R08 The Behavioral Biases of Individuals

1. Introduction

As discussed in *The Behavioral Biases of Individuals*, behavioral finance challenges traditional finance at two levels:

- Behavioral Finance Micro (BFMI), which challenges the assumptions that individuals are perfectly rational, perfectly self-interested, have access to perfect information, etc., and
- Behavioral Finance Macro (BFMA), which challenges the assumption that markets are perfectly efficient.

This reading is about BFMI. Specifically, we learn about the behavioral biases that can cause individuals to make financial decisions that deviate from what the Rational Economic Man (REM) would do. These biases can be either cognitive (see section 3) or emotional (see section 4).

In the context of portfolio management, recognizing behavioral biases can allow an adviser to develop a deeper understanding of his clients and, as will be covered in section 5, it may be necessary to deviate from the mean variance optimal portfolio that in order to accommodate a client's behavioral biases.

2. Categorizations of Behavioral Biases

Behavioral biases can be either cognitive errors or emotional biases. The curriculum provides the following definitions of each category:

Cognitive Errors	• "basic statistical, information-processing, or memory errors" • "blind spots" • "distortions of the human mind" • "the inability to do complex mathematical calculations, such as updating probabilities" • "stem from faulty reasoning" • "attributable to the way the brain perceives, forms memories, and makes judgements"
Emotional Biases	• "biases that help avoid pain and produce pleasure" • "arise spontaneously as a result of attitudes and feelings" • "stem from impulse or intuition" • "result from reasoning influenced by feelings"

2.1 Differences between Cognitive Errors and Emotional Biases

An adviser must act differently when working with a client who exhibits cognitive errors than she would when working with a client who exhibits emotional biases. Note: A client may demonstrate both cognitive errors and emotional biases, in which case it is important to determine whether the biases are primarily cognitive or emotional. This issue will be discussed further in section 5 of this reading.

Due to the different nature of the two categories of biases, cognitive errors can be "moderated" – typically through education. By contrast, it may only be possible for an

advisor to "adapt" to a client's emotional biases, which are less easily "corrected". Specific recommendations for how to advise clients who demonstrate primarily cognitive errors or primarily emotion biases are provided in section 5 of this reading.

3. Cognitive Errors

This section (as well as section 4) is structured to assist in identifying each bias. The specific advice for how to overcome each individual bias provided in the curriculum has been summarized as general advice for addressing cognitive errors (in section 3.3) and emotional biases (in section 4.7).

There are two categories of cognitive biases: 1) belief perseverance biases and information-processing biases.

3.1 Belief Perseverance Biases

Belief perseverance biases arise when individuals are selective in how they deal with new information that challenges their existing beliefs. The specific types of selective behavior observed are:

- Selective exposure: Only noticing information that is of interest
- Selective perception: Ignoring or modifying information that contradicts existing beliefs
- Selective retention: Remembering or emphasizing only information that confirms existing beliefs

As a result of these behaviors, individuals assign and update probabilities in a way that deviates from what we could expect from the Rational Economic Man assumed by traditional finance (which was discussed in *The Behavioral Bias of Individuals*).

3.1.1 Conservatism Bias

Individuals demonstrate conservatism bias by maintaining their previous beliefs and inadequately incorporating (or "under-reacting to") new information, even when this new information is significant. From the traditional finance perspective, this can be described as the failure to accurately update probabilities using Bayes' formula.

In Example 1, we see periods where analysts continue to issue negative earnings forecasts even after companies have begun to report improved earnings (and, presumably, there are objective reasons to expect this trend to continue). Similarly, after extended periods of positive earnings, analysts expect this trend to continue even after companies begin to report disappointing results (and, presumably, there are objective reasons to expect this trend to continue).

Those affected by conservatism bias will hold on to investments longer than a rational investor would. For example, in Practice Problem 3 at the end of this reading, we see that Luca Gerber maintains a positive outlook for ABC Innovations and does not sell the Ludwig foundation's position in the firm despite negative results from clinical trials and even cautionary statements from company management.

Refer to Example 1 from the curriculum.

3.1.2 Confirmation Bias

Confirmation bias occurs when individuals place too much emphasis on information that confirms their existing beliefs and underweight (or ignore) information that challenges these beliefs. Consider the example of Luca Gerber in Practice Problem 4 at the end of this reading, who demonstrates confirmation bias by choosing to emphasize the statements that uphold his positive assessment of ABC Innovations and ignoring the significant amount of negative information about the company. As will be covered in *Behavioral Finance and Investment Processes*, confirmation bias is a particular concern for analysts conducting research and for all investors during periods of extreme prices (bubbles and crashes). Investors who are affected by confirmation bias may hold an undiversified portfolio (possibly due to a concentrated position in own-company stock).

3.1.3 Representativeness Bias

Representativeness bias occurs when an individual classifies new information based on past experiences and categories. The two subsets of representativeness bias are base rate neglect and sample size neglect. Base rate neglect is the overweighting of new information and underweighting of base rates. Sample size neglect is the incorrect assumption that data from small sample sizes is representative of the overall population.

In Example 2, Jacques Verte would be guilty of base rate neglect if he were to overvalue the importance of a few recent stories about auto parts manufacturers experiencing difficulty and undervalue the importance of APM Company's 50-year record.

