LIE DETECTION GUIDE

Theory and Practice for Investment Professionals

Maria Hartwig, PhD
Jason A. Voss, CFA

CFA Institute

LIE DETECTION GUIDE

Theory and Practice for Investment Professionals

Maria Hartwig, PhD
Jason A. Voss, CFA

CONTENTS

Part II
Lie Detection Techniques: Verbal, Nonverbal, and Interviewing Approaches

CE Qualified Activity   CFA Institute

This publication qualifies for 2.5 CE credits under the guidelines of the CFA Institute Continuing Education Program.

Claim your CE credits: www.cfainstitute.org/learning/
products/publications/car/Pages/car.v2017.n1.1.aspx

CHAPTER OVERVIEWS

PART I

CHAPTER 1 OVERVIEW

In this chapter, we offer an introductory overview of the academic study of deception. The emphasis of our overview is on the empirical literature—that is, the study of deception that relies on systematic gathering of data using a scientific approach. We also describe the research methods that have been used in the study of deception. More specifically, we will discuss the laboratory method and a variety of nonexperimental methods, including field research and surveys. The purpose of this chapter is to give the reader a broad grasp of the scope of the scientific field of deception and to provide a basic understanding of the benefits and drawbacks associated with different ways of studying the topic. This chapter will help the reader digest the substantive overview of research on deception and its detection, which we will turn to in later chapters.

CHAPTER 2 OVERVIEW

In Chapter 2, we provide a review of the most influential theories of deception. Different theories produce different predictions about how lying might manifest itself in speech and nonverbal behavior. First, we discuss the emotional theory of deception, which emphasizes the stress, anxiety, and fear that may accompany lying. This theory also posits that expressions of emotions occur involuntarily to some extent and that such expressions thus might not be possible to suppress completely. According to the theory, lying will give rise to leakage of signs of emotion.

Second, we discuss cognitive load theory, which focuses on the mental strain that lying may produce. This theory predicts that a liar's behavior will show signs that the liar is mentally taxed (e.g., slower speech rate, less animated nonverbal behavior). Third, we discuss the so-called self-presentational perspective, which emphasizes that lying and truth telling are similar in that they both entail the effort to appear honest. Throughout the chapter, we discuss strengths and weakness of each theory. In the following chapter, we compare the predictions of these theories with the results of the empirical literature.

CHAPTER 3 OVERVIEW

In this chapter, we discuss cues to deception—that is, behaviors that characterize deception—including nonverbal (i.e., body language) cues, verbal behavior involving analysis of the content of speech, and so-called paralinguistic cues (vocal behavior that does not carry any semantic meaning, such as stuttering and pauses). We provide a review of the patterns from studies, including experimental studies and field studies. As we shall see, a vast body of research demonstrates that lies barely show. There are few, if any, behaviors that reliably indicate deception. We will discuss the implications of this finding for lie detection.

CHAPTER 4 OVERVIEW

Several hundred studies have measured people's ability to distinguish between truthful and deceptive statements. In Chapter 4, we provide an overview of these studies. We review the major findings, including average accuracy rates, people's tendency to be overly suspicious or credulous (so-called judgment biases), and whether there are groups of people or individuals who are better lie-catchers than others. We also discuss whether there are conditions under which lies are harder or easier to detect.

PART II

CHAPTER 5 OVERVIEW

In this chapter, we provide an overview of the research on lie detection techniques. Our aim is to describe existing techniques and to provide a sense of the effectiveness of these techniques. We discuss training programs that provide people with information about what cues to rely on and what cues to disregard. We also discuss a variety of frameworks designed to evaluate the verbal and linguistic elements of statements. Finally, we provide a brief review of techniques that focus on psychophysiological indicators (i.e., polygraph techniques).

CHAPTER 6 OVERVIEW

In this chapter, we discuss techniques that aim to improve lie detection through various forms of questioning. These techniques share the premise that liars and truth tellers might respond differently when asked questions in a strategic fashion. We discuss an approach derived from law enforcement practice and a number of techniques rooted in psychological science. The bulk of the chapter is devoted to a technique called "strategic use of evidence," which encompasses a number of tactics aimed to produce verbal indicators of deception that have earned the highest scores yet recorded for lie detection success.

INTRODUCTION

Experienced investment managers know that investing is equal parts quantitative and qualitative analysis. There is certainly value in assessing the macroeconomic environment, assessing industry performance, conducting financial statement analysis, calculating financial ratios, and executing valuation models. Yet, any research analyst or portfolio manager knows that a rigorous analysis also requires conversations with a prospective investment's competitors, employees, and most importantly, its management. Yet management teams of businesses have enormous personal financial incentives to create impeccable pictures of the companies they oversee.

This reliance on the statements of other people leaves investment professionals vulnerable to half-truths, manipulation, and even outright deception. Sadly, the history of investing is rife with such stories—the original Ponzi scheme, WorldCom, Enron, China Natural Gas, IndyMac, Satyam Computer. The list is extensive, and the costs to investors and their clients are in the billions. Investors have many analytical tools at their disposal, but what tools exist for investment professionals to assess the veracity of statements coming from management? What is sorely needed is a guide to help investment professionals better understand the psychology of truth and lie detection and to provide them with practical tools for handling truth and lie detection.

Fortunately, there is no shortage of scholarly attention given to the topic of deception and its detection. The moral status of lying is a classic topic of interest for philosophers. That is, whether and when lying is ethically permissible is a matter of longstanding debate. Psychiatrists, sociologists, and psychologists also focus on lying and lie detection. More broadly, deception appears perennially compelling to people across time and cultures. Fascination with—and condemnation of—deceit is manifest in legends and myths from ancient times up to today. Deception occurs in a vast number of settings, and there is good reason to study its psychology. In some cases, distinguishing between truthful and deceptive statements is critical and the failure to do so, catastrophic.

This book has several goals:

- *The science*. We wish to provide CFA Institute members with an overview of the state of the science in the field of deception.

- *Practical tools*. We want to present practical methods that may be of use to practitioners who have to make judgments of veracity in their daily work.

- *Cautions*. We want to offer, where relevant, words of caution regarding methods that, in all likelihood, are doomed to fail.

We draw primarily on the research produced in academic psychology because the bulk of the work is in this domain. The guide consists of two major parts:

1. Part I reviews our basic scientific understanding of the psychology of deception.
2. Part II focuses on practical methods of lie detection.

There are several reasons why we begin by discussing basic theories and findings on deception rather than immediately delivering practical lie and truth detection methods. First, lie detection is a very difficult enterprise, and in order to have even a remote chance of success, it is important to understand the fundamental mechanisms at play. Second, it is also important to understand the many misconceptions about lie detection that dominate the media and popular press. Last, a familiarity with the psychological underpinnings of a given technique helps practitioners use the technique in a flexible and artful manner, rather than in a mechanical fashion.

That being said, Part I and Part II are both written to stand on their own. So, readers primarily wanting practical tools are invited to jump straight to Part II, but we believe lie/truth discrimination is improved with an understanding of both the limitations of various techniques, as demonstrated by exhaustive scientific research, and the theoretical underpinnings of the techniques that do, in fact, work.

Here, then, is an overview of the *Lie Detection Guide: Theory and Practice for Investment Professionals*.

PART I

Chapter 1 is a short introduction to the study of deception, including a brief history of the field and a cursory overview of the methodological approaches used to study the topic. We then discuss laboratory research on deception as well as field studies and the benefits and drawbacks that accompany each of these approaches. The purpose of this discussion is to help investment professionals understand how scientific research on deception is conducted. Given the amount of pseudoscience that exists in the popular media, such understanding is extremely important.

Chapter 2 reviews the major theoretical frameworks that have been invoked in order to understand the psychology of deception. Chapter 3 discusses findings on cues to deception—that is, verbal and nonverbal characteristics (i.e., "body language") that may or may not indicate deception.

> **SNEAK PREVIEW**
>
> The major finding from studies on cues to deception is that there are barely any visible signs of deception. In short, despite widespread beliefs held by people all over the world, there is no "Pinocchio's nose"—behavior that distinguishes between lying and truth telling.

Chapter 4 is a discussion of human judgment of deception and a review of the substantial scientific research on human accuracy in judgment of deception and truth. Next is a review of the various heuristics and biases that have been found to characterize these judgments. We also discuss the conditions under which lie detection is more and less accurate. Unfortunately, research shows that lie detection is a very difficult enterprise and that even trained professionals are not good at detecting deception. Several explanations for this problematic (and counterintuitive) finding are discussed as well.

PART II

The majority of the practical methods of lie detection were developed for applications in criminal and legal settings. However, the conceptual underpinnings of the techniques are often general and are likely applicable in other settings. We review techniques that are demonstrably shown to be effective in improving lie detection as well as those that are likely useless. The reason for reviewing ineffective techniques is that such techniques are often aggressively marketed to various groups of practitioners as tools to help them in their professional life. By being aware of the pseudoscience of lie detection, CFA Institute members can make more educated choices about which techniques to adopt and which to avoid.

In Chapter 5, we discuss traditional lie detection approaches, which are based on analyses of nonverbal behavior as well as on psychophysiological lie detection techniques. They are most intimately connected with the use of the notorious polygraph. We conclude with Chapter 6, which is our most comprehensive treatment of lie detection techniques and, most importantly for investment professionals, their application. This concluding chapter includes frameworks to assess truth and deception based on analyses of the verbal content of statements as well as a family of techniques based on the premise that lie-catchers must assume a more active role in the process of detecting deception. These methods involve strategic questioning that aims to elicit cues to deception. Encouragingly, these potent techniques are a near-perfect fit for the existing skillset and day-to-day routine of investment professionals. During the past few decades, intense research efforts have been devoted to these methods, and so far, they are promising.

Finally, a general caveat: Although this guide is for investment professionals, much of the scientific research on lie detection focuses on criminal and security settings. In other words, our work entails some element of translating research applications from one setting to another. We have done our best to achieve an effective translation, but we believe further research on lie detection tailored to the needs of investment professionals is necessary. It is our ultimate hope that this guide sparks interest in lie detection in the financial industry, leading to further research conducted in laboratory and field settings and subjected to rigorous scientific scrutiny. Such scientific research can lead to the development of further practical guidelines on the topic.

