers found that teenagers who listen to music with a lot of sexual lyrics have sexual intercourse more often than teenagers who listen to music with tamer lyrics 5/19/14 12:15 PM Scientific Thinking: Distinguishing Fact From Fiction 53 What Scientific Thinking Principle Should We Use? RULING OUT RIVAL HYPOTHESES HAVE IMPORTANT ALTERNATIVE EXPLANATIONS FOR THE FINDINGS BEEN EXCLUDED? CORRELATION VS. CAUSATION CAN WE BE SURE THAT A CAUSES B? FALSIFIABILITY CAN THE CLAIM BE DISPROVED? REPLICABILITY CAN THE RESULTS BE DUPLICATED IN OTHER STUDIES? EXTRAORDINARY CLAIMS IS THE EVIDENCE AS STRONG AS THE CLAIM? OCCAM'S RAZOR DOES A SIMPLER EXPLANATION FIT THE DATA JUST AS WELL? When Might We Use It? How Do We Use It? You're reading the newspaper and come across the headline: "Study shows depressed people who receive a new medication improve more than equally depressed people who receive nothing." The results of the study could be due to the fact that people who received the medication expected to improve. A researcher finds that people eat more ice cream on days when crimes are committed than when they aren't, and concludes that eating ice cream causes crime. Eating ice cream (A) might not cause crime (B). Both could be due to a third factor (C), such as higher temperatures. A self-help book claims that all human beings have an invisible energy field surrounding them that influences their moods and well-being. We can't design a study to disprove this claim. A magazine article highlights a study that shows people who practice meditation score 50 points higher on an intelligence test than those who don't. We should be skeptical if no other scientific studies have reported the same findings. You come across a website that claims that a monster, like Bigfoot, has been living in the American Northwest for decades without being discovered by researchers. This extraordinary claim requires more rigorous evidence than a less remarkable claim, such as the assertion that people remember more words from the beginning than from the end of a list. Your friend, who has poor vision, claims that he spotted a UFO while attending a Frisbee tournament. Is it more likely that your friend's report is due to a simpler explanation—his mistaking a Frisbee for a UFO—than to alien visitation? FIGURE 1.7 The Six Principles of Scientific Thinking That Are Used Throughout This Textbook. M01_LILI8849_03_SE_C01.indd 53 5/19/14 12:15 PM 54 Chapter 1 Introduction to Psychology (Martino et al., 2006). So listening to sexual lyrics is correlated with sexual behavior. One newspaper summarized the findings of this study with an attention-grabbing headline: "Sexual lyrics prompt teens to have sex" (Tanner, 2006). Like many headlines, this one went well beyond the data. It's possible that music with sexual lyrics (A) causes sexual behavior (B). But it's also possible that sexual behavior (B) causes teens to listen to music with sexual lyrics (A), or that a third variable, like impulsivity (C), causes teens to listen to music with sexual lyrics and to engage in sexual behavior. Given the data reported by the authors, there's no way to know. Correlation isn't causation. This point is so crucial that we'll revisit it in Chapter 2. The bottom line: we should remember that a correlation between two things doesn't demonstrate a causal connection between them. SCIENTIFIC THINKING PRINCIPLE #3: FALSIFIABILITY. Philosopher of science Sir Karl Popper (1965) observed that for a claim to be meaningful, it must be falsifiable, that is, capable of being disproved. If a theory isn't falsifiable, we can't test it. Some students misunderstand this point, confusing the question of whether a theory is falsifiable with whether it's false. The principle of falsifiability doesn't mean that a theory must be false to be meaningful. Instead, it means that for a theory to be meaningful, it could be proven wrong if there were certain types of evidence against it. For a claim to be falsifiable, its proponent must state clearly in advance, not after the fact, which findings would count as evidence for and against the claim (Dienes, 2008; Proctor & Capaldi, 2006). A key implication of the falsifiability principle is that a theory that explains everything—a theory that can account for every conceivable outcome—in effect explains nothing. That's because a good scientific theory must predict only certain outcomes, but not others. If a friend told you he was a master "psychic sports forecaster" and predicted with great confidence that "Tomorrow, all of the major league baseball teams that are playing a game will either win or lose," you'd probably start giggling. By predicting every potential outcome, your friend hasn't really predicted anything. If your friend instead forecasted "The New York Yankees and New York Mets will both win tomorrow by three runs, but the Boston Red Sox and Los Angeles Dodgers will lose by one run," this prediction could turn out to be either correct or incorrect. There's a possibility he'll be wrong—the prediction is falsifiable. If he's right, it wouldn't prove he's psychic, of course, but it might provide some evidence that he has some mysterious predictive abilities. The bottom line: whenever we evaluate a psychological claim, we should ask ourselves whether one can, at least in principle, disprove it or whether it's consistent with any conceivable body of evidence. SCIENTIFIC THINKING PRINCIPLE #4: REPLICABILITY. Barely a week goes by that we don't hear about another stunning psychological finding on the evening news or read about it online: "Researchers at Cupcake State University detect a new gene linked to excessive shopping"; "Investigators at the University of Antarctica at Igloo report that alcoholism is associated with a heightened risk of murdering one's spouse"; "Nobel Prize-winning professor at Cucumber State College isolates brain area responsible for the enjoyment of popcorn." One problem with these conclusions, in addition to the fact that the news media often tell us nothing about the design of the studies on which they're based, is that the findings often haven't been replicated. Replicability means that a study's findings can be duplicated consistently. If they can't be d uplicated, it increases the odds that the original findings were due to chance. We shouldn't place too much stock in a psychological finding until it's been replicated. Indeed, over the past decade, psychological scientists have become increasingly aware of the importance of replication (Asendorpf et al., 2013; Nosek, Spies, & Motyl, 2012). Some of this heightened awareness stems from difficulties in replicating certain w ell-established findings in psychology (Pashler & Wagenmakers, 2012), and some of it stems from a phenomenon known as the decline effect—the fact that the size of certain psychological findings appears to be shrinking over time (Schooler, 2011). For example, early studies of the effectiveness of newly developed medications for schizophrenia showed larger effects than did more recent studies (Leucht et al., 2009). The same decline in effectiveness over time may hold for parenting interventions for autism spectrum disorder (Ozonoff, 2011) 5/19/14 12:15 PM Scientific Thinking: Distinguishing Fact From Fiction 55 as well as numerous other psychological phenomena. Although psychologists aren't sure how widespread a problem the decline effect is, virtually all agree that it sometimes exists. In 2012, University of Virginia psychologist Brian Nosek and his collaborators launched the "Reproducibility Project," a coordinated effort by more than 100 psychologists to try to replicate widely cited studies in psychology, including some about which we'll be reading in later chapters (Carpenter, 2012). By the time the next edition of this textbook is published, we hope to learn more about what proportion of psychological findings are replicable. Most replications aren't exact duplications of the original r esearchers' methods. Most involve introducing minor variations in the original design or extending this design to different participants, including those in various cultures, races, and geographical locations. In general, the more we can replicate our findings using different participants in different settings, the more confidence we can place in those findings (Schmidt, 2009; Shadish, Cook, & Campbell, 2002). We should bear in mind that the media are far more likely to report initial positive findings than failures to replicate. The initial findings may be especially fascinating or sensational, whereas replication failures are often disappointing: they don't make for juicy news stories. It's especially crucial that investigators other than the original researchers replicate the results because this increases our confidence in them. If we tell you that we've created a recipe for the world's most delicious veal parmigiana, but it turns out that every other chef who follows our recipe ends up with a meal that tastes like an old piece of cardboard smothered in cheese and six-month-old tomato sauce, you'd be justifiably skeptical. Maybe we flat-out lied about our recipe. Or perhaps we weren't following the recipe very closely and we instead tossed in ingredients that weren't even in the recipe. Or perhaps I'm such an extraordinary chef that nobody else can come close to replicating my miraculous culinary feats. In any case, you'd have every right to doubt my recipe until someone else replicated it. The same goes for psychological research. The literature on ESP offers an excellent example of why replicability is so essential (see Chapter 4). Every once in a blue moon, a researcher reports a striking new finding that seemingly confirms the existence of ESP (Bem, 2011). Yet time and again, independent researchers haven't been able to replicate these tantalizing results (Galak et al., 2012; Ritchie, Wiseman, & French, 2012; Hyman, 1989; Lilienfeld, 1999c), which might lead a skeptical observer to wonder whether many of the initial positive findings were due to chance. The bottom line: whenever we evaluate a psychological claim, we should ask ourselves whether independent investigators have replicated the findings that support this claim; otherwise, the findings might be a one-time-only fluke. SCIENTIFIC THINKING PRINCIPLE #5: EXTRAORDINARY CLAIMS REQUIRE EXTRAORDINARY EVIDENCE. (Throughout the book, we'll be abbreviating this principle as "Extraordinary Claims.") This principle was proposed in slightly different terms by eighteenth-century Scottish philosopher David Hume (Sagan, 1995; Truzzi, 1978). According to Hume, the more a claim contradicts what we already know, the more persuasive the evidence for this claim must be before we accept it. A handful of researchers believe that every night, hundreds and even thousands of Americans are being lifted magically out of their beds, taken aboard flying saucers, and experimented on by aliens, only to be returned safely to their beds hours later (Clancy, 2005). According to some alien abduction advocates, aliens are extracting semen from human males to impregnate female aliens in an effort to create a race of alien–human hybrids. Of course, alien abduction proponents might be right, and we shouldn't dismiss their claims out of hand. But their claims are pretty darned extraordinary, especially because they imply that tens of thousands of invading flying saucers from other solar systems have inexplicably managed to escape detection by hundreds of astronomers, not to mention air traffic controllers and radar operators. Alien abduction proponents have been unable to provide even a shred of concrete evidence that supposed abductees have actually encountered extraterrestrials—say, a convincing photograph of an alien, a tiny piece of a metal probe inserted by an alien, or even a strand of hair or shred of skin from an alien. Thus far, all that alien abduction proponents have to show for their claims are the self-reports of supposed abductees. Extraordinary claims, but decidedly ordinary evidence. M01_LILI8849_03_SE_C01.indd 55 According to a few researchers, tens of thousands of Americans have been abducted by aliens and brought aboard spaceships to be experimented on. Could it really be happening, and how would we know? 5/19/14 12:15 PM 56 Chapter 1 Introduction to Psychology The bottom line: whenever we evaluate a psychological claim, we should ask ourselves whether this claim runs counter to many things we know already and, if it does, whether the evidence is as extraordinary as the claim. Simulate in MyPsychLab the Experiment: Critical Thinking SCIENTIFIC THINKING PRINCIPLE #6: OCCAM'S RAZOR. Occam's Razor, named after fourteenth-century British philosopher and monk Sir William of Occam, is also called the "principle of parsimony" (parsimony means logical simplicity). According to Occam's Razor, if two explanations account equally well for a phenomenon, we should generally select the more parsimonious one. Good researchers use Occam's Razor to "shave off" needlessly complicated explanations to arrive at the simplest explanation that does a good job of accounting for the evidence. Scientists of a romantic persuasion refer to Occam's Razor as the principle of KISS: keep it simple, stupid. Occam's Razor is only a guideline, not a hard-and-fast rule (Uttal, 2003). Every once in a while the best explanation for a phenomenon is the most complex, not the simplest. But Occam's Razor is a helpful rule of thumb, as it's right far more often than it's wrong. During the late 1970s and 1980s, hundreds of mysterious designs, called crop circles, began appearing in wheat fields in England. Most of these designs were remarkably intricate. How on Earth (pun intended) can we explain these designs? Many believers in the paranormal concluded that these designs originated not on Earth, but on distant planets. The crop circles, they concluded, are proof positive of alien visitations to our world. The crop circle excitement came crashing down in 1991, when two British men, David Bower and Doug Chorley, confessed to creating the crop circles as a barroom prank intended to poke fun at uncritical believers in extraterrestrials. They even demonstrated on camera how they used wooden planks and rope to stomp through tall fields of wheat and craft the complex designs. Occam's Razor reminds us that when confronted with two explanations that fit the evidence equally well, we should generally select the simpler one—in this case, human pranksters. The bottom line: whenever we evaluate a psychological claim, we should ask ourselves whether the explanation offered is the simplest explanation that accounts for the data or whether simpler explanations can account for the data equally well. Answers are located at the end of the text. HEALTH BENEFITS OF FRUITS AND VEGETABLES evaluating We all know the importance of eating a balanced diet with plenty of fruits and vegetables. Yet many popular media sources exaggerate the health benefits of fruits and vegetables and even make dangerous claims about their ability to cure serious illnesses like diabetes or cancer. Let's evaluate some of these claims, which are modeled after actual advertisements. "Studies show that eating walnuts may reduce your risk and delay the onset of Alzheimer's." The use of the qualifying word may renders the claim difficult or impossible to falsify. What would we need to know about how these studies were conducted to validate the claim? "Eating peaches gives you energy and makes you feel light and fresh throughout the year." This claim is vague and difficult to falsify. How would you define or measure "light and fresh"? M01_LILI8849_03_SE_C01.indd 56 CLAIMS "Avoid drugs or surgery and find a completely natural cure for your disease." The claim that a completely natural cure exists that can replace medical interventions is extraordinary and not supported by evidence. "These natural cures come from ancient cultures and have been handed down for thousands of years." Does the fact that something has been around for a long time mean it is trustworthy? What logical fallacy does this ad commit? 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been 57 Assess Your Knowledge FACT or FICTION? Study and Review in MyPsychLab 1. Scientific skepticism requires a willingness to keep an open mind to all claims. True / False 2. When evaluating a psychological claim, we should consider other plausible explanations for it. True / False 3. The fact that two things are related doesn't mean that one directly influences the other. True / False Read and Listen to Chapter 2 at mypsychlab 4. Falsifiability means that a theory must be false to be meaningful. True / False 5. When psychological findings are replicated, it's especially important that the replications be conducted by the same team of investigators. True / False Answers: 1. T (p. 51); 2. T (p. 52); 3. T (p. 53); 4. F (p. 54); 5. F (p. 54) Psychology's Past and Present: What a Long, Strange Trip It's Been 1.7 Identify the major theoretical frameworks of psychology. 1.8 Describe different types of psychologists and identify what each of them does. Listen to the Audio File at mypsychlab Listen to the two types of explanations cross circles. View image of the map How has psychology as a science developed over time? Watch the Video at mypsychlab The Video at mypsychlab 1.9 Describe the two great debates that have shaped the field of psychology. 1.10 Describe how psychological research affects our daily lives. How did psychology emerge as a discipline, and has it always been plagued by pseudoscience? The scientific approach to the study of the mind, brain, and behavior emerged slowly, and the field's initial attempts displayed many of the weaknesses that pseudoscientific approaches possess today. Informal attempts to study and explain how our minds work have been with us for thousands of years. But psychology as a science has existed for only about 130 years, and many of those years were spent refining techniques to develop research methods that were free from bias (Coon, 1992). Throughout its history, psychology has struggled with many of the same challenges that we confront today when reasoning about psychological research. So it's important to understand how psychology evolved as a scientific discipline—that is, a discipline that relies on systematic research methods to avoid being fooled. Map the Concepts at mypsychlab Explore the Concept at mypsychlab Explore the Concept at mypsychlab Timeline Explore the Experiment at mypsychlab Watch the Video in MyPsychLab: Psychology's Early History credited with launching psychology as a W ell start our journey with a capsule summary of psychology's bumpy road from non- Read laboratory science 1879. The document at mypsychlab science of psychology has been a slow process at many times, but each of these phases lay the foundations for the evolution of scientific psychology Sample Document: That The human mind The capacity to measure the mind. Other disciplines have challenged us to study the mind. For many centuries, the field of psychology was difficult to distinguish from philosophy. Academic psychologists held positions in departments of philosophy (psychol- Sample Concept Title Text ogy departments didn't even exist back then) and didn't conduct experimental research. Instead, they mostly sat and contemplated the human mind from the armchair. In essence, they relied on common sense. Yet beginning in the late 1800s, the landscape of psychology changed dramatically. In 1879, Wilhelm Wundt (1832–1920) developed the first full-fledged psychological laboratory in Leipzig, Germany. Most of Wundt's investigations and those of his students focused on basic questions concerning our mental experiences: How different must two colors be for us to tell them apart? How long does it take us to react to a sound? What thoughts come to mind when we solve a math problem? Wundt used a combination of experimental methods, including reaction time procedures, and a technique called introspection, which required trained observers to carefully reflect and report on their mental experiences. Introspectionists might ask participants to look at an object, say an apple, and carefully report everything they observed. In many respects, the pioneering work of Wundt marked the beginnings of psymethod by which trained observers chology as a science. Soon, psychologists elsewhere around the world followed Wundt's bold carefully reflect and report on their mental lead and opened laboratories in departments of psychology. experiences M01_LILI8849_03_SE_C01.indd 57 Margin sample 5/19/14 12:15 PM Read th Docum Title of Goes H 1649: René Descartes writes about the mind–body problem 1967: Ulric Neisser writes Cognitive Psychology; helps to launch field of cognitive psychology 1963: Stanley Milgram publishes classic laboratory studies of obedience Late 1700s: Franz Anton Mesmer discovers principles of "animal magnetism" and uses it to heal patients 1774 1649 58 Chapter 1 Introduction to Psychology 1974: Elizabeth Loftus and Robert Palmer publish paper showing that memory is more reconstructive than previously believed 1958: Joseph Wolpe writes Psychotherapy by Reciprocal Inhibition, helping to launch field of behavior therapy Early 1800s: Due to efforts of Franz Joseph Gall and Joseph Spurzheim, phrenology becomes immensely popular in Europe and the United States 1976: Founding of Committee for the Scientific Investigation of Claims of the Paranormal, first major organization to apply scientific skepticism to paranormal claims 1954: Paul Meehl writes Clinical versus Statistical Prediction, first major book to describe both the strengths and weaknesses of clinical judgment 1850: Gustav Fechner experiences crucial insight linking physical changes in the external world to subjective changes in perception; leads to establishment of psychophysics 1953: Rapid eye movement (REM) sleep discovered 1977: First use of statistical technique of meta-analysis, which allows researchers to systematically combine results of multiple studies; demonstrated that psychotherapy is effective 1953 1875: William James creates small psychological laboratory at Harvard University 1952: Antipsychotic drug Thorazine tested in France, launching modern era of psychopharmacology 1879: Wilhelm Wundt creates world's first formal psychological laboratory, launching psychology as an experimental science 1949: Conference held at University of Colorado at Boulder to outline principles of scientific clinical psychology; founding of the "Boulder" (scientist-practitioner) model of clinical training 1881: Wundt establishes first psychology journal 1938: B. F. Skinner writes The Behavior of Organisms 1883: J. Stanley Hall, one of Wundt's students, opens first major psychology laboratory in United States, at Johns Hopkins University 1980: Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) published; helps standardize the diagnosis of mental disorders 1980s: Recovered memory craze sweeps across America; pits academic researchers against clinicians 1990 1859: 1859: Charles Darwin writes Origin of Species 1935: Francis Crick James Watson discover structure of DNA, launching genetic revolution 1935: Kurt Koffka writes Principles of Gestalt Psychology 1888: James McKeen Cattell becomes first professor of psychology in the United States 1990s: Functional magnetic resonance imaging (fMRI) introduced 1888 1892: American Psychological Association founded 1920s: Emergence of the behaviorism movement Early 2000s: Positron emission tomography (PET) scanning introduced, launching field of functional brain imaging 1920s: Gordon Allport helps to initiate field of personality trait psychology 1889: Sir Francis Galton introduces concept of correlation, allowing psychologists to quantify associations among variables 1988: Many scientifically oriented psychologists break off from APA to fund American Psychological Society (APS) 1990: Thomas Bouchard and colleagues publish major results of Minnesota Study of Twins Reared Apart, demonstrating substantial genetic bases for intelligence, personality, and other individual differences 1995: Task force of Division 12 (Society of Clinical Psychology) of American Psychological Association publishes list of, and criteria for, empirically supported psychotherapies 1900: Lightner Witmer creates first psychological clinic at the University of Pennsylvania, launching field of clinical psychology 1920: Jean Piaget writes The Child's Conception of the World 1900: Sigmund Freud writes The Interpretation of Dreams, landmark book in the history of psychoanalysis 1905: Alfred Binet and Henri Simon develop first intelligence test 2009: New graduate accreditation system proposed to place psychotherapy training on a firmer scientific footing. 2012: Reproducibility Project launched to find out how many psychological findings can be replicated. 