In the investment context, sample size neglect can be seen when a few data points are naïvely extrapolated as being representative of a long-term trend. For example, an investor who puts too much emphasis on short-term results when considering a potential investment.

Exam Tip

One way to identify ***representativenes bias*** *is to determine whether the person is deriving information from the past and using that information in current investment strategy. Examples:*

- *A lawyer investing in companies which "remind" him of his most successful clients.*
- *A mutual fund manager choosing an investment just because the current CEO did a good job in some other company in the past.*

The key words to look for: "reminded", "past", "used to","last year".

Refer to Example 2 from the curriculum.

3.1.4 Illusion of Control Bias

Illusion of control bias occurs when individuals incorrectly believe that they can control or influence outcomes, or for individuals to think that he has more control over the situation than he actually does. Hence, they have a false impression that future events are due to their skill rather than due to luck. A person who feels that selecting her own lottery ticket number, rather than accepting a machine generated number, increases the likelihood of

winning is exhibiting this bias. (We know that choosing one's own lottery numbers has no bearing on the probability of winning.)

In the context of investments, individuals may believe that they can influence the returns on their investments. Investment analysts who rely on complex models when making forecasts are particularly susceptible to illusion of control bias.

Concentrated positions in own-company stock are common among those who are affected by illusion of control bias. Employees may believe that, because they can control their performance at work, they can influence their company's results. In reality, market prices are driven by a multitude of factors that are far beyond the control of any individual – even top managers.

3.1.5 Hindsight Bias

Hindsight bias is a mistaken belief that outcomes were (and are) predictable. Investment analysts are particularly susceptible to this bias. Hindsight bias is demonstrated by those who remember their forecasts that turned out to be accurate and forget those that were inaccurate. This can lead to excessive risk-taking due to an irrationally high assessment of one's ability to correctly predict outcomes.

3.2 Information-Processing Biases

Information-processing biases occur when information is processed in an irrational manner. As noted above, the ability to differential between information-processing biases and belief perseverance biases is less important than the ability to correctly categorize a bias as either cognitive or emotional.

3.2.1 Anchoring and Adjustment Bias

Anchoring and adjustment bias occur when investors "anchor" themselves to the first information they receive and incorporate new information by adjusting this reference point – even if this new information suggests that a greater change is necessary. Consider the following example. A financial market participant (FMP) purchased a stock for $40 per share. The stock goes up to $60 based on positive information. The new price is justified given available public information. However, the FMP sells the stock because he perceives it to be overpriced relative to the purchase price of $40. This individual is exhibiting anchoring and adjustment bias.

While under-reacting to new information is similar to conservatism bias (see section 3.1.1 of this reading), anchoring and adjustment bias is associated with a specific reference point. Note that, in Practice Problem 3 at the end of this reading, Luca Gerber is said to demonstrate conservatism bias by maintaining his existing positive assessment of ABC Innovations in the face of several negative developments and statements. In Practice Problem 5, Gerber is said to exhibit anchoring and adjustment bias because he maintains his forecast that ABC Innovations will reach a 52-week high of CHF 80 despite all the bad news.

3.2.2 Mental Accounting Bias

Mental accounting bias occurs when an individual arbitrarily classifies money based on its:

- Source (e.g., salary, bonus, etc.), or
- Intended use (e.g., retirement, current spending)

Case Study #2 (section 5.2.1), provides a good example of this bias. Mrs. Maradona demonstrates a mental accounting bias because she segregates "money into various accounts, such as money for paying bills, money for traveling, and money for bequeaths."

3.2.3 Framing Bias

Framing bias occurs when an individual answers a question with the same basic facts differently depending on how it is asked. For example, an individual may choose to buy a lottery ticket if the possibility of winning a large prize is emphasized, but decline to do so if the extremely remote possibility of winning that prize is emphasized.

Investors who are affected by framing bias may misidentify their risk tolerance based on how information is presented. Example 3 shows how the portfolio may look more or less attractive depending on whether the range of expected returns or standard deviation is provided as the measure of risk.

Refer to Example 3 from the curriculum.

3.2.4 Availability Bias

People tend to base decisions on information that is readily available or easily recallable. This results in an availability bias in that probability estimates are skewed by how easily certain potential outcomes come to mind. Four sources of availability biases which are applicable to FMPs are:

1. Retrievability. If an answer or idea comes to mind more quickly than another answer or idea, the first answer or idea will likely be chosen as correct even if it is not the reality.
2. Categorization. When solving problems, people gather information from what they perceive as relevant search sets.
3. Narrow Range of Experience. This bias occurs when a person with a narrow range of experience uses too narrow a frame of reference based upon that experience when making an estimate.
4. Resonance. People are often biased by how closely a situation parallels their own personal situation.

Availability bias can be difficult to identify because it is similar to biases such as representativeness and overconfidence. The clearest demonstration of availability bias is when investors make decisions based on word-of-mouth or name recognition.

3.3 Cognitive Errors: Conclusion

Various recommendations are provided for how to address each of the biases covered in this section. Rather than focus on specifics, it is better to step back and recognize that cognitive errors can typically be corrected through education and recognizing the flaws in one's decision-making process. Measures such as actively seeking out information that challenges one's existing beliefs, keeping detailed records, and updating probabilities in an unbiased manner are generally applicable to all cognitive errors. By contrast, such

measures are not recommended when working with individuals who are affected by emotional biases.

