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Behavioral Corporate Finance

Concepts and Cases for Teaching Behavioral Finance



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Hersh Shefrin

Behavioral Corporate Finance

Concepts and Cases for Teaching Behavioral Finance

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Concepts and Cases for Teaching Behavioral Finance

Second Edition

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BEHAVIORAL CORPORATE FINANCE: CONCEPTS AND CASES FOR TEACHING BEHAVIORAL FINANCE,
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To my wife Arna
for her unfailing support
and gracious forbearance
during the many hours I spent developing
the manuscripts for both editions;
and to my students for their invaluable
feedback from working through the ideas
in this book.

About the Author



Hersh Shefrin *Santa Clara University*

Hersh Shefrin, who holds the Mario L. Belotti Chair in the Department of Finance at the Leavey School of Business, is one of the pioneers of behavioral finance. He has published widely in the area and writes for both academics and practitioners. Professor Shefrin regularly teaches behavioral finance courses and often speaks on the subject to financial executives, portfolio managers, security analysts, risk managers, and financial planners both in the U.S. and abroad.

In 1999, his book, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing*, was published by Harvard Business School Press. This is the first comprehensive treatment of behavioral finance written specifically

for practitioners. In 2002, Oxford University Press, who assumed publication of the book, released an edition with a revised preface to reflect recent events and developments.

In 2001, Professor Shefrin edited a three-volume collection, entitled *Behavioral Finance*, published by Edward Elgar. In addition to seminal papers in this rapidly developing field, these volumes contain some of the pioneering works in psychology, upon which behavioral finance is based.

In 2005, his book, *A Behavioral Approach to Asset Pricing*, was published by Elsevier. This is the first book to develop behavioral pricing kernel theory, thereby providing a unified, comprehensive behavioral approach to the main elements of asset pricing theory: stochastic discount factor, mean-variance portfolios, beta, option pricing, and the term structure of interest rates. A second edition of this book was published in 2008.

In 2008, after the publication of the first edition of this book, Professor Shefrin published a related book titled *Ending the Management Illusion*, which described how behavioral corporate finance could be taught using a simulation game. The gaming approach places students in a decision environment in which both their intellects and emotions are engaged. Students work together in groups, making decisions to run a simulated company, in a setting that provides them with an opportunity to identify their own psychological tendencies, the tendencies of others, and to develop processes and group cultures that mitigate their vulnerability to behavioral pitfalls.

In 2010, Professor Shefrin published a monograph titled *Behavioralizing Finance*. The monograph discusses both the strengths and weaknesses to the behavioral approach, and suggests some directions for strengthening the weaknesses.

In 2016, Professor Shefrin published a book titled *Behavioral Risk Management*. As the title suggests, the book describes the applicability of behavioral concepts to risk management, suggesting that risk managers augment their quantitative skill sets to include psychological elements. Risk management is a very broad area, as most corporate finance textbooks make clear, and applies to corporate finance.

Professor Shefrin's scholarly articles have appeared in the *Journal of Finance*, the *Journal of Financial Economics*, the *Review of Financial Studies*, the *Journal of Financial and Quantitative Analysis*, *Financial Management*, the *Financial Analysts Journal*, the *Journal of Portfolio Management*, and the *Journal of Economic Behavior & Organization*.

Professor Shefrin completed his PhD at the London School of Economics in the economics of uncertainty; he earned a Master of Mathematics from the University of Waterloo and a BS (Honours) in economics and mathematics from the University of Manitoba. He also holds an honorary doctorate from the University of Oulu, Finland.

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Preface to the Second Edition

GOALS AND STRUCTURE

The second edition of *Behavioral Corporate Finance* comes a decade after the publication of the first edition, which was the first textbook dedicated to providing instructors with a comprehensive pedagogical approach for teaching students how behavioral concepts apply to corporate finance. This second edition contains a great deal of new material, as the academic literature in behavioral corporate finance a decade ago was nascent. Notably, in the last 10 years this literature has mushroomed, and so the second edition has much upon which to draw.

Feedback from adopters of the first edition provides testimony to the fact that the examples and cases in the first edition are unique in bringing behavioral corporate finance alive. This is especially true of the minicases that conclude each chapter of the first edition. The second edition contains a completely new set of minicases. However, almost all of the minicases used in the first edition are still available in the Additional Resources (available online) that accompany each chapter.