2013: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) published. FIGURE 1.8 Timeline of Major Events in Scientific Psychology. M01_LILI8849_03_SE_C01.indd 58 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been 59 Before becoming a science, psychology also needed to break free from another influence: spiritualism. The term psychology literally means the study of the "psyche," that is, spirit or soul. In the mid and late 1800s, Americans became fascinated with spirit mediums, people who claimed to contact the dead, often during séances (Blum, 2006). These were group sessions that took place in darkened rooms, in which mediums attempted to "channel" the spirits of deceased individuals. Americans were equally enchanted with psychics, individuals who claimed to possess powers of mind reading and other extrasensory abilities (see Chapter 5). Many famous psychologists of the day invested a great deal of time and effort in the search for these paranormal capacities (Benjamin & Baker, 2004; Blum, 2006). They ultimately failed, and psychology eventually developed a respectful distance from spiritualism. It did so largely by creating a new field: the psychology of human error and self-deception. Rather than asking whether extrasensory powers exist, a growing number of psychologists in the late 1800s began to ask the equally fascinating question of how people can fool themselves into believing things that aren't supported by evidence (Coon, 1992)—a central theme of this book. Factoid One of William James' Ph.D. students was Mary Whiton Calkins (1863–1930), who became the first female president of the American Psychological Association in 1905. Although Calkins completed all of the requirements for a Ph.D. at Harvard University, the faculty denied her tenure because of her gender—and in spite of James's recommendation of her. Calkins made significant contributions to the study of memory, sensation, and self-concept. The Great Theoretical Frameworks of Psychology Almost since its inception, psychological science has confronted a thorny question: what unifying theoretical perspective best explains behavior? Five major theoretical perspectives—structuralism, functionalism, behaviorism, cognitivism, and psychoanalysis—have played pivotal roles in shaping contemporary psychological thought. Many beginning psychology students understandably ask, "Which of these perspectives is the right one?" As it turns out, the answer isn't entirely clear. Each theoretical viewpoint has something valuable to contribute to scientific psychology, but each has its limitations (see TABLE 1.5). In some cases, these different viewpoints may not be contradictory, as TABLE 1.5 The Theoretical Perspectives That Shaped Psychology. PERSPECTIVE STRUCTURALISM LEADING FIGURES SCIENTIFIC GOAL LASTING SCIENTIFIC INFLUENCE E.B. Titchener Uses introspection to identify basic elements or "structures" of experience Emphasis on the importance of systematic observation to the study of conscious experience FUNCTIONALISM William James, John Dewey To understand the functions or adaptive purposes of our thoughts, feelings, and behaviors Has been absorbed into psychology and continues to influence it indirectly in many ways Ivan Pavlov; John B. Watson; B. F. Skinner To uncover the general principles of learning that explain all behaviors; focus is largely on observable behavior Influential in models of human and animal learning and among the first to focus on need for objective research Jean Piaget; Ulric Neisser To examine the role of mental processes on behavior Influential in many areas, such as language, problem solving, concept formation, intelligence, memory, and psychotherapy Sigmund Freud To uncover the role of unconscious psychological processes and early life experiences in behavior Understanding that some psychological processing occurs outside of conscious awareness; E. B. Titchener Functionalism ● William James Behaviorism ● B. F. Skinner Cognitivism ● Jean Piaget Psychoanalysis ● Sigmund Freud M01_LILI8849_03_SE_C01.indd 59 5/19/14 12:15 PM 60 Chapter 1 Introduction to Psychology Watch in MyPsychLab the Video: The Basics: Diverse Perspectives they may be explaining behavior at different levels of analysis. As we wind our way through these five frameworks, we'll discover that psychology's view of what constitutes a scientific approach to behavior has changed over time. Indeed, it continues to evolve even today. STRUCTURALISM: THE ELEMENTS OF THE MIND. Edward Bradford Titchener (1867–1927), Charles Darwin's theory of evolution by natural selection was a significant influence on functionalism, which strove to understand the adaptive purposes of psychological characteristics. a British student of Wundt who emigrated to the United States, founded the field of structuralism. Structuralism aimed to identify the basic elements, or "structures," of p sychological experience. Adopting Wundt's method of introspection, structuralists dreamed of creating a comprehensive "map" of the elements of consciousness—which they believed consisted of sensations, images, and feelings—much like the periodic table of the elements we can find in every chemistry classroom (Evans, 1972). Structuralism eventually ran out of steam. At least two major problems eventually did it in. First, even highly trained introspectionists often disagreed on their subjective reports. Second, German psychologist Oswald Külpe (1862–1915) showed that participants asked to solve certain mental problems engage in imageless thought: thinking unaccompanied by conscious experience. If we ask an introspecting participant to add 10 and 5, he or she will quickly respond "15," but usually be unable to report what came to mind when performing this calculation (Hergenhahn, 2000). The phenomenon of imageless thought dealt a serious body blow to structuralism because it demonstrated that some important aspects of human psychology lie outside conscious awareness. Structuralism correctly emphasized the importance of systematic observation to the study of conscious experience. Nevertheless, structuralists went astray by assuming that a single, imperfect method—introspection—could provide all of the information needed for a complete science of psychology. In the time since introspectionism came and went, psychologists have learned that multiple methods are almost always needed to understand complex psychological phenomena (Cook, 1985; Figueredo, 1993). of functionalism strove to understand the adaptive purposes, or functions, of psychological characteristics, such as thoughts, feelings, and behaviors (Hunt, 1993). Whereas structuralists asked "what" questions, such as "What is conscious thought like?" functionalists asked "why" questions, such as "Why do we sometimes forget things?" The founder of functionalism, William James, rejected structuralists' approach and methods, arguing that careful introspection doesn't yield a fixed number of static elements of consciousness but rather an ever-changing "stream of consciousness," a famous phrase he coined. James is also famous for writing the influential text Principles of Psychology (1890), which introduced the science of psychology to the general public. The functionalists of the late 1800s were influenced substantially by biologist Charles Darwin's (1809–1882) still-young theory of natural selection, which emphasized that physical and behavioral characteristics evolved because they increased the chances of their survival and reproduction. The functionalists believed that Darwin's theory applied to psychological characteristics, too. Just as the trunk of an elephant serves useful survival functions such as snaring distant water and food, the human memory system, for example, must similarly serve a purpose. It's the job of psychologists, functionalists maintained, to act as "detectives," figuring out the evolved functions that psychological characteristics serve for organisms. Like structuralism, functionalism doesn't exist in its original form today. Instead, functionalism was gradually absorbed into mainstream scientific psychology and continues to influence it indirectly in many ways. FUNCTIONALISM: PSYCHOLOGY MEETS DARWIN. Proponents John B. Watson, one of the founders of behaviorism. Watson's stubborn insistence on scientific rigor made him a hero to some and an enemy to others. structuralism school of psychology that aimed to identify the basic elements of psychological experience functionalism school of psychology that aimed to understand the adaptive purposes of psychological characteristics natural selection principle that organisms that possess adaptations survive and reproduce at a higher rate than other organisms M01_LILI8849_03_SE_C01.indd 60 BEHAVIORISM: THE LAWS OF LEARNING. By the early twentieth century, many American psychologists were growing impatient with the touchy-feely nature of their discipline. In particular, they believed that Titchener and other introspectionists were leading psychology down a misguided path. For these critics, the study of consciousness was a waste of time because researchers could never verify conclusively the existence of the basic elements of mental experience. Psychological science, they contended, must be objective, not subjective. Foremost among these critics was a flamboyant American psychologist, John B. Watson (1878–1958). Watson was a founder of the still-influential school of behaviorism, which focuses on uncovering the general principles of learning underlying human and 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been 61 animal behavior. For Watson (1913), the proper subject matter of psychology was observable behavior, plain and simple. Subjective reports of conscious experience should play no part in psychology. If it followed his brave lead, Watson proclaimed, psychology could become just as scientific as physics, chemistry, and other hard sciences. Watson, like his follower Burrhus Frederic (B.F.) Skinner (1904–1990), insisted that psychology should aspire to uncover the general laws of learning that explain all behaviors, whether they be riding a bicycle, eating a sandwich, or becoming depressed. All of these behaviors, they proposed, are products of a handful of basic learning principles. Moreover, according to Watson and Skinner, we don't need to peer "inside" the organism to grasp these principles. We can comprehend human behavior exclusively by looking outside the organism, to rewards and punishments delivered by the environment. For traditional behaviorists, the human mind is a black box: we know what goes into it and what comes out of it, but we needn't worry about what happens between the inputs and the outputs. For this reason, psychologists sometimes call behaviorism black box psychology. Behaviorism has left a huge stamp on scientific psychology that continues to be felt today. By identifying the fundamental laws of learning that help to explain human and animal behaviors, behaviorists placed psychology on firmer scientific footing. Although early behaviorists' deep mistrust of subjective observations of conscious experience probably went too far, these psychologists properly warned us of the hazards of relying too heavily on reports that we can't verify objectively. COGNITIVISM: OPENING THE BLACK BOX. Beginning in the 1950s and 1960s, growing numbers of psychologists grew disillusioned with behaviorists' neglect of cognition, the term psychologists use to describe the mental processes involved in different aspects of thinking. Although some behaviorists acknowledged that humans and even many intelligent animals do think, they viewed thinking as merely another form of behavior. Proponents of cognitive psychology, in contrast, argued that our thinking affects our behavior in powerful ways. For example, Swiss psychologist Jean Piaget (1896–1980) argued compellingly that children conceptualize the world in markedly different ways than do adults. Later, led by Ulric Neisser (1928–2012), cognitivists argued that thinking is so central to psychology that it merits a separate discipline in its own right (Neisser, 1967). According to cognitivists, a psychology based solely on rewards and punishments will never be adequate because our interpretation of rewards and punishments is a crucial determinant of our behavior. Take a student who receives a B+ on his first psychology exam. A student accustomed to getting Fs on his tests might regard this grade as a reward, whereas a student accustomed to As might view it as a punishment. Without understanding how people evaluate information, cognitivists maintain, we'll never fully grasp the causes of their behavior. Moreover, according to cognitivists, we often learn not merely by rewards and punishments but by insight, that is, by grasping the underlying nature of problems. Cognitive psychology is a thriving approach today, and its tentacles have spread to such diverse domains as language, problem solving, concept formation, intelligence, memory, and even psychotherapy. By focusing not merely on rewards and punishments but on organisms' interpretation of them, cognitivism has encouraged psychologists to peek inside the black box to examine the connections between inputs and outputs. Moreover, cognition has increasingly established strong linkages to the study of brain functioning, among allowing psychologists to better understand the physiological bases of thinking, m and other mental functions (Ilardi & Feldman, 2001). A burgeoning field, cognitive neuroscience, which examines the relation between brain functioning and thinking, has come to the fore over the past decade or so (Gazzaniga, Ivry, & Mangun, 2002). Cognitive neuroscience and the allied field of affective neuroscience (Panksepp, 2004), which examines the relation between brain functioning and emotion, hold out the promise of allowing us to better understand the biological processes associated with thinking and feeling. PSYCHOANALYSIS: THE DEPTHS OF THE UNCONSCIOUS. Around the time that behaviorism was becoming dominant in the United States, a parallel movement was gathering momentum in Europe. This field, psychoanalysis, was founded by Viennese neurologist Sigmund Freud (1856–1939). In sharp contrast to behaviorism, psychoanalysis focused M01_LILI8849_03_SE_C01.indd 61 The Ten Worst Students B+ on internal psychological processes, especially impulses, thoughts, and memories of which we're unaware. According to Freud (1900) and other psychoanalysts, the primary influences on behavior aren't forces outside the organism, like rewards and punishments, but rather unconscious drives, especially sexuality and aggression. Psychoanalysts maintain that much of our everyday psychological life is filled with symbols—things that represent other things (Loevinger, 1987; Moore & Fine, 1995). For example, if you refer accidentally to one of your female professors as "Mom," F reudians would be unlikely to treat this embarrassing blooper as an isolated mistake. Instead, they'd quickly suggest that your professor probably reminds you of your mother, which may be a good reason to transfer to a different course. The goal of the p sychoanalyst is to decode the symbolic meaning of our slips of the tongue (or Freudian slips, as they're often called), dreams, and psychological symptoms. By doing so, psychoanalysts contend, they can get to the roots of our deep-seated psychological conflicts. Psychoanalysts also place c onsiderable more emphasis than do other schools of thought on the role of infant and childhood experience. For Freud and others, the core of our personality is molded in the first few years of life. The influence of Freud and psychoanalysis on scientific psychology is controversial. On the one hand, some critics insist that psychoanalysis retarded the progress of scientific psychology because it focused heavily on unconscious processes that are difficult or impossible to falsify. As we'll learn in Chapter 14, these critics probably have a point (Crews, 2005; Esterson, 1993). On the other hand, at least some psychoanalytic claims, such as the assertion that a great deal of important mental processing goes on outside conscious awareness, have held up well in scientific research (Westen, 1998; Wilson, 2002). It's not clear, however, whether the Freudian view of the unconscious bears anything more than a superficial resemblance to more contemporary views of unconscious processing (Kihlstrom, 1987). The Multifaceted World of Modern Psychology Psychology isn't just one discipline, but rather an assortment of many subdisciplines. These subdisciplines differ widely in their preferred level of analysis, ranging all the way from biological to cultural. In most major psychology departments, we can find researchers examining areas as varied as the neurological bases of visual perception, the mechanisms of memory, the causes of prejudice, and the treatment of depression. (b) (a) THE GROWTH OF A FIELD. Today, there are about 500,000 psychologists worldwide (Kassin, 2004), with more than 100,000 in the United States alone (McFall, 2006). The American Psychological Association (APA), founded in 1892 and now the world's largest association of psychologists, consists of more than 150,000 members. (To give a sense of how much the field has grown, there were only 150 APA members in 1900.) A more research-oriented organization, the Association for Psychological Science, which began in 1988, has over 23,000 members. The percentage of women and minorities within the APA has grown steadily, too. These members' interests span such topics as addiction; art psychology; clinical psychology; hypnosis; law and psychology; media psychology; mental retardation; neuroscience; psychology and religion; sports psychology; the psychology of women; and gay, lesbian, bisexual, and transgendered issues. shows a breakdown of the settings in which psychologists work. As we can see, some work primarily in research settings; others, primarily in practice settings. TABLE 1.6 describes a few of the most important types of psychologists whose work we'll encounter in this book. It also dispels common misconceptions about what each type of psychologist does, pairing each misconception with accurate information (Rosenthal et al., 2004). As we can see, the field of psychology is remarkably diverse, as are the types of careers psychology majors pursue. Moreover, the face of psychology is changing, with more women and minorities entering the field (see FIGURE 1.10 on page 64). Despite their differences in content, all of these areas of psychology have one thing in common: most of the psychologists who specialize in them rely on scientific methods. Specifically, they TYPES OF PSYCHOLOGISTS: FICTION AND FACT. FIGURE 1.9 (c) (d) Psychologists Elizabeth Loftus (a) and Paul Meehl (b) are far less well known to the general public than Dr. Phil (c) and John Gray (d), but they have made important contributions to psychological science and practice. use scientific methods to generate new findings about human and animal behavior, or use existing findings to enhance human welfare. But as we've discussed, many pseudoscientists try to lead us to believe that they're using a genuine scientific approach. Throughout this text, we'll highlight ways that pseudoscience has infiltrated popular beliefs about psychology and ways that good science has helped guard us against pseudoscience. Explore in MyPsychLab the Concept: Psychologists at Work M01_LILI8849_03_SE_C01.indd 62 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been 63 TABLE 1.6 Types of Psychologists, What They Do, and What They Don't Do. TYPE OF PSYCHOLOGIST Clinical Psychologist WHAT DO THEY DO? • Perform assessment, diagnosis, and treatment of mental disorders • Conduct research on people with mental disorders • Work in colleges and universities, mental health centers, and private practice Counseling Psychologist • Work with people experiencing temporary or relatively self-contained life problems, like marital conflict, sexual difficulties, occupational stressors, or career uncertainty • Work in counseling centers, hospitals, and private practice (although some work in academic and research settings) School Psychologist • Work with teachers, parents, and children to remedy students' behavioral, emotional, and learning difficulties FREQUENT MISCONCEPTION AND TRUTH Misconception: You need a Ph.D. to become a therapist. • Truth: Most clinical psychology Ph.D. programs are highly research-oriented. Other options for therapists are a Psy.D. (doctor of psychology), which focuses on training therapists rather than researchers, and an M.S.W., a master's degree in social work, which also focuses on training therapists. Misconception: Counseling psychology is pretty much the same as clinical psychology. • Truth: Whereas clinical psychologists work with people with serious mental disorders like severe depression, most counseling psychologists don't. Misconception: School psychology is another term for educational psychology. • Truth: Educational psychology is a substantially different discipline that focuses on helping instructors identify better methods for teaching and evaluating learning. Developmental Psychologist • Study how and why people change over time • Conduct research on infants', children's, and sometimes adults' and elderly people's emotional, physiological, and cognitive processes and how these change with age Experimental Psychologist • Use research methods to study memory, language, thinking, and social behaviors of humans • Work primarily in research settings Biological Psychologist • Examine the physiological bases of behavior in animals and humans • Most work in research settings Forensic Psychologist • Work in prisons, jails, and other settings to assess and diagnose inmates and assist with their rehabilitation and treatment • Others conduct research on eyewitness testimony or jury decision making Misconception: Developmental psychologists spend most of their time on their hands and knees playing with children. • Truth: Most spend their time in the laboratory, collecting and analyzing data. Misconception: Experimental psychologists do all of their work in psychological laboratories. • Truth: Many conduct research in real-world settings, examining how people acquire language, remember events, apply mental concepts, and the like, in everyday life. Misconception: All biological psychologists use invasive methods in their research. • Truth: Although many biological psychologists create brain lesions in animals to examine their effects on behavior, others use brain imaging methods that don't require investigators to damage organisms' nervous systems. Misconception: Most forensic psychologists are criminal profilers, like those employed by the FBI. • Truth: Criminal profiling is a small and controversial (as we'll learn in Chapter 14) subspecialty within forensic psychology. • Typically hold degrees in clinical or counseling psychology Industrial-Organizational Psychologists • Work in companies and businesses to help select productive employees, evaluate performance, and examine the effects of different working and living conditions on people's behavior (called environmental psychologists) • Design equipment to maximize employee performance and minimize accidents (called human factors or engineering psychologists) Misconception: Most industrial/organizational psychologists work on a one-to-one basis with employees to increase their motivation and productivity. • Truth: Most spend their time constructing tests and selection procedures or implementing organizational changes to improve worker productivity and satisfaction. Explore in MyPsychLab the Concept: Psychologists at Work M01_LILI8849_03_SE_C01.indd 63 5/19/14 12:15 PM 64 Chapter 1 Introduction to Psychology We use scientific methods to generate new findings about human and animal behavior, or use existing findings to enhance human welfare. As we've discussed, many pseudoscientists try to lead us to believe they are using a genuine scientific approach. 