PART I
THE SCIENCE OF DECEPTION AND ITS DETECTION: BASIC PRINCIPLES AND MAJOR FINDINGS

CHAPTER 1
THE STUDY OF DECEPTION:
BACKGROUND AND METHODS

In this chapter, we offer an introductory overview of the academic study of deception. Our emphasis here is the empirical literature—that is, the study of deception that relies on systematic gathering of data using a scientific approach. We also describe the research methods that have been used in the study of deception. More specifically, we discuss the laboratory method and a variety of nonexperimental methods, including field research and surveys. The purpose of this chapter is to give the reader a broad grasp of the scope of the scientific field of deception and to provide a basic understanding of the benefits and drawbacks associated with different ways of studying the topic.

HISTORY AND SCOPE OF THE STUDY OF DECEPTION

Lies have fascinated people since ancient times. Countless tales and myths center around liars and the fates that befall them. Perhaps most famous in Western thought is the pivotal role deception plays in the Biblical story of Adam and Eve: The serpent uses deception to entice Eve to commit the original sin, leading God to banish Adam and Eve from the Garden of Eden. In literature, Pinocchio[1] and Baron Munchausen[2] are iconic examples of prolific liars. Aesop's classic fable about the boy who cried wolf also centers on the telling of falsehood and the consequences of such conduct. In folklore, deception is typically depicted as sinful and oftentimes carries a penalty. This notion has important consequences for the detection of deception.

Deception has been an area of academic interest since the dawn of the Western intellectual tradition. Early Greek philosophers pondered the nature of lying, primarily from a moral perspective. Both Plato and Aristotle discussed the virtues of lying and truth telling within their larger frameworks of ethics. The moral status of deception has continued to be a topic of vigorous scholarly debate through the centuries.

---

[1]One of Pinocchio's most prominent and culturally enduring characteristics was that his nose grew when he was lying. His nose always grew when he told a lie, and it never grew when he told the truth. Hence, Pinocchio represents the notion that there are visible signs of deception.
[2]Baron Munchausen is a fictional character who tells fantastical and patently implausible stories about various conquests.

One of the most famous perspectives was articulated by Immanuel Kant, who postulated an absolute prohibition against lying. That is, he argued that deception is wrong under all circumstances, regardless of the repercussions of telling the truth. In contrast to the Kantian view, utilitarian ethics, developed in the 18th century, considers the consequences of lying versus telling the truth and favors the course of action that maximizes positive outcomes. In this perspective, lying is permitted if the consequences of telling the truth are more dire than those of lying. Deception is still a topic of considerable philosophical debate, primarily in moral philosophy but also in epistemology and the philosophy of language (Bok 1999; Martin 2009).

Although philosophical interest in deception spans millennia, systematic empirical research on the topic is, by comparison, a relatively recent phenomenon. The first attempts at studying deception using the empirical approach coincided with the growth of experimental psychology in the middle of the 20th century. Research grew at a relatively slow pace during the 1960s and 1970s and began to increase in breadth and intensity in following decades. Much of this research was rooted in social psychology and approached lying as an interpersonal phenomenon. Since the 1990s, there has been an explosion of interest in the topic, with particularly striking growth in the branches of research focusing on forensic, legal, and security contexts (Vrij 2008).

Intense interest in deception detection in the legal context is fairly easy to explain: Post-conviction DNA evaluations have revealed that miscarriages of justice happen with disturbing frequency (Garrett 2011). Often, these are the result of false confessions—innocent people accepting responsibility for crimes they did not commit (Kassin, Drizin, Grisso, Gudjonsson, Leo, and Redlich 2010). In many of these cases, the starting point is the misjudgment of an innocent person, who is then interrogated aggressively with the purpose of producing a confession. In simple terms, numerous cases of wrongful conviction involve a failure to appropriately classify the denial of an innocent person as truthful.

The terror attacks on the World Trade Center on 11 September 2001 have resulted in further research interest in the detection of deception. More specifically, the failure of security screening protocols prompted further inquiry into the psychology of credibility judgments in national security settings (Honts and Hartwig 2014). Although much of the research on deception up to this point focused on lies about past events, the problem of preventing terrorist attacks prompted research into the psychology of lies about the future—that is, intentions (see Mac Giolla, Granhag, and Vrij 2015).

A large body of research in clinical psychology is on lying in the form of faking illness (Tabernik and Vitacco 2015). Such malingering can have significant advantages if successful: Offenders may escape incarceration and instead receive psychiatric treatment. Forensic psychologists are also interested in simulated amnesia, where offenders falsely claim lack of memory of criminal events (Christianson and Merckelbach 2004).

So, a number of settings have attracted attention from deception scholars, and the list here is by no means exhaustive. Psycholinguists, developmental psychologists, and psychiatrists study deception from a variety of perspectives as well. But to date, paltry research focuses on lie detection in financial analysis settings, which is remarkable given the importance of deception and its detection in investing. There are substantial monetary incentives for executives to offer deceptive statements, which is evident from the long history of corporate fraud. The consequences of failing to detect financial fraud are also substantial, sometimes amounting to billions of dollars in losses for those who invest in businesses engaging in fraudulent practices. Even half-truths about quarterly earnings expectations—although far subtler than fraud—carry enormous costs.

METHODS OF DECEPTION DETECTION RESEARCH

EXPERIMENTAL RESEARCH

Although some deception research has been purely theoretical, the vast majority is empirical; that is, it relies on the systematic collection and analysis of data from human subjects. The major research approach in deception research is the experimental method, in which researchers randomly assign research participants to various conditions and measure the difference in participants' behavior among these conditions. These experiments nearly always occur in laboratory settings, in which researchers carefully control the environment to ensure that the only difference between the two conditions is the variable being manipulated. In the deception literature, researchers randomly assign participants either to a condition where they are asked to tell the truth or to a condition where they are instructed to provide deliberately false information. Participants who provide statements in this fashion are often referred to as *senders*, regardless of whether they are lying or telling the truth. Random assignment ensures that there are no systematic differences between participants other than that some of them are lying and others are telling the truth.

Advantages of the Experimental Method

The primary advantage of the experimental method is that it ensures what is referred to as *internal validity*—that is, the ability to draw causal conclusions. For example, an experimental study showing that participants instructed to lie include fewer details in their statements compared with participants who are instructed to tell the truth clearly suggests that lying, and nothing else, causes this difference. There is no other plausible explanation (e.g., personality differences between people in the two conditions) because random assignment ensures that the groups are equivalent except for the experimental manipulation of lying. Another major advantage of the experimental method is that it provides researchers with so-called ground

truth—unambiguous knowledge about whether the statements given by participants are in fact truthful or deceptive—which is quite difficult to achieve in nonexperimental studies.

Ground truth: *unambiguous knowledge about whether the statements given by participants are in fact truthful or deceptive*

In many studies where lie detection accuracy is of interest, statements derived from laboratory research are shown to "lie-catchers" (also referred to as *receivers* or *observers*). These might be college students, community members, or presumed lie experts (e.g., police officers, customs officers, and other groups whose judgments of deception are part of their professional lives). There are numerous ways to vary the conditions under which lie-catchers make judgments: They might be exposed to video recordings of the statements or be asked to evaluate written transcripts. They might be incentivized to make correct judgments, or they may not. The senders to whom they are exposed might be strangers, friends, or romantic partners.

Drawbacks to the Experimental Method

The experimental approach is not without its limitations. There is an obvious element of artificiality to the laboratory situation that may limit its ability to generate results comparable to real-world settings. In fact, whether laboratory research generates valid results is a topic of heated debate (Hartwig and Bond 2011). Critics of the laboratory approach point out the potential problems of relying heavily on student samples, which may not be representative of the population in general. Moreover, critics complain that researchers typically instruct people to lie (as part of the random assignment procedure), whereas in real life, people presumably elect whether to lie or tell the truth. The most common criticism concerns the stakes of the lies told in laboratory settings: Because of ethical rules governing the treatment of human subjects, deception researchers cannot threaten participants with severe consequences if they fail to produce a convincing statement. By contrast, in the real world, failing to convince may carry severe penalties (regardless of whether one is lying or telling the truth). Later in the guide, we discuss the validity of the concerns raised by critics of the laboratory method. In particular, these critics argue that it is not possible to apply conclusions from laboratory settings to the real world because the lies told in laboratory situations are trivial and artificial.

FIELD RESEARCH

The alternative to laboratory research is field research—more broadly, nonexperimental research. Here researchers identify lies occurring in real-life settings, which might seem straightforward but is actually complicated. Researchers need to establish with absolute certainty that the statements are actually deceptive. For example, a statement given by a suspect during a police interrogation might be a lie, but a conviction in court is not considered sufficient support for ground truth. As described earlier, we know that innocent people are sometimes convicted of crimes they did not commit.

Even if researchers are able to ensure the ground truth is deceptive, they then face another challenge: identifying so-called comparable truths. Imagine that a crime suspect claims to have been at home while a crime was committed but CCTV footage and physical evidence (e.g., DNA) show the suspect was actually at the scene of the crime at that time. The suspect's statement is clearly a lie. But with what will researchers compare this statement?

It would be problematic to use statements from the same interrogation where the suspect (truthfully) describes where he lives because the stakes of this statement are considerably lower. Instead, researchers need to find statements that are similar in nature to the deceptive ones in terms of the conditions under which they are told and the stakes of the situation in order to make meaningful comparisons between the characteristics of truths and lies.

Given the difficulty of collecting suitable data on real-life, high-stake lies, there are significantly fewer studies using this methodology than the experimental approach. Still, there are enough to draw some conclusions about the nature of these lies and people's ability to detect them.

SURVEY RESEARCH

Deception researchers also conduct surveys. The primary purpose of these surveys is to map people's beliefs about deceptive behavior. That is, researchers find out about the behavioral characteristics people associate with deception. Such knowledge is useful because researchers can then compare a person's beliefs with the data on the actual cues to deception in order to gauge their accuracy. Some surveys compare the beliefs of different populations (e.g., lay people versus professional lie-catchers) in order to establish whether some groups have more-correct beliefs than others. There are also cross-cultural surveys that aim to establish whether beliefs about the characteristics of deceptive behavior differ by culture.