The goals and structure of the second edition are the same as in the first edition. The primary goal is to identify the key psychological obstacles to value maximizing behavior, along with steps that managers can take to mitigate the effects of these obstacles. In this respect, instructors should view this book as a complement to traditional texts in corporate finance, not as a substitute. Notably, neither students nor instructors require a background in psychology to understand the key psychological concepts. All the key concepts can be grasped intuitively, and are easily related to financial decisions.

The second edition can be viewed as something of an out-of-sample test. Most of the examples and cases identified psychological phenomena in specific companies. The second edition provides an opportunity to trace the implications of those phenomena over the subsequent decade. Readers can judge for themselves whether the rest of those stories were random outcomes, or instead natural outcomes of the underlying psychological phenomena being present. The same remark applies to the book *Ending the Management Illusion*, which is a companion treatment to the first edition and analyzes a completely different set of companies. Readers can judge for themselves whether, after the publication of the book, the companies identified as being psychologically smart went on to become successful and whether those that were identified as being psychologically challenged went on to exhibit poor performance, if not outright failure.

Based upon advice from reviewers, the second edition features two new chapters, and some rearrangement of chapter order from the first edition. The first new chapter, Chapter 1, introduces the psychological foundations in depth. As a result, instructors no longer need to rely on online Additional Resources for this material.

The second new chapter is Chapter 13, on investments. This chapter extends the discussion from the application of behavioral concepts to corporate finance alone to their application to investments. As a result, the book can be used to teach dedicated courses in behavioral finance, not just corporate finance. To this end, instructors can use the book to teach behavioral finance in much the same order that they teach

traditional finance: corporate finance first, followed by investments. At the same time, the book has a modular structure, and therefore can be used as a secondary text in regular investment courses as well as regular corporate finance courses. In this regard, Chapter 1, which provides the behavioral foundations, Chapter 3 on valuation, and Chapter 5 on market efficiency apply to investments as well to corporate finance.

As was mentioned in the Preface to the first edition, many traditional finance textbooks, in both corporate finance and investments, have added behavioral chapters. These additions serve as testimonials to the importance of behavioral ideas for finance. At the same time, there is a limit to how much can be accomplished within the confines of a single chapter, especially when it comes to integrating behavioral concepts into the treatment of traditional topics. Coverage of behavioral issues in traditional texts through a single-chapter approach has tended to be at best surface level, providing students with a behavioral flavor but not with the in-depth skills required to understand, identify, and deal with behavioral phenomena.

Teaching behavioral corporate finance is much more effective when the primary focus is a specific topic such as capital budgeting or capital structure, and the discussion focuses on the psychological dimension of the topic in question. In contrast, placing primary focus on psychological phenomena rather than specific corporate finance topics shifts attention away from integration. A similar remark applies to investments. For example, lumping technical analysis and behavioral finance into a single chapter, as some authors do, is not only misleading but also takes focus away from the very significant behavioral dimension in almost all other aspects of investment. This book provides instructors in mainstream finance courses with a resource that will allow them to identify the behavioral dimension in each topic they teach, and offer their students an integrated approach that combines traditional and behavioral perspectives.

ORGANIZATIONAL DESIGN

This book identifies the key behavioral concepts associated with every major topic in corporate finance: capital budgeting, capital structure, valuation, dividend policy, corporate governance, and mergers and acquisitions. However, the book provides only a brief summary of the traditional approach to each topic, whose purpose is to provide context. Instructors are assumed to teach the traditional approach from the traditional textbook of their choice. Instructors who use this book as a behavioral supplement in a traditional finance course can cover topics in the traditional manner, and then follow up the discussion by introducing the behavioral dimension. Instructors who use this book to teach a behavioral finance course can build on prior finance courses, and briefly summarize the traditional approach before introducing the behavioral approach to each topic. Questions and minicases appearing at the end of the chapters are designed to help students recognize the strength, magnitude, and persistence of behavioral phenomena in financial decision making.

Chapter 11 broadens the discussion of Chapter 9 from the first edition and makes the point that financial management means more than corporate finance. Rather, financial management entails the integration of corporate finance and management, meaning the incorporation of the psychological dimension into corporate financial decision making. Failures in financial management, especially risk management,

lie at the heart of the global financial crisis. Examples from the financial crisis illustrate the main ideas in the chapter.