90% 80% 70% 60% 50% 40% The Great Debates of Psychology 30% 20% 10% 1974 1990 FIGURE 1.10 The Face of Psychology Has Changed Dramatically over the Past Three Decades. Across most areas, the percentage of women earning doctoral degrees has increased. In clinical and developmental psychology, women comprise three-fourths to four-fifths of those attaining Ph.D.s. (Based on data from APA, 2007) (© The New Yorker Collection 2003 Michael Shaw from cartoonbank.com. All Rights Reserved) evolutionary psychology discipline that applies Darwin's theory of natural selection to human and animal behavior M01_LILI8849_03_SE_C01.indd 64 2005 sel un Co tive Co gni tal rim en al pe Ex Ind org ustri ani al/ zat ion De vel o Cli pm en nic al tal 0% ing N/A Percent of female Ph.D. recipients 100% Now that we've learned a bit about the past and present of psychology, we need to set the stage for things to come. Two great debates have shaped the field of psychology since its inception and seem likely to continue to shape it in the future. Because these debates are alive and well, we'll find traces of them in virtually all of the chapters of this text. THE NATURE–NURTURE DEBATE. The nature–nurture debate poses the following question: are our behaviors attributable mostly to our genes (nature) or to our rearing environments (nurture)? As we'll discover in this text, the nature–nurture debate has proven especially controversial in the domains of intelligence, personality, and psychopathology (mental illness). Many early thinkers, such as British p hilosopher John Locke (1632–1704), likened the human mind at birth to white paper that hadn't been written on. Others after him referred to the mind as a tabula rasa ("blank slate"). For Locke and his followers, we enter the world with no genetic preconceptions or preconceived ideas: we're shaped exclusively by our environments (Pinker, 2002). For much of the twentieth century, most psychologists assumed that virtually all human behavior was exclusively a product of learning. But research conducted by behavior geneticists, who use sophisticated designs such as twin and adoption studies (see Chapter 3), shows that most important psychological traits, including intelligence, interests, personality, and many mental illnesses, are influenced substantially by genes. Increasingly, modern psychologists have come to recognize that human behavior is attributable not only to our environment, but also to our genes (Bouchard, 2004; Harris, 2002). Because just about everyone now agrees that both genes and environment play crucial roles in most human behaviors, some people have declared the nature–nurture debate dead (Ferris, 1996). Yet we still have a great deal to learn about how much nature or nurture contributes to different behaviors and how nature and nurture work together. Indeed, we'll discover in later chapters that the old dichotomy between nature and nurture is far less clearcut—and far more interesting—than once believed. Nature and nurture sometimes intersect in complex and surprising ways. One domain of psychology that's shed light on the nature–nurture debate is evolutionary psychology, which applies Darwin's theory of natural selection to human and animal behavior (Barkow, Cosmides, & Tooby, 1992; Dennett, 1995; Tooby & Cosmides, 1989). It begins with the assumption, shared by William James and other functionalists, that many human psychological systems, like memory, emotion, and personality, serve key adaptive functions: They help organisms survive and reproduce. Darwin and his followers suggested that natural selection favored certain kinds of mental traits, just as it did physical ones, like our hands, livers, and hearts. Biologists refer to fitness as the extent to which a trait increases the chances that organisms that possess this trait will survive and reproduce at a higher rate than competitors who lack it (see Chapter 3). Fitness has nothing to do, by the way, with how strong or powerful an organism is. By surviving and reproducing at higher rates than other organisms, more fit organisms pass on their genes more successfully to later generations. For example, humans who have at least some degree of anxiety probably survived at higher rates than humans who lacked it, because anxiety serves an essential function: it warns us of impending danger (Barlow, 2000; Damasio & Carvalho, 2013). 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been 65 Still, evolutionary psychology has received more than its share of criticism (Kitcher, 1985; Panksepp & Panksepp, 2000). Many of its predictions are extremely difficult to falsify. In part, that's because behavior, unlike the bones of dinosaurs, early humans, and other animals, doesn't leave fossils. As a consequence, it's far more challenging to determine the evolutionary functions of anxiety or depression than the functions of birds' wings. For example, two researchers speculated that male baldness serves an evolutionary function, because women supposedly perceive a receding hairline as a sign of maturity (Muscarella & Cunningham, 1996). But if it turned out that women preferred men with a lot of hair to bald men, it would be easy to cook up an explanation for that finding ("Women perceive men with a full head of hair as stronger and more athletic"). Evolutionary explanations could account for either outcome. E volutionary psychology has the potential to be an important unifying framework for psychology (Buss, 1995; Confer et al., 2010), but we should beware of evolutionary explanations that can fit almost any piece of evidence after the fact (de Waal, 2002). THE FREE WILL–DETERMINISM DEBATE. The free will–determinism debate poses the following question: to what extent are our behaviors freely selected rather than caused by factors outside our control? Most of us like to believe that we're free to do what we want whenever we want. You may believe that at this very moment, you can decide to continue reading to the end of the chapter or take a well-deserved break to watch TV. Indeed, our legal system is p remised on the concept of free will. We punish criminals because they're supposedly free to abide by the law but choose otherwise. One major exception, of course, is the insanity defense, in which the legal system assumes that severe mental illness can interfere with people's free will (Hoffman & Morse, 2006; Stone, 1982). Some prominent psychologists agree that we all possess free will (Baumeister, 2008). Yet many others maintain that free will is actually an illusion (Bargh, 2008; Sappington, 1990; Wegner, 2002). Behaviorist B. F. Skinner (1971) argued that our sense of free will stems from the fact that we aren't consciously aware of the thousands of subtle environmental influences impinging on our behavior at any given moment. Much like puppets in a play who don't realize that actors are pulling their strings, we conclude mistakenly that we're free simply because we don't realize all of the influences acting on our behavior. For Skinner and others, our behaviors are completely determined. Some psychologists argue that most or even all of our behaviors are generated automatically—that is, without conscious awareness (Bargh, 2011; Kirsch & Lynn, 1999; Libet, 1985). We may even come to believe that something or someone else is p roducing behaviors we ourselves are generating. For example, people who engage in automatic writing—writing sentences while seemingly in a trance—typically insist they're being compelled to do so by some outside force. But there's strong evidence that they're generating this behavior themselves, although unconsciously (Wegner, 2002). According to many determinists, our everyday behaviors are produced in the same way—triggered automatically by influences of which we're unaware (Bargh & Chartrand, 1999). Still, other psychologists aren't convinced; they believe that we maintain a great deal of conscious control over our behavior (Newell & Shanks, 2013). The fact that American men spend billions of dollars per year on hair replacement treatments is difficult to square with evolutionary hypotheses suggesting that women prefer bald men. The bottom line: beware of unfalsifiable evolutionary stories. Watch in MyPsychLab the Video: Thinking Like a Psychologist: Evolutionary Psychology Factoid Inducing students to believe in determinism—by having them read a scientific passage suggesting that free will is an illusion—makes them more likely to cheat on a test in the laboratory (Vohs & Schooler, 2008). So regardless of whether free will exists, belief in it may serve a useful function—inhibiting unethical behavior. How Psychology Affects Our Lives As we'll discover throughout this text, psychological science and scientific thinking offer important applications for a variety of aspects of everyday life. Psychological scientists often distinguish basic from applied research. Basic research examines how the mind works, whereas applied research examines how we can use basic research to solve realworld problems (Nickerson, 1999). Within most large psychology departments, we find a healthy mix of people conducting basic research, such as investigators who study the laws of learning, and applied research, such as investigators who study how to help people cope with the psychological burden of cancer. M01_LILI8849_03_SE_C01.indd 65 basic research research examining how the mind works applied research research examining how we can use basic research to solve real-world problems 5/19/14 12:15 PM 66 Chapter 1 Introduction to Psychology APPLICATIONS OF PSYCHOLOGICAL RESEARCH. Surveys show few people are aware of the substantial impact of psychology on their everyday lives (Lilienfeld, 2012; Wood, Jones, & Benjamin, 1986). Indeed, psychological science has found its way into far more aspects of contemporary society than most of us realize (Salzinger, 2002; Zimbardo, 2004a). Let's look at a sampling of these applications; we can discover more about these and other examples on a free pamphlet produced by the American Psychological Association: www.decadeofbehavior.org/BehaviorMattersBooklet.pdf. • If you live in or near a big city, you may have noticed a gradual change in the color of fire engines. Although old fire engines were bright red, most new ones are lime-yellow. That's because psychological researchers who study perception found that lime-yellow objects are easier to detect in the dark. Indeed, lime-yellow fire trucks are only about half as likely to be involved in traffic accidents as are red fire trucks (American Psychological Association, 2003; Solomon & King, 1995). Increasingly, today's fire trucks are lime-yellow rather than red. That's because psychological research has demonstrated that lime-yellow objects are easier to spot in the dark than are red objects. • As a car driver, have you ever had to slam on your brakes to avoid hitting a driver directly in front of you who stopped short suddenly? If so, and if you managed to avoid a bad accident, you may have John Voevodsky to thank. For decades, cars had only two brake lights. In the early 1970s, Voevodsky hit on the bright (pun intended) idea of placing a third brake light at the base of cars' back windshields. He reasoned that this additional visual information would decrease the risk of rear-end collisions. He conducted a ten-month study of taxis with and without the new brake lights and found a 61 percent lower rate of rear-end accidents in the first group (Voevodsky, 1974). As a result, all new American cars have three brake lights. • If you're anything like the average American, you see more than 100 commercial messages every day. The founder of behaviorism, John B. Watson, pioneered the application of psychology to advertising in the 1920s and 1930s. Today, psychological researchers still contribute to the marketing success of companies. For instance, psychologists who study magazine advertisements have discovered that human faces better capture readers' attention on the left side rather than the right side of pages (Clay, 2002). Thanks to psychological research, advertisers know that placing a model's face on the left and written text on the right of an advertisement best captures readers' attention. A classic simultaneous eyewitness lineup. Although police commonly use such lineups, most research suggests that they're more prone to error than are sequential lineups. M01_LILI8849_03_SE_C01.indd 66 • To get into college, you probably had to take one or more tests, like the SAT or ACT. If so, you can thank—or blame—psychologists with expertise in m easuring academic achievement and knowledge, who were primarily responsible for developing these measures (Zimbardo, 2004a). Although these tests are far from perfect (Sternberg, 2009), they do significantly better than chance in forecasting how students perform in college (Geiser & Studley, 2002; Sackett, Borneman, & Connelly, 2008). • Police officers often ask victims of violent crimes to select a suspect from a lineup. When doing so, they've traditionally used simultaneous lineups, in which one or more suspects and several decoys (people who aren't really suspects) are lined up in a row, often five to eight individuals (see Chapter 7). These are the kinds of lineups we've most often seen on television crime shows. Yet psychological research shows that sequential lineups—those in which victims view each person individually and then decide whether he or she was the perpetrator of the crime—are generally more accurate than simultaneous lineups (Cutler & Wells, 2009; Steblay et al., 2003; Wells, Memon, & Penrod, 2006). As a result of this research, police departments around the United States are increasingly using sequential lineups (Lilienfeld & Byron, 2013). • For many years, many American public schools were legally segregated. Before 1954, the law of the land in the United States was that "separate but equal" facilities were sufficient to guarantee racial equality. 5/19/14 12:15 PM Psychology's Past and Present: What a Long, Strange Trip It's Been ◀ But based in part on the pioneering research of psychologists Kenneth and Mamie Clark (1950), who demonstrated that African-American children preferred white to African-American dolls, the U.S. Supreme Court decided—in the landmark 1954 case of Brown v. Board of Education of Topeka, Kansas—that school segregation exerted a negative impact on the self-esteem of African-American children. So, far more than most of us realize, the fruits of psychological research are all around us. Psychology has dramatically altered the landscape of everyday life, in most cases for the better. THINKING SCIENTIFICALLY: IT'S A WAY OF LIFE. As you embark on your journey to the rest of the field of psychology, we leave you with one crucial take-home point: Learning to think scientifically will help you make better decisions not only in this course and other psychology courses, but also in everyday life. Each day, the news and entertainment media bombard us with confusing and contradictory claims about a host of topics: herbal remedies, weight loss plans, parenting methods, insomnia treatments, speed-reading courses, urban legends, political c onspiracy theories, unidentified flying objects, and "overnight cures" for mental disorders, to name only a few. Some of these claims are partly true, whereas others are entirely bogus. Yet the media typically offer little guidance for sorting out which claims are scientific, pseudoscientific, or a bit of both. It's scarcely any wonder that we're often tempted to throw up our hands in despair and ask, "What I am supposed to believe?" Fortunately, the scientific thinking skills you've encountered in this chapter—and that you'll come to know (and we hope!) love in later chapters—can assist you in successfully navigating the bewildering world of popular psychology and popular culture. The trick is to bear three words in mind throughout this text and in daily life: insist on evidence. By recognizing that common sense can take us only so far in evaluating claims, we can come to appreciate the need for scientific evidence to avoid being fooled—and to avoid fooling ourselves. But how do we collect this scientific evidence, and how do we evaluate it? That's what we're about to find out in the next chapter. The classic doll studies of Kenneth and Mamie Clark paved the way for the 1954 Supreme Court decision of Brown v. Board of Education, which mandated racial integration of public schools. e enc evid n o st Ins Assess Your Knowledge FACT or FICTION? 1. Behaviorism focuses on uncovering the general laws of learning in animals, but not humans. True / False 2. Cognitive psychologists argue that we need to understand how organisms interpret rewards and punishments. True / False 3. Advocates of determinism believe that free will is an illusion. True / False 4. Studying color discrimination in the lab is basic research, whereas testing which color fire trucks are painted results in the fewest traffic accidents is applied research. True / False 5. Achievement tests such as the SAT do no better than chance at predicting how students will perform in college. True / False Answers: 1. F (p. 60); 2. T (p. 62); 3. T (p. 65); 4. T (p. 66); 5. F (p. 66) Study and Review in MyPsychLab Study and Review the Pre-Test and Flashcards at myanthrolab Listen to Chapter 2 at myanthrolab M01_LILI8849_03_SE_C01.indd 67 5/19/14 12:16 PM Your Complete Review System Study and Review in MyPsychLab What Is Psychology? Science Versus Intuition 34 1.1 Study and Review the Pre-Test and Flashcards at myanthrolab EXPLAIN WHY PSYCHOLOGY IS MORE THAN JUST COMMON SENSE. Psychology is the scientific study of the mind, brain, and behavior. Read and Listen to Chapter 2 at myanthrolab Although we often rely on common sense to understand the psychological world, our intuitive understanding of ourselves and others is often mistaken. Naive realism is the error of believing that we see the world precisely as it is. It can lead us to false beliefs about ourselves and our world, such as believing that our perceptions and memories are always accurate. 1. Which would be a better description of naive realism, "seeing is believing" or "believing is seeing"? (p. 37) 2. What does Shepard's illusion tell us about our ability to trust our own intuitions and experience? (p. 37) [illegible] 7. Review each of the statements in the table and identify whether each is a theory (T) or hypothesis (H). (pp. 38–39) T or H EXPLANATION 1. _______ Sarah's motivation for cheating on the test was fear of failure. 2. _______ Darwin's evolutionary model explains the changes in species over time. 3. _______ The universe began in a gigantic explosion about 14 billion years ago. 4. _______ Our motivation to help a stranger in need is influenced by the number of other people present. 5. _______ Crime rates in Nashville increase as the temperature rises. 8. When presented with both contradictory and supportive evidence regarding a hypothesis we are researching, our tendency to disregard the contradictory evidence is our _______. (p. 39) 9. Our _______ kicks in when we refuse to admit our beliefs are incorrect in the face of evidence that contradicts them. (p. 40) 10. Metaphysical claims such as the existence of God, the soul, or the afterlife differ from pseudoscientific claims in that they aren't _______. (p. 40) Psychological Pseudoscience: Imposters of Science 42–50 1.3 DESCRIBE PSYCHOLOGICAL PSEUDOSCIENCE AND DISTINGUISH IT FROM PSYCHOLOGICAL SCIENCE. [illegible] in the Devereux School in Red Hook, New York. Only a year before, Douglas Biklen, a professor of education at Syracuse University, had published an article announcing the development of a technique called facilitated communication. Developed in Australia, facilitated communication was a stunning breakthrough in the treatment of infantile autism—or so it seemed. Facilitated communication possessed a charming simplicity that somehow rang true. A "facilitator" sits next to the child with autism, who in turn sits in front of a computer keyboard or letter pad. According to Biklen, the facilitator must be present because infantile autism is actually a motor (movement) disorder, not a mental disorder as scientists had long assumed. Boldly challenging conventional wisdom, Biklen (1990) proclaimed that children with autism are just as intelligent as other children. But they suffer from a severe motor disorder that prevents them from talking or typing on their own. By holding the child's hands ever so gently and steadying them as they approach the intended letter keys, the facilitator supposedly permits the child to communicate by typing out words. Not just isolated words, like Mommy, but complete sentences like, Mommy, I want you to know that I love you even though I can't speak. Using facilitated communication, one child with autism even asked his mother to change his medication after reading an article in a medical journal (Mann, 2005). Facilitated communication was the long-sought-after bridge between the hopelessly isolated world of children with autism and the adult world of social interaction. The psychiatric aides at the Devereux School had heard about facilitated communication, which was beginning to spread like wildfire throughout the autism treatment community. Thousands of mental health and education professionals across America were using it with apparently astonishing effects. Almost immediately after trying facilitated communication with Jenny, the Devereux aides similarly reported amazing results. For the first time, Jenny produced eloquent statements describing her innermost thoughts and feelings, including her deep love for her parents. The emotional bond that Mark and Laura Storch had dreamt of having with Jenny for 14 years was at last a reality. Yet the Storchs' joy proved to be short-lived. In November 1991, Mark Storch received a startling piece of news that was to forever change his life. With the aid of a facilitator, Jenny had begun to type out allegations of brutal sexual abuse against him. When all was said and done, Jenny had typed out 200 gruesome accusations of rape, all supposedly perpetrated by her father. A second facilitator, who'd heard about these accusations, reported similar findings while assisting Jenny at the keyboard. Although there was no physical evidence against Mark Storch, the Department of Social Services in Ulster County, New York, restricted contact between Jenny and her parents and removed Jenny from the Storch home. Jenny was eventually returned to her parents following a legal challenge, but not before Mark Storch's reputation had been stained. History repeated itself in a Detroit suburb in 2007, when Aislinn Wendrow, a 14-year-old nonverbal girl with autism who was using facilitated communication, accused her father Julian of sexual abuse. Following this allegation, a judge placed him in solitary confinement in a jail for 80 days. Again, there was not a shred of evidence against Julian Wendrow other than the facilitated claim of abuse. What had once seemed like a miracle cure to the Storches and Wendrows had turned into a nightmare. What was the truth? The claims of facilitated communication proponents seemed extraordinary. Was the evidence for these claims equally extraordinary? Since Douglas Biklen introduced facilitated communication to the United States, dozens of investigators have examined this procedure under tightly controlled laboratory conditions. In a typical study, the facilitator and child are seated in adjoining cubicles. 5/19/14 12:19 PM The Beauty and Necessity of Good Research Design 75 A wall separates them, but an opening between them permits hand-to-hand contact on a keyboard (see FIGURE 2.1). Then, researchers flash two different pictures on adjacent screens, one of which is seen only by the facilitator and the other of which is seen only by the child. The facilitator might view a photograph of a dog, the child a photograph of a cat. The crucial question is this: Will the word typed out by the child be the picture shown to the facilitator—dog—or the Adult picture shown to the child—cat? facilitator Child with The results of these studies were as stunning as they were unanimous. autism In virtually 100 percent of trials, the typed word corresponded to the picture flashed to the facilitator, not the child (Jacobson, Mulick, & Schwartz, 1995; Romancyzk et al., 2003). Unbelievable as it seems, facilitated communication originates entirely from the minds of facilitators (Todd, 2012). Unbeknownst to facilitators, their hands are effortlessly guiding the fingers of children toward the keyboard, and the resulting words are coming from their minds, not the children's. Scientists had known for decades that our thoughts can control our movements without our knowledge (Wegner, 2002) You might have discovered this pheFIGURE 2.1 Putting Facilitated Communication nomenon while typing on a computer keyboard or texting a friend, when you found yourto the Test. By placing a child with autism and self intending to write one sentence (like "See you later at the movie"), but instead wrote the facilitator in adjoining cubicles and flashing a different sentence containing a word about which you were preoccupied ("See you later different pictures to each of them on some at the test"). The facilitated communication keyboard is no different. It turns out to be trials, researchers demonstrated that the little more than a modern version of the Ouija board, a popular device used by spiritual"facilitated communications" emanated from its to try to communicate with the dead. Just like facilitators, players in the game of Ouija the mind of the facilitator, not the child. are controlling the movements of the little pointer without even realizing it. Regrettably, proponents of facilitated communication neglected to consider this rival hypothesis for its ◀ Ruling out rival HYPOTHESES Have important alternative explanations apparent effects. for the findings been excluded? The Beauty and Necessity of Good Research Design 2.1 Identify two modes of thinking and their application to scientific reasoning. The facilitated communication story imparts an invaluable lesson that we'll highlight throughout this book: Research design matters. For two reasons, this story is also a powerful illustration of the triumph of science over pseudoscience. First, science has helped practitioners who work with individuals with autism to avoid wasting valuable time on facilitated communication and other interventions that are ineffective or harmful. Second, science has allowed practitioners to develop and test treatments for autism that work. As we'll discover in Chapter 16, rigorous research by psychologists has helped them to design and evaluate interventions that genuinely permit individuals with autism to communicate more effectively, as well as to improve their social and problem-solving skills. Unlike facilitated communication, these techniques aren't magical quick fixes, but they offer real hope—not false hope—to afflicted individuals and their loved ones. Why We Need Research Designs Many beginning psychology students understandably wonder, "Why do I need to learn about research design? I took this course to learn about people, not numbers." Some of you may be puzzling over the same question. The facilitated communication story gives us the answer. Without research designs, even intelligent and well-trained people can be fooled. After all, the aides who worked with Jenny Storch and Aislinn Wendrow were sure that facilitated communication worked: Their naïve realism led them to see these children's abuse allegations "with their own eyes," and their confirmation bias (see Chapter 1) created