META-ANALYTIC RESEARCH

There are hundreds of studies on deception and its detection using various methodologies. A useful way to get a grasp of the general patterns in this literature is to conduct meta-analyses—statistical syntheses of an entire body of work. That is, in a meta-analysis, all studies that meet the inclusion criteria are collapsed and analyzed in order to provide a picture of the literature as a whole. There have been several major meta-analyses of the deception literature. In general, although we discuss some findings from individual studies, our discussion draws on the meta-analytic findings because these are highly robust.

CONCLUSION

Although deception appears not only in the realm of fiction but also in philosophy, linguistics, and sociology, the bulk of the scientific literature stems from psychological research. Researchers use a variety of methods to study deception and its detection. A very common approach is the experimental method, which takes place in laboratory settings. The experimental method allows researchers to examine deception and its detection under a wide range of circumstances and, importantly, to draw conclusions about the causal links between variables. However, the experimental method may be limited in its ability to simulate real-life conditions. To complement experimental studies, researchers sometimes use the field method, in which real-life lies and truths are examined. Although these studies offer realism, they are complicated to carry out and the results can be hard to interpret. By using the meta-analytic approach, in which multiple studies are combined and analyzed together, it is possible to get an overall picture of the results from studies that use different methods.

CHAPTER 2
THEORETICAL PERSPECTIVES ON DECEPTION

In this chapter, we provide a review of the most influential theories of deception. Different theories produce different predictions about how lying might manifest itself in speech and nonverbal behavior. First, we discuss the emotional theory of deception, which emphasizes the stress, anxiety, and fear that may accompany lying. This theory also posits that expressions of emotions occur involuntarily to some extent and that they thus might not be possible to suppress completely. According to the theory, lying gives rise to leakage of signs of emotion. We also discuss cognitive load theory, which focuses on the mental strain that lying may produce and thus predicts that a liar's[3] behavior shows signs of mental taxation (e.g., slower speech rate, less animated nonverbal behavior). In contrast to both the emotional and the cognitive load theory, the so-called self-presentational perspective emphasizes that lying and truth telling are similar in that they both entail efforts to appear honest. Throughout the chapter, we discuss the strengths and weakness of each theory. In the following chapter, we compare the predictions of these theories with the results of the empirical literature.

These perspectives have in common that they attempt to articulate how lying differs from truth telling on a psychological level. However, the theories differ in what psychological processes they emphasize and, consequently, in the cues they predict to emerge when a person is telling a lie.

THE EMOTIONAL THEORY

One of the first comprehensive psychological theories of deception was outlined by Ekman and Friesen (1969). Their work is anchored in theories of emotion, which is reflected in their approach to deception. In their view, deception is accompanied by emotional processes—in general, such negative emotions as guilt (about the act the liar is trying to cover up and possibly about the act of lying itself), fear (that her lie might be uncovered), and anxiety. However, Ekman (2009) reported that positive emotions are also possible; liars may occasionally experience glee at the prospect of fooling someone (an emotion he refers to as *duping delight*).

---

[3]When using the terms "liars" and "truth tellers," we are referring to a person who is providing deceptive or truthful information at a given moment. We do not mean to imply any chronic characteristics with these terms; that is, when we refer to someone as a liar, we do not mean that the person has a consistent tendency to lie.

Ekman's (2009) theory of deception is closely linked to the leakage hypothesis, which states that cues to an underlying emotion may leak, primarily in the form of nonverbal signs of the emotion the liar is attempting to suppress. For example, if a liar is highly fearful that his lie will be detected, he may unwittingly display indicators of this emotion through fidgeting, rapid speech, or subtle facial indicators of alarm. The leakage hypothesis has its origin in the work of Darwin (1872), who argued that emotions are partly hardwired and that displays of emotion may occur automatically.

In Ekman's (2009) version of the leakage hypothesis, people deliberately attempt to control expressions of emotions in order to present a credible demeanor while lying. However, there may be a brief moment, prior to the onset of deliberate control, during which the felt emotion is displayed, or "leaked." Ekman labeled these fleeting displays of suppressed emotion *microexpressions*, which are presumed to last a fraction of a second and may be hard for the untrained eye to detect.

It is important to note that Ekman's (2009) theory pertains to lies of significance; his argument was that only lies that are sufficiently important to trigger emotions give rise to leakage. Hence, Frank and Ekman (1997) dismissed much of the laboratory research as insufficient for testing the emotional approach because, they argue, lies told in these settings are too trivial to trigger significant emotion.

Ekman's emotional theory of deception is influential in the literature. The notion that deception gives rise to noticeable behavioral traces has guided the search for cues to deception for many decades. His approach has also captured the attention of the popular media and of a variety of government agencies. Most prominently, in the wake of the terror attacks on 11 September 2001, the US Transportation Security Administration (TSA) rolled out a program of security screening at airports based on Ekman's model of deception.

More specifically, the TSA created the so-called Screening of Passengers by Observation Techniques (SPOT) program, in which specially trained TSA officers observe the demeanor of travelers for cues of stress, fear, and anxiety (presumably accompanying deception). The SPOT program is highly controversial. It has repeatedly been scrutinized by the Government Accountability Office (2010), which criticized the program for weaknesses in its theoretical underpinnings and the lack of empirical validation.[4]

The emotional theory of deception has simplistic appeal: It seems plausible that people would experience a host of negative emotions, especially if the lie is serious in nature. However, truth telling might be accompanied by the same emotions. Imagine the following two scenarios: In the first scenario, an athlete accused of doping appears on national television to deny these

---

[4]See also Weinberger (2010).

accusations. If the athlete is guilty of doping and thus lies, it is reasonable to think that he would experience distress at the prospect of not being able to convince the audience that he is innocent. In the second scenario, the athlete is innocent and is thus telling the truth when he denies the accusations. In this scenario, it is also plausible to imagine that the athlete experiences some form of emotional distress. For example, he might be concerned that he fails to convince the audience of his innocence, and he might experience fear of the consequences of such a failure. He might also experience anger in response to the unjust accusation.

There are countless other examples of situations in which truth tellers might experience distress (e.g., an innocent suspect of a crime, a spouse who is wrongfully accused of cheating, a politician who is under false suspicion of corruption). The emotional theory is fundamentally problematic in that it does not take into account the experiences that may accompany truth telling and thus fails to generate clear predictions about how liars and truth tellers might differ in terms of their behavior.

Interestingly, Ekman (2009) himself acknowledges this problem: In *Telling Lies*, he described what he called the "Othello error." He drew on Shakespeare's *Othello*, in which Othello misinterprets his lover Desdemona's distress as a sign of deception. Thus, the Othello error occurs when a lie-catcher wrongly interprets a truthful person's reaction to suspicion as evidence that they are lying.

Later, we discuss the empirical evidence pertaining to the emotional theory in more detail. For now, these theoretical problems are reflected in the data: There is little evidence that liars show more discernible signs of emotional distress than truth tellers.

Advantage:	The emotional theory has simplistic appeal.
Disadvantage:	The theory neglects the psychological experience of truth tellers, who also may experience emotions when attempting to convince.
Conclusion:	The theory fails to give rise to clear predictions about behavioral differences between liars and truth tellers because both experience emotions.

COGNITIVE LOAD THEORY

As part of their theoretical framework on deception, Zuckerman, DePaulo, and Rosenthal (1981) stated that lying might be a more cognitively taxing task than telling the truth; that is, lying is more mentally demanding. This view, which is often referred to as *cognitive load theory*, has attracted significant attention in the last decade, during which the original ideas proposed by Zuckerman et al. have been fleshed out, in particular by Vrij, Granhag, Mann, and Leal (2011).

Vrij et al. (2011) outlined a number of reasons that lying might be more cognitively effortful than telling the truth:

1. Need for a plausible story. In contrast to truth tellers, who simply recall a story from memory, liars must concoct a story that serves as a credible alternative to the truth, which might be challenging on several levels. A liar's story must be detailed enough that it has the superficial characteristics of a real event but not any details the lie-catchers know to be false. It must be a story that the liar can repeat without inconsistencies if asked to do so.

2. Need for credibility. Liars are less likely to take their credibility for granted than truth tellers, and they are thus more prone to control their behavior in such a way that they appear credible (e.g., making sure their body language does not give away their lie). Such self-monitoring also involves mental effort.

3. Need for acceptance. Because liars are less likely to take their credibility for granted, they are probably more likely to pay attention to the receiver of the lie in search of feedback about whether their lie appears to go undetected.

4. Need for focus. Liars may have to expend cognitive resources in order to remind themselves of the task of maintaining a credible demeanor.

5. Need for suppression. Lying requires actively suppressing the truth, which requires executive control (which, in turn, involves cognitive load).

Cognitive load theory acknowledges that lying might be accompanied by emotion, but it strongly emphasizes the involvement of what is referred to as *cold cognition*—that is, cognitive processes that are rational and deliberate, in contrast to *hot cognition*, which refers to emotional processes.

From these deliberate, cognitive processes, we can make several predictions about how liars' behavior should differ from that of truth tellers. The kinds of behaviors that may arise from cognitive load are easy to imagine. For example, picture a person asked to solve a tricky mathematical problem in his head or a person asked to recall what she had for dinner a week ago. However, it should be noted that cues to cognitive load are not entirely easy to define: Some indicators of cognitive load, such as relatively rigid body language, may also be indicative of tension and stress.

A person who is operating under a heavy cognitive load tends to make more speech errors and take longer pauses before responding to questions. Cognitive load is also associated with a decrease in the frequency of eye blinks (Leal and Vrij 2008) and a general decrease in body movements, particularly in the form of peripheral limb (i.e., arms, fingers, feet, and legs) movement. As discussed in the next chapter, there is a quite a lot of empirical support for the cognitive load theory.

Apart from serving as a theoretical framework that can help us understand the psychological processes that accompany deception, cognitive load theory has been extended and developed into a lie detection technique (discussed in much more detail in Chapter 6).

Advantage: The basic idea that lying is more cognitively demanding is supported by a substantial body of research.

Disadvantage: It is not entirely clear what behaviors a person under cognitive load will display because some cues to cognitive load overlap with cues to other states (e.g., tension).

Conclusion: Cognitive load theory is generally accepted as a sound approach to understanding deception.

SELF-PRESENTATIONAL PERSPECTIVE ON DECEPTION

In 1959, the sociologist Erving Goffman published his seminal theory of human social interaction: *The Presentation of Self in Everyday Life*. His theory is based on the metaphor of life as theater, with people behaving like actors on a stage. Goffman suggested that people are typically motivated to control the impressions others have of them, in order to come across in desirable ways.