With a few exceptions, each chapter is devoted to a traditional topic. The exceptions are Chapters 1, 2, 11, and 13. Chapters 1 and 2 introduce the key psychological concepts used throughout the book. Chapter 1 provides a detailed presentation of 10 important psychological concepts, with the emphasis on psychology, not finance. Chapter 2 is devoted to explaining how these concepts apply to finance, and it is a prerequisite for every subsequent chapter. Every other chapter explains how concepts developed in Chapters 1 and 2 apply to traditional topics in corporate finance and to investments. Notably, Chapter 2 has been written to be self-contained, and so those wishing to proceed directly to the application of the 10 key psychological concepts can do so without working first through Chapter 1.

For example, Chapter 1 introduces students to the concept of excessive optimism, and Chapter 2 describes how it impacted the decisions of the CEO of a specific firm. Chapter 3 then describes how excessive optimism affects valuation. Chapter 4 describes how excessive optimism affects capital budgeting. Chapter 7 describes how excessive optimism affects capital structure. The main issue is not to be repetitive about the fact that corporate managers tend to be excessively optimistic. The main issue is to explain how excessive optimism impacts the different decisions that managers are called upon to make.

Chapter 11 is entitled Financial Management and Group Process, and does not have an obvious counterpart in traditional textbooks on corporate finance. This chapter makes the point that financial management involves more than just corporate finance, but instead entails the integration of corporate finance and management.

Chapters follow a set format. Behavioral objectives for learning introduce each chapter. Most chapters have a section that provides a brief overview of the traditional approach to the topic at hand. The remainder of the chapter then focuses on developing the behavioral concepts and applications.

In order to help students focus on the underlying psychological issues, “Concept Preview Questions” are used. These are intended to help students reflect on how their own minds approach information and decision tasks. Thematic boxes, labeled “Behavioral Pitfalls” provide brief illustrations of business situations that feature the psychological phenomena being discussed. Hints for mitigating bias and error are provided in thematic boxes labeled “Corporate Nudges,” or in the case of Chapter 13 “Investor Nudges.”

Chapter summaries review the main points of the chapter in relation to the learning objectives. Chapter questions provide focused exercises to help students learn the key points in the chapter. Every chapter concludes with a minicase, allowing students the opportunity to develop the skills of recognizing psychological phenomena within the context of real world events.

The behavioral objectives, concept preview questions, thematic boxes and chapter summaries contain the major points in the book. Illustrative examples, anecdotes and cases serve as the most effective way of communicating general findings and ideas. Most students relate easily to stories. However, the stories are only intended to communicate the main points. The general evidence is based on the academic studies described in the book.

As was mentioned above, Chapters 1 and 2 are prerequisites to all the remaining chapters. However, all remaining chapters essentially stand alone, so that instructors have the flexibility to choose whichever chapters they deem appropriate, and in whatever order they find most useful.

INTENDED MARKET: CORPORATE FINANCE COURSES

I have written *Behavioral Corporate Finance* for use in any course devoted to teaching either corporate finance or behavioral finance. For traditional courses in corporate finance, I see the book being used as a supplement to any traditional textbook that serves as the primary course text. This pairing of a traditional primary corporate finance text and *Behavioral Corporate Finance* provides a powerful way to augment the teaching of traditional skills with an understanding of the psychological factors that influence the application of these skills in practice. In this respect, *Behavioral Corporate Finance* contains many real-world examples and case studies, designed to bring the behavioral concepts to life. Similar remarks apply to courses in Investment, which can draw on Chapter 13.

Behavioral pitfalls represent one of the most important obstacles to the successful implementation of the skills taught in traditional corporate finance courses. When it comes to improving the financial decision process, understanding these pitfalls is absolutely essential. Therefore, a crucial challenge is to teach students nudging techniques for avoiding psychological pitfalls identified in the behavioral decision literature, as well as how to deal with others that do fall into the associated traps.

INSTRUCTOR RESOURCES

All of the instructor resources for this text are available on the book web site at www.mhhe.com/shefrin2e. We put them in one place for easier access and convenience.