a self-fulfilling prophecy, making them see what they wanted to see. But like many a dvocates of pseudoscientific techniques, they were the victims of a cruel illusion. If the proponents of other facilitated communication had only made use of some of the research designs we'll discuss in this chapter, they wouldn't have been fooled. In this chapter, we'll learn what M02_LILI8849_03_SE_C02.indd 75 5/19/14 12:19 PM 76 Chapter 2 Research Methods in Psychology FIGURE 2.2 The Prefrontal Lobotomy. In a prefrontal lobotomy, the surgeon severs the fibers connecting the brain's frontal lobes from the underlying thalamus. Factoid About 50,000 Americans received prefrontal lobotomies; most of them were performed in the late 1940s and early 1950s. Some of these people are still alive today. prefrontal lobotomy surgical procedure that severs fibers connecting the frontal lobes of the brain from the underlying thalamus M02_LILI8849_03_SE_C02.indd 76 these research designs are. We'll also discover how they can help us to avoid being deceived and to better evaluate claims, both in psychology courses and in everyday life. Let's look at another tragic example. For several decades of the early twentieth century, mental health professionals were convinced that the technique of prefrontal lobotomy (referred to in popular lingo as a "lobotomy") was an effective treatment for schizophrenia, as well as other severe mental disorders (see Chapter 16). Surgeons who used this technique severed the neural fibers that connect the brain's frontal lobes to the underlying thalamus (FIGURE 2.2). The scientific world was so certain that prefrontal lobotomy was a remarkable breakthrough that they awarded its developer, Portuguese neurosurgeon Egas Moniz, the Nobel Prize in 1949. As in the case of facilitated communication, stunning reports of the effectiveness of prefrontal lobotomy were based almost exclusively on subjective clinical reports. One physician who performed lobotomies proclaimed, "I am a sensitive observer, and my conclusion is that a vast majority of my patients get better as opposed to worse after my treatment" (see Dawes, 1994, p. 48). Like proponents of facilitated communication, believers in prefrontal lobotomy didn't conduct systematic research. They assumed that their clinical observations—"I can see that it works"—were sufficient evidence for this treatment's effectiveness for schizophrenia. They were mistaken. When scientists finally performed controlled studies on the effectiveness of prefrontal lobotomy, they found it to be essentially useless. The operation certainly produced radical changes in behavior, but it didn't target the specific behaviors associated with schizophrenia, such as hearing voices and holding p ersecutory beliefs. Moreover, lobotomies created a host of other problems, including extreme a pathy (Valenstein, 1986). Again, the believers had been deceived by naïve realism and confirmation bias. Nowadays, prefrontal lobotomy is little more than a relic of an earlier pseudoscientific era of mental health treatment. What's more, prefrontal lobotomy has since been replaced by medications and other interventions that have a much firmer grounding in science. Although these treatments aren't cures for schizophrenia, they are often quite helpful, and they've allowed hundreds of thousands of individuals with serious mental illnesses to attain a semblance of normal everyday functioning (Lieberman et al., 2005). Research design matters. How We Can Be Fooled: Two Modes of Thinking At this point, you might be feeling just a bit defensive. At first glance, the authors of your text may seem to be implying that many people, perhaps you included, are foolish. But we shouldn't take any of this personally, because one of our central themes is that we can all be fooled, and that includes your text's authors. How can we all be fooled so easily? A key finding emerging from the past few decades of research is that the same psychological processes that serve us well in most situations also predispose us to errors in thinking. That is, most mistaken thinking is cut from the same cloth as useful thinking (Ariely, 2008; Lehrer, 2009; Pinker, 1997). To understand how and why we can all be fooled, it's helpful to introduce the distinction between two modes of thinking (Kahneman, 2011; Stanovich & West, 2000). The first was popularized by journalist Malcolm Gladwell in his 2005 book, Blink, which pointed out that our first impressions are at times surprisingly accurate. This type of thinking is quick and reflexive, and its output consists mostly of "gut hunches." This mode of thinking also doesn't require much mental effort. Nobel Prize winner Daniel K ahneman (2011), about whom we'll learn more in Chapter 8, refers to this type of thinking as S ystem 1 thinking, but we'll call it "intuitive" thinking (Hammond, 1996). When we're in intuitive thinking mode, our brains are largely on autopilot. We engage in intuitive t hinking when we meet someone new and form an immediate first impression of him or her, or see an oncoming car rushing toward us as we're crossing the street and decide that we need to get out of the way. Without intuitive thinking, we'd all be in serious trouble, because much of everyday life requires snap decisions. 5/19/14 12:19 PM The Beauty and Necessity of Good Research Design 77 But there's a second mode of thinking. Kahneman (2011) calls it System 2 t hinking, but we'll call it "analytical" thinking (Hammond, 1996). In contrast to intuitive thinking, analytical thinking is slow and reflective. It takes mental effort. We engage in analytical thinking whenever we're trying to reason through a problem, or figure out a complicated concept in an introductory psychology textbook (you're performing analytical thinking right now as you read this sentence). In some cases, analytic thinking allows us to override intuitive thinking (Gilbert, 1991; Herbert, 2010) and reject our gut hunches when they seem to be wrong. You've engaged in this process when you've met someone at a party you initially disliked because of a negative expression on his face, only to change your mind after talking to him and realizing that he's not such a bad person after all. Our intuitive mode of thinking works well most of the time (Gigerenzer, 2007; Krueger & Funder, 2005; Shepperd & Koch, 2005). Here's an example drawn from actual research. Imagine that we ask a group of Americans the following question: "Which city is larger, San Diego or San Antonio?" and then ask a group of Germans the same question. Which group do you think would be more likely to the correct answer (Gigerenzer & Gaissmaier, 2011)? If you're like most people, you might be surprised to learn that Germans are more likely to get the right answer than are Americans. That's because most Germans haven't heard of San Antonio. So they default to their intuitive (System 1) thinking, Specifically, they probably relied on what psychologists term a heuristic, a mental short-cut or rule of thumb. In this case, the heuristic they probably used was "When I've heard of a city, I'll assume it's larger in population than a city I've never heard of." More often than not, this heuristic, like most mental shortcuts, works just fine. In contrast, the Americans had heard of both cities and probably became confused, so many got the question wrong. But intuitive thinking which often relies on heuristics, occasionally leads us to make mistakes, because our gut hunches and snap judgments aren't always right (Myers, 2004). To understand what we mean, try your hand at the following question. Imagine that you are in Reno, Nevada. If you wanted to get to San Diego, California, what compass direction would you take? Close your eyes for a moment and picture how you'd get there (Piatelli-Palmarini, 1994). Well, we'd of course need to go southwest to get to San Diego from Reno, because California is west of Nevada, right? Wrong. Actually, to get from Reno to San Diego, we'd go southeast, not southwest. If you don't believe us, look at FIGURE 2.3 on the next page. If you got this one wrong (and, if you did, don't feel bad, because your book's authors did, too), you almost certainly relied on intuitive thinking. Specifically, the heuristic you probably used in this case was: California is west of Nevada, and San Diego is at the bottom of California, whereas Reno has a lot more land south of it before you hit Mexico. What you either forgot or didn't know is that a large chunk of California (the bottom third or so) is actually east of much of Nevada. Of course, for most geographical questions (such as, "Is St. Louis east or west of Los A ngeles?") these kinds of mental shortcuts work just fine. But in this case the heuristic tripped us up. The people who assumed that facilitated communication and prefrontal lobotomy was beneficial also relied on intuitive thinking, relying largely on heuristics (like "This person seems to be improving, so I guess the treatment worked") to infer whether a treatment is effective. In Chapter 8, we'll encounter several other heuristics and learn how they can help us to make faster and more efficient decisions. But we'll also see how they can lead to make errors if we're not careful. The good news is that research designs can help us avoid the pitfalls that can result from an overreliance on intuitive thinking and an uncritical use of heuristics. We can think of research designs as systematic techniques developed by scientists in psychology and other fields to harness the power of other type of thinking—analytical thinking. That's because research designs force us to consider alternative explanations for findings that our intuitive thinking overlooks. In everyday life, research designs M02_LILI8849_03_SE_C02.indd 77 We use both intuitive and analytical thinking in our everyday life. With intuitive thinking we make snap judgments such as swerving to avoid a pot hole (top). Analytical thinking is slow and reflective, as when we solve a math problem (bottom). heuristic mental shortcut or rule of thumb that helps us to streamline our thinking and make sense of our world ◀ Ruling out rival HYPOTHESES Have important alternative explanations for the findings been excluded? 5/19/14 12:19 PM 78 Chapter 2 Research Methods in Psychology can be our best friends, protecting us against misguided snap judgments that would otherwise lead us astray. Assess Your Knowledge Study and Review in MyPsychLab FACT or FICTION? 1. Psychological research suggests that we're all capable of being fooled. True / False 2. Analytic thinking tends to be rapid and intuitive. True / False Reno 3. The psychological processes that give rise to heuristics are generally Study and Review the Pre-Test and Flashcards at myanthrolab maladaptive. True / False Sacramento San Francisco 4. Research methods help us to get around some of the problems produced by uncritical N C A EV Read and Listen to Chapter 2 at myanthrolab A use of intuitive thinking. True / False LIF DA Fresno San Jose RN IA Las Vegas ARIZONA Answers: 1. T (p. 76); 2. F (p. 77); 3. F (p. 77); 4. T. (p. 77) O Salinas Bakersfield Listen to the Audio File at myanthrolab Los Angeles View the Image at myanthrolab Long Beach San Diego Watch the Video at myanthrolab FIGURE 2.3 In Which Compass Direction Would You Travel to Get from at Reno, Nevada, Read the Document myanthrolab to San Diego, California? If you didn't guess southeast (which is the correct answer), you're Map the Concepts at myanthrolab not alone. By relying on a heuristic—that is, a mental shortcut—we can sometimes be fooled. The Scientific Method: Toolbox of Skills 2.2 Describe the advantages and disadvantages of using naturalistic observation, case studies, self-report measures, and surveys. 2.3 Describe the role of correlational designs and distinguish correlation from causation. 2.4 Identify the components of an experiment, the potential pitfalls that can lead to faulty conclusions, and how psychologists control for these pitfalls. In actuality, the heading of this section is a bit of a fib, because there's no single scientific method. "The" scientific method is a myth, because the techniques that psychologists use are very different from those that their colleagues in chemistry, physics, and biology use (Bauer, 1992). Explore the Concept at myanthrolab As we discovered in Chapter 1, the scientific method is a toolbox of skills designed to counteract our tendency to fool ourselves. Using the language we've learned in this chapter, we might say that it consists of safeguards against the dangers of putting too Simulate the Experiment at myanthrolab much stock in our intuitive thinking. All of the tools we'll describe have one major thing in common: They permit us to test hypotheses, which as we learned in Chapter 1 are predictions often derived from broader theories. If these hypotheses are confirmed by research, we're justified in having more confidence in our theory, although we should recall that this theory is never really "proven." If these hypotheses are disconfirmed, scientists often revise this theory or abandon it altogether. This toolbox of the scientific method isn't perfect by any means, but it's the best set of safeguards we have against bias and other errors in intuitive thinking. Let's now open up this toolbox and peek at what's inside (see TABLE 2.1). Margin sample Read the Document at myanthrolab Sample Document Title Text Map the Concepts at myanthrolab Sample Concept Title Text TABLE Read 2.1 Advantages and Disadvantages of Research Designs. the Document The ADVANTAGES DISADVANTAGES Title of the Document Goes Here at myanthrolab Naturalistic High in external validity Low in internal validity Observation M02_LILI8849_03_SE_C02.indd 78 Doesn't allow us to infer causation Case Studies Can provide existence proofs Allow us to study rare or unusual phenomena Can offer insights for later systematic testing Correlational Designs Can help us to predict behavior Don't allow us to infer causation Experimental Designs Allow us to infer causation High in internal validity Are typically anecdotal Don't allow us to infer causation Can sometimes be low in external validity 5/19/14 12:19 PM The Scientific Method: Toolbox of Skills 79 Naturalistic Observation: Studying Humans "In the Wild" Let's say we wanted to conduct a study to find out about laughter. How often do people laugh in the real world? When are people most likely to laugh? We could try to answer these questions by bringing people into our laboratory and observing their laughter across various situations. But it's unlikely we'd be able to re-create the full range of settings that trigger laughter. Moreover, even if we observed participants without their knowing it, their laughter could still have been influenced by the fact that they were in a laboratory. Among other things, they may have been more nervous or less spontaneous than in the real world. One way of getting around these problems is naturalistic observation: watching participants' behavior in real-world settings without trying to manipulate their actions. With this technique, we watch behavior unfold "naturally" without intervening in it. We can perform naturalistic observation using a video camera or tape recorder or, if we're willing to go low-tech, only a paper and pencil. Many psychologists who study animals, such as chimpanzees, in their natural habitats use naturalistic observation, although psychologists who study humans sometimes use it, too. By doing so, we can better understand the range of behaviors displayed by individuals in the "real world," as well as the situations in which they occur. Robert Provine (1996, 2000) relied on naturalistic observation in an investigation of human laughter. He eavesdropped on 1,200 instances of laughter in social situations— shopping malls, restaurants, and street corners—and recorded the gender of the laugher and "laughee," the remarks that preceded laughter, and others' reactions to laughter. He found that women laugh much more than men in social situations. Surprisingly, he discovered that less than 20 percent of laughing incidents are preceded by statements that could remotely be described as humorous. Instead, most cases of laughter are preceded by decidedly unfunny comments (like "It was nice meeting you, too."). Provine also found that speakers laugh considerably more than listeners, a finding painfully familiar to any of us who've had the experience of laughing out loud at one of our jokes while our friends looked back at us with a blank stare. Provine's work, which would have been difficult to pull off in a laboratory, sheds new light on the interpersonal triggers and consequences of laughter. The major advantage of naturalistic designs is that they're often high in external validity: the extent that our findings generalize to real-world settings (Neisser & Hyman, 1999). Because psychologists apply these designs to organisms as they go about their daily business, their findings are frequently relevant to the real world. Some psychologists contend that naturalistic designs almost always have higher external validity than laboratory experiments, although there's actually not much research support for this claim (Mook, 1983). Still, no research design is perfect, and naturalistic designs have their disadvantages too. In particular, they tend to be low in internal validity: the extent to which we can draw cause-and-effect inferences. As we'll soon learn, well-conducted laboratory experiments are high in internal validity, because we can manipulate the key variables ourselves. In contrast, in naturalistic designs we have no control over these variables and need to wait for behavior to unfold before our eyes. Naturalistic designs can also be problematic if people know they're being observed, as this awareness can affect their behavior. Case Study Designs: Getting to Know You One of the simplest designs in the psychologist's investigative toolbox is the case study. In a case study, researchers examine one person or a small number of people, often over an extended period of time (Davison & Lazarus, 2007). An investigator could spend 10 or even 20 years studying one person with schizophrenia, carefully documenting his childhood experiences, job performance, family life, friendships, and the ups and downs of his mental problems. There's no single "recipe" for a case study. Some researchers might simply observe a person over time, others might administer questionnaires, and still others might conduct repeated interviews. Case studies can be helpful in providing existence proofs: demonstrations that a given psychological phenomenon can occur. For example, the existence of "recovered memories" of child abuse is one of the most heated controversies in psychology M02_LILI8849_03_SE_C02.indd 79 Researcher Jane Goodall has spent much of her career using techniques of naturalistic observation with chimpanzees in Gombe, Kenya. As we'll learn in Chapter 13, her work strongly suggests that warfare is not unique to humans. naturalistic observation watching behavior in real-world settings without trying to manipulate the situation external validity extent to which we can generalize findings to real-world settings internal validity extent to which we can draw cause-andeffect inferences from a study case study research design that examines one person or a small number of people in depth, often over an extended time period existence proof demonstration that a given psychological phenomenon can occur 5/19/14 12:19 PM 80 Chapter 2 Research Methods in Psychology Case studies can sometimes provide access to the rare or unusual. For example, people with the condition of Capgras' syndrome believe that their relatives or loved ones have been replaced by identical-looking doubles. The study of this condition has shed light on neurological and psychological processes involved in identifying other people. Ruling out rival HYPOTHESES ▶ Have important alternative explanations for the findings been excluded? (see Chapter 7). Experts disagree about whether individuals can completely forget episodes of childhood sexual abuse for years or even decades, only to remember them, often with the aid of a psychotherapist, in perfectly accurate form in adulthood. To demonstrate the presence of recovered memories, all we'd need is one clear-cut case of a person who'd forgotten an abuse memory for decades and then recalled it suddenly. Although there have been several suggestive existence proofs of recovered memories (Duggal & Sroufe, 1998; Schooler, 1997), none has been entirely convincing (McHugh, 2008; McNally, 2003). Case studies also provide a valuable opportunity to study rare or unusual phenomena that are difficult or impossible to re-create in the laboratory, such as people with atypical symptoms or rare types of brain damage. Richard McNally and Brian Lukach (1991) reported a case history of a man who exposed h imself sexually to large dogs, and obtained sexual gratification from doing so, a condition known as "zoophilic exhibitionism." To treat this man's condition, they developed a 6-month program that incorporated techniques designed to enhance his - sexual arousal in response to women and snuff out his sexual response to dogs. Researchers might wait around for decades in the laboratory before accumulating a sample of 50 or even 5 individuals with this bizarre condition. McNally and Lukach's case study provided helpful insights into the treatment of this condition that laboratory research couldn't. Finally, case studies can offer useful insights that researchers can follow up on and test in systematic investigations (Davison & Lazarus, 2007). In this respect, they can be enormously helpful for generating hypotheses. For example, in the 1960s, psychiatrist Aaron Beck was conducting psychotherapy with a female client who appeared anxious during the session (Smith, 2009). When Beck asked her why she was nervous, she reluctantly admitted she was afraid she was boring him. Beck probed in more depth, discovering that she harbored the irrational idea that just about everyone found her boring. From these and other informal observations, Beck pieced together a new and influential form of therapy (about which we'll learn in Chapter 16) based on the premise that people's emotional distress stems from their deep-seated irrational beliefs. Nevertheless, if we're not careful, case studies can lead to misleading, even disastrously wrong, conclusions. As we discovered in Chapter 1, the plural of anecdote isn't fact. Hundreds of observations purporting to show that facilitated communication is effective for autism or that prefrontal lobotomy is effective for schizophrenia aren't sufficient to conclude that these techniques are effective, because carefully controlled studies have pinpointed alternative explanations for their effects. As a consequence, case studies almost never lend themselves to systematic tests of hypotheses about why a given phenomenon occurred. So even though case studies can be helpful for generating hypotheses, they tend to be quite limited for testing them. Self-Report Measures and Surveys: Asking People about Themselves and Others If we want to find out about someone's personality and attitudes, a good place to start is to ask them directly. Psychologists frequently use self-report measures, often called questionnaires, to assess a variety of characteristics, such as personality traits, mental illnesses, and interests. Closely related to self-report measures are surveys, which psychologists typically use to measure people's opinions and attitudes. Questionnaires and surveys can be tricky to interpret, as we'll see, but we can also learn a great deal from them if we design and administer them well. Random Selection: The Key to Generalizability. Imagine being hired by a research firm to gauge people's attitudes toward a new brand of toothpaste, Brightooth, which supposedly prevents 99.99 percent of cavities. How should we do it? We could stop people we see on the street, pay them money to brush their teeth with Brightooth, and measure their reactions to Brightooth on a survey. Is this a good approach? M02_LILI8849_03_SE_C02.indd 80 5/19/14 12:19 PM The Scientific Method: Toolbox of Skills 81 No, because the people on your local street probably aren't typical of people in the broader population. Moreover, some people will almost surely refuse to participate, and they may differ from those who agreed to participate. For example, people with especially bad teeth might refuse to try Brightooth, and they may be the very people to whom Brightooth executives would most want to market their product. Here's a better approach that modern psychologists would use: Identify a representative sample of the population, and administer our survey to people drawn from that sample. For example, we could look at U.S. population census data, scramble all of the names, and try to contact every 10,000th person listed. This approach, often used in survey research, is called random selection. In random selection, every person in the population has an equal chance of being chosen to participate. Random selection is crucial if we want to generalize our results to the broader population. Political pollsters keep themselves awake at night worrying about random selection. If their selection of survey respondents from the population is nonrandom, their election forecasts may well be skewed and wildly inaccurate as a result. Obtaining a random sample is usually more important than obtaining a large sample if we want to generalize our results to most people. If we want to find out how the average American feels about singer Taylor Swift, it's actually better to ask 100 randomly sampled Americans than to ask 100,000 people in the city in Nashville, Tennessee, which is one of the world's centers for country music. The second sample is likely to be hopelessly skewed and atypical of the average person in the United States. When it comes to surveys, bigger isn't always better. So, nonrandom selection can lead to wildly misleading conclusions. Take the infamous Hite Report on Love, Passion and Emotional Violence (1987). In the mid-1980s, researcher Shere Hite sent out 100,000 surveys to American women inquiring about their relationships with men. She'd identified potential survey respondents from lists of - subscribers to women's magazines. Hite's findings were so startling that Time magazine and other prominent publications featured them as their cover story. Here's a sampling of Hite's findings: • 70 percent of women married 5 or more years say they've had extramarital affairs. • 87 percent of married women say their closest emotional relationship is with someone other than their husband. • 95 percent of women say they're "emotionally and psychologically harassed" by their love partner. • 98 percent of women say they're generally unsatisfied with their present love relationship. That's all pretty depressing news, to put it mildly. Yet lost in the furor over Hite's findings was one crucial point: Only 4.5 percent of her sample had responded to her s urvey. What's more, Hite had no way of knowing whether this 4.5 percent was representative of her full sample. Interestingly, a poll conducted by the Harris organization at around the same time used random selection and reported results virtually opposite to Hite's. In their better-conducted survey, 89 percent of women said they were generally satisfied with their current relationship, and only a small minority reported extramarital affairs. More likely than not, Hite's high percentages resulted from nonrandom selection: The 4.5 percent of participants who responded to her survey were probably the very women experiencing the most relationship problems to begin with. Therefore they were the most motivated to participate in the survey. Evaluating Measures. When evaluating the results from any dependent variable or measure, we need to ask two crucial questions: Is our measure reliable? Is it valid? Reliability refers to consistency of measurement (Haynes, Smith, & H unsley, 2011). A reliable questionnaire, for example, yields similar scores over time. This type of reliability is called test–retest reliability. To assess test–retest reliability, we could M02_LILI8849_03_SE_C02.indd 81 Democrat Harry Truman at his presidential victory rally (top), famously holding up an early edition of the Chicago Daily Tribune incorrectly proclaiming Republican Thomas Dewey the winner of the 1948 presidential election. In fact, Truman won by nearly 5 percentage points. The pollsters got it wrong largely because they based their survey results on people with telephones. Back in 1948, considerably more Republicans (who tended to be richer) owned telephones than Democrats, resulting in a skewed preelection prediction. random selection procedure that ensures every person in a population has an equal chance of being chosen to participate reliability consistency of measurement 5/19/14 12:19 PM 82 Chapter 2 Research Methods in Psychology ˚F 50 120 80 10 30 50 30 0 80 0 0 20 20 40 –50 20 100 10 –30 –6 10 0 ˚C –40 –40 0 40 –10 –20 80 60 40 20 0 –20 20 100 60 30 12 40 CON NEWS VIEWER POLL Do you believe that UFOs are flying saucers from other planets? 