What is desirable in one setting, however, might not be desirable in another. Thus, people need to play different roles depending on the social context. They strategically emphasize certain elements of themselves and downplay others depending on what impressions they want to make. For example, during a job interview, a person likely attempts to convey reliability and competence. During a dinner with new friends, a person will try to present herself as sociable, pleasant, and charming. A college student interacting with a professor probably wants to be seen as hard working and ambitious, while he might want his friends to perceive him as fun loving and outgoing.

All these attempts at impression management are examples of self-presentation—people's attempts to reach social goals by editing or grooming their behavior using both verbal and nonverbal means. Self-presentation is not equivalent to self-promotion or boasting because some situations call for modesty and humility. In such situations, people might downplay their skills in order to not violate the social norms (DePaulo 1992).

Self-presentational theory is not a theory about deception per se. However, it paints a picture of human behavior as a deliberate, strategic product. Our social behavior is not raw. We

constantly filter and edit ourselves. We highlight and downplay various aspects of ourselves when interacting with others in order to reach certain goals.

Social psychologist Bella DePaulo translated Goffman's (1959) classic framework into a theory of deception. DePaulo, Lindsay, Malone, Muhlenbruck, Charlton, and Cooper's (2003) self-presentational perspective on deception stands in contrast to the previously discussed theories of deception because it emphasizes the similarities, rather than the differences, between lying and telling the truth. Liars and truth tellers, DePaulo et al. argued, share a common goal: to create an impression of honesty. Therefore, both liars and truth tellers engage in strategic behaviors in order to produce a display designed to convince the audience that they are truthful. Based on this view, the basic prediction emerging from the self-presentational perspective is that behavioral cues to deception are weak because the underlying processes of lying and truth telling are similar.

The self-presentational perspective makes one fundamental distinction between lying and truth telling: Liars' claims to honesty are illegitimate. It is this difference between the claims of liars (that they are being truthful) and the reality (that they in fact are lying) that DePaulo et al. (2003) called *the deception discrepancy*.

From this discrepancy, it is possible to generate some predictions about cues to deception. Because liars know that their claims to honesty are bogus, they might embrace their accounts to a lesser degree, which might lead them to appear ambivalent. Their stories might also be more vague and less detailed, partly because they may be less familiar with the domain they are talking about and partly to avoid being disproved.

Similarly to cognitive load theory, the self-presentational perspective also predicts that liars might experience a higher degree of mental busyness and deliberateness. DePaulo et al (2003) wrote: "Enthusiasm flows effortlessly from those who truly are experiencing enthusiasm, but fakers have to marshal theirs. Liars can be preoccupied with the task of reminding themselves to act the part that truth tellers are not just role-playing but living" (p. 78).

> **Advantage:** Self-presentational theory is a broad framework to understand social behavior in general and deception in particular. It is generally accepted as sound.
>
> **Disadvantage:** The theory offers few predictions about how deceptive behavior differs from truthful behavior because the principal idea is that they are activities with similar goals.
>
> **Conclusion:** Based on the self-presentational perspective, we can expect quite similar behaviors from liars and truth tellers.

SUMMARY

The three broad theories lead to different predictions about how liars and truth tellers differ in terms of behavior. In short, the emotional approach emphasizes the effect that may accompany deception and hence implies that liars might betray themselves through leakage of emotion. Cognitive load theory focuses on the mental effort that lying might entail and suggests that liars may show behavioral signs of this effort. Finally, the self-presentational perspective highlights the similarities in the goals shared by liars and truth tellers and thus predicts only faint differences in the behaviors of liars and truth tellers.

In the next chapter, we review the empirical literature on cues to deception and compare these cues with the predictions of the theoretical frameworks discussed in this chapter. In short, the research supports the self-presentational perspective—cues to deception are, in general, weak and unreliable—and the cognitive load theory, which emphasizes the mental strain of lying.

CUES TO DECEPTION

In this chapter, we discuss cues to deception—behaviors that characterize deception. We also discuss nonverbal (i.e., body language) cues, verbal behavior involving analysis of the content of speech, and so-called paralinguistic cues (vocal behavior that does not carry any semantic meaning, such as stuttering and pauses). We then provide a review of the patterns that emerge from studies, including experimental studies and field studies. A vast body of research shows that lies barely show. There are few, if any, behaviors that reliably indicate deception. Last, we discuss the implications of this finding for lie detection.

Earlier, we mentioned the classic story of Pinocchio. Pinocchio was remarkable in several ways, but his most well-known trait was that his nose grew when he was lying. His nose always grew when he lied, and it never grew when he was telling the truth. This is what researchers refer to as a perfect *cue to deception*. A cue to deception is, in simple terms, a behavioral indicator that people display to a larger extent when they are lying than when they are telling the truth.

Such behavioral indicators can relate to an aspect of a person's story (e.g., the number of details in his statement, the degree to which he contradicts himself), the way he delivers his story (e.g., whether he stutters or takes long pauses), or his body language (e.g., whether he shifts position in his seat, scratches himself, or look his conversation partner in the eyes).

The ideal cue to deception would be something like Pinocchio's nose; it would always present during deception and never when a person is telling the truth. If there were such a cue, lie-catchers would never make errors when attempting to discern deception. Assuming that they knew about this metaphorical Pinocchio's nose, they would always correctly determine when someone is lying and when truthful.

Finding a behavior, or a pattern of behaviors, that occurs with different frequency during deception is the perennial quest in the scientific study of deception, and the search for reliable cues to deception has spanned half a century (Vrij 2008). Again, the most common method used to study cues to deception is the laboratory approach, but a number of field studies have focused on lies told in naturalistic settings (Hartwig 2011). To date, there have been hundreds of studies examining behavioral differences between liars and truth tellers, and these studies have mapped a vast number of behaviors as potential cues to deception.

TYPES OF BEHAVIORAL CUES

Here, it is useful to make a distinction between different types of behaviors. Researchers typically divide cues into three rough categories:

- verbal cues, which pertain to the content of a person's speech;

- paralinguistic cues, which relate to speech but do not carry any semantic meaning (e.g., speech errors, speech hesitations, the level of voice pitch); and,

- nonverbal cues, which include all forms of body language, including facial expressions.

It is also possible to divide cues to deception into two different categories, depending on how these behaviors are measured: minute or global cues. Minute cues are measured by breaking down behavior into small units and counting their frequency or duration.

For example, researchers might measure elements of verbal behavior by counting the number of details or, even more specifically, the number of details relating to sound, visual, or other sensory information. They might measure paralinguistic cues by examining the duration of speech latencies—the pause between a question and an answer or the number of times a person stutters during a given statement. Nonverbal behaviors can be measured in a minute manner as well—for example, by counting the number of times a person moves her torso, head, legs, feet, arms, or fingers or by measuring the duration of gaze aversion (i.e., looking away from the conversation partner).

Global cues are broader impressions of behavior and are sometimes referred to as *impressionistic cues*. These cues are measured by having people who are unaware of whether they are seeing a liar or a truth teller rate a person on broad dimensions. For example, they might be asked to rate whether a person appears cooperative, pleasant, tense, forthcoming, and so forth.

META-ANALYTIC FINDINGS

In over half a century of research on cues to deception, where hundreds of behaviors supposedly exhibited during lying were examined, researchers have not been able to identify anything that could be characterized as a proper Pinocchio's nose: There is no single behavior, nor a pattern of behaviors, that appears to reliably distinguish liars from truth tellers.

Let us inspect the results from scientific literature on cues to deception in more detail. Recall that a meta-analysis is a statistical overview of a large body of work. DePaulo et al. (2003) compiled the largest meta-analysis to date, including 1,338 estimates of 158 behaviors,

measured both minutely and globally. Again, there is no constellation of behaviors that systematically appears as a sign of lying. The behaviors that do show a systematic covariation with deception are typically only weakly related to deceit. In short, the behavioral traces of deception are faint at best.

People believe that lying is accompanied by signs of stress, anxiety, and guilt—a concept covered in more depth later. Examples include gaze aversion, fidgeting, and speech disturbances, such as stuttering. The meta-analysis showed that these beliefs are misguided.

Table 1 shows the strength of various behavioral cues in terms of their ability to indicate deceptive behavior. For example, in DePaulo et al. (2003), the effect size d (a statistical measure of the strength of association between two variables) of eye contact was a statistically nonsignificant 0.01.[5] Specifically, the researchers, who looked at many different measures of eye contact, stated: "It is notable that none of the measures of looking behavior supported the widespread belief that liars do not look their targets in the eye. The 32 independent estimates of eye contact produced a combined effect that was almost exactly zero ($d = 0.01$)" (DePaulo et al. 2003, p. 93).

Fidgeting with an object—another popular supposed deception cue—does not occur more frequently when lying, $d = -0.12$ (the negative value suggests that object fidgeting occurs less, not more, frequently when lying, but this difference is not statistically significant). Speech disturbances are not related to deception either ($d = 0.04$), and neither are posture shifts ($d = 0.05$).

Interestingly, the strongest cues that appear in the meta-analysis are global impressions of behavior. For example, liars appear less cooperative ($d = -0.66$), more ambivalent ($d = 0.34$), and more tense ($d = 0.27$) than truth tellers. Their stories sound less plausible ($d = -0.23$) and are told with less immediacy ($d = -0.55$)[6] and less logical structure ($d = -0.25$).

---

[5]The usual way of interpreting effect size is that a d around 0.2 is a small effect, a d around 0.5 is a medium effect, and a d around 0.8 is a large effect. An example of a small effect size is the difference in height between 15- and 16-year old girls. This is a real statistical difference, but it is very small. In other words, predicting whether a girl is 15 or 16 years old based purely on information about her height is very difficult.

[6]Vocal and verbal immediacy is a complicated construct, but in short, high levels of immediacy signal openness, forthcomingness, and a willingness to communicate with the receiver.