4. Emotional Biases

The six types of emotional biases covered in this reading are:

1. Loss-Aversion Bias
2. Overconfidence Bias
3. Self-Control Bias
4. Status Quo Bias
5. Endowment Bias
6. Regret-Aversion Bias

4.1 Loss-Aversion Bias

Loss-aversion bias is demonstrated when an investor refuses to sell positions that are trading below their original cost in order to avoid realizing losses. By contrast, loss-averse investors tend to sell "winning" investments early in order to lock-in gains. Taken together, these tendencies are known as the disposition effect.

The clearest indication of loss-aversion bias is when an investor holds on to losing investments. For example, Tiffany Jordan demonstrates loss-aversion bias in Practice Problem 7 at the end of this reading when she refuses to sell positions that are "significantly under water".

Excessive trading is associated with loss-aversion bias to the extent that winning investments are sold. However, trading may decrease if the majority of a portfolio's positions are trading below their purchase price. A further indication of loss-aversion is an unbalanced and overly-risky portfolio that is the net result of selling winning investments and holding on to losing investments.

In Case Study #2 (section 5.2.2 of this reading), Mrs. Maradona is given two diagnostic questions to test for loss-aversion bias. In Question 1, she is asked to choose between:

A. An assured gain of $400
B. A 25% chance of gaining $2,000 and a 75% chance of gaining nothing

Mrs. Maradona chooses the assured gain of $400, despite the fact that option B has an expected value of $500. This is consistent with selling winning investment too soon in order to lock in a gain.

In Question 2, she is asked to choose between:

A. An assured loss of $400
B. A 50% chance of losing $1,000 and a 50% chance of losing nothing

Mrs. Maradona chooses option B, despite the fact that its expected value (-$500) is less than the outcome choosing option A (-$400). This is consistent with refusing to sell a losing investment in order to avoid recognizing a loss.

Refer to Example 4 from the curriculum.

4.2 Overconfidence Bias

Investors demonstrate overconfidence bias by holding an irrational belief in the superiority of their knowledge and abilities. It is also known as the illusion of knowledge bias. Self-attribution bias, a subset of overconfidence bias, is the tendency to take credit for successes and attribute the blame for failures to others (or chance).

The diagnostic questions that appear in Case Study #2 (section 5.2.1) are helpful in detecting overconfidence bias. Mr. Renaldo believes that he has "a fair amount of ability" to pick stocks that will outperform the market and expects annual returns that are "well above" the long-term average of 10%. Unrealistic return expectations are a clear indication of overconfidence bias. In response to another question, Mr. Renaldo claims that the real estate crash of 2007/08 was "somewhat easy" to predict, which is an indication of both overconfidence and hindsight bias.

The diagnostic question for overconfidence bias that appears in Exhibit 7 ("Suppose you make a winning investment. How do you generally attribute the success of your decision?") is relevant to self-attribution bias. For example, in Practice Problem 6, Tiffany Jordan is described as having "a tendency to be quick to blame, and rarely gives credit to team members for success." This is a clear example of self-attribution bias. Furthermore, during exam, if you come across a case in which the individual is saying that "he knows the industry, and he thinks that he is an expert on the industry" then immediately red flags would be raised because there is a very high probability the person is displaying Overconfidence bias.

The consequences of overconfidence bias are:

- Underestimating risks
- Rejecting or ignoring of contradictory information
- Overestimating expected returns
- Excessive trading
- Experience below-market returns

Refer to Example 5 from the curriculum.

4.3 Self-Control Bias

In a general sense, self-control bias is a lack of self-discipline. In the context of investing, self-control bias is the inability to put off current consumption and save for the future.

In Practice Problem 1 at the end of reading 6, an investor makes the following statement: "I have always followed a budget and have been a disciplined saver for decades. Even in hard times when I had to reduce my usual discretionary spending, I always managed to save." This is an example of an individual acting rationally according to expected utility and demonstrating no effect of self-control bias. By contrast, in Case Study #2 (section 5.2.1), Mr. Renaldo demonstrates self-control bias when he mentions his preference for luxury cars and his inability to save for retirement.

As a result of their inability to maintain a discipline savings plan, investors who are affected

by self-control bias tend to take on too much risk in an attempt to catch up. This can result in an inappropriate asset allocation.

4.4 Status Quo Bias

Status quo bias is exhibited by investors who avoid making any changes to one's portfolio. A manifestation of this bias is when employees fail to allocate pension contributions from their employer outside of the default option. Testing for status quo bias is a simple matter of asking an investor how frequently he trades or reviews his portfolio's performance. The consequences of status quo bias are:

- Holding an inappropriate asset allocation
- Failing to explore certain investment opportunities

4.5 Endowment Bias

Endowment bias occurs when an individual sets a higher asking price when selling an asset than she would be willing to pay for an asset with the same characteristics. In some cases, individuals may demonstrate an irrationally strong attachment to assets that were inherited from a relative. Alternatively, an employee may be unwilling to sell her employer's shares out of a sense of loyalty. Therefore, the diagnostic question used to test for the presence of endowment bias (from Exhibit 7) is: "How would you describe your emotional attachment to possessions or investment holdings?"