- The *Instructor's Manual* includes a chapter overview, learning objectives, key terms, and presentation of the material which organizes the material around the PowerPoint Presentation. Solutions to the end of chapter questions and minicases are also provided.
- *PowerPoint Presentation Slides* contain key points and summaries to help instructors give lectures on the main ideas in the chapter.
- *Test Bank*, prepared by David Distad of the University of California, Berkeley, contains a variety of true/false questions, multiple choice, and essay questions. Complete answers are provided for all test questions and problems.
- *Additional Minicases and Case Analysis Questions* for selected chapters are referenced in the text and available online.

For those interested in using *Behavioral Corporate Finance* as a text in a course dedicated to behavioral finance, additional teaching resources are also provided on the book web site. These resources expand the material presented in most chapters and have been referenced in the text. In addition, separate chapters dealing with real options and investments are also available on the web.

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*Hersh Shefrin
Santa Clara University*

Chapter One

Behavioral Foundations

The main objective of this chapter is for students to demonstrate that they can describe 10 specific psychological phenomena that impact the judgments and choices that normal people make about decision tasks that feature risk. These phenomena are divided into two groups: heuristics and biases, and framing effects.

After completing this chapter students will be able to:

1. Identify key biases that typically arise when people make judgments about risk.
2. Explain why reliance on heuristics, while unavoidable, leaves people vulnerable to making biased judgments.
3. Recognize that framing effects lead people's attitudes toward taking risk to be highly dependent on the circumstances in which they find themselves.

1.1 TRADITIONAL CORPORATE FINANCIAL DECISIONS AND PSYCHOLOGICAL TASKS

A wealth of psychological research over the last 50 years provides important insights into how normal people make judgments and choices about risky alternatives. Over the same period, research conducted by financial academics provides important insights into how financial executives should consider making judgments and decisions about corporate risk, and to some extent what executives do in practice. This book will help you to connect these two research streams, and in the course of doing so it will provide you with insights about the degree to which psychological pitfalls create imperfections in corporate decision making and reductions in corporate value. The book will also provide guidance about how to create value by mitigating vulnerability to these pitfalls.

To help fix ideas, consider a small example. Imagine a firm is contemplating a new one-year project which requires it to spend \$3.2 million at the end of this year, in the anticipation of receiving a return at the end of the following year. The project is cyclical, as the financial executives at the firm believe that the actual value of the future cash flow from the project will strongly depend on the state of the economy during the next year. The project also features high risk, as cash flow will be especially high if the economy is strong but especially low if the economy is weak. Typically, for projects of comparable risk, the firm seeks an expected return of 35 percent.

Suppose that the economy was stagnant last year, and that economists' current outlook for next year is that there is a very high chance that growth will continue to be stagnant. Suppose too that most economists agree that there is a low chance of moderate growth and a very low chance of a boom. The consensus view is that a recession is not likely, but if one materializes it is half as likely to be severe as mild.

The financial executives typically rely on these forecasts to form their own judgments, which they combine with other information such as recent stock market performance. In this regard, the stock market increased by 25 percent during the last twelve months, the stock of the average firm in their industry increased by 18 percent, and the stock of their own firm increased by 12 percent.

In assessing their proposed project, the executives estimate that its cash flows will be \$46.9 million in the event of a boom, \$31.9 million if the economy exhibits moderate growth, \$1.9 million if the economy is stagnant, -\$8 million in the case of a mild recession, and -\$13 million in the case of a severe recession.

Put yourself in the position of a financial executive who has the responsibility of deciding whether to adopt this project. Suppose that you place a lot of trust in the cash flow estimates, as well as in the economists' general assessment. Would you feel that you have enough information to make an informed decision about whether to adopt the project?

The standard textbook approach to project selection revolves around discounted expected cash flows. In theory, the computation of expected cash flows would require quantitative probabilities for the alternative states of the economy, not simply the qualitative descriptors mentioned above. Therefore, financial executives who sought to base their decision on the kind of reasoning found in traditional corporate finance textbooks would need to convert the economists' qualitative descriptors, along with other information such as stock market performance, into numerical probabilities. Imagine that they do so, and assign a probability of 6 percent to a boom, 1 percent to moderate growth, 90 percent to a stagnant economy, 1 percent to a mild recession, and 2 percent to a severe recession. Exhibit 1-1 summarizes the information in this example.