TABLE 1.   STRENGTH OF VARIOUS BEHAVIORAL CUES AS INDICATORS TO DECEPTIVE BEHAVIOR

Rank	Behavioral Cue	d	n
1	Cooperative	−0.66	222
2	Verbal and vocal immediacy (impressions)	−0.55	584
3	Admitted lack of memory	−0.42	183
4	Pupil dilation	0.39	328
5	Talking time	−0.35	207
6	Ambivalence	0.34	243
7	Detailed response	0.30	883
8	Spontaneous corrections	−0.29	183
9	Nervousness, tension	0.27	571
10	Logical structure	−0.25	112
11	Plausibility	−0.23	223
12	Pitch (when motivated)	0.21	294
13	Word and phrase repetition	0.21	100
14	Complaints	0.21	397
15	Fidgeting, general	0.16	444
16	Illustrators	−0.14	839
17	Facial pleasantness	−0.12	635
18	Fidgeting with object	−0.12	420
19	Body animation/activity	0.11	214
20	Blinking	0.07	850
21	Rate of speaking	0.07	806
22	Posture shifts	0.05	1,214
23	Speech disturbances	0.04	283
24	Eye contact	0.01	1,491

Note: d = a statistical measure of the strength of association between two variables; n = number of individuals in the sample.

Source: DePaulo et al. (2003).

Furthermore, some cues measured minutely turn out to be related to deception. Importantly, these cues tend to be verbal rather than nonverbal in nature. For example, liars talk for a shorter time ($d = -0.35$) and include fewer details ($d = -0.30$). More specifically, deceptive statements differ in the inclusion of several verbal elements: Lies contain more negative statements and complaints ($d = 0.21$); liars are less likely to spontaneously correct themselves ($d = -0.29$) and are less likely to admit a lack of memory ($d = -0.42$).

WHAT THEORIES DO THE DATA SUPPORT?

Earlier, we discussed three theories: the theory that liars experience more negative emotions; the theory that liars experience more cognitive load; and the theory that both liars and truth tellers invest effort in appearing believable and their behavioral displays are thus likely to be rather similar.

EMOTIONAL THEORY: NOT SUPPORTED

The predictions from the emotional theory largely fail. There are few signs that liars betray themselves through manifestations of nervous and anxious behaviors. Liars do not fidget, stutter, or avert their gaze. In general, there is very little evidence that liars fall prey to leakage.

Ekman's (2009) emotional theory strongly emphasized the utility of so-called microexpressions—very brief facial expressions that supposedly convey a suppressed or concealed emotion. The attention given to microexpressions in the media might suggest an abundance of research published in peer-reviewed journals addressing this question. However, this is not the case.

Porter and ten Brinke (2008) noted that "to [their] knowledge, no published empirical research has established the validity of microexpressions, let alone their frequency during falsification of emotion" (p. 509), which is the reason microexpressions of emotion were not included in DePaulo et al.'s (2003) meta-analysis.

In order to examine the question of micro-expressions during deception, Porter and ten Brinke (2008) conducted a study of people's ability to (1) fabricate expressions of emotions they did not experience and (2) conceal emotions that they did experience. Their results showed that people are not perfectly capable of fabricating displays of emotions they do not experience: When people were asked to present a facial expression different from the emotion they were experiencing, there were some inconsistencies in these displays. The effect seems to depend on the type of emotion. The subjects performed better at creating convincing displays of happiness compared with displays of negative emotions, possibly because of people's experience of creating false expressions of positive emotion in everyday

life. With regard to concealing an emotion people did experience, they performed better: There was no evidence of leakage of the felt emotion in these expressions.

As for microexpressions, no complete microexpression (lasting 1/5–1/25 of a second) involving both the upper and lower half of the face was found in any of the 697 facial expressions analyzed in the study. However, 14 partial microexpressions were found—7 in the upper and 7 in the lower half of the face. Interestingly, these partial microexpressions occurred during both false and genuine facial expressions. That is, not only those who were falsifying or concealing emotions displayed these expressions; true displays of emotion involved microexpressions to the same extent.

This study poses serious problems for the theory of microexpressions of emotions. First, it shows that these expressions occur exceedingly rarely. Second, and even more problematically, they occur even when people are not faking displays of emotion. How then can an observer use microexpressions to decipher whether someone is displaying false or genuine emotion?

The short answer is that they cannot. It is particularly troublesome, then, that there is an industry selling training tools to various professional groups promising to improve individuals' accuracy in distinguishing between lies and truths. Practitioners should be highly skeptical of these training tools; no scientific evidence supports their effectiveness.

COGNITIVE LOAD THEORY: SUPPORTED

Some findings support the cognitive load perspective: Most prominently, liars appear more tense. Their pupils are also more dilated, their pitch of voice is higher, and their vocal tension is higher—all are signs of cognitive strain.

Recent research has generated several techniques by which the cognitive load of lying can be enhanced. These techniques may, as we shall see, lead to higher deception detection accuracy.

SELF-PRESENTATIONAL THEORY: SUPPORTED

From the pattern of data on cues to deception, the broad prediction of the self-presentational perspective appears to be supported: Cues to deception are faint overall and also unreliable. Out of 158 behaviors examined in the meta-analysis, the majority were not related to deception. Out of the behaviors that showed a significant association with deception, the average strength of the association was weak at best.

Perhaps the self-presentational interpretation is correct: Liars and truth tellers face a similar task—to convince the receiver of their message that they are truthful—and might be similarly motivated to accomplish this task. This similarity might result in behavioral outputs that are nearly indistinguishable from one another.

Another helpful aspect of the self-presentational theory is that people frequently engage in some form of strategic editing of their behavior in order to come across in desirable ways (Schlenker 2002) regardless of whether they are telling the truth or lying.

There are countless examples of this in everyday life: We may act pleasantly toward colleagues that we actually dislike in order to keep interactions smooth and conflict free; we sometimes receive undesirable presents with grace; we sit through tedious meetings and dinners with straight or friendly faces. In fact, we teach lessons of self-presentation to our children—for example, reproaching them when they speak their minds openly and instructing them to not do so if their opinions are hurtful or if their timing is inappropriate.

In summary, people have ample experience of what can be considered a form of acting. Perhaps acting truthful when one is actually lying is not as unusual of a task as it seems at first glance. In fact, research shows that lying is an everyday phenomenon: People admit to lying between once and twice a day (DePaulo, Kashy, Kirkendol, Wyer, and Epstein 1996).

The self-presentational theory does predict that liars might be more evasive and ambiguous and operate under a heavier self-regulatory burden. Some of the findings from DePaulo's (1992) meta-analysis support this: Liars' stories are less rich and compelling, and liars appear less cooperative and more tense.

The findings that liars are less likely to admit lack of memory and to correct themselves while speaking are both supportive of the prediction that liars take their credibility for granted less than truth tellers. It seems liars attempt to create a flawless account, but in doing so, they overshoot the mark; their stories thus lack some of the ordinary imperfections of truthful statements.

In conclusion, the empirical data on cues to deception lend support to the self-presentational perspective and to the notion that lying is more cognitively demanding but not to the emotional approach. However, the most important message from research on cues to deception is that there are very few signs that reliably indicate deception.

USING KNOWLEDGE ABOUT CUES TO DECEPTION

The average effect size for cues to deception in DePaulo et al.'s (2003) meta-analysis was $d = 0.10$. This is a minute difference; on the basis of such a small difference, it is nearly impossible to make accurate judgments. The task of judging deception on the basis of these weak cues can be likened to the task of a physician attempting to diagnose a disease that has very few visible symptoms or a research analyst making a buy decision based solely on a single conference call: There is simply not enough diagnostic information for good decision making.

Is it possible to train lie-catchers to attend only to the most diagnostic cues to deception and ignore those that do not distinguish between liars and truth tellers? Researchers have tested whether such cue-based training programs might lead to higher lie detection accuracy but have, unfortunately, found limited, if any, effect on lie detection accuracy (Frank and Feeley 2003). Even the most reliable cues emerging from research are weak, and they might only be apparent when aggregating a substantial amount of data.

In summary, decades of empirical studies suggest that lying has very few physical manifestations in the liar. Nonverbal behavior appears to be a mostly useless source of information about deception. Although there appear to be some impressionistic and verbal cues to deception, these cues are on average weak. In the next chapter, we review research on people's ability to detect deception in a variety of settings, including the first study on lying in the field of investment management.

How should CFA Institute members use the knowledge generated from 50 years of research on deception? Can we expect that an investment professional informed about the patterns observed in the meta-analysis will perform reasonably well when faced with the task of judging deception? Unfortunately, the answer is probably no. But stay tuned! Although the techniques most people believe are effective at lie detection are not, there are, in fact things that *do* work; these things are the focus of Part II.

SUMMARY

The major conclusion from half a century of research on cues to deception is that there is no single behavior, nor any constellation of behaviors, that systematically and reliably indicates deception. This finding is unfortunate from a practical perspective because it suggests that lies are very difficult to detect. Nonverbal behavior seems to be especially unreliable: Contrary to common sense, body language does not provide diagnostic information about deception. Instead, the most useful source of information lies in the content of speech: Liars' statements are less detailed, and they are more evasive and ambiguous. In the next chapter, we turn to the literature on accuracy in human judgments of deception.

HUMAN LIE JUDGMENTS:
ACCURACY AND BIAS

Several hundred studies have measured people's ability to distinguish between truthful and deceptive statements. Now we provide an overview of these studies and review the major findings, including average accuracy rates, people's tendency to be overly suspicious or credulous (so-called judgment biases), and whether there are groups of people or individuals who perform better than others. We also discuss whether there are conditions under which lies are more or less easy to detect.

HUMAN LIE DETECTION ACCURACY

Given the finding that there are barely any cues to deception in nonverbal behavior or speech, we should expect that judging whether a statement is a lie or a truth is a difficult task. As described in our discussion of research methods (Chapter 1), a large body of work has attempted to answer the question of how accurate people are at distinguishing between truths and lies.

Indeed, research supports the notion that lie detection is difficult: A meta-analysis including over 200 studies showed that the average accuracy rate was 54% (Bond and DePaulo 2006). Of course, the hit rate of flipping a coin is 50%. Importantly, few studies deviate from this slightly-above-chance performance; that is, the vast majority of the studies included in the meta-analysis clustered closely around the 54% average, suggesting that this accuracy rate is highly consistent across studies.

This conclusion refutes a popularly held belief: Most people think that they are bad liars but can tell when someone else is lying. The results from the scientific research suggest that the exact opposite is true. People are skilled liars but fare very poorly when having to distinguish between truthful and deceptive statements.