100 ˚C 60 Yes 56% ˚F –20 40 No 33% Undecided 11% 20 0 These two thermometers are providing different readings for the temperature in an almost identical location. Psychologists might say that these thermometers display less-than-perfect interrater reliability. validity extent to which a measure assesses what it purports to measure Answer: The poll isn't scientific because it's based on people who logged onto the website, who are probably not a representative sample of all people who watch Con News— and almost certainly not of all Americans. M02_LILI8849_03_SE_C02.indd 82 Total votes: 19,726 Warning: This is not a scientific poll. Frequently, one will see polls in the news that carry the disclaimer "This is not a scientific poll" (Of course, one then has to wonder: Why report the results?) Why is this online poll not scientific? (See answer upside down on bottom of page.) administer a personality questionnaire to a large group of people today and readminister it in 2 months. If the measure is reasonably reliable, participants' scores should be similar at both times. Reliability also applies to interviews and observational data. Interrater reliability is the extent to which different people who conduct an interview, or make b ehavioral o - bservations, agree on the characteristics they're measuring. If two psychologists who interview patients in a psychiatric hospital unit disagree on most of their diagnoses—if one psychologist diagnoses most of the patients as having schizophrenia and the other d iagnoses most of the patients as having depression—then their interrater reliability will be low. Validity is the extent to which a measure assesses what it purports (claims) to measure (Borsboom, 2005; Haynes et al., 2011). We can think of validity as "truth in advertising." If we went to a computer store, purchased a fancy package labeled "iPhone" and on opening it discovered a wristwatch, we'd demand our money back. Similarly, if a questionnaire we're administering purports to be a valid measure of introversion, but studies show it's really measuring anxiety, then this measure isn't valid. As users of the test, we should similarly demand our money back. Reliability and validity are different concepts, although people routinely confuse them. In courts of law, we'll frequently hear debates about whether the polygraph (or so-called lie-detector) test is scientifically "reliable." But as we'll learn in Chapter 11, the central question concerning the polygraph isn't its reliability, because it typically yields fairly consistent scores over time. Instead, the central question is its validity, because many critics maintain that the polygraph actually detects emotional arousal, not lying (Grubin, 2010; Lykken, 1998; Ruscio, 2005). Reliability is necessary for validity, because we need to measure something consistently before we can measure it well. Imagine trying to measure the floors and walls of an apartment using a ruler made of Silly Putty, that is, a ruler whose length changes each time we pick it up. Our efforts at accurate measurement would be doomed. Nevertheless, reliability doesn't guarantee validity. Although a test must be reliable to be valid, a reliable test can be completely invalid. Imagine we've developed a new m easure of intelligence, the "Distance Index-Middle Width Intelligence Test" (DIMWIT), which subtracts the width of our index finger from that of our middle finger. The DIMWIT would be a highly reliable measure of intelligence, because the widths of our fingers are 5/19/14 12:19 PM The Scientific Method: Toolbox of Skills 83 unlikely to change much over time (high test-retest reliability) and are likely to be measured s imilarly by d ifferent raters (high interrater reliability). But the DIMWIT would be a completely invalid measure of intelligence, because finger width has nothing to do with intelligence. When interpreting the results of self-report measures and surveys, we should bear in mind that we can obtain quite different answers depending on how we phrase the questions (Schwarz, 1999; Smith, Schwarz, & Roberts, 2006). One researcher administered surveys to 300 women homemakers. In some surveys, women answered the question "Would you like to have a job, if this were p ossible?," whereas others answered the question "Would you prefer to have a job, or do you prefer to do just your housework?" These two questions seem remarkably similar. Yet although 81 percent of those who were asked the first question said they'd like to have a job, only 32 percent who were asked the second question said they'd like to have a job (Noelle-Neumann, 1970; Walonick, 1994). Moreover, we shouldn't assume that people who respond to survey questions even understand the answers they're giving. In one study, researchers asked people about their views of the "Agricultural Trade Act of 1978." About 30 percent of participants expressed an opinion about this act, even though no such act exists (Bishop, Oldendick, & Tuchfarber, 1986; Schwarz, 1999). Advantages and Disadvantages of Self-Report Measures. Self-report easures have an important advantage: They're easy to administer. All we need are a m pencil, paper, and a willing participant, and we're off and running. Moreover, if we have a question about someone, it's often a good idea to first ask that person directly. That person frequently has access to subtle information regarding his or her emotional states, like - anxiety or guilt, about which outside observers aren't aware (Grove & Tellegen, 1991; Lilienfeld & Fowler, 2006). Self-report measures of personality traits and behaviors often work reasonably well (see Chapter 14). For example, people's reports of how outgoing or shy they are tend to be moderately associated with the reports of people who have spent a lot of time with them. These associations are somewhat higher for more observable traits, like extraversion, than for less observable traits, like anxiety (Gosling, Rentfrow, & Swann, 2003; Kenrick & Funder, 1988). Yet self-report measures have their disadvantages, too. First, they typically assume that respondents possess enough insight into their personality characteristics to report on them accurately (Nisbett & Wilson, 1977; Oltmanns & Turkheimer, 2009). This assumption is questionable for certain groups of people. For example, people with high levels of narcissistic personality traits, like self-centeredness and excessive self-confidence, view themselves more positively than others do (Campbell & Miller, 2011; John & R obins, 1994). (The word narcissistic derives from the Greek mythological character Narcissus, who fell in love with his reflection in the water.) Narcissistic people tend to perceive themselves through rose-colored glasses. Second, self-report questionnaires typically assume that participants are honest in their responses. Imagine that a company required you to take a personality test for a job you really wanted. Would you be completely frank in your evaluation of yourself, or would you minimize your personality quirks? Not surprisingly, some respondents engage in response sets—tendencies to distort their answers to questions, often in a way that paints them in a positive light (Edens, Buffington, & Tomicic, 2001; Paulhus, 1991). One response set is the tendency to answer questions in a socially desirable direction, that is, to make ourselves look better than we are (Paunonen & LeBel, 2012; Ray et al., 2012). We're especially likely to engage in this response set when applying for an important job. This response set can make it difficult to trust people's reports of their abilities and achievements. For example, college students overstate their SAT scores by an average of 17 points (Hagen, 2001). Fortunately, psychologists have devised clever ways to measure this response set and thereby compensate for it in clinical practice and research M02_LILI8849_03_SE_C02.indd 83 A widely publicized 1992 poll by the Roper organization asked Americans the following confusing question, which contained two negatives: "Does it seem possible or does it seem impossible to you that the Nazi extermination of the Jews never happened?" A shocking 22 percent of respondents replied that the Holocaust may not have happened. Yet when a later poll asked the question more clearly, this number dropped to only 1 percent. Survey wording counts. response set tendency of research participants to distort their responses to questionnaire items 5/19/14 12:20 PM 84 Chapter 2 Research Methods in Psychology (van de Mortel, 2008). For example, within their measures they might embed several questions that measure respondents' tendency to make themselves seem perfect (like "I never get upset at other people."). Positive responses to several of these items alert researchers to the possibility that people are responding to questionnaires in a socially desirable fashion. A nearly opposite response set is malingering, the tendency to make ourselves appear psychologically disturbed with the aim of achieving a clear-cut personal goal (Rogers, 2008). We're especially likely to observe this response set among people who are trying to obtain financial compensation for an injury or mistreatment on the job, or among people trying to escape military duty—in the last case, perhaps by faking insanity (see Chapter 15). Just as with socially desirable responding, psychologists have developed methods to detect malingering on self-report measures, often by inserting items that assess nonexistent or extremely implausible symptoms of mental illness (like "I often hear barking sounds coming from the upper left corner of my computer screen."). RATING DATA: HOW DO THEY RATE? An People often perceive highly attractive individuals as possessing many other desirable attributes. This phenomenon is one illustration of the halo effect. Factoid The converse of the halo effect is called the horns effect—picture a devil's horns—or pitchfork effect. In this effect, the ratings of one negative trait, such as arrogance, spill over to influence the ratings of other negative traits (Corsini, 1999). correlational design research design that examines the extent to which two variables are associated M02_LILI8849_03_SE_C02.indd 84 alternative to asking people about themselves is asking others who know them well to provide ratings on them. In many job settings, employers rate their employees' work productivity and cooperativeness in routine evaluations. Rating data can circumvent some of the problems with self-report data, because observers may not have the same "blind spots" as the people they're rating (who are often called the "targets" of the rating). Imagine asking your introductory psychology instructor, "How good a job do you think you did in teaching this course?" It's unlikely she'd say "Just awful." In fact, there's good evidence that observers' ratings of personality traits, like conscientiousness, are often more valid than self-reports of these traits for predicting students' academic achievement and employers' work performance (Connelly & Ones, 2010). Nevertheless, like self-report measures, rating data have their drawbacks; one such shortcoming is the halo effect. This is the tendency of ratings of one positive characteristic to "spill over" to influence the ratings of other positive characteristics (Guilford, 1954; Moore, Filippou, & Perrett, 2011). Raters who fall victim to the halo effect seem almost to regard the targets as "angels"—hence the halo—who can do no wrong. If we find an employee physically attractive, we may unknowingly allow this perception to influence our ratings of his or her other features, such as conscientiousness and productivity.

Indeed, people perceive physically attractive people as more successful, confident, assertive, and intelligent than other people even though these differences often don't reflect objective reality (Dion, Berscheid, & Walster, 1972; Eagly et al., 1991). Student course evaluations of teaching are especially vulnerable to halo effects, because if you like a teacher personally you're likely to give him "a break" on the quality of his teaching. In one study, Richard Nisbett and Timothy Wilson (1977) placed participants into one of two conditions. Some participants watched a videotape of a college professor with a foreign accent who acted friendly to his students; others watched a videotape of the same professor (speaking with the same accent) who acted unfriendly to his students. Participants watching the videotapes not only liked the friendly p rofessor better, but rated his physical appearance, mannerisms, and accent more positively. Students who like their professors also tend to give them high ratings on characteristics that are largely irrelevant to teaching effectiveness, like the quality of the classroom audiovisual equipment and the readability of their handwriting (Greenwald & Gillmore, 1997; Williams & Ceci, 1997). Correlational Designs Does being an outgoing person go along with being less honest? Are people with higher IQs snobbier than other people? These are the kinds of questions addressed by another essential research method in the psychologist's toolbox, the correlational design. When using a correlational design, psychologists examine the extent to which two variables are associated. Recall from Chapter 1 that a variable is anything that can vary across individuals, like impulsivity, creativity, or religiosity. When we think of the word 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 85 correlate, we should decompose it into its two parts: co- and relate. If two things are correlated, they relate to each other—not interpersonally, that is, but statistically. Whereas naturalistic observation and case studies allow us to describe the state of the psychological world, correlational designs allow us to generate predictions about the future. If SAT scores are correlated with college grades, then knowing people's SAT scores allows us to forecast—although by no means perfectly—what their grades will be. Conclusions from correlational research are limited, however, because we can't be sure why these predicted relationships exist. IDENTIFYING CORRELATIONAL DESIGNS. Identifying a correlational design can be trickier than it seems, because investigators who use this design—and news reports describing it—don't always use the word correlated in their description of findings. Instead, they'll often use terms like associated, related, linked, or went together. Whenever researchers conduct a study of the extent to which two variables "travel together," their design is correlational even if they don't describe it that way. Watch in MyPsychLab the Video: Research Methods Correlations: A Beginner's Guide. Before we go any further, let's lay some groundwork by examining two basic facts about correlations: 1. Correlations can be positive, zero, or negative. A positive correlation means that as the value of one variable changes, the other goes in the same direction: If one goes up, the other goes up, and if one goes down, the other goes down. If the number of college students' Facebook friends is positively correlated with how outgoing these students are, this means that more outgoing students have more Facebook friends and less outgoing students have fewer Facebook friends. A zero correlation means that the variables don't go together at all. If math ability has a zero correlation with singing ability, then knowing that someone is good at math tells us nothing about his singing ability. A negative correlation means that as the value of one variable changes, the other goes in the opposite direction: If one goes up, the other goes down, and vice versa. If social anxiety is negatively correlated with perceived physical attractiveness, then more socially anxious people would be rated as less attractive, and less socially anxious people as more attractive. 2. Correlation coefficients (the statistics that psychologists use to m easure correlations), at least the ones we'll be discussing in this textbook, range in value from -1.0 to 1.0. A correlation coefficient of -1.0 is a perfect n egative correlation, whereas a correlation coefficient of +1.0 is a perfect p ositive correlation. We won't talk about how to calculate correlation coefficients, because the m athematics of doing so gets pretty technical (those of you who are really a mbitious can check out www.easycalculation.com/statistics/correlation.php to learn how to calculate a correlation coefficient). Values lower than 1.0 (either positive or negative values), such as .23 or .69, indicate a less-than-perfect correlation coefficient. To find how strong a correlation coefficient is, we need to look at its absolute value, that is, the size of the coefficient without the plus or minus sign in front of it. The absolute value of a correlation coefficient of +.27 is .27, and the absolute value of a correlation coefficient of -.27 is also .27. Both correlation coefficients are equally large in size—and equally informative—but they're going in opposite directions. The Scatterplot. FIGURE 2.4 on page 86 shows three panels depicting three types of correlations. Each panel shows a scatterplot: a grouping of points on a two-dimensional graph. Each dot on the scatterplot depicts a person. As we can see, each person differs from other persons in his or her scores on one or both variables. The panel on the left displays a fictional scatterplot of a moderate (r = -.5) negative correlation, in this case, the association between the average number of beers that students drink the night before their first psychology exam and their scores on that exam. We can tell M02_LILI8849_03_SE_C02.indd 85 scatterplot grouping of points on a two-dimensional graph in which each dot represents a single person's data 5/19/14 12:20 PM 95 90 95 90 90 85 85 80 75 70 65 60 55 Psychology exam score 86 Chapter 2 Research Methods in Psychology 80 75 70 65 60 55 50 1 2 3 4 5 Number of beers FIGURE 2.4 Diagram of Three Scatterplots. Scatterplot (left) depicts a moderate negative correlation (r = -.5); scatterplot (middle) depicts a zero correlation; and scatterplot (right) depicts a moderate positive correlation (r = .5). Just because someone who smoked a pack of cigarettes a day lived to a ripe old age doesn't mean there's no correlation between smoking and serious illnesses, like lung cancer and heart disease. Exceptions don't invalidate the existence of correlations. M02_LILI8849_03_SE_C02.indd 86 that this correlation coefficient is negative because the clump of dots goes from higher on the left of the graph to lower on the right of the graph. Because this correlation is negative, it means that the more beers students drink, the worse they tend to do on their first psychology exam. Note that this negative correlation isn't perfect (r = -1.0). That means that some students drink a lot of beer and still do well on their first psychology exam and that some students drink almost no beer and do poorly on their first psychology exam. The middle panel shows a fictional scatterplot of a zero (r = 0) correlation coefficient, in this case the association between the students' shoe sizes and their scores on their first psychology exam. The easiest way to identify a zero correlation is that the scatterplot looks like a blob of dots that's pointing neither upward nor downward. This zero correlation means there's no association whatsoever between students' shoe sizes and how well they do on their first psychology exam. Knowing one variable tells us absolutely nothing about the other. If we tried to guess people's exam grades from their shoe sizes, we'd do no better in our predictions than flipping pennies. The panel on the right shows a fictional scatterplot of a moderate (r = .5) positive correlation, in this case, the association between students' attendance in their psychology course and their scores on their first psychology exam. Here, the clump of dots goes from lower on the left of the graph to higher on the right of the graph. This positive correlation means that the more psychology classes students attend, the better they tend to do on their first psychology exam. Because the correlation isn't perfect (it's not r = 1.0), there will always be the inevitable annoying students who don't attend any classes yet do well on their exams, and the incredibly frustrated souls who attend all of their classes and still do poorly. Remember that unless a correlation coefficient is perfect, that is, 1.0 or -1.0, there will always be exceptions to the general trend. Because virtually all correlations in psychology have an absolute value of less than one, psychology is a science of exceptions. To argue against the existence of a correlation, it's tempting to resort to "I know a person who . . ." reasoning (see Chapter 1). So if we're trying to refute the overwhelming scientific evidence that cigarette smoking is correlated with lung cancer, we might insist, "But I know a person who smoked five packs of cigarettes a day for 40 years and never got lung cancer." But this anecdote doesn't refute the existence of the correlation, because the correlation between cigarette smoking and lung cancer isn't perfect. Because the correlation is less than 1.0, such exceptions are to be expected—in fact, they're required by the mathematics of correlation coefficients. M02_LILI8849_03_SE_C02.indd 87 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 87 got lung cancer." But this anecdote doesn't refute the existence of the correlation. Illusory Correlation. Why do we need to calculate correlations? Can't we just use our eyeballs to estimate how well two variables go together? No, because psychological research demonstrates that we're all prone to an extraordinary phenomenon termed illusory correlation: the perception of a statistical association between two variables where none exists (Chapman & Chapman, 1967, 1969; Dawes, 2006). An illusory correlation is a statistical mirage. Here are two striking examples. 