The consequences of endowment bias are:

- Failing to sell (and replace) certain assets
- Holding an inappropriate asset allocation
- Failing to explore opportunities

4.6 Regret-Aversion Bias

An investor whose negative experience with a past investment would prevent her from making a similar investment – despite objective evidence that the new investment offers the best opportunity – is exhibiting regret-aversion bias.

Case Study #2 (section 5.2.1) provides two diagnostic questions to test for regret-aversion bias (Mr. Renaldo's answers are highlighted in bold):

Question 1: Suppose you make an investment in Stock ABC, and over the next six months, ABC appreciates by your target of 15 percent. You contemplate selling but then come across an item in the *Financial Times* that rehashes the company's recent successes and also sparks new optimism. You wonder whether ABC could climb even higher. Which answer describes your likeliest response given ABC's recent performance and the FT article?

A. **I think I'll hold off and wait to see what happens. I'd really "kick" myself if I sold now and ABC continued to go up.**

B. I'll probably sell because ABC has hit the target I set, and I try to stick to the targets I set.

In response to Question 1, Mr. Renaldo avoids selling at his previously-established target

because he'd regret doing so and watching ABC appreciate further. Note that the 15% growth target was (presumably) based on rational expectations, whereas the *Financial Times* article offers no new information to justify deviating from this strategy.

Question 2: Suppose you have decided to invest £10,000 in one individual company stock, and you have narrowed your choice down to two companies: Blue, Inc., and Red, Inc. Blue is a well-followed, eminently established company whose shareholders include many large pension funds. Red is newer but has performed well; it has not garnered the same kind of public profile as Blue, and it has few well-known investors. According to your calculations, both stocks are expected to have equal risk and return payoffs. Which answer most closely matches your thought process in this situation?

A. I would probably feel indifferent between the two investments, because both generated the same expected parameters with respect to risk and return.

B. **I will most likely invest in Blue because if I invested in Red and my investment failed, I would feel foolish. Few well-known investors backed Red, and I would really regret going against their informed consensus only to discover that I was wrong.**

C. I will most likely invest in Blue because I feel safe taking the same course as so many respected institutional investors. If Blue does decline in value, I know I won't be the only one caught by surprise. With so many savvy professionals sharing my predicament, I could hardly blame myself for poor judgment.

In the case of Question 2, both Red, Inc. and Blue, Inc. have identical risk and return profiles, which means that any rational investor should be indifferent between them (answer A). However, Mr. Renaldo chooses answer B because he would "feel foolish" if he acted differently than the "informed consensus". This biased thinking leads to herding behavior, which is a clear indication of regret-aversion bias.

Answer C also indicates the presence of regret-aversion bias, as the investor is absolving himself of any blame in the event that the investment in Blue underperforms because with "so many savvy professionals sharing my predicament, I could hardly blame myself for poor judgement." Note that this expressed desire to avoid the pain of taking responsibility for a bad investment puts regret-aversion clearly in the category of emotional biases.

4.7 Emotional Biases: Conclusion

As noted above in section 3.3, investors who are affected by primarily cognitive biases are likely to respond well to education. However, an education-based approach is not as useful when working with investors who display primarily emotional biases. The best advice to follow when addressing emotional biases comes from section 2.1.3 of *Behavioral Finance and Investment Processes:*

"When advising emotionally biased investors, advisers should focus on explaining how the investment program being created affects such issues as financial security, retirement, or future generations rather than focusing on such quantitative details as standard deviations and Sharpe ratios."

5. Investment Policy and Asset Allocation

Optimal asset allocation will differ depending on investor-specific factors such as:

- Return objectives
- Risk tolerance
- Liquidity needs
- Time horizon
- Tax considerations
- Legal and regulatory issues
- Unique circumstances

An adviser will record these objectives and constraints in an Investment Policy Statement (IPS), which is used to identify each investor's optimal asset allocation. Regardless of their different circumstances, traditional finance tells us that investors will choose a portfolio located on the efficient frontier. However, we need to consider the possibility that behavioral factors such as the biases covered earlier in this reading will cause investors to want an asset allocation that deviates from the mean-variance efficient portfolio.

5.1 Behaviorally Modified Asset Allocation

Imagine that, based on consideration of investor's objectives and constraints, an adviser decides that the mean-variance efficient allocation is 70% equities and 30% bonds. However, due to the influence of behavioral biases, the investor would prefer an allocation of 50% equities and 50% bonds. The adviser has two options:

1. Adapt to the biases by accepting the behaviorally modified 50/50 asset allocation (or something close to it) despite the fact that it is less efficient than the recommended 70/30 allocation.
2. Moderate the impact of the biases by working with the investor until he or she is comfortable with the 70/30 allocation (or something close to it).

One potential method of modifying a portfolio is called "goals-based investing", which structures a portfolio in layers that correspond to an investor's various objectives (or goals). This method is consistent with behavioral portfolio theory, which was covered in section 4.3.3 of *The Behavioral Finance Perspective*, and inconsistent with the modern portfolio theory approach of traditional finance. However, the portfolio modification guidelines and recommendations that are relevant to LO.d are covered in sections 5.1.1 and 5.1.2.