MODERATORS OF LIE DETECTION ACCURACY

A logical question would be whether there are conditions under which lie detection accuracy is higher than normal. Because the finding that lie detection accuracy is poor is in contrast to common experience, it is worth inspecting the literature in more detail.

In technical terms, variables that affect the detectability of lies are called *moderating variables*, or *moderators*. The near-chance hit rate of lie detection accuracy is remarkably robust, and there are very few moderators to lie detection accuracy. **Figure 1** elaborates on the research on potential moderators.

FIGURE 1.   FACTORS AFFECTING ACCURACY
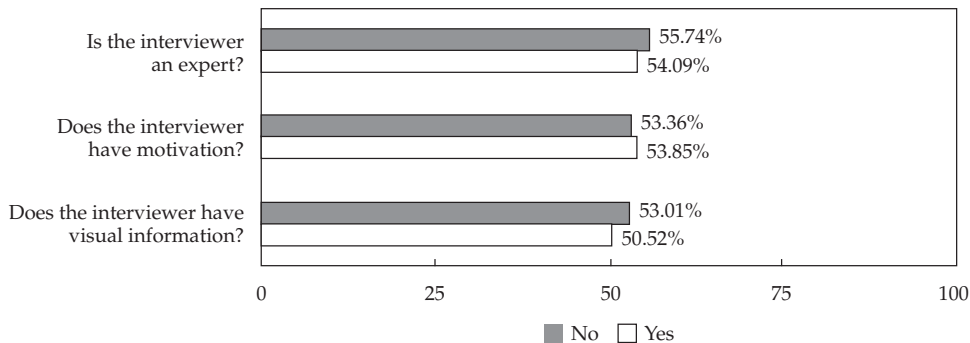
Source: Bond and DePaulo (2006).

PRESUMED LIE DETECTION EXPERTISE

The most frequent common-sense objection to the 54% accuracy finding is that it does not apply to people who make judgments of credibility as part of their professional lives. Examples of such professionals are law enforcement officers, customs officers, judges, lawyers, and migration agency officers (Vrij 2008).

On the surface, this idea seems plausible. Professionals who make lie judgments in their work life have experience and, in some cases, training that aims to improve their ability to detect deception. Research has examined the lie detection accuracy rates of a variety of presumed lie detection experts—most commonly, police officers (Meissner and Kassin 2002; for examples of other professional groups, see Burgoon, Buller, Ebesu, and Rockwell 1994; Kraut and Poe 1980).

Contrary to common-sense notions, these experts do not outperform lay people (Bond and DePaulo 2006). **Figure 2** shows that experts have a 54.09% success rate compared with a slightly *higher* success rate among lay people—55.74%. Even when highly experienced professionals are allowed to question a person in the manner of their own choice—a realistic judgment situation—hit rates hover around chance levels (Hartwig, Granhag, Strömwall,

and Vrij 2004; see also Hartwig, Granhag, Strömwall, and Kronkvist 2006; Luke, Hartwig, Joseph, Brimbal, Chan, Dawson, Jordan, Donovan, and Granhag 2016).

In fact, to our knowledge, there has not been a single study in which presumed lie experts' performance is found to be superior to that of lay people. The decision making of experts does differ, however: Lay people display a propensity for credulity—a so-called truth bias—whereas professional lie-catchers tend to err in the direction of suspicion (Meissner and Kassin 2002). They are also prone to overconfidence; that is, they have a stronger belief that their judgments are correct even though this confidence is unwarranted (Garrido, Masip, and Herrero 2004; Kassin, Leo, Meissner, Richman, Colwell, Leach, and La Fon 2007; Masip, Alonso, Garrido, and Antón 2005).

We recently conducted the very first study of investment professionals' ability to distinguish between true and false statements (Hartwig, Voss, and Wallace 2015). We recruited a random, global sample of investment professionals and showed them a series of statements that were either truthful or deceptive. Some of these statements were from laboratory settings, in which community members or students told lies and truths about their involvement in mock crimes. Other statements we gathered from real-life, high-stake situations—lies told during press conferences, where relatives of missing people pled for information about their missing family member. In some cases, these relatives had killed their family members; in other cases, they were innocent. We also examined statements from fraudulent company conference calls (i.e., where the US SEC was successful in bringing enforcement actions), a domain with which investment professionals are presumably familiar.

Overall, investment professionals' accuracy rates did not exceed the chance rate, and there was no evidence that they perform better when judging statements that involved financial fraud. In fact, they had a pronounced truth bias for these statements, which led them to falsely classify many of the actually deceptive statements as truthful (what is referred to as a *false negative error*). Clearly, this has large ramifications in terms of due diligence on the part of investment professionals. In addition to the many quantitative analyses investment professionals conduct, they are called on to make informed judgments about the veracity of statements made by sell-side analysts, investor relations executives, and corporate executives. Yet, this evidence suggests that they are bad at detecting these lies.

Furthermore, the investment professionals seem to be markedly overconfident; that is, those in our study were far more certain that their judgments were correct than was warranted by their actual accuracy levels. In sum, our results show that investment professionals also struggle with the task of distinguishing between true and false statements. In particular, they have a difficult time pinpointing actual lies, which may have serious consequences.

MOTIVATION TO CONVINCE

Research has examined a number of variables beyond professional experience as potentially related to higher deception detection accuracy. It seems plausible that motivation might play a role; that is, when the stakes are high and liars face serious consequences for failing to dupe, their lies might be more transparent. This would be a form of *motivational impairment effect*—a tendency to choke under pressure.

In a recent meta-analysis (Hartwig and Bond 2014), this hypothesis was tested. Contrary to what common sense suggests, lies are not more detectable when liars are more motivated and when the stakes are higher. In **Figure 2**, detection success under low motivation is 53.36%, whereas under high, success rates are barely higher, 53.85%. Lies more also not more readily detectable when the lie involves strong emotions, as compared with trivial ones.

One way to explain these surprising findings is that liars and truth tellers are, to some extent, facing similar tasks: Although it might be anxiety-provoking to tell a lie in a context where the stakes of not being believed are substantial (e.g., while under investigation), truth tellers in a similar situation may also experience significant distress at the prospect of not being able to appear convincing.

MODALITY EFFECTS

Researchers have examined whether detecting lies is easier in some modalities than others—for example, whether lie-catchers fare better when they have access to audiovisual information as opposed to only visual information or written transcripts. There is a widespread belief among lay people and presumed lie experts that having access to nonverbal cues (e.g., watching a video recording) makes lie detection easier than when one is deprived of such cues (e.g., when reading written transcripts, see Vrij 2008). This assumption is sometimes called the *demeanor assumption*—the idea that people betray their inner states through their nonverbal behavior.

The consensus in the scientific community, however, is that reliance on nonverbal channels of information is largely unhelpful and that focusing on verbal information is more likely to lead to correct judgments (Vrij 2008; Vrij and Granhag 2012). In fact, the meta-analysis on lie judgment accuracy shows that lie detection accuracy is lower when lie-catchers only have access to demeanor—for example, in visual-only modalities, such as video without sound—at 50.52%—than when they have access to audiovisual or audio-only modalities, where verbal information is available (53.01%). Furthermore, accuracy is lower with video modalities than with written transcripts (Bond and DePaulo 2006).

PREPARATION

It seems reasonable that lies that are prepared in advance may be harder to detect than extemporaneous lies. People often report planning their lies precisely for the purpose of avoiding detection (e.g., Strömwall, Hartwig, and Granhag 2006). Meta-analytic overviews provide some support: Lies that are told after the person prepares them are more difficult to detect than those told without preparation (Bond and DePaulo 2006), but this difference is small—only around 4%.

INDIVIDUAL DIFFERENCES: LIE DETECTION "SUPERSTARS"?

Perhaps individual differences play a role in lie detection accuracy. That is, some people might be better at detecting lies than others. Such differences would be obscured when collapsing data from thousands of people and simply inspecting the average hit rates.

In another comprehensive meta-analysis including 247 samples, Bond and DePaulo (2008) examined variation across people in their ability to detect lies. There is some variation simply as a result of chance. Consider a situation where 100 people take a true/false test on a topic about which they have absolutely no knowledge. The average accuracy rate is 50% because people are simply guessing. Probabilities dictate, however, that some people will do quite well and others poorly.

The critical question about variation in lie judgments, therefore, is whether individual differences exceed those than can be expected by chance alone. The empirical answer is that the variation in lie detection accuracy across individuals does not exceed chance (Bond and DePaulo 2008); there is no evidence that some people systematically achieve higher hit rates than others as the result of skill or expertise.

How can it be that there is no evidence of individual differences in lie detection ability? We are used to thinking about performance in terms of abilities or skills. For example, some people are fast readers; others are slower. Some people excel at chess, whereas other people perform poorly.

In order for skills in judgments to be possible, however, there must be some visible sign of whatever condition is to be judged (in our case, deception). Earlier, we used the example of a physician attempting to diagnose a disease with few to no visible symptoms. Imagine that 100 physicians face the task of diagnosing a number of patients with a disease that does not present itself in any visible way. Some patients have the disease, and others don't. Can we expect that some physicians are better than others at this diagnostic exercise? Certainly, some physicians might get quite a few diagnoses right just out of luck, but it would not make sense to think that these physicians get it right because they are more *skilled* at the task. In other

words, the individual differences in performance can be attributed to nothing other than chance. The case of deception detection is similar: Lie-catchers do not differ systematically from each other in their ability to detect deception beyond what is expected by chance. In all likelihood, this is because there are so few discernible signs of deception (DePaulo et al. 2003).

JUDGMENT BIAS

In the deception literature, researchers often measure the extent to which people exhibit biases in their judgments about deception. Of particular interest is the degree to which people display a truth or lie bias—that is, the tendency to make a disproportionate number of truth or lie judgments. Judgment biases are informative because they convey information about the implicit assumptions behind lie-catchers' decision making. Also, they make it possible to draw inferences about what types of errors a sample of lie-catchers are likely to make.

Research finds that people in general display a tendency toward a truth bias. The average proportion of truth judgments in the research published to date is 55% (Bond and DePaulo 2006); moreover, this truth bias is enhanced when people make judgments of those with whom they have a close relationship (Anderson, Ansfield, and DePaulo 1999).

That lay people would display a truth bias makes sense for a couple of reasons. First, it is likely that most everyday messages are truthful. It is plausible that lie-catchers bring this expectation of honesty with them into the laboratory setting. Second, in everyday life, false negative errors are probably less costly than false positive ones. That is, erring on the side of credulity rather than skepticism is probably a safer strategy when navigating ordinary social contexts.