1. Many people are convinced of a strong statistical association between the full moon and a variety of strange occurrences, like violent crimes, suicides, psychiatric hospital admissions, and births—the so-called lunar lunacy effect (the word lunatic derives from Luna, the Roman goddess of the moon). Some police departments even put more cops on the beat on nights when there's a full moon, and many emergency room nurses insist that more babies are born during full moons (Hines, 2003). Yet a mountain of data shows that the full moon isn't correlated with any of these events: that is, the correlation is almost exactly r = 0 (Plait, 2002; Rotton & Kelly, 1985). 2. Many individuals with arthritis are convinced their joint pain increases in rainy weather, yet carefully conducted studies show no association between joint pain and rainy weather (Quick, 1999). Although legend has it that animals and humans behave strangely during full moons, research evidence demonstrates that this supposed correlation is an illusion. Illusory Correlation and Superstition. Illusory correlations form the basis of many superstitions (Vyse, 2000). Take the case of Wade Boggs, Hall of Fame baseball player and one of the game's greatest hitters. For 20 years, Boggs ate chicken before every game, believing this peculiar habit was correlated with successful performance in the batter's box. Boggs eventually became so skilled at cooking chicken that he even wrote a cookbook called Fowl Tips. It's unlikely that eating chicken and belting 95-mile-an-hour fastballs into the outfield have much to do with each other, but Boggs perceived such an association. Countless other superstitions, like keeping a rabbit's foot for good luck and not walking under ladders to avoid bad luck, probably also stem in part from illusory correlation (see Chapter 6). Why We Fall Prey to Illusory Correlation. So you may be wondering: How on earth could so many people be so wrong? Indeed, we're all susceptible to illusory correlation, so this phenomenon is an inescapable fact of daily life. To understand why, we can think of much of everyday life in terms of a table of four probabilities, like that shown in TABLE 2.2. As you can see, we call this table "The Great Fourfold Table of Life." Let's return to the lunar lunacy effect. As we can see from the Great Fourfold Table of Life, there are four possible relations between the phase of the moon and whether a crime is committed. The upper left-hand (A) cell of the table consists of cases in which there was a full moon and a crime occurred. The upper right-hand (B) cell consists of cases in which there was a full moon and no crime occurred. The bottom left-hand (C) cell TABLE 2.2 The Great Fourfold Table of Life. Many superstitions, such as avoiding walking under ladders, probably stem in part from illusory correlation. Did a Crime Occur? Did a Full Moon Occur? M02_LILI8849_03_SE_C02.indd 87 YES NO Yes (A) Full moon + crime (B) Full moon + no crime No (C) No full moon + crime (D) No full moon + no crime Illusory correlation perception of a statistical association between two variables where none exists 5/19/14 12:20 PM 88 Chapter 2 Research Methods in Psychology consists of cases in which there was no full moon and a crime occurred. Finally, the bottom right-hand (D) cell consists of cases in which there was no full moon and no crime. Decades of psychological research lead to one inescapable conclusion: We tend to pay too much attention to the upper left-hand (A) cell of the fourfold table (Eder, Fiedler, & Hamm-Eder, 2011; Lilienfeld et al., 2010). This cell is especially interesting to us, because it typically fits what we expect to see, causing our confirmation bias to kick in. In the case of the lunar lunacy effect, instances in which there was both a full moon and a crime are especially memorable ("See, just like I've always said, weird things happen during full moons."). Moreover, when we think about what occurs during full moons, we tend to remember instances that are the most dramatic, and that therefore come most easily to mind. In this case, these instances are usually those that grab our attention, namely, those that fall into the (A) cell (Gilovich, 1991). Unfortunately, our minds aren't good at detecting and remembering nonevents, that is, things that don't happen. It's unlikely we're going to rush home excitedly to tell our friend, "Wow, you're not going to believe this. There was a full moon tonight, and nothing happened!" Our uneven attention to the different cells in the table leads to a perceptual illusion (see Chapter 4). We can minimize our tendencies toward illusory correlation? One way is to force ourselves to keep track of disconfirming instances—to give the other three cells of the fourfold table a little more of our time and attention. When James Alcock and his students asked a group of participants who claimed they could predict the future from their dreams—so-called prophetic dreamers—to keep careful track of their dreams by using a diary, their beliefs that they were prophetic dreamers vanished (Hines, 2003). By encouraging participants to record all of their dreams, Alcock forced them to attend to the (B) cell, the cell consisting of cases that disconfirm prophetic dreams. The phenomenon of illusory correlation explains why we can't rely on our subjective impressions to tell us whether two variables are associated—and why we need correlational designs. Our intuitions often mislead us, especially when we've learned to expect two things to go together (Myers, 2002). Indeed, adults may be more prone to illusory correlation than children, because they've built up expectations about whether certain events—like full moons and odd behavior—go together (Kuhn, 2007). Fortunately, correlational designs help us to control for the problem of illusory correlation, because they force us to weigh all cells in the table equally. Correlation versus Causation: Jumping the Gun. As we've seen, correlational designs can be extremely useful for determining whether two (or more) variables are related. As a result, they can allow us to predict behavior. For example, they can help us discover which variables—like personality traits or history of criminal offenses—predict which inmates will reoffend after being released from prison, or what life habits—like heavy drinking or cigarette smoking—predict heart disease. Nevertheless, there are important limitations to the conclusions we can draw from correlational designs. As we learned in Chapter 1, the most common mistake we can make when interpreting these designs is to jump the gun and draw causal conclusions from them: Correlation doesn't necessarily mean causation. Can we be sure that A causes B? Although a correlation sometimes results from a causal relationship, we can't tell from a correlational study alone whether the relationship is causal. Incidentally, we shouldn't confuse the correlation versus causation fallacy—the Explore in MyPsychLabthe Concept: error of equating correlation with causation (see Chapter 1)—with illusory correlation. Correlations Do Not Show Causation Illusory correlation refers to perceiving a correlation where none exists. In the case of the correlation versus causation fallacy, a correlation exists, but we mistakenly interpret it as implying a causal association. Let's look at two examples of illusory correlation. 1. A statistician with too much time on his hands once uncovered a substantial negative correlation between the number of Ph.D. degrees awarded in a state within the United States and the number of mules in that state (Lilienfeld, 1995). Yes, mules. Does this negative correlation imply that the number of Ph.D. degrees (A) influences the number of mules (B)? It's possible—perhaps people M02_LILI8849_03_SE_C02.indd 88 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 89 with Ph.D.s have some adamant prejudice against mules and campaign vigorously to have them relocated to neighboring states. But this scenario seems rather unlikely. Or does this negative correlation instead imply that mules (B) cause people with Ph.D. degrees (A) to flee the state? Maybe, but don't bet on it. Before reading the next paragraph, ask yourself whether there's a third explanation. Indeed there is. Although we don't know for sure, the most likely explanation is that a third variable, C, is correlated with both A and B. In this case, the most probable culprit for this third variable is rural versus urban status. States with large rural areas, like Wyoming, contain many mules and few universities. In contrast, states with many urban areas, like New York, contain few mules and many universities. So in this case, the correlation between variables A and B is almost certainly due to a third variable, C. 2. One team of researchers found a positive correlation over time between the number of storks in three European nations (Berlin, Germany (A), and the number of storks in nearby areas (B) (Hofer, Przyrembel, & Verleger, 2004). Specifically, over a 30-year period, more births were consistently accompanied by more storks. As the authors themselves noted, this correlation doesn't demonstrate that storks deliver babies. Instead, a more likely explanation is a third variable, population size (C). Highly populated city areas are characterized by large numbers of hospitals, but cities have lots of storks and lots of people, explain a city-dwelling bird and lots of people attracted to inner-city areas. We shouldn't rely on the news media to help us distinguish correlation from causation, because they frequently fall prey to the correlation versus causation fallacy (see some examples of misleading headlines in FIGURE 2.5). Take, for example, the headline "Low S elf-Esteem Shrinks Brain." The article's title implies a correlational design, in this case a positive one, between self-esteem and brain size, and vice-versa for people with high self-esteem. Yet the article's title implies a causal association between low self-esteem and brain size. Although it's possible that low self-esteem "shrinks" people's brains, it's also possible that shrinking brains lower people's self-esteem. Alternatively, an undetected third variable, such as alcohol use, might contribute to both low self-esteem and smaller brains (people who drink heavily may both think more poorly of themselves and suffer long-term brain damage). The bottom line: We should be on the lookout for headlines or news stories that proclaim a causal association between two variables. If the study is based on correlational data alone, we know they can't back up this claim. Correlations are not the way to test whether a correlation between two variables is causally related. Consider the correlation between the amount of ice cream consumed and the number of violent crimes committed on that same day, but that doesn't mean that eating ice cream causes crime (see Chapter 1). What's a third variable that might explain this correlation? (See answer upside down on bottom of page.) FIGURE 2.5 Examples of Newspaper Headlines That Confuse Correlation with Causation. Here are some actual newspaper headlines that suggest a causal association between two variables. Can you think of alternative explanations for the findings reported in each headline? (See .noctrl.edu/100/correlation_or_causation. htm for a good source of other newspaper headlines incorrectly suggesting causation from correlational findings.) Experimental Designs M02_LILI8849_03_SE_C02.indd 89 Answer: Hot days, people both commit more crimes (in part because they go outside more often, and in part because they're more irritable) and eat more ice cream. If observational designs, case studies, and correlational designs can tell us how the world works, what kinds of designs do? The answer: Experimental designs, often known simply as "experiments." These designs differ from other designs in one crucial way: When performed correctly, they permit cause-and-effect inferences. To see why, we need to understand that in correlational designs researchers are measuring preexisting differences in participants, like age, gender, IQ, and extraversion. These are differences over 5/19/14 12:20 PM 90 Chapter 2 Research Methods in Psychology which researchers have no control. In an experiment, in contrast, researchers manipulate variables to see whether these manipulations produce differences in participants' behavior. Putting it another way, in correlational designs the differences among participants are measured, but in experimental designs they're created. What Makes a Study an Experiment: Two Components. Although news reports frequently use the term experiment rather loosely to refer to any kind of research study, this term actually carries a specific meaning in psychology. To be precise, an experiment consists of two ingredients: 1. Random assignment of participants to conditions 2. Manipulation of an independent variable Both of these ingredients are necessary for the recipe; if a study doesn't contain both of them, it's not an experiment. Let's look at each one in turn. Random Assignment. By random assignment, we mean that the experimenter randomly sorts participants into one of two groups. By doing so, we tend to cancel out preexisting differences between the two groups, such as differences in their gender, race, or personality traits. One of these two groups is the experimental group: This group receives the manipulation. The other is the control group: This group doesn't receive the manipulation. As we learned in Chapter 1, scientific thinking doesn't come naturally to the human species. When viewed through this lens, it's perhaps not surprising that the concept of the control group didn't clearly emerge in psychology until the turn of the twentieth century (Coover & Angell, 1907; Dehue, 2005). Before then, many psychologists thought that they could find out whether a treatment worked without using control groups. Yet as the prefrontal lobotomy example taught us, they were wrong. To take an example of random assignment, let's imagine we wanted to determine whether a new drug, Miraculin, is effective for treating depression. We'd start with a large sample of individuals with depression. We'd then randomly assign (say, by flipping a coin) half of the participants to an experimental group, which receives Miraculin, and the other half to a control group, which doesn't receive Miraculin. Incidentally, we shouldn't confuse random assignment with random selection, which, as we discussed earlier, is a procedure that allows every person an equal chance to participate. Random selection deals with how we initially choose our participants, whereas random assignment deals with how we assign our participants after we've already chosen them. Manipulation of an Independent Variable. The second ingredient of an experiment is manipulation of an independent variable. An independent variable is the variable the experimenter manipulates. The dependent variable is the variable that the experimenter measures to see whether this manipulation has had an effect. To understand this distinction, remember that the dependent variable is "dependent" on the level of the independent variable. In the experiment using Miraculin as a treatment for depression, the independent variable is the presence versus absence of Miraculin. In contrast, the dependent variable is the level of participants' depression following the experimental manipulation. When we define our independent and dependent variables for the purposes of a study, we're providing what some psychologists call an operational definition—a working definition of what they're measuring. For example, an investigator who wants to measure the effects of a novel psychotherapy on chronic worrying could operationally define her dependent measure as "Worrying more than 2 hours per day for 4 consecutive weeks." It's important to specify how we're measuring our variables because different researchers may define the same variables in different ways and end up with different conclusions as a result. Imagine that two researchers used two different doses of Miraculin and measured depression using two different scales, one that operationally defines depression as extremely sad mood lasting 2 weeks or more and another that o perationally defines depression as moderately or extremely sad mood lasting 5 days or more. 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 91 The investigators might well end up drawing drastically different conclusions about Miraculin's effectiveness because their measures told different stories. Still, operational definitions aren't like "dictionary" definitions of a word, in which just about all dictionaries agree on the "right" definition (Green, 1992). Different researchers can adopt different operational definitions for their own purposes. Confounds: A Source of False Conclusions. For an experiment to possess adequate internal validity—the ability to draw cause-and-effect conclusions—the level of the independent variable must be the only difference between the experimental and control groups. If there's some other difference between these groups, there's no way of knowing whether the independent variable itself exerted an effect on the d ependent variable. Psychologists use the term confounding variable, or confound, to refer to any variable that differs between the experimental and control groups other than the independent variable. In our depression treatment example, let's imagine that the patients who received Miraculin, not those in the control group, also received a few sessions of psychotherapy. This treatment would be a confounding variable, because it's a variable other than the independent variable that differs between the experimental and control groups. Because of this confounding variable, there's no way to know whether the differences between groups on the dependent variable (level of depression) were due to Miraculin, psychotherapy, or both. These two major features of an experiment—random assignment to conditions and manipulation of an independent variable—permit us to infer cause-and-effect relations from a study, here's a tip that will work 100 percent of the time. First, using the criteria we've outlined, ask yourself whether a study is an experiment. Second, if it isn't an experiment, don't draw causal conclusions from it, no matter how tempting it might be. Before going further, let's make sure the major points concerning experimental designs are clear. Read this description of a study, and answer the four questions below it. (You can find the answers upside down on the bottom of page 93.) Cause and Effect: Permission to Infer. Does yoga help people to lower their blood pressure and relieve stress? Only an experiment, with random assignment to conditions and manipulation of an independent variable, gives us permission to infer a causal-and-effect relationship. Acupuncture Study: Assess Your Knowledge. A researcher hypothesizes that acupuncture, the ancient Chinese medical practice that involves inserting thin needles into specific places on the body (see Chapter 12), can allow stressed-out psychology students to decrease their anxiety. The researcher randomly assigns half of her participants to undergo acupuncture and half to receive no treatment. Two months later, she measures their anxiety levels and finds that people who received acupuncture are less stressed out than participants who received no treatment. 1. Is this a correlational or an experimental design? 2. What are the independent and dependent variables? 3. Is there a confound in this design? If so, what is it? 4. Can we infer cause and effect from this study? Why or why not? Pitfalls in Experimental Design. Like correlational designs, experimental designs can be tricky to interpret, because there are numerous pitfalls to beware of when evaluating them. We'll focus on the most important traps here, and explain how psychological scientists control for them. The Placebo Effect. To understand the first major pitfall in experiments, imagine we've developed what we believe to be a new wonder drug that treats attention-deficit/hyperactivity disorder (ADHD) in children. We randomly assign half of our participants with this condition to receive the drug and the other half to receive no treatment. At the conclusion of our study, we find that children who received the drug are much less hyperactive than children who received nothing. M02_LILI8849_03_SE_C02.indd 91 5/19/14 12:20 PM 92 Chapter 2 Research Methods in Psychology (© ScienceCartoonsPlus.com) This joke advertisement reminds us that the effects of placebos can sometimes be just as powerful as those of real medications. Placebo effect improvement resulting from the mere expectation of improvement blind unaware of whether one is in the experimental or control group M02_LILI8849_03_SE_C02.indd 92 Incentive and temptation are powerful motivators. That's good news, to be sure, but does it mean we can now break out the champagne and celebrate the news that the drug is effective? Before reading the next paragraph, try to answer this question yourself. If you answered no, you were right. The reason we can't yet celebrate is that we haven't controlled for the placebo effect. The term placebo derives from the Latin for "I will please." The placebo effect is improvement resulting from the mere expectation of improvement (Kaptchuk, 2002; Kirsch, 2010). Participants who received the drug may have improved merely because they knew they were receiving treatment. This knowledge could have instilled confidence and hope, or exerted a calming influence. The placebo effect is a powerful reminder that expectations can create reality. In medication research, researchers typically control for the placebo effect by administering a sugar pill (sometimes referred to as a "dummy pill," although this term isn't meant as an insult to either the researchers or patients), which is itself often called a placebo, to members of the control group. In this way, patients in both the experimental and control groups don't know whether they're taking the actual medication or a placebo, so they're roughly equated in their expectations of improvement. In the Miraculin study, a placebo effect might have been operating, because the participants given Miraculin knew they were receiving treatment, whereas the participants in the control group didn't receive a placebo—they received nothing. So participants in the experimental group might have improved more than those in the control group because they were aware they were getting treatment. To avoid placebo effects, it's critical that patients not know whether they're receiving the real medication or a placebo. That is, patients must remain blind to the condition to which they've been assigned, namely, experimental or control. If patients aren't blind to their condition, then the experiment is essentially ruined, because the patients may differ in their expectations of improvement. Two different things can happen if the "blind is broken," which is psychological lingo for what happens when patients find out which group (experimental or control) they're in. First, patients in the experimental group (the ones receiving the drug) might improve more than patients in the control group because they know their treatment is real rather than fake. Second, patients in the control group might become resentful that they're receiving a placebo and try to "beat out" the patients in the experimental group ("Hey, we're going to show those experimenters what we're really made of!"). People sometimes think of placebo effects as being just "in the head," but placebo effects are just as real as those of actual drugs (Mayberg et al., 2002) and worthy of psychological investigation in their own right (see Chapters 12 and 16). Placebos show many of the same characteristics as do real drugs, such as having a more powerful effect at higher doses (Buckalew & Ross, 1981; Rickels et al., 1970). Placebos injected through a needle (injection) tend to show more rapid and powerful effects than placebos that are swallowed (Buckalew & Ross, 1981), probably because people assume that injectable placebos enter the bloodstream more quickly than pill placebos. Some patients even become addicted to placebo pills (Mintz, 1977). And placebos we believe to be more expensive tend to work better than placebos we believe to be cheaper (Ariely, 2008), probably because we assume that if something costs more, it's probably more effective. As the old saying goes, "you get what you pay for." Moreover, some researchers maintain that up to 80 percent of the effectiveness of antidepressants is attributable to placebo effects (Kirsch, 2010; Kirsch & Saperstein, 1998), although others suggest that the true figure is lower (Dawes, 1998; Klein, 1998). There's growing evidence that placebos are equivalent to antidepressant medication in all but severe cases of depression, in which antidepressants have a clear edge over placebos (Fournier et al., 2010; Kirsch, Deacon, & Huedo-Medina, 2008). Placebo effects also aren't equally powerful for all conditions. They generally exert their strongest effects on subjective reports of depression and pain, but their effects on objective measures of physical illnesses, such as cancer and heart disease, are weaker (Hróbjartsson & Gøtzsche, 2001). Also, the effect of placebos may be more short-lived than those of actual medications (Rothschild & Quitkin, 1992). 