5.1.1 Guidelines for Determining a Behaviorally Modified Asset Allocation

In deciding whether to adapt or moderate a client's portfolio in order to account for behavioral biases, the adviser must consider two factors:

1. The investor's level of wealth, and
2. The nature of the investor's behavioral biases

Level of wealth: Since there is no objective definition of a high or low level of wealth, the curriculum refers to Standard of Living Risk (SLR), which is the risk that an investor will need to reduce her standard of living in order to avoid outliving her assets. If an investor

has sufficient wealth to absorb sub-optimal returns without having to lower her standard of living, the advisor should adapt. By contrast, if choosing an inefficient asset allocation puts her at significant risk of having to lower her standard of living, the advisor should work to moderate the impact of his behavioral biases. In summary:

Level of wealth	Recommended action
High (Low SLR)	Adapt
Low (High SLR)	Moderate

Nature of biases: As noted in section 2, cognitive errors are easier to modify than emotional biases. An adviser may be able to convince an investor affected by cognitive errors to choose the optimal portfolio with some information and education sessions. By contrast, it is recommended that the adviser adapt when dealing with an investor who is influenced by emotional biases. In summary:

Nature of biases	Recommended action
Emotional	Adapt
Cognitive	Moderate

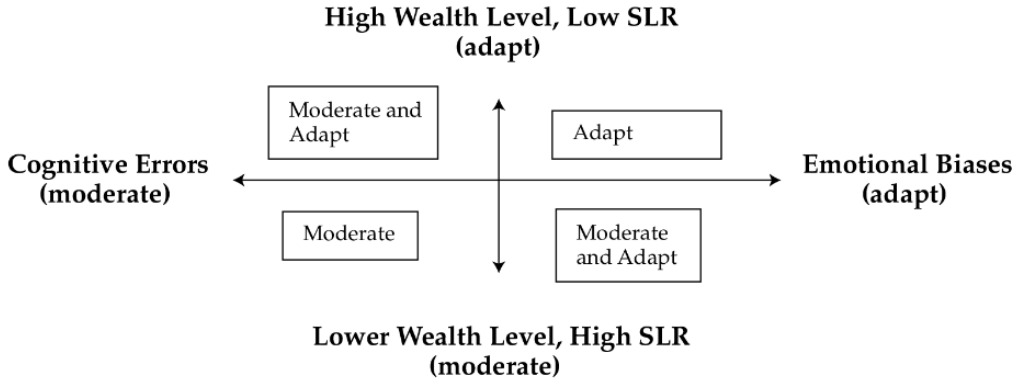
It is possible, even likely, that investors (both on the exam and in real life) will demonstrate the impact of both cognitive and emotional biases. In such cases, it is necessary to determine which category is more prevalent. For example, in Case Study #2 (see section 5.2.2), Mrs. Maradona's biases are:

Cognitive Errors	Emotional Biases
• Anchoring and Adjustment Bias • Mental Accounting Bias	• Loss Aversion Bias

In this case, we say that Mrs. Maradonna's biases are primarily cognitive.

Exhibit 5 summarizes the recommended actions based on the factors discussed in this section.

Exhibit 5. Visual Depiction of Guideline I and Guideline II



For an adviser dealing with a high wealth (low SLR) individual with emotional biases, it is recommended that she adapt to the behavioral biases. For example, in Case Study #1 (see

section 5.2.1), Mr. Renaldo's recommends a portfolio that deviates from the optimal allocation after ensuring that this would not put the client at undue risk of having to reduce his standard of living.

By contrast, moderation is the best course of action when dealing with an individual who has a low level of wealth (high SLR) and whose biases are cognitive. In Case Study #2 (see section 5.2.2), the adviser recognizes Mrs. Maradona's standard of living risk and recommends a portfolio that does not deviate from the optimal allocation.

In cases of low SLR/cognitive biases and high SLR/emotional biases, a combination of adaptation and moderation is recommended.

5.1.2 How Much to Moderate or Adapt

When adjusting an asset allocation to account for behavioral biases, the issue to be addressed is how much to deviate from the allocations in the mean-variance efficient portfolio.

If an investor with a high level of wealth and emotional biases, the recommended deviation is +/- 10 to 15%. For example, in Case Study #1 (see section 5.2.1), Mr. Renaldo's current portfolio is composed of 80% equities, compared to the optimal allocation of 60%. The adviser "adapts" by accepting a 70% equity allocation.

If an investor with a low level of wealth (high SLR) and cognitive biases, the recommended deviation from the optimal allocation is +/- 0 to 3%. In Case Study #2 (see section 5.2.2), Mrs. Maradona has allocated 100% of her portfolio to bonds, which puts her at considerable risk of outliving her assets. The adviser does not adapt, but rather recommends the mean-variance optimal allocation of 70% bonds, 20% equities and 10% cash.

In cases of low SLR/cognitive biases and high SLR/emotional biases, the recommended deviation from the optimal allocation is 5 to 10%. These recommendations are summarized in Exhibit 6.