Research on populations other than lay people shows interesting patterns of judgment biases. For example, law enforcement officers, particularly in North America, display a tendency toward a lie bias (Meissner and Kassin 2002). It is conceivable that law enforcement officers encounter more deception in their professional life than lay people do and that they, therefore, expect a higher rate of deception in experimental settings.

In a study of convicted criminals, an even more pronounced lie bias was found (Hartwig, Granhag, Strömwall, and Andersson 2004). Perhaps they too live in an unusually deceptive environment, and perhaps for a criminal, it is more costly to mistakenly trust a person than to incorrectly deem them to be deceptive.

Whatever the root cause of judgment biases, it is clear that they affect the accuracy of lie and truth detection (Levine, Kim, Park, and Hughes 2006). For example, there is a long-documented veracity effect, meaning that the average person is more correct at identifying statements that are truthful compared with those that are deceptive (Levine, Park, and

McCornack 1999). Imagine that a person has a pronounced truth bias (e.g., 75% of all statements encountered by the person are taken to be true, whereas only 25% of statements are deemed deceptive). Further imagine that this person is operating in an environment in which the base rate of truth and lies is 50/50 (which is often the case in scientific research). This truth-biased person detects most of the truths but misses most of the lies simply as a function of more frequently stating that a given message is true. In the most extreme case, imagine a person who displays a 100% truth bias. This person correctly classifies 100% of the truths encountered but at the price of 0% accuracy for classifying lies (all of which are miscategorized as true).

Crucially, in investing, a bias toward either truths or lies can have devastating effects. A truth bias means that fraudulent activity is likely overlooked, whereas a lie bias means that excellent investment opportunities are forsaken with tremendous opportunity costs. In fact, in the research sponsored by CFA Institute, we found that investment professionals have a truth bias, making them more vulnerable to fraud.

WHY DO LIE-CATCHERS FAIL? EXPLAINING POOR LIE DETECTION ACCURACY

The finding that all people, even presumed experts, are poor lie-catchers is highly robust across populations, settings, and judgment conditions. Why is this? More specifically, what is the primary explanation for the fact that people are not good at telling the difference between truths and lies?

Understanding the mechanism behind this finding is of importance for at least two reasons. First, identifying the fundamental mechanisms that underlie poor lie judgment accuracy helps advance our basic knowledge about deception detection. Second, and more importantly, practically speaking, knowing why lie-catchers fail can help us identify ways in which lie detection accuracy can be improved.

Hartwig and Bond (2011) suggested two possible reasons for poor lie detection accuracy: Lie-catchers rely on behaviors that are not actually indicative of deception, and cues to deception are weak. These explanations are called the *wrong subjective cue hypothesis* and the *weak objective cue hypothesis*, respectively.

THE WRONG SUBJECTIVE CUE HYPOTHESIS

A substantial body of research examines people's beliefs about deceptive behavior (Strömwall, Granhag, and Hartwig 2004). Frequently, these beliefs are referred to as *subjective cues to*

deception (as opposed to *objective cues to deception*, which are actual indicators of deception). The wrong subjective cue hypothesis holds that poor lie detection is explained by people's incorrect ideas about the psychology of deception—more specifically, the behavioral consequences of telling a lie. These incorrect ideas, the argument goes, make people pay attention to irrelevant and misleading cues when facing the task of detecting deception.

Most of the studies examining the subjective cue hypothesis use survey methodology, which entails asking people to self-report their beliefs about the characteristics of deceptive behavior. In some of these studies, people are asked open-ended questions about their beliefs about deception (e.g., How can you tell if someone is lying? See Global Deception Research Team 2006).

In other studies, people are asked a series of closed-ended questions about how various behaviors are related to deception, if at all. For example, people may be asked to take a stand on whether deceptive statements contain more details than truthful ones, whether the opposite is true, or whether there is no difference in the amount of detail between true and false statements (e.g., Granhag and Strömwall 2002). A variety of groups have been surveyed to date, including lay people, legal professionals (e.g., police officers, prosecutors, judges, prison guards), prison inmates, college students, and business managers (Hartwig and Granhag 2015). There are also massive cross-cultural examinations of the consistency of beliefs about deception across countries (Global Deception Research Team 2006).

The results of these studies are remarkably consistent: Across a wide variety of groups and cultures, people express highly similar beliefs about the nature of deceptive behavior. The most common subjective cue to deception is gaze aversion. That is, people believe that liars do not look their conversation partner in the eyes. Other frequently reported beliefs, shown in **Exhibit 1**, are that liars move more than truth tellers (e.g., that they shift posture; fidget; engage in such self-manipulations as playing with their hair or picking at their clothes; and/or move their arms, hands, feet, and/or legs); that the speech of a deceptive person is marred by hesitations, stuttering, pauses, and other speech disturbances; and that liars' stories are inconsistent and incoherent. In short, people seem to believe that liars are nervous, uncomfortable, and distressed and that these feelings are apparent in their behavior.

EXHIBIT 1.   EXPLICIT BELIEFS ABOUT DECEPTION

Non-Verbal Cues	Vocal/Paralinguistic Cues	Verbal Cues
Gaze aversion	Speech hesitations	Implausibility
Fidgeting	Speech errors	Inconsistency
Posture shifts	High-pitched voice	Indirect statements
Illustrators	High speech rate	Non-immediate statements
Hand/finger movements	Speech latencies	
Foot/leg movements	Pause frequency	
Head movements		
Eye blinks		

Notes: The exhibit is based on a qualitative review of the literature, drawing on the literature discussed here along with the syntheses provided by Hartwig et. al. (2004) and Vrij (2008). For each cue listed, people tend to express the belief that more of a particular behavior is displayed during deception.

Recently, we conducted a survey of investment professionals' beliefs about deceptive behavior (Hartwig et al. 2015). We collected data from a large sample of professionals, including portfolio managers, research analysts, consultants, and financial advisers from 76 countries/territories all over the world. In line with the findings just reviewed, the most strongly expressed beliefs were that liars are gaze aversive and fidgety. When asked about the reliability of verbal and nonverbal behavior as cues to deception, respondents expressed the view that nonverbal behavior is more reliable. In short, investment professionals' beliefs clearly mirrored those expressed by other groups all across the world.

What is the realism of these beliefs? In Chapter 3, we reviewed the literature on objective cues to deception. Comparing this literature with that covering subjective cues to deception reveals significant discrepancies between people's beliefs and reality: Gaze aversion is not a reliable indicator of deception. Fidgeting and excessive body movements are not cues to deception either, and there is little systematic evidence that speech disturbances betray deception.

In short, the wrong subjective cue hypothesis appears to be supported by the literature. That is, people do indeed express misconceptions about deceptive behavior. These misconceptions could very well explain why people perform so poorly when attempting to distinguish between true and false statements.

However, before concluding that false beliefs about deception are an important explanation for poor accuracy, it is necessary to point out a critical methodological limitation in the survey research discussed: We cannot be certain that the cues people say they use are the cues they actually use when judging veracity. It is possible that people have little or no insight into their decision making and that they self-report beliefs that have little (or no) influence on their actual judgments.

TESTING THE TWO HYPOTHESES ABOUT POOR ACCURACY

In order to explore this possibility, and to further explore why lie-catchers so often fail, Hartwig and Bond (2011) conducted a series of meta-analyses. More specifically, they set out to examine whether the wrong subjective cue hypothesis has merit—that is, whether people actually rely on the wrong cues regardless of what beliefs they claim to endorse. Furthermore, they aimed to examine the weak objective cue hypotheses—that the reason for poor accuracy lies in the faintness of cues to deception.

To examine the wrong subjective cue hypothesis, Hartwig and Bond (2011) used a statistical model applied in a wide variety of decision-making research. The methodology of the approach is complex: It involves gathering objective data on people's cue reliance by correlating various behaviors with judgments of deception and truth. The following is a simplified version of the approach. Imagine that Person A is providing a statement that contains many details and Person B is providing a statement with far fewer details. If the statements of Person A and Person B are shown to a number of lie-catchers and Person A receives more truth judgments than Person B, it can be concluded that people use details as a cue to deception (because this difference between Person A's and Person B's statements seems to have led to different conclusions about their veracity). The research drew on all the literature on deception published to date and revealed several surprising findings.

First, Hartwig and Bond (2011) found that the cues that people commonly self-report—gaze aversion, body movements, fidgeting—had relatively little impact on their actual decision making about deception. That is, whether a given person was averting their gaze or moving around nervously was only weakly correlated with whether they attracted judgments of deception. This finding has implications for how judgments about deception are studied: It suggests that asking people about their decision making is not particularly informative because they do not seem to actually know what cues they rely on. Relatedly, the fact that people are unaware of what cues they rely on suggests that lie detection is largely an intuitive process. Lie detection might, therefore, work similarly to other common ways in which people form intuitive impressions of others (e.g., interpersonal chemistry). For

example, someone might immediately like or dislike someone else's personality, without knowing exactly why.

Second, and also surprisingly, Hartwig and Bond (2011) found that the behaviors people rely on when judging deception are largely valid indicators. For example, people correctly make more lie judgments when a person's statement is vague and evasive and lacking in specific details and when that person comes across as ambiguous or uncooperative. These are cues that other meta-analytic research has shown to be associated with deception (DePaulo et al. 2003).

How is it that people appear to rely on the most valid indicator of deception yet obtain such mediocre accuracy rates? The meta-analysis shows that the most plausible explanation is the weak objective cue hypothesis: Because the signals of deception are so weak, it is simply not possible for observers to obtain high hit rates, regardless of what cues they rely on. In fact, in a hypothetical analysis of accuracy rates when lie-catchers would rely on the perfect constellation of cues, lie judgment accuracy would not increase much.

These results may cause you to despair about the prospect of ever being able to accomplish accuracy rates beyond chance. But fear not: In Chapter 6, we discuss a wave of research seeking to remedy the problems of lie detection—namely, lie-catchers must take an active role in eliciting behavioral differences from liars and truth tellers. Excitingly, the skills required are likely already a part of your investment professional toolkit.