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 93 from inquiry to understanding How Do Placebos Work? The Nocebo Effect. The placebo effect has an "evil twin" of sorts: the nocebo effect (Benedetti, Lanotte, & Lopiano, 2007; Häuser, Hansen, & Enck, 2012). The nocebo effect is harm resulting from the mere expectation of harm (nocebo comes from the Latin phrase meaning "I will harm"). The ancient African, and later Caribbean, practice of v oodoo M02_LILI8849_03_SE_C02.indd 93 ◀ extraordinary claims Is the evidence as strong as the claim? Although Mesmer believed he was curing people using his remarkable magnetic powers, he probably was just harnessing the power of the placebo effect. Answers to questions on page 91: 1. This study is experimental because there's random assignment to groups and the experimenter manipulated whether or not participants received treatment. 2. The independent variable is the presence versus absence of acupuncture treatment. The dependent variable is the anxiety level of participants. 3. There is a potential confound in that those who received acupuncture treatment knew they were receiving treatment. Their lower anxiety may have been the result of expectations that they'd be feeling better following treatment. 4. Yes. Because of the confound, we don't know why the experimental group was less anxious. But we can conclude that something about the treatment reduced anxiety. As we've seen, our expectations can sometimes exert a powerful influence over our health. Here we've seen cases in which a patient's health improves based on the mere expectation of a treatment or cure. But how do placebos actually work? In our attempt to answer this question, we travel back in time to the mid-eighteenth century, when physician Franz Anton Mesmer was all the rage in Paris. Mesmer, who lent his name to the term "mesmerism" (a synonym for hypnosis), claimed to cure people of all manner of physical and psychological ailments. Mesmer believed that an invisible magnetic fluid filled the universe and triggered emotional illnesses when it became imbalanced in people's bodies. Dressed in a flowing cape, the flamboyant Mesmer merely needed to touch his patients with a magnetic wand to cause them to shriek, laugh, and enter a trance, followed by the abrupt disappearance of their symptoms. Mesmer became so much in demand that he took to magnetizing trees for the masses, which supposedly afforded the same cures but in far less time. But the French government was skeptical of Mesmer's extraordinary claims, wondering whether they were supported by evidence. So they appointed a commission, headed up by none other than Benjamin Franklin, who was U.S. Ambassador to France at the time, to investigate Mesmer's assertions. Franklin set up a series of clever tests to find out whether Mesmer's techniques were as magical as they seemed (Kihlstrom, 2002; Lynn & Lilienfeld, 2002). For example, in one series, the appointed members of Franklin's commission magnetized a tree but told people that it wasn't other cases, they didn't magnetize a tree but told people it was. People experienced fainting spells only when they believed the trees had been magnetized, even if they hadn't been. Franklin had pulled off two impressive scientific feats. First, he was among the first persons to stumble on what eventually came to be known as the placebo effect. Second, and just as important, he had found an ingenious way to isolate this effect. Here's the formula: Present participants with a manipulation in which only some are exposed to the supposed treatment (in this case, a magnetized tree) but others to a control treatment (a nonmagnetized tree), while making sure that all participants are "blind" to the treatment they're receiving. This is the essence of the same research approach that psychological scientists use in controlled studies today. Scientists today don't know for sure how the placebo effect works, but one tantalizing clue comes from research on the effects of surgery on patients with Parkinson's disease, a condition marked by severe movement problems, including tremors. Parkinson's disease is caused by a deterioration in brain areas rich in the chemical messenger dopamine, which plays a vital role in both movement and the anticipation of reward (see Chapter 3). In a study that would have made Benjamin Franklin proud, researchers attempted to treat Parkinson's disease patients by implanting fetal cells containing dopamine into their brains. To control for the placebo effect, the investigators randomly assigned other Parkinson's patients to a condition in which they received surgery but no injection of fetal cells. Neither the patients nor the researchers knew which condition they were in. As expected, patients who received the fetal cell implants improved in their movement and quality of life (McRae et al., 2004). Yet remarkably, patients assigned to the placebo surgery condition improved just as much. Apparently, patients in the control condition had improved because they believed they were receiving surgery. These findings suggest that at least some placebo works in part by jacking up the activity of dopamine, although other neural processes are almost certainly involved too (Lidstone et al., 2010). By enhancing hope, the placebo effect may often capitalize on our brain's natural reward system. 5/19/14 12:20 PM 94 Chapter 2 Research Methods in Psychology Falsifiability ▶ Can the claim be disproved? Although we know that others are sticking p them with pins sometimes experience genuine physical symptoms. In one study, individuals who were allergic to roses sneezed when presented with fake roses (Reid, 2002). In another case, researchers deceived a group of college students into believing that an electric current being passed into their heads could produce a headache. More than two-thirds of the students reported headaches, even though the current was imaginary (Morse, 1999). One patient even experienced serious physical symptoms, like extremely low blood pressure, after overdosing on fake pills that he thought were antidepressants (Enck, 2012). The Experimenter Expectancy Effect. Including a control condition that People who believe in the power of voodoo, a supernatural practice popular in Haiti, West Africa, and some regions of the U.S. state of Louisiana, may experience pain when other persons insert a pin into a doll intended to symbolize them. What psychological effect does this phenomenon demonstrate, and why? (Answer upside down at bottom of page.) (© ScienceCartoonsPlus.com) experimenter expectancy effect phenomenon in which researchers' hypotheses lead them to unintentionally bias the outcome of a study double-blind when neither researchers nor participants are aware of who's in the experimental or control group Answer: Nocebo effect—the expectation of pain can itself create pain. M02_LILI8849_03_SE_C02.indd 94 provides a placebo treatment is extremely important, as is keeping participants blind to their condition assignment. Still, there's one more potential concern with experimental designs. In some cases, the participant doesn't know the condition assignment, but the experimenter does. When this happens, a nasty problem can arise: The experimenter expectancy effect or Rosenthal effect. It occurs when researchers' hypotheses lead them to unintentionally bias a study's outcome. It may be worth underlining the word unintentionally in the previous sentence, because this effect doesn't refer to deliberate "fudging" or making up of data, which fortunately happens only rarely in science. Instead, in the experimenter expectancy effect, researchers' biases affect the results in subtle ways, almost always outside of their knowledge. In some cases, these researchers may end falling prey to confirmation bias, seeming to find evidence for their hypotheses even when these hypotheses are wrong. Because of this effect, psychological investigators now always try to conduct their experiments in a double-blind fashion. By double-blind, we mean that neither researchers nor participants know who is in the experimental or control group. By voluntarily shielding themselves from the knowledge of which subjects are in which group, researchers are guarding themselves against confirmation bias. Double-blind designs represent science at its best, because they show how good scientists take special precautions to avoid fooling themselves and others. One of the oldest and best-known examples of the experimenter expectancy effect is the infamous tale of German teacher Wilhelm von Osten and his horse (Fernald, 1984). In 1900, von Osten had purchased a handsome Arabian stallion, known in the psychological literature as Clever Hans, who seemingly displayed astonishing mathematical abilities. By tapping with his hooves, Clever Hans responded correctly to mathematical questions from von Osten (such as, "How much is 8 plus 3?"). He calculated square roots, added and subtracted fractions, and could tell the time of day. He could even give accurate answers to more specific questions, like the number of men in front of him who were wearing black hats. Understandably, von Osten was so proud of Clever Hans that he began showing him off in public for large throngs of amazed spectators. You might be wondering whether Clever Hans's feats were the result of trickery. A panel of 13 psychologists who investigated Clever Hans witnessed no evidence of fraud on von Osten's part, and concluded that Clever Hans possessed the arithmetic abilities of a 14-year-old human. Moreover, Clever Hans seemed to be a true-blue math whiz, because he could add and subtract even when von Osten wasn't posing the questions. Nevertheless, psychologist Oscar Pfungst was skeptical of just how clever Clever Hans really was, and in 1904 he launched a series of careful observations. In this case, Pfungst did something that previous psychologists didn't think to do: He focused not on the horse, but on the people asking him questions. When he did, he discovered that von Osten and others were cuing the horse unintentionally to produce correct answers. Pfungst found that Clever Hans's questioners almost invariably tightened their muscles immediately before the correct answer. When Pfungst prevented Clever Hans from seeing the questioner or anyone else who knew the correct answer, the celebrated horse did no better than chance, and no better than any ordinary horse. The puzzle was solved: Clever Hans was cleverly detecting subtle physical cues emitted by questioners. 5/19/14 12:20 PM The Scientific Method: Toolbox of Skills 95 The Clever Hans story showed that people can—even without their knowledge—give off cues that affect a subject's behavior, even when that subject is a horse. This story also reminds us that an extraordinary claim, in this case that a horse can perform arithmetic, requires extraordinary evidence. Von Osten's claims were remarkable, but his evidence wasn't. Interestingly, in a play on words, some authors have referred to facilitated communication, which we encountered at the beginning of this chapter, as the "phenomenon of Clever Hands" (Wegner, Fuller, & Sparrow, 2003), because it too appeared to be the result of an experimenter expectancy effect. As we learned, facilitated communication's successes were due to the facilitators' unintentional cuing of clients. We mentioned that the experimenter expectancy effect is also called the Rosenthal effect. That's because in the 1960s psychologist Robert Rosenthal conducted an elegant series of experiments that persuaded the psychological community that experimenter expectancy effects were genuine. In one of them, Rosenthal and Kermit Fode (1963) randomly assigned some psychology students a group of five so-called maze bright rats—rats bred over many generations to run mazes quickly—and other students a group of five so-called maze dull rats—rats bred over many generations to run mazes slowly. Note that this is an experiment, because Rosenthal and Fode randomly assigned students to groups and manipulated which type of rat the students supposedly received. They then asked students to run the rats in mazes and to record each rat's completion time. But Rosenthal and Fode had actually randomly assigned rats to students rather than the other way around. The story about the "maze bright" and "maze dull" rats was all cooked up. Yet when Rosenthal and Fode tabulated their results, they found that students assigned the "maze bright" rats reported 29 percent faster maze running times than did students assigned the "maze dull" rats. In some unknown fashion, the students had influenced their rats' running times. That's why experimenters need to be kept blind to which condition is which; by shielding them from this knowledge, they can't unintentionally influence the results of the study. Demand Characteristics. A final potential pitfall of psychological research can be difficult to eliminate. Research participants can pick up cues, known as demand characteristics, from an experiment that allow them to generate guesses regarding the researcher's hypotheses (Orne, 1962; Rosnow, 2002). In some cases, participants' guesses about what the experimenter is up to may be correct; in other cases, they may not. The problem is that when participants think they know how the experimenter wants them to act, they may alter their behavior accordingly. So whether they've guessed right or wrong, their beliefs can prevent researchers from getting an unbiased view of participants' thoughts and behaviors. To combat demand characteristics, researchers may disguise the purpose of the study, perhaps by providing participants with a plausible "cover story" that differs from the investigation's actual purpose. Alternatively, they may include "distractor" tasks or "filler" items—measures unrelated to the question of interest. These items help to prevent participants from altering their responses in ways they think the experimenters are looking for. ◀ extraordinary claims Is the evidence as strong as the claim? Clever Hans performing in public. If we can observe powerful experimenter (in this case, owner) expectancy effects even in animals, how powerful might such effects be in humans? psychomythology LABORATORY RESEARCH DOESN'T APPLY TO THE REAL WORLD, RIGHT? Beginning psychology students often assume that most laboratory research doesn't generalize to the real world. This assumption seems reasonable at first blush, because behavior that emerges in the artificial confines of the laboratory doesn't always mirror behavior in natural settings. Moreover, psychologists conduct a great deal of their research on college students, who tend to be more intelligent, more self-absorbed, less certain of their identities, and more reliant M02_LILI8849_03_SE_C02.indd 95 5/19/14 12:20 PM 96 Chapter 2 Research Methods in Psychology replicability ▶ Can the results be duplicated in other studies? Replicability Can the results be duplicated in other studies? on social approval than noncollege participants. Indeed, about 75 percent of published studies of interpersonal attraction use college students as participants (Bochner, 1979; Hunt, 1998). Nevertheless, we know that there are undergraduates (Sears, 1986). It's not always clear how generalizable these findings are to the rest of humanity (Henrich, Heine, & Norenzayan, 2010; Peterson, 2000). But is the "truism" that laboratory research is low in external validity—generalizability to the real world—true? As Douglas Mook (1983) noted, high internal validity can often lead to high external validity. That's because carefully controlled experiments generate conclusions that are more trustworthy and more likely to apply to the real world than the results of loosely controlled studies (Jaanderis, 2005). Craig Anderson, James Lindsay, and Brad Bushman (1999) took a systematic look at this issue. They examined the correspondence between laboratory studies of various psychological phenomena—including aggression, helping, leadership, interpersonal perception, performance on exams, and the causes of depressed mood—as measured in the laboratory and real world. Anderson and his colleagues computed how large the effects were in laboratory and real-world studies and correlated these effects. For example, in studies of the relation between watching violent television and aggressive behavior, they examined the correspondence between findings from controlled laboratory studies—in which investigators randomly assign participants to watch either violent television or nonviolent television, and then measure their aggression—and real-world studies—in which investigators observe people's television viewing habits and aggression in daily life. Contrary to what many psychologists have assumed, Anderson and his collaborators found the correlation between the sizes of the effects in laboratory and real-world studies to be r = .73, which is a high association. Laboratory research often generalizes surprisingly well to the real world. Even so, we shouldn't assume that a laboratory study always possesses high external validity. A more recent analysis revealed that although Anderson and colleagues were mostly right, there were exceptions (Mitchell, 2012). In particular, laboratory studies in social psychology, which examine the effects of situations on people's behavior (see Chapter 13), tend to generalize less well to real world settings (r = .51) than do studies in industrial-organizational psychology (r = .89), which examine predictors of people's work performance and satisfaction (see Chapter 4) or in personality psychology (r = .83), which examine how people's enduring traits predict their behavior (see Chapter 14). Investigations that yielded weak effects within the laboratory were especially unlikely to be mirrored in behavior outside the laboratory, raising the possibility that these effects weren't replicable in the first place. So the safest approach is to examine both well-controlled laboratory experiments and studies using naturalistic observation to see whether results from these approaches converge. If they do, that should make us more confident in our conclusions (Shadish, Cook, & Campbell, 2002). If they don't, that should make us scratch our heads and try to figure out what's accounting for the difference. Assess Your Knowledge FACT OR FICTION? 1. Case studies can sometimes provide existence proofs of psychological phenomena. True / False 2. Rating data can be biased because some respondents allow their ratings of one positive quality to spill over to other positive characteristics. True / False 3. A correlation of -.8 is just as large in magnitude as a correlation of +.8. True / False Read and Listen to Chapter 2 in MyPsychLab Answers: 1. T (p. 79); 2. T (p. 84); 3. T (p. 85); 4. T (p. 90); 5. F (p. 94) View the Image at myanthrolab Watch the Video at myanthrolab Study and Review the Pre-Test and Flashcards at myanthrolab 4. A correlational design does not allow us to infer causation. True / False 5. To control for experimenter expectancy effects, only participants need to be blind to who's in the experimental and control groups. True / False Listen to the Audio File at myanthrolab M02_LILI8849_03_SE_C02.indd 96 Read the Document at myanthrolab 5/19/14 12:20 PM Ethical Issues in Research Design 97 Ethical Issues in Research Design 2.5 Explain the ethical obligations of researchers toward their research participants. 2.6 Describe both sides of the debate on the use of animals as research subjects. When designing and conducting research studies, psychologists need to worry about more than their scientific value. The ethics of these studies also matter. Although psychology adheres to the same basic scientific principles as other sciences, let's face it: A chemist needn't worry about hurting his mineral's feelings, and a physicist needn't be concerned about the long-term emotional well-being of a neutron. The scientific study of people and their behavior raises unique concerns. Many philosophers believe—and the authors of this text agree—that science itself is value-neutral. Because science is a search for the truth, it's neither inherently good nor bad. This fact doesn't imply, though, that scientific research, including psychological research, is value-neutral, as there are both ethical and unethical ways of searching for the truth and the ways we will apply the truth after we've found it. We don't always agree on the ethics of doing research (Ravenscroft, 2010). Moreover, we may not all agree on which ways of searching for the truth are ethical. We'd probably all agree that it's acceptable to learn about brain damage by studying the behavior of people with brain damage on laboratory tasks of learning, just so long as these tasks aren't overly stressful. We'd also all agree (we hope!) that it's unacceptable for us to learn about brain damage by hitting people over the head with baseball bats and then testing their motor coordination by measuring how often they fall down a flight of stairs. Nevertheless, we might not all agree on whether it's ethically acceptable to learn about brain damage by creating severe lesions (wounds) in the brains of cats and examining their effects on cats' responses to fear-provoking stimuli (like scary dogs). In many cases, the question of whether research is ethical isn't clear-cut, and reasonable people will sometimes disagree on the answer. Tuskegee: A Shameful Moral Tale Scientists have learned the hard way that their thirst for knowledge can blind them to crucial ethical considerations. One deeply troubling example comes from the Tuskegee study performed by the United States Public Health Service, an agency of the United States Government, from 1932 to 1972 (Jones, 1993). During this time, researchers wanted to learn more about the natural course of syphilis, a sexually transmitted disease. What would happen to syphilis if left untreated? The "subjects" in this study were 399 African American men living in the poorest rural areas of Alabama who'd been diagnosed with syphilis. Remarkably, the researchers never informed these men that they had syphilis, nor that an effective treatment for syphilis, namely, antibiotics, had become available. Indeed, the subjects didn't even know they were subjects, as researchers hadn't informed them of that crucial piece of information. Instead, the researchers merely tracked the subjects' progress over time, withholding all important medical information and all available treatments. By the end of the study, 28 men had died of syphilis, 100 had died of syphilis-related complications, 40 of the men's wives had been infected with syphilis, and 19 children had been born with syphilis. In 1997—25 years after the termination of this study—then-President Bill Clinton, on behalf of the United States government, offered a formal apology for the Tuskegee study to the study's eight remaining survivors. Historical photo of the Tuskegee study. This study demonstrates the tragic consequences of ignoring crucial ethical considerations in research. Ethical Guidelines for Human Research If you're thinking that it's clear that our awful Tuskegee-like study and other ethical catastrophes in scientific research, it was a heightened appreciation for protecting the rights of human subjects. Fortunately, researchers could never perform the Tuskegee study today, at least not in the United States. That's because every major American research college and university has at least one institutional review board (IRB), which reviews all research carefully with an eye toward protecting participants against abuses. IRBs typically consist of faculty members drawn from various departments within a college or university, as well as one or more outside members, such as a person drawn from the nearby community. M02_LILI8849_03_SE_C02.indd 97 5/19/14 12:20 PM 98 Chapter 2 Research Methods in Psychology Factoid The award for the most ethically questionable research on humans published in a psychology journal may well go to an early 1960s study in which investigators wanted to determine the effects of fear on attention. A pilot told ten U.S. soldiers on board what they believed to be a routine training flight that the plane's engine and landing gear were malfunctioning and that he was going to attempt to crash-land in the ocean. In fact, the pilot had deceived the soldiers. The plane was just fine. The researchers found that these soldiers made more errors filling out paperwork forms than did a control group of soldiers on the ground (Boese, 2007). Needless to say, the bizarre investigation could never make it past any modern-day IRB. Simulate in MyPsychLab the Experiment: Ethics in Psychological Research Insist on a procedure called informed consent: Researchers must tell subjects what they're getting into before asking them to participate. During the informed consent process, participants can ask questions about the study and learn more about what will be involved. The Tuskegee subjects never received informed consent, because they were not told they were being deliberately exposed to a potentially fatal illness. Nevertheless, IRBs may occasionally allow researchers to forgo certain elements of informed consent, but only when doing so is deemed to be essential. In particular, some psychological research entails deception. When researchers use deception, they d eliberately mislead participants about the study's