	Bias Type: Cognitive	Bias Type: Emotional
High Wealth Level/Low SLR	Modest Asset Allocation Change Suggestion: +/– 5 to 10% Max Per Asset Class	Stronger Asset Allocation Change Suggestion: +/– 10 to 15% Max Per Asset Class
Low Wealth Level/High SLR	Close to the Rational Asset Allocation Suggestion: +/– 0 to 3% Max Per Asset Class	Modest Asset Allocation Change Suggestion: +/– 5 to 10% Max Per Asset Class

5.2 Case Studies

The key lessons from the two case studies presented in this section have been incorporated in the relevant section. Here we will simply reproduce Exhibit 7. It highlights diagnostic questions that help identify the behavioral biases discussed in this reading.

Behavioral Bias	Diagnostic Question
Loss Aversion	Imagine you make an investment that drops 25 percent in the first six months. You are unsure if it will come back. What would you normally do (NOT what you *think* you should do; what you *would* do)?
Endowment	How would you describe your emotional attachment to possessions or investment holdings?
Status Quo	How would you describe the frequency of your trading?
Anchoring	You purchase a stock at $50 per share. It goes up to $60 in a few months, and then it drops to $40 a few months later. You are uncertain what will happen next. How would you respond to this scenario?
Mental Accounting	Generally, do you categorize your money by different financial goals, or do you look at the bigger financial picture?
Regret Aversion	Have you ever made an investment that you have regretted making? How did that affect your future investing decisions?
Hindsight	Do you believe investment outcomes are generally predictable or unpredictable?
Framing	Assume you have agreed to a financial plan created by your adviser that has a projected return of 9 percent and an annual standard deviation of +/–15% (a typical plan). Would it surprise you to know that statistically in the worst case, the plan's return could be negative 36 percent or more in one year out of 100? Would this information cause you to rethink your risk tolerance?
Conservatism	Assume you make an investment based on your own research. An adviser presents you with information that contradicts your belief about this investment. How would you respond?
Availability	Do you ever make investment decisions (such as selecting a mutual fund or online broker) based on word-of-mouth or name recognition?
Representativeness	Have you ever made a new investment because of its apparent similarity to a past successful investment (e.g., a tech stock or value stock) without doing research to validate the new investment's merits?
Overconfidence	Suppose you make a winning investment. How do you generally attribute the success of your decision?
Confirmation	Suppose you make an investment based on your own research. The investment doesn't move up as much as you thought it might. How are you likely to respond?
Illusion of Control	You are offered two free lottery tickets. You may either select your own numbers or have a machine do it. What would you do?
Self-Control	Do you tend to save or spend disposable income?

Summary

LO.a: Distinguish between cognitive errors and emotional biases.

- Cognitive errors can be broken down into two types
  - Belief perseverance biases: People hold on to original beliefs and they react selectively to new information. Examples: Conservatism, Confirmation, Hindsight, Illusion of control, representativeness
  - Information processing biases: Also called statistical errors. These errors can occur because people process information incorrectly or because of memory errors or faulty reasoning. Examples: Framing, Anchoring & Adjustment, Mental Accounting, Availability.

- Emotional biases are influenced by feelings and emotion and usually related with human behavior to avoid pain and produce pleasure; arise spontaneously as a result of attitudes and feelings; are less easy to correct and can only be "adapted to". Examples: loss-aversion, overconfidence, self-control, endowment, regret aversion, and status quo.

LO.b: Discuss commonly recognized behavioral biases and their implications for financial decision making.

LO.c: Identify and evaluate an individual's behavioral biases.

There are two categories of cognitive errors: 1) Belief perseverance biases; 2) Information-processing biases.

Belief perseverance Bias	Description	Examples/Implications
Conservatism	Maintain prior views by inadequately incorporating new information	• Hold winners or losers too long • Under-react to new information • exhibit discomfort or difficulty in processing new information
Confirmation	Look for and notice what confirms prior beliefs	• Focus on confirmatory/positive information about existing investments • Over-react to confirmatory/positive information • Hold under-diversified portfolio
Hindsight	See past events as having been predictable	• Overestimate the degree to which a prior event was predictable
Illusion of Control	False belief that we can influence or control outcomes	• Feeling of control over company where one works • Hold under-diversified portfolio

Representativeness	Classify new information based on past experiences	• Look for patterns in new information • Over-optimism about a past winner • Treat small sample as "representative" of entire population • Invest in companies that remind one of successful clients • Over-react to new information and neglect base rate • Excessive trading and high manager turnover (owing to focus on short-term performance)

Information-Processing Biases	**Description**	**Examples/Implications**
Framing	Answer question differently based on how it is asked/framed	• Exhibit risk-averse (risk-seeking or loss-aversion) attitude when outcomes are framed in terms of gains (losses)
Anchoring and Adjustment	developing estimates based on "anchor" value (e.g. target price) and adjusting decisions up or down based on that value	• Place high weight on anchor • Under-react to new information • Influenced by purchase price or arbitrary price levels
Mental Accounting	Treat one sum of money different from other depending on source or use	• Investing some money very conservatively and the rest in speculative stocks. • Ignore correlations among various assets and total return • Hold suboptimal portfolio due to inefficient asset allocation
Availability	Influenced by how easily outcome comes to mind	• Place high weight on easily available information → influenced by advertising • Select alternatives with which one has greater resonance; select alternatives that are easily retrievable • Focus on a limited set of investments ("categorization") • Make investment decisions based on their familiarity with the industry or country ("narrow range of experience")