Based on the executives' probability judgments, the expected cash flow from the project would be \$4.5 million, whose present value at 35 percent turns out to be

EXHIBIT 1-1 Forecasted Cash Flows for a Hypothetical Project, with Associated Gains and Losses, Conditional on the Future State of the Economy Along with Economists' Qualitative Probabilistic Assessments and Managers' Quantitative Probabilistic Assessments

Future State of Economy	Economists' Probability Assessments	Managers' Probability Assessments	Cash Flow	Cash Flow (Gain/Loss)
Severe recession	Highly unlikely	2%	-\$13.1	-\$16.3
Mild recession	Not likely	1%	-\$8.1	-\$11.3
Stagnant economy	Very high chance	90%	\$1.9	-\$1.3
Low-to-moderate growth	Low chance	1%	\$31.9	\$28.7
Boom	Very low chance	6%	\$46.9	\$43.7

\$3.4 million. Notably, \$3.4 million exceeds the \$3.2 million required capital investment, which according to traditional textbook analysis suggests that the financial executives should adopt the project.

There are two important psychological points to note in the example. The first point pertains to the fact that the financial executives were not given quantitative probabilities, but instead had to make their own subjective judgments about what numbers to use, based on a mix of qualitative and quantitative information available to them. Notice from Exhibit 1-1 that executives assign a probability of 6 percent to a boom, which is much higher than the 1 percent they assign to low-to-moderate growth. Given that economists characterized low-to-moderate growth as being more likely than a boom, financial executives' probability assignment might reflect judgmental biases or a psychological tendency to overweight probabilities of extreme events. A similar remark applies to the probabilities that executives assign to a recession.

The second point concerns the gains and losses associated with the project, where the gain is expressed as "payback" defined as cash flow minus initial investment. See the rightmost column in Exhibit 1-1. Notice that the probability of the project incurring a loss is 93 percent, with gains being generated if the economy grows. Psychologically, being super sensitive to losses might lead the executives to reject the project, despite its positive net present value.

The two points just mentioned relate to the primary focus of this chapter, whose purpose is to introduce ten specific psychological phenomena that underlie the behavioral approach to corporate finance. To be sure, there are other psychological phenomena discussed in the book, besides the ones introduced in this chapter. However, the ten phenomena that form the heart of this chapter provide the foundational material for everything else in the book.

Notably, these ten phenomena impact investors just as they impact the managers of a firm. Investors also form judgments about firms' future cash flows, especially when they face choices about trading the securities of those firms. An important issue that arises in the behavioral approach is that both managers and investors often need to consider the psychological phenomena impacting other people, as well as themselves, when making their own judgments and decisions.

Dual Systems

In this chapter you will learn about biases associated with **heuristics**, or rules of thumb, upon which people rely in order to arrive at their judgments and make decisions, as well as how people's choices are influenced by the manner in which they **frame** their decision tasks with respect to gains and losses. Accordingly, the remainder of this chapter is organized into four main sections, the first three of which are respectively devoted to biases, heuristics, and framing effects; these sections introduce and describe 10 specific psychological phenomena. The fourth section discusses psychological and neurological frameworks to explain the factors underlying people's judgments and decisions about risk, as well as ways to improve both of these tasks.

Many aspects of the 10 phenomena take place below the level of consciousness. In this regard, psychologists suggest that we can think of our brains as having two systems, an intuitive system they call **System 1**, which is fast, and a more deliberative

heuristic

A rule of thumb used to arrive at a judgment or make a decision.

frame

Synonymous for description.

System 1

The fast, automatic, and intuitive processes associated with thinking.

System 2

The slow, deliberate, conscious processes associated with thinking.

system they call **System 2**, which is slow. Although both systems engage in calculation, we are consciously more aware of the calculations when they are done by System 2, such as computing the present value of a stream of cash flows. The calculations performed by System 1 are more automatic, such as when making a turn while driving a car or running to catch a ball.

The operations that System 1 makes are quite impressive, given the absence of conscious calculation. At the same time, human intuition is imperfect, which is why we are prone to make errors in judgment and choices that are imprudent. It is easy to suggest that the remedy is to rely on System 2 for judgment and decision making. However, System 2 requires much more effort than System 1, and we typically lack the mental resources and capabilities necessary for System 2 perfection.

The term “dual systems” is shorthand for the System 1/System 2 conceptual framework. An important reason to study behavioral corporate finance is to investigate how dual systems influence judgments and decisions that are made in a corporate financial environment. In this regard, much of what is taught in traditional corporate finance textbooks pertains to processes that System 2 carries out. Behavioral corporate finance adds explicit consideration of System 1 issues to the mix, with the intent to help managers make better decisions.