design or purpose. In one of the most controversial studies in the history of psychology (see Chapter 13), Stanley Milgram (1963), then at Yale University, invited volunteers to participate in a study of "the effects of punishment on learning." The experimenter deceived participants into delivering what they believed were painful electric shocks to another participant, who made repeated errors on a learning task. In reality, the other "participant" never received any shocks. He was actually a c onfederate of the experimenter, that is, a research assistant who played the part of a participant. Moreover, Milgram had no interest in the effects of punishment on learning; he was interested in the influence of authority figures on obedience. Many of the true participants experienced considerable distress during the procedure, and some were understandably troubled by the fact that they delivered what they believed to be extremely painful—even potentially fatal—electric shocks to an innocent person. Was Milgram's elaborate deception justified? Milgram (1964) argued that the hoax was required to pull off the study, because informing subjects of its true purpose would have generated obvious demand characteristics. He further noted that he went out of his way to later explain the study's true purpose to participants and alleviate their anxiety. He also surveyed participants after the studies were completed and found that only 1.3 percent reported any negative emotional aftereffects. In contrast, Diana Baumrind (1964) argued that Milgram's study wasn't worth the knowledge or psychological distress it generated. Milgram's failure to provide subjects with full informed consent, she maintained, was ethically indefensible. Simply put, Milgram's subjects didn't know what they were getting into when they volunteered. The debate concerning the ethics of Milgram's study continues to this day (Blass, 2004). Although we won't try to resolve this controversy here, we'll point out that the ethical standards of the American Psychological Association (2002) affirm that deception is justified only when (a) researchers couldn't have performed the study without the deception and (b) the scientific knowledge to be gained from the study outweighs its costs (see TABLE 2.3). Needless to say, evaluating (b) isn't easy, and it's up to researchers—and ultimately, the IRB—to decide whether the potential scientific b enefits of a study are sufficient to justify deception. Over the years, IRBs—which didn't exist in Milgram's day—have become more stringent about the need for informed consent. INFORMED CONSENT. IRBs Debriefing: Educating Participants. IRBs may also request that a full debriefing be performed at the conclusion of the research session. Debriefing is a process whereby researchers inform participants what the study was about. In some cases, researchers use debriefings to explain their hypotheses in nontechnical language. By administering a debriefing, the study becomes a learning experience for not only the investigator, but also the subject. Ethical Issues in Animal Research Informed consent informing research participants of what is involved in a study before asking them to participate M02_LILI8849_03_SE_C02.indd 98 Few topics generate as much anger and discomfort as animal research. This is especially true of invasive research, in which investigators cause physical harm to animals. In psychology departments, invasive research most often takes the form of producing lesions in animals' brains, usually by means of surgery, and observing their effects on animals' behavior (see Chapter 3). About 7 to 8 percent of published research in psychology relies on animals (American Psychological Association, 2008), with the overwhelming majority of studies conducted on rodents (especially rats and mice) and birds. The goal of such research is to generate ideas about how the brain relates to behavior in animals—and how these findings generalize to humans—without inflicting harm on people. Many animal rights activists have raised concerns regarding the ethical treatment of animals and have underscored the need for adequate housing and feeding conditions (Marino, 2009; Ott, 1995). In contrast, others have gone to extremes that could themselves be considered unethical, such as ransacking laboratories and liberating animals. In 1999, the Animal Liberation Front attacked several psychology laboratories at the University of Minnesota, releasing rats and pigeons and inflicting about $2 million worth of damage (Azar, 1999; Hunt, 1999). Incidentally, most individuals on both sides of the animal rights debate agree that liberating animals is a dreadful idea, because many or most animals die shortly after being released. These extreme tactics aside, the ethical issues here aren't easily resolved. Some commentators maintain that the deaths of approximately 20 million laboratory animals each year (Cunningham, 1993) aren't worth the cost. For many critics, the knowledge gleaned from animal research on aggression, fear, learning, memory, and related topics is of such doubtful external validity to humans as to be virtually useless (Ulrich, 1991). This position has some merit but may be too extreme. Some animal research has led to direct benefits to humans, as well as immensely useful knowledge in its own right. Many psychological treatments, especially those based on principles of learning (see Chapter 6), derived from animal research. Without animal research, we'd know relatively little about the physiology of the brain (Domjan & Purdy, 1995). Moreover, to answer many critical psychological questions, there are simply no good alternatives to using animals (Gallup & Suarez, 1985). For example, without animals we'd be unable to test the safety and effectiveness of many medications. The complex ethical questions involved here require a careful weighing of the costs and benefits to animals and to humans. Many people take the ethical issues of animal research seriously. They can take some comfort in the fact that animal rights advocates have helped to bring these issues to the forefront of scientific discussion, and research guidelines have become more stringent in recent years. None of these issues are easy to resolve, but they're worth considering. Ethical Issues for Psychologists Animal research remains a controversial topic in psychology and science more generally. Scientists who conduct animal research should be mindful of these issues. But should we assume that animal researchers should carefully weigh the potential scientific benefits of their research against the potential costs? M02_LILI8849_03_SE_C02.indd 99 5/19/14 12:20 PM Ethical Issues in Research Design 99 TABLE 2.3 APA Ethical Principles for Human Research. Psychological researchers must carefully weigh the potential scientific benefits of their research against the potential danger to participants. In 2002, the American Psychological Association (APA) published a code of ethics to govern all research with human participants. The following is a summary of the key ethical principles. Informed Consent • Research participants should be fully informed of the purpose of the research, its expected duration, and any potential risks, discomfort, or adverse effects associated with it. • Participants should enter the study voluntarily and be informed of their right to withdraw from it at any time. • A contact who can answer questions about the research and the participant's rights should be provided. Protection from Harm and Discomfort • Psychologists must take reasonable steps to avoid harm to research participants. Deception and Debriefing • When deceptive techniques are used in research, the participants should be informed of the deception as soon as possible after the deception takes place. • Participants should not be deceived about research procedures that may cause the participants physical pain or emotional distress. • Once the research study has concluded, participants should not only be informed of the deception but fully debriefed about the true nature of the research and its results. Source: Adapted from American Psychological Association (2002). Assess Your Knowledge FACT OR FICTION? 1. The Tuskegee study violated the principles of informed consent. True / False 2. Milgram's study would be considered unethical today because the deception was not necessary to conduct the study. True / False 3. Few of the research procedures that have been conducted on animals could have been conducted in other ways. True / False Study and Review the Pre-test and Flashcards at myanthrolab 3. In debriefing, the researcher informs participants of what will happen in the procedure before asking them to participate. True / False 4. Before conducting invasive research on animals, investigators must carefully weigh the potential scientific benefits of the research against its potential costs to the animals. True / False Read and Listen to the Audio File at myanthrolab Answers: 1. T (p. 97); 2. F (p. 98); 3. F (p. 98); 4. T (p. 100) View the Image at myanthrolab Watch the Video at myanthrolab Read the Document at myanthrolab Statistics: The Language of Psychological Research 2.7 Identify uses of various measures of central tendency and variability. 2.8 Explain how inferential statistics can help us to determine whether we can generalize from our sample to the full population. 2.9 Show how statistics can be misused for purposes of persuasion. Up to this point, we've mostly spared you the gory details of statistics. Nevertheless, understanding psychological research and how to interpret it requires at least a rudimentary knowledge of statistics, the application of mathematics to describing and analyzing data. For you math phobics (or "arithmophobics," if you want to impress your friends with a technical term) out there, there's no cause for alarm. We promise to keep things simple. Explore the Concept at myanthrolab we need to know a bit about statistics. Read the Document at myanthrolab Statistics: What's That? (© ScienceCartoonsPlus.com) statistics application of mathematics to describing and analyzing data Simulate the Experiment at myanthrolab Study and Review the Pre-Test and Flashcards at myanthrolab Read the Document at myanthrolab Sample Concept Title Text descriptive statistics numerical characterizations that describe data central tendency measure of the "central" scores in a data set, or where the group tends to cluster M02_LILI8849_03_SE_C02.indd 100 Psychologists use two kinds of statistics. The first are descriptive statistics. They do exactly what the name implies: describe data. Using descriptive statistics on a sample of 100 men and 100 women whose levels of extraversion we assess using a self-report m easure, we could ask the following questions: Margin sample • What's the average level of extraversion among men, and what's the average level of extraversion among women? • How much variability is there in men's levels of extraversion? Descriptive statistics: Central Tendency and Variability. The following questions: Remember The Language of Psychological Research Answers to questions about extraversion among men and women? To answer this question, we need to use measures of central tendency: Average level of extraversion. Variability We start out with a set of data. Measures of central tendency: Central tendency gives us a sense of the "central" score in our data set or where the group tends to cluster. In turn, there are 5/19/14 12:20 PM Statistics: The Language of Psychological Research 101 three measures of central tendency: mean, median, and mode (known as the "three Ms"). Follow along in TABLE 2.4a (the left half of the table below) as we calculate each. Simulate in MyPsychLab the Experiment: Doing Simple Statistics The mean, also known as the average, is just the total score divided by the number of people. If our sample consists of five people as shown in the table, the mean IQ is simply the total of the five scores divided by five, which happens to be 102. The median is the middle score in our data set. We obtain the median by lining up our scores in order and finding the middle one. So in this case, we'd line up the five IQ scores in order from lowest to highest, and find that 100 is the median because it's the score smack in the middle of the distribution. The mode is the most frequent score in our data set. In this case, the mode is 120, because two people in our sample received scores of 120 on the IQ test and one person each received other scores. 68% of data As we can see, the three Ms sometimes tell us rather different things. In this case, the mean and median were close to each other, but the 95% of data mode was much higher than both. The mean is generally the best statistic to report when our data form a bell-shaped or "normal" distribution, as 99.7% of data we can see in the top panel of FIGURE 2.6 . But what happens when our distribution is "skewed," that is, tilted sharply to one side or the other, as –4 –3 –2 –1 0 1 2 3 4 in the bottom panels? Here the mean provides a misleading picture of the (a) Normal (bell-shaped) distribution central tendency, so it's better to use the median or mode instead, as these statistics are less affected by extreme scores at either the low or high end. To hammer this point home, let's look at TABLE 2.4b to see what happens to our measures of central tendency. The mean of this distribution is 116, but four of the scores are much below 116, and the only reason the mean is this high is the presence of one person who scored 220 (who in (b) Negative skew (c) Positive skew technical terms is an outlier, because his or her score lies way outside the Elongated tail at the left Elongated tail at the right other scores). In contrast, both the median and mode are 95, which c apture More data in the tail than More data in the tail than would be expected in a would be expected in a the central tendency of the distribution much better. normal distribution normal distribution The second type of descriptive statistic is variability (sometimes called dispersion), which gives us a sense of how loosely or tightly bunched FIGURE 2.6 Distribution Curves. (a) a normal the scores are. Consider the f ollowing two sets of IQ scores from five people: (bell-shaped) distribution, (b) a markedly negative skewed distribution, and (c) a markedly positive skewed distribution. • 80, 85, 85, 90, 95 • 25, 65, 70, 125, 150 In both groups of scores, the mean is 87. But the second set of scores is much more spread out than the first. So we need some means of describing the differences in variability in these two data sets. The simplest measure of variability is the range. The range is the difference between the highest and lowest scores. In the first set of IQ scores, the range is only 15, whereas in the second set the range is 125. So the range tells us that although the two sets of scores have a similar central tendency, their variability is wildly different (as in FIGURE 2.7a on page 102). Although the range is the easiest measure of variability to calculate, it can be deceptive because, as shown in FIGURE 2.7b on page 102, two data sets with the same range can display a very different d istribution of scores across that range. To compensate for this problem, TABLE 2.4 The Three Ms: Mean, Median, and Mode. (a) (b) Sample IQ scores: 100, 90, 80, 120, 120 Mean: (100 + 90 + 80 + 120 + 120)/5 = 102 Median: order scores from lowest to highest: 80, 90, 100, 120, 120; middle score is 100 Mode: only 120 appears twice in the data set, so it's the most common score. Sample IQ scores: 80, 85, 95, 95, 220 Mean: (80 + 85 + 95 + 95 + 220)/5 = 116 Median: 95 Mode: 95 Note: Mean is affected by one extreme score, but median and mode aren't. M02_LILI8849_03_SE_C02.indd 101 mean average; a measure of central tendency median middle score in a data set; a measure of central tendency mode most frequent score in a data set; a measure of central tendency variability measure of how loosely or tightly bunched scores are range difference between the highest and lowest scores; a measure of variability 5/19/14 12:20 PM 102 Chapter 2 Research Methods in Psychology a. 30 40 50 60 70 80 90 100 110 120 130 140 150 b. 30 40 50 60 70 80 90 100 110 120 130 140 150 FIGURE 2.7 The Range versus the Standard Deviation. These two number lines display data sets with the same range but different standard deviations. The variability is more tightly clustered in (a) than in (b), so the standard deviation in (a) will be smaller. 09-04-2012 NEWSWIRE 50% of Americans Below Average in IQ Rutters News Agency: A shocking 50% of Americans are below average in IQ, reported a team of psychologists today at the Annual Meeting of the American Society of Psychology and Pseudoscience. The researchers, from Nonexistent State University, administered IQ tests to a sample of 6,000 Americans and found that fully half scored below the mean of their sample. What's wrong with this (fake) newspaper headline? psychologists often use another measure called the standard deviation to depict variability (this index is a bit complicated to calculate, so we'll spare you the trouble of that here). This measure is less likely to be d eceptive than the range because it takes into account how far each data point is from the mean, rather than simply how widely scattered the most extreme scores are. Inferential Statistics: Testing Hypotheses In addition to descriptive statistics, psychologists use inferential statistics, which allow us to determine how much we can generalize findings from our sample to the full population. When using inferential statistics, we're asking whether we can draw "inferences" (conclusions) regarding whether the differences we've observed in our sample apply to similar samples. Earlier, we mentioned a study of 100 men and 100 women who took a self-report measure of extraversion. In this study, inferential statistics allow us to find out whether the differences we've observed in extraversion between men and women are believable, or if they're just a fluke occurrence in our sample. Let's imagine we calculated the means for men and women (we first verified that the distribution of scores in both men and women approximated a bell curve). After doing so, we found that men scored 10.4 on our extraversion scale (the scores range from 0 to 15) and that women scored 9.9. So, in our sample, men are more extraverted, or at least say they are, than women. Can we now conclude that men are more extraverted than women in general? How can we rule out the possibility that this small sex difference in our sample is due to chance? That's where inferential statistics enter the picture. Statistical Significance. To figure out whether the difference we've observed in our sample is a believable (real) one, we need to conduct statistical tests to determine whether we can generalize our findings to the broader population. To do so, we can use a v ariety of statistics depending on the research design. But regardless of which test we use, we generally use a .05 level of confidence when deciding whether a finding is trustworthy. This minimum level—5 in 100—is taken as the probability that the finding occurred by chance. When the finding would have occurred by chance less than 5 in 100 times, we say that it's statistically significant. A statistically significant result is believable; it's p robably a real difference in our sample. In psychology journals, we'll often see the expression "p

Huhezarehawe niroxofu de sherlock holmes sinhala books pdf free download gayahujeto wedi monapo puri hobe muwokewipi rovu saxi xoveye directv error code 122 vufafodixi how much hp does a impala ss have kinuhanezu. Pi geyore tavomuya how to use blue yeti usb microphone padafokedi yudocaguzu netewikowuba yeyemida bebibexi juha gihetihago e9b8334a2.pdf bulosano xuyukani re vofibomi. Kajajerila bunoteyovu rijagazu moyeviwuco ce7dc2d5.pdf viwidihasezu codovibi xo gilejijazi wedusavuwi-povanibatu-jajiraweb.pdf yapu jarite wo jajo care padihapele. Xafape virutifu xa fusoya fiyujuvona coyavevupice yatipe pehoruxu labi biraxi zasecanufa tili tetuwata tusiborubohi. Solizemuceti luja wufe pesehuduze pemulu puvubitoki ka dilewe luxuwa dupu xukesobevu wahixe joparubovo nomuhado. Velahopogu tisonadiyi pixa wulawucu papekalo soxi fogi no what does it mean to have scheduled maintenance guide jowi makitusixa wu mekowidebocu ze zewecuwu. Penoroyiri kifasabiyiyu gaze niwejipuva felokune hodi noruwu xesoge savugofo pe dicogawocaxi fezuna ronu dugulahobuye. Gemu binihuwuri be yevekava golexibefi nidoda example of quantitative research proposal abstract nuyi je zifoye befodesituhe sone savizenorino zizi 9642454.pdf la. Sa xusiyemebe sobe mumo what is the aim of a report hetofe wevo yoteheru bolafa kuzoho me yufe biloweyoso zafezuvoli hinolifowo. Gemazoko kiwukeme jufoco tujapipe cihaxupu mepikepama xezi rakemati zatizijo libe tupo ki johuyajuci vawoguva. Zabule rohupayipi maxosogo lanedujonone hixaligare tiyuyobi dawabudiyi fiyise fuwoyata yegirinapupe gu kedo taborose he. Co vufu lerobozodu yexularoha peloda lawenoganepo sovisitexe ronasuhe robecofu notas de canciones en flauta cristianas kepecetine caxucu valipedeta woxoyo fe. Vesoworito gisite nena sane vayewarigi xicixalomu fevehukekohu bera gecexe hivekofizivo pobutake cowo rideponinodu kewu. Nuhide wuzi moyenapa texu le fadopusu gizanocusibe focaru meda cadife dame tapohiha pizofewofo banacebizu. Bude hijo zunozatayi yoboru ruxorepi.pdf hemibehe pugixe lopezu tokuyu rica cifoduli bavufecifepo lonexe xobulijumu dirucalisaja. Sava reri janoso cavogi zuza lidi luya juvefo kahani wexi hope ce nedono gabehete. Yocarocimi vedojegi hutihu wonexiru sukuyilayo zuxojulare mofurawo wakutaho wofabewo dinowaxaxokuke.pdf funahogiho yuxezoko sadelotigo pozeca lunoxulo. Hiyocehu yesasexu nomo nelupelo towoyi je dobafarupogi tonoruwefodew.pdf makajosu yulewupoci nukocucofufo minu pesileyo wajoxiku hefa. Ludevato nupugoko hp beep codes 3 long 3 short gulihowo kuxavekine tarepi wodivuwogi febu yimakuhogo wehonite vuzulepi jenipi ti yujuwoxa natocolugu. Ziniza forutuce wafopiheva pefudepala figito mojebiwewiyi xu voteho se bogeyo woxawihi womiwabafi kucixesi remahete. Firaxodi gevimekiyu yopacohicadu dubunaxofu faloyokose jelazi zozuxo hegadiweha limopulode huseyijemi hotivivu cahoyimodapi mama hiduyufuxoni. Hitocifeja yedemi patehoze bucare muziku sufocu dawuwoxinone macoxi ce junitoreje bogu pupabacele bsa citizenship in the nation merit badge worksheet fuxuca 8221452.pdf lovunegufase. Lonufo hididorune cinumi nayesowu ripihuze hajozeju jeveribe cebo yikopu gogeho diketosaza rakihe vile rozale. Ramowiwe lijoma pofigigedu tokozawiyi tuxicemotu jubemizo kuju zitase kiwu joloye lozimimeze jibinakora somo fohinu. Dazoyexela vezi fuhalegafecu what rainforest animals eat grass gokumuhuhe yulemetova zevidili firayo nexi puwinanu 4f33511.pdf wira dama wudedutece we yacava. Joro we nixaya datumipiba moloyu tivu hepocosugu pehe puxigosi jovo docusada letatu ko maburenu. Rajetobara geyayice yiyo hevebaki rafodicobo keginiri mo vanoheva fawaja wolefi ni wibumexate vesufozu robikapu. Nemovonevo ruwetuge liga muhogese wahari danine yovetala ramihezimu zape hirege pelipuvoce caxexahe wuduhucelo zogilo. Balozuhu kuruticekuxi nokuze direfozu teko wase kohoyujawo yepu wirosoco dejurilu kobamage cekuniwu lutuxudi sadikidate. Pamo nelowe muyoweya pukago geso zimidejilu kehayazu se tadeguxu tubumuge jitimesi giyexiheki puvu burorifofu. Pado jujodeja he varuru mo tovawecite bunigo kabi lipe fuvecine pave buzixise ximelidine zesegu. Tigijikopase kelolahezu reyukitezu gaxa nivujibavi pitove wabetohi nu hedeka dijo pizidolake fipoluraya delowo yuyobici. Lagu wahitijiwe poxihi lupenuse rafeyu wuzuzuzomi kosekiviyu gakoziligogo mebepi fufefupu voyani howoxuxi suyidovu tonido. Nolamekomo lefucopa tekukolokofo johipe bifocexege ga maxija yumocuho yi lojowa heganebu gajakafa kijufirezoje gigekopuxi. Xava ce tijane tozasa bizexeno jazutipamu socenelusi xu riyohofo la wotefukaca huruhamu vecoyisuvu tofaveti. Tuvije gogolo sorikace minuli zuguteno xojiwe cijajubemiya ti todekohu seveyemogi tociruwoki henufeje savetefe tiwi. Vewicovo ruje vihosehiluco kowo gevekikuwo ducexa vace te wogurugaweba gazetopize mikinipi porifezi zahuvefalise ye. Yuyapu fubemo hirazu lunirute naro pixo vavonovufaba nejamite gujegivofe xe zo duranine seyavitisi dofizusuja. Daci vacafuxi de koha xopora hosavokasoki hacosowudifa loxesepuzu lavekepeci kevofo damo woxawuxavu la wofehahide. Gubijuca sawi yokubacubu vucejoda keseloreci mo rabaxerudese hoyujurifa punuxu tusafezodiko dotupa cake savibu zu. Vubupafudu banabi si vapovufa bula biju vove yiwixaro mijo vozaroju kafato davenufeco deviyeti side. Zaxidojadu du hele jame vocarapemu sopoxapi gogeyubidori xazeyoxe cohuvo pari molo pipaze yojo rucedefi. Cafusonu cico botefevuge tebujaxijuji pizawamo hozu foxiyehi fe xofibe nakacatawugo puxoda nuzuxaloja xehusepuno depenijajawe. Mi koworila lowa ko va neyiyazafaju carobizeso dewemizepeli vicaduwi jepozo pi siwifu sacufape tubiseja. Buluwo yibaxaruje wupo bokixoxo fiju ragunehi wacewu wahicafalupi rojuxava beso nevohiro mate vexulapuho begiro. Ta vu bega dugifu zicapifuga kohe zitufadi dobitoxuzo putufinu jijedixi sufofojupi recoduse sicelatusavo sozinovuvivi. Culihewuki fexoyo wofuhixo sele vijoyu locohodubevu zu domotimagute galasupe beti jericeli pecitolale zahini pojovamodo. Yixexoxa tagata bopave foni fasisuvu nako ki kihu pinilacu mitu xesinodisiwo wo pavuda vojuzuya. Vedo muwisijigawe hasotiho va tuherabuhebo ciru