Emotional Bias	**Description**	**Examples/Implications**
Loss Aversion	Prefer avoiding losses over achieving gains	• Hold on to losing stocks too long and sell winning stocks too early (also called "disposition effect")

Overconfidence	Unwarranted faith in one's abilities (Illusion of knowledge; self-attribution)	• Excessive trading • Narrow confidence intervals • Assign high probability of success
Self-Control	Fail to act in pursuit of long- term goals	• Focus on short-term satisfaction • Fail to save enough for the future
Endowment	Exhibit an emotional attached to the asset owned	• Shares in father's company a source of family pride • People value asset more when they hold rights to it • Hold inherited/purchased securities
Regret Aversion	Avoid pain of regret associated with bad decisions	• Hold losing positions for too long • Prefer low risk assets • Engage in "herding behavior" • Prefer maintaining positions in familiar investments
Status Quo	Do nothing rather than make a change	• Hold on to securities even if they are inconsistent with risk/return objectives; trade very infrequently

LO.d: Evaluate how behavioral biases affect investment policy and asset allocation decisions and recommend approaches to mitigate their effects.

Behavioral biases can be incorporated into an IPS using two approaches:

i. **Goal-Based Investment Approach**: portfolio is constructed in layers, representing investment goals and asset allocation within each layer.
ii. **Behaviorally Modified Asset Allocation**: portfolio is constructed by selecting an asset allocation that satisfies investor's natural psychological & behavioral preferences.

The decision to moderate or adapt to a client's behavioral biases during the asset allocation process depends on two factors:

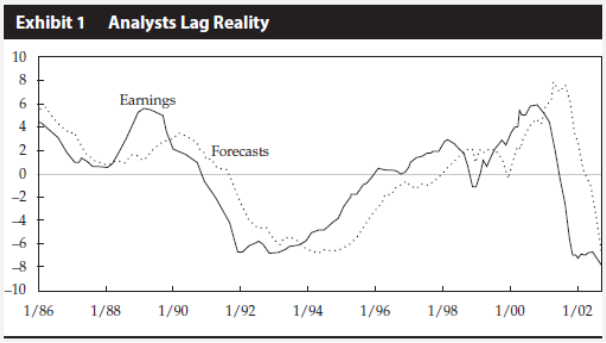
a) Client's level of wealth
   - High wealth → low SLR(standard of living risk) → adapt to biases
   - Low wealth → high SLR → try to moderate biases

b) Type of behavioral biases the client exhibits
   - Emotional → Hard to educate →adapt to biases
   - Cognitive → Comparatively easier to educate→ try to moderate biases

Examples from the Curriculum

Example 1. Conservatism in Action

James Montier writes, "The stock market has a tendency to underreact to fundamental information—be it dividend omissions, initiations or an earnings report."3 When discussing the behavior of security analysts, Montier explains, "People tend to cling tenaciously to a view or a forecast. Once a position has been stated, most people find it very hard to move away from that view. When movement does occur, it does so only very slowly. Psychologists call this conservatism bias. The chart below shows conservatism in analysts' forecasts. We have taken a linear time trend out of both the operating earnings numbers, and the analysts' forecasts. A cursory glance at the chart reveals that analysts are exceptionally good at telling you what has just happened. They have invested too heavily in their view, and hence will only change it when presented with indisputable evidence of its falsehood."4 The chart accompanying Montier's analysis (2002b) appears as Exhibit 1. Discuss Montier's analysis in the context of biases of individuals.



Solution:

In relating conservatism to security analysts, Montier provides clear evidence of the conservatism bias in action: The analysts maintain their forecasts even when presented with new information. The behavior observed in security analysts can logically be extended to individual investors who are likely to engage in similar behavior when managing their own investment portfolios.

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Example 2. Representativeness

APM Company is a large, 50-year old auto parts manufacturer having some business difficulties. It has previously been classified as a value stock. Jacques Verte is evaluating the future prospects of the company. Over the 50-year life of APM, there have been few failures of large auto parts manufacturers even given periods of difficulty. There have been a number of recent headlines about auto parts manufacturers having business and financial difficulty and potentially going out of business. He is considering two possibilities:

A. APM will solve its difficulties, the company's performance will revert to the mean, and the stock will again be a value stock.
B. APM will go out of business, and the stock will become valueless.
    1. Is Scenario A or B more likely? Explain why.

2. If Verte is subject to representativeness bias, is he more likely to classify APM into A or B? Explain why.

Solution to 1:

Scenario A. It is more likely that APM will solve its difficulties, the company's performance will revert to the mean, and the stock will again be a value stock.

The base rate, based on 50 years of data, is that more auto parts companies revert to the mean rather than go out of business.

Solution to 2:

Verte is likely to classify APM as B, predicting that it will go out of business because he read some headlines about other auto parts manufacturers going out of business. Verte, in classifying APM as likely to go out of business, may be guilty of both base-rate neglect and sample-size neglect. He has potentially ignored the base-rate information that far more auto parts manufacturers revert to the mean rather than go out of business, and he has assumed that the small sample of failing auto parts manufacturers is representative of all auto parts manufacturers.