The next three sections discuss the results of experiments that psychologists have used to uncover the 10 psychological phenomena that form the heart of this chapter. In order to appreciate the discussion that follows, it is vitally important to complete the behavioral questionnaire, which is available in Additional Resources to Chapter 1. This questionnaire can be downloaded from the book web site at www.mhhe.com/shefrin2e. After completing the behavioral questionnaire, please continue your reading of this chapter, which provides a detailed discussion of each of the 10 phenomena.

Each of the next three sections is divided into subsections, with each subsection introducing one of the ten foundational psychological phenomena. The subsections feature a three-pronged 3-D structure, namely: description, diagnostic question, and discussion. A subsection begins with a brief description of a psychological phenomenon. This is followed by an example of a diagnostic question that psychologists have used to identify the phenomenon in question. The ensuing discussion indicates how people generally respond to the question, and what the response pattern means for the phenomenon being discussed.

1.2 BIASES

Bias

A predisposition toward making a specific type of error.

A **bias** is a predisposition towards making a specific type of error.

Excessive Optimism

Description

Psychologists have concluded that people are *excessively optimistic*, by which they mean unrealistically optimistic. More precisely, people tend to overestimate how frequently they will experience favorable outcomes and underestimate how frequently they will experience unfavorable outcomes.

Diagnostic Question

Consider the following four specific events that might happen to you during your lifetime and answer the question that appears thereafter.

1. Being fired from a job
2. Your work recognized with award
3. Living past 80
4. Having your car stolen

Compared to other people of the same gender as you in this class, what do you think are the chances that each of these events will happen to you? The choices range from much less than average, through average, to much more than average. Enter a column of numbers from 1 to 4 on a blank page, and record your answers next to each event number. For example, consider event 1, being fired from a job. If you think that being fired from a job is as likely to happen to you as to anyone else, record a 7 beside event 1.

- | | |
|--------------------------|---------------------|
| 1. 100% less (no chance) | 9. 20% more |
| 2. 80% less | 10. 40% more |
| 3. 60% less | 11. 60% more |
| 4. 40% less | 12. 80% more |
| 5. 20% less | 13. 100% more |
| 6. 10% less | 14. 3 times average |
| 7. Average | 15. 5 times average |
| 8. 10% more | |

Discussion

In the preceding diagnostic question, people can rate how likely they are to experience particular events relative to other people who are similar to them. A rating of 7 means that a person feels that an event is as likely to happen to them as to anyone else in similar circumstances.¹ Some of the events are favorable, and some are unfavorable. The unfavorable events are being fired from a job and having your car stolen. The favorable events are your work recognized with an award, and living past 80.

The four events under discussion are part of a general study involving 42 life events, of which 18 are favorable and 24 are unfavorable. The 42 events are described in the Additional Resources to Chapter 1, which is available online at the book web site. The questionnaire you answered as part of this chapter comprised an 18-question subset of the set of 42. If everyone held objectively correct beliefs, then the average response across the class for all events should be 7. Typically the average rating for the unfavorable events is below 7, while the average rating for the favorable events is above 7.² This means that people believe that unfavorable events are less likely to happen to them than to other people, but favorable events are more likely to happen to them than to other people. While this may be true for some people, it cannot be true for everyone. The general conclusion is that people tend to be excessively optimistic.³

excessive optimism

People overestimate how frequently they will experience favorable outcomes and underestimate how frequently they will experience unfavorable outcomes.

The original study on **excessive optimism** was conducted in the 1970s and used undergraduate students at an American university as subjects. The general results have been replicated many times and are robust, applying both to undergraduate students and to working professionals of all ages, both in the United States and internationally. In respect to the four life events discussed here, typical average class responses for the question about being fired lie in the range 3.8 to 5.2. This range corresponds to judgments that are between 44 percent and 18 percent less than the average, respectively.⁴ Typical ranges for the other three questions are 7.5 to 9.1 for your work being recognized with an award, 7.1 to 7.9 for living past 80, and 5.1 to 6.3 for having your car stolen. For these ranges, every unit deviation from 7.0 corresponds to 10 percent in probability.

Psychologists have identified a separate concept of optimism, called “dispositional optimism,” which is about having a positive general outlook on life. Dispositional optimism can be measured on a scale of 0 to 100, with scores above 50 corresponding to optimism and scores below 50 corresponding to pessimism.

Dispositional optimism and excessive optimism are positively related, but weakly so. For undergraduate finance majors, a 10-point increase in dispositional optimism on average increases the probability attached to favorable events by approximately 3 percent, and decreases the probability attached to unfavorable events by approximately 2 percent. However, the correlation between dispositional optimism and excessive optimism is low. Moreover, for an international group of investment professionals, the correlation is effectively zero, suggesting the need for caution when basing statements about excessive optimism on measures of dispositional optimism.⁵

The diagnostic question for optimism that involves living past the age of 80 is of special interest. In practice, assessments of length of life can be used to proxy for optimism. The use of this proxy has led to the conclusion that excessively optimistic people are more likely to believe that future economic conditions will improve. They are also more entrepreneurial and work more hours than people who are less optimistic.⁶

Overconfidence

Psychologists have found that people are generally overconfident when it comes to their knowledge and ability to complete difficult tasks. **Overconfidence** is a bias that pertains to how well people understand the limits of their knowledge, their own abilities, or both.

Description

People who are *overconfident* about their level of knowledge think they know more than they actually know. People who are overconfident about their abilities think they are better than they actually are. This overconfidence does not necessarily mean that these people are ignorant or incompetent. It just means that in their own eyes they are smarter and better than is actually the case.

Psychologists test for overconfidence about knowledge by asking knowledge-based questions such as the following.⁷

overconfidence

People know less than they think they know and view themselves as better than they actually are.

Diagnostic Question

Based on your own knowledge, and without using any additional sources, what is your best guess about the length, in miles, of the Amazon River? This is a difficult question for most people to answer, and it is unrealistic to assume that they will provide an accurate response. For this reason, suppose that we also ask for a confidence interval, meaning a low guess and a high guess, with the width of the interval reflecting a person's degree of confidence in his or her response. For example, we might ask people to structure their confidence intervals so that they feel 90 percent confident that their low and high guesses would bracket the answer they would find by conducting an Internet search about the length of the Amazon. If you have not yet done so for the Amazon River question, try it now by providing your best guess, a low guess, and a high guess, structured to define a 90 percent confidence interval.

A confidence interval for a single question is somewhat informative. More informative is to ask people to provide best guesses and confidence intervals for a series of difficult questions, say 10, so that we can point out that a person who is well calibrated would expect that for nine of the ten questions, the "true" numbers provided by an Internet search would lie within the confidence intervals.

Discussion

An Internet search for the length of the Amazon River yields an answer of 4,000 miles. If 4,000 lies between your low guess and your high guess, give yourself a hit. Otherwise, give yourself a miss. The answers to the 10 difficult questions in the behavioral questionnaire can be found in endnote 7 at the end of this material. People who are well-calibrated should expect to score nine hits for the 10 questions.⁸

When people set their confidence intervals too narrowly, their hit rates can be expected to be less than nine. Such people are overconfident about their knowledge. When they set their confidence intervals too widely, their hit rates can be expected to be 10. Such people are typically underconfident about their knowledge.

How well do people do on these questions? Typically, the most frequent number of hits, and the average number of hits, is about 4, with the mean being approximately 4.5. For a typical class, the standard deviation is approximately 2.5: the response associated with being well calibrated lies two standard deviations above the most frequent number of hits. That is, when it comes to difficult questions, people are typically very overconfident about their knowledge. They do not realize how little they know.

In respect to the overconfidence questions, what is the percentage of people responding who are well-calibrated? The answer turns out to be about 3.5 percent. Virtually everyone else is overconfident. Nevertheless, occasionally someone will achieve a hit rate of 100 percent and appear to be underconfident. But this is a relatively rare occurrence.⁹

In order to test for overconfidence in respect to ability, psychologists often pose the following question to people.

Diagnostic Question

Relative to all the people in the class, how would you rate yourself as a driver? (1) Above average? (2) Average? or (3) Below average? Here average is defined as the median.

Discussion

By definition, the median lies exactly in the middle, with the population equally divided on either side. The point of the last question is that very few people rate themselves below average. Instead, almost everyone rates themselves as either above average or average. This notion of overconfidence is sometimes called the **better than average effect**.

better than average effect

People tend to rate themselves above average rather than below average.