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Example 3. Effect of Framing

Decision-making frames are quite prevalent in the context of investor behavior. Risk tolerance questionnaires can demonstrate how framing bias may occur in practice and how FMPs should be aware of its effects. Suppose an investor is to take a risk tolerance questionnaire for the purpose of determining which "risk category" he or she is in. The risk category will determine asset allocations and the appropriate types of investments. The following information is provided to each questionnaire taker:

> Over a 10-year period, Portfolio ABC has averaged an annual return of 10 percent with an annual standard deviation of 16 percent. Assuming a normal return distribution, in a given year there is a 67 percent probability that the return will fall within one standard deviation of the mean, a 95 percent probability that the return will fall within two standard deviations of the mean, and a 99.7 percent probability that the return will fall within three standard deviations of the mean. Thus, there is a 67 percent chance that the return earned by Portfolio ABC will be between –6 percent and 26 percent, a 95 percent chance that the return will be between –22 percent and 42 percent, and a 99.7 percent chance that the return will be between –38 percent and 58 percent.

The following two questions focus on hypothetical Portfolio ABC, DEF, and XYZ. The risk and return for each portfolio is the same in each of the two questions, but the presentation of information differs. Will an investor choose the same portfolio or different portfolios when asked Question 1 compared to Question 2? Explain your answer.

1 Based on the chart below, which investment portfolio fits your risk tolerance and desire for long-term return?

A Portfolio XYZ.

B Portfolio DEF.

C Portfolio ABC.

Portfolio	95% Probability Return Range	10-Year Average Return
XYZ	0.5% to 6.5%	3.5%
DEF	–18.0% to 30.0%	6.0%
ABC	–22.0% to 42.0%	10.0%

2 Based on the chart below, which investment portfolio fits your risk tolerance and desire for long-term return?

A Portfolio XYZ.

B Portfolio DEF.

C Portfolio ABC.

Portfolio	10-Year Average Return	Standard Deviation of Returns
XYZ	3.5%	1.5%
DEF	6%	12%
ABC	10%	16%

Solution:

An investor may choose different portfolios when asked Question 1 compared to Question 2. Portfolio XYZ may appear more attractive in the first question, where two standard deviations are used to define the range of returns and show the risk, than in the second, where only the standard deviations are shown. Also, in the second question, the returns are presented first and the measure of risk second. Thus, how questions are framed and the order in which questions are presented can have a significant impact on how they are answered. FMPs should be acutely aware of how framing can affect investment choices.

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Example 4: Effect of Loss-Aversion Bias

Loss-aversion bias, executed in practice as the disposition effect, is observed often by wealth management practitioners. The classic case of this bias is when an investor opens the monthly account statement and scans the individual investments for winners and losers. Seeing that some investments have lost money and others have gained, discuss how the investor is likely to respond given a loss-aversion bias.

Sample Solution:

The investor is likely to respond by continuing to hold the losing investments. The idea of actually losing money is so painful that the first reaction is to hold the investment until it breaks even. The investor is acting based on emotions, not cognitive reasoning. In this case, if the investor did some research, he or she might learn that the company in question is experiencing difficulty and that holding the investment actually adds to the risk in the portfolio (hence the term risk-seeking in the domain of losses).

Conversely, the winners are making money. Loss-averse FMPs have a tendency to sell these investments and realize their gains to avoid any further risk. In this case, if the investor did some research, he or she might learn that the company in question actually improves the risk/return profile of the portfolio. By selling the investment, not only is the potential for future losses eliminated, but the potential for future gains is also eliminated. Combining the added risk of holding the losers with the elimination of potential gains from selling the winners may make investors' portfolios less efficient than portfolios based on fundamental analysis.

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Example 5: Prediction and Certainty Overconfidence

Prediction Overconfidence:

Clarke and Statman (2000) demonstrated prediction overconfidence when they asked investors the following question: "In 1896, the Dow Jones Industrial Average, which is a price index that does not include dividend reinvestment, was at 40. In 1998 it crossed 9,000. If dividends had been reinvested, what do you think the value of the DJIA would be in 1998? In addition to that guess, also predict a high and low range so that you feel 90 percent confident that your answer is between your high and low guesses." In the survey, few responses reasonably approximated the potential 1998 value of the Dow, and no one estimated a correct confidence interval. (The 1998 value of the DJIA, under the conditions posed in the survey, would have been 652,230!)

Certainty Overconfidence:

People display certainty overconfidence in everyday life situations, and that overconfidence carries over into the investment arena. People have too much confidence in the accuracy of their own judgments. As people learn more about a situation, the accuracy of their judgments may increase but their confidence may increase even more; as a result, they may fallaciously equate the quantity of information with its quality. Confidence also tends to increase if people are given incentives to perform. Overconfidence is greatest when accuracy is near chance levels, and reduces as accuracy increases from 50 percent to 80 percent. Slovic, Fischhoff, and Lichtenstein (1982) gave subjects a general knowledge test and then asked them how sure they were of their answer. Subjects reported being 100 percent sure when they were actually only 70 percent to 80 percent correct.

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