In a typical class, 45 to 55 percent might rate themselves as above average and 30 to 45 percent might rate themselves as average. The proportion of those rating themselves as below average are fewer in number, typically 10 percent or less. Notably, for undergraduates, the responses for above average tend to be at the high end of the range. Some people fault the wording in the question for not specifying a criterion on which to judge driving ability, suggesting that they chose criteria on which they indeed judge themselves to be above average. In a sense, this proves the point: people prefer to regard themselves as above average, if possible. Virtually nobody likes being below average.

Confirmation Bias

People who overlook information that disconfirms positions which they are evaluating or views which they hold in favor of information that confirms those positions or views are said to exhibit **confirmation bias**.¹⁰

confirmation bias

People attach too much importance to information that supports positions which they are evaluating or views which they hold relative to information that runs counter to those positions or views.

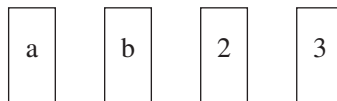
Description

People often spend too much time searching for reasons to support why a position they are evaluating or a view they hold are correct and too little time searching for reasons that might lead them to conclude that the position or their views are incorrect.

Confirmation bias pertains to the manner in which people either seek information or make use of the information at their disposal. Psychologists have concluded that many people are vulnerable to confirmation bias. This conclusion is based on the study of hypothesis evaluation tasks such as the following.

Diagnostic Question

Imagine that you are presented with four cards placed flat on a table in front of you. There is a letter appearing on one side of the card and a number on the other side of the card. You see the following on the four cards: a, b, 2, and 3.



Suppose you are asked to test the following hypothesis about these four cards: “Any card having a vowel on one side has an even number on the other side.” Imagine

that you are asked to select those cards, and only those cards, that will determine whether the hypothesis is true. That is, please select the minimum number of cards that will enable you to determine whether or not the hypothesis is true. Of the four cards, which would you turn over to verify the hypothesis?

Discussion

In this card task, most people turn over the card with the *a*, and some turn over the card with the 2 as well. The proportion turning over just the *a* and the 2 tends to vary between 30 and 70 percent. Typically less than a third choose to turn over just the *a* and the 3. Yet, turning over only the *a* and 3 turns out to be the correct answer. This is because the efficient way of testing the validity of the hypothesis is to follow the “innocent until proven guilty” maxim and turn over only the cards that might falsify the hypothesis.

Consider in turn the falsification potential of each card. Suppose we turn over the card featuring the *a*. We will find either an even number or an odd number. If we find an even number, we have evidence supporting the hypothesis. However, if we find an odd number, we know that the hypothesis is false. Next, suppose we turn over the card with the *b*. This card provides us with no evidence to judge the validity of the hypothesis, since the hypothesis says nothing about cards featuring consonants. Now consider the card with a 2 on it. If we turn it over, we might find a vowel. This would be consistent with the hypothesis. Alternatively, we might find a consonant. That would be irrelevant to the hypothesis. Hence, this card offers no potential for falsification. Last, suppose that we turn over the card with the 3 on it. If we find a vowel, we know that the hypothesis is false. A consonant provides no information to support or falsify the hypothesis. Thus, the only two cards that offer the potential for falsification are the *a* and the 3. However, most people choose *a* and 2, or *a* alone. Notice that while *a* allows for both confirmation and falsification, 2 allows for confirmation only.¹¹

Illusion of Control

When a person makes a decision, the outcome typically depends on a combination of luck and skill. Psychologists have concluded people have an exaggerated view of how much control they exert over outcomes. The associated bias is known as the **illusion of control**.

illusion of control

People overestimate the extent to which they can control events.

Description

The more control a person has over the outcome, the less the influence of chance and the more the influence of skill.

Diagnostic Question¹²

Imagine that you agree to participate in a baseball pool. The pool works as follows. Lying in front of you are two identical piles of baseball cards, with each pile containing 227 cards. The face of each card displays the picture of a different baseball player. The organizer of the baseball pool asks you to look through the pile, select one card, and show it to her. After you have done so, the organizer looks through the second (duplicate) pile, finds the twin of the card you selected, and deposits the twin into a brown cardboard carton. In order to participate, you pay \$1 to the pool