SUMMARY

Statistical syntheses of research on human lie detection accuracy shows that people's ability to distinguish between truths and lies barely exceeds chance. Contrary to common expectations, there is no evidence that there are groups or individuals who are particularly skilled at the task. Not even trained professionals, such as law enforcement officers, perform better than what would be expected by chance. Hit rates are largely stable across a variety of conditions, although there is some evidence that they are higher when people have access to verbal behavior, as opposed to only nonverbal behavior. The most plausible explanation for these findings is that cues to deception are very weak. There is, therefore, a clear need for techniques that can improve accuracy rates. In the following chapters, we review a number of techniques that have been developed for this purpose.

PART II
LIE DETECTION TECHNIQUES: VERBAL, NONVERBAL, AND INTERVIEWING APPROACHES

TRADITIONAL LIE DETECTION TOOLS

In this chapter, we provide an overview of the research on lie detection techniques. Our aim is to familiarize you with existing techniques and to provide a sense of the effectiveness of these techniques. We discuss training programs that provide information about what cues to rely on and what cues to disregard. We also discuss a variety of frameworks designed to evaluate the verbal and linguistic elements of statements. Finally, we provide a brief review of techniques that focus on psychophysiological indicators (i.e., polygraph techniques).

MAJOR LIE DETECTION TOOLS

Numerous situations call for accurate judgments of deception and truth. For example, should we trust a romantic partner who has cheated in the past but claims that he is now faithful? Or which of two friends do we believe when they have had an argument and each gives us a very different account of who is to blame?

Problems of lie detection also abound in the legal system. In criminal trials, judges, prosecutors, defense attorneys, and ultimately, juries face a myriad of questions about which statements to accept as truthful and which to dismiss as deceptive. Similar problems arise in other legal procedures, as they do in national security contexts. Most germane to the investment management experience, investment professionals face the serious problem of having to distinguish between truth and lies coming from a whole host of individuals and institutions.

The vast literature on techniques designed to aid people who face the task of judging deception can be sorted into three broad categories:

1. *Observations of behavior (including the content of the speech).* More specifically, a number of studies have attempted to use training techniques to enhance observers' accuracy in detecting deception.

2. *Analysis of verbal elements.* Techniques relying on systematic analysis of the verbal elements of deceptive and truthful statements can aid deception detection.

3. *Psychophysiological measures.* In order to tap into deceptive processes, equipment is sometimes used to examine changes in a person's physiology—most frequently, the polygraph.

BEHAVIORAL OBSERVATION AND TRAINING PROGRAMS

Training programs are the original technique to improve people's lie detection accuracy. Implicitly, they rely on the belief that the emotional approach theory works—that there is some sort of leakage of cues to deception, some form of signal that can be detected. These training programs also assume that poor accuracy in lie judgments is a function of people attending to the wrong information when trying to detect deception (i.e., the wrong subjective cue hypothesis). As discussed, these premises are problematic, and years of enormous research does not favor them. Nevertheless, attempting to train people in these techniques is a persistent pursuit, and hence, they are worthy of some discussion.

Early research on training to detect deception focused primarily on nonverbal channels of communication (e.g., Druckman, Rozelle, and Baxter 1982). The standard approach in the early days of this research was to expose participants to information about valid cues to deception (based on the data available at that time) and then show them video recordings of people either lying or telling the truth.

The performance of this trained group would then be compared with that of a group who did not receive the training (or alternatively, one group of participants' lie detection ability would be measured before and after training). The rationale for this approach is fairly straightforward: Naive people might not know the details about the behavior of liars and truth tellers. Providing people with scientifically based information about how liars actually behave (and don't behave) might lead them to adopt more correct decision-making strategies, in turn producing higher accuracy rates. Later research efforts have incorporated verbal content into training programs (for a review of the literature, see Bull 2004).

Taking a broad look at the available literature, there is some disagreement about the effectiveness of training programs. Vrij (2008) concluded that the effects of such programs are small. In Frank and Feeley's (2003) review, the authors concluded that the effect of information-based training programs is modest. Driskell (2012) painted a more optimistic picture of these programs, reporting that the effects are "positive, significant, and of medium magnitude" (p. 724).

Part of the disagreement in the literature likely stems from the fact that there is substantial variation in the nature of the information provided in training programs. Given the literature on the faint traces of deception in nonverbal behavior, training people to rely on these cues is likely to be unproductive. Sensitizing people to the verbal characteristics of deceptive and truthful statements might be a more fruitful exercise.

Some training programs have taken a different approach to improving lie detection accuracy—incorporating outcome feedback about people's performance after making a

series of lie judgments. These approaches are based on theories of learning, which suggest that outcome feedback about one's performance is critical to form proper decision-making rules (Hogarth 2001).

More specifically, in this view, people do not need to be supplied with explicit information about how to carry out a given task. Instead, by being provided with information about when they failed and when they succeeded, they may develop implicit decision-making rules that lead them in the right direction. Indeed, Driskell's (2012) meta-analysis showed that training programs that include outcome feedback yield higher accuracy rates than those that rely solely on the provision of information.

A problem with the training programs described is that, to the extent that they cause improvements in lie detection accuracy at all, the mechanism of improvement is unclear.

The presumption of the training programs—that teaching people to rely on valid cues (either through information or through the provision of outcome feedback) orients them to more useful aspects of liars' and truth tellers' behavior—may be valid. But it might also be that the positive effects of training (again, to the extent that such effects arise, which is a matter of debate) are a side effect of the training.

For example, perhaps people become more motivated to do well after they have been trained, and any improvement is a function of more effort invested in the task. There are some interesting data supporting this possibility. In one study, Levine, Feeley, McCornack, Hughes, and Harms (2005) included a bogus training condition, where trainees received nonsensical information, in addition to a regular training condition, where participants received information about valid cues to deception. If it is the factual content of training programs that primarily produce improvement in lie detection performance, participants in this bogus training condition should have performed as poorly as participants in the condition where no training at all was provided. However, Levine et al. found that participants improved in the regular training condition as well as in the bogus training condition compared with those who received no training. This result supports the view that the process of training itself might lead lie-catchers to be more attentive or motivated.

Advantages: The advantages to training programs are very few, if any, given the large amount of research demonstrating that they tend to be ineffective.

Disadvantages: Given that the primary reason for poor accuracy is the lack of reliable cues to deception, observational training programs make little sense.

VERBAL LIE DETECTION TECHNIQUES

A number of lie detection techniques are based on analyses of the verbal content of truthful and deceptive statements. Some have been proposed and promoted by practitioners; others emerge from laboratory research. An in-depth review of the literature on these techniques is beyond the scope of this book, but we do provide a brief survey of the most prominent techniques and discuss the evidence in support of each technique.

Scientific Content Analysis

Scientific content analysis (SCAN) is a verbal lie detection technique developed by the Israeli polygrapher Avinoam Sapir. It is used widely around the world, including in the United States, the United Kingdom, Australia, Canada, Belgium, the Netherlands, and Mexico. Federal law enforcement agencies, including the FBI, employ SCAN, as do military agencies, intelligence agencies, and various security agencies and companies (Vrij 2008). The procedure of SCAN is to ask the subject in question to produce a written narrative of her actions. This narrative is then analyzed by a person trained in SCAN, who evaluates the statements based on a number of criteria that are supposed to occur more (or less) frequently in deceptive statements. SCAN criteria include lack of memory and vagueness (e.g., using terms like "I think" or "I believe"), which is presumed to indicate deception; exclusion of pronouns (e.g., writing "Took the train" rather than "I took the train"), which is a supposed indicator of deception; and explicit denial ("I didn't do _____"), which indicates truthfulness.[7]

Despite the word *scientific* in its title, SCAN is not a scientifically sound technique. There are multiple problems with it. First, it has no theoretical basis. That is, there is no psychologically sound rationale for the criteria used to analyze statements. It is not connected to any proper theoretical framework within psychology (nor within any other discipline, for that matter). Second, the empirical data evaluating the technique are scarce (Porter and Yuille 1996).

A handful of attempts to test the efficacy of SCAN have been made, but the majority of these studies are too flawed to allow for any conclusions. Most problematically, in two studies the ground truth of the statements used in the analyses was not known (Driscoll 1994; Smith 2001). If the researchers cannot say for certain whether a given statement was truthful or deceptive, it is impossible to properly analyze whether the classifications made by SCAN are accurate.

There is one methodologically sound study evaluating the technique (Nahari, Vrij, and Fisher 2012). In this study, SCAN was compared with reality monitoring (RM), a technique discussed later. The results showed that RM scores differed between truthful and deceptive statements (meaning that the technique was helpful in identifying truths and lies), but SCAN did not.

---

[7]For a complete list of the SCAN criteria, see Nahari, Vrij, and Fisher (2012), and for a description of the technique written by its inventor, see Sapir (2000).

None of the analyses provided support for SCAN as a useful technique to detect deception. In light of the theoretical weakness of the technique and its poor empirical support, it is highly problematic that SCAN is used so widely. We believe that practitioners should be highly skeptical of the technique.

Advantages: There are no advantages to the technique, given the lack of empirical support for its claims.

Disadvantages: There is no coherent theory behind the technique nor any empirical support for its efficacy.

Criteria-Based Content Analysis

Criteria-based content analysis (CBCA) is part of a system of assessment of statements called *statement validity analysis* (SVA). SVA is a comprehensive framework for establishing the veracity of statements. The technique is most widely used in Western Europe—particularly Germany—where SVA is routinely used in such court cases as alleged child sexual abuse. In such cases, often the only piece of evidence is a statement by the child in question. Proper use of CBCA requires substantial training. Here, we only offer an overview of the technique. A reader who is interested in a more in-depth discussion of CBCA can consult Köhnken (2004) or Brown (2010).

CBCA is based on the so-called *Undeutsch hypothesis* (named after one of the founders of the technique). The Undeutsch hypothesis simply states that reports of events based on self-experience are likely to differ in a number ways from those that are based on imagination. CBCA attempts to capture such differences using 19 criteria. Examples include unusual details, superfluous details, reproduction of speech, spontaneous corrections, and admitting lack of memory—all believed to be indicative of truth.[8]

CBCA has been criticized for its lack of an underlying theory. For example, the Undeutsch hypothesis is not particularly informative in itself; it only states that we can expect that lies and truths differ in their verbal characteristics. There is no logical link between this hypothesis and the 19 criteria included in CBCA. In contrast to SCAN, however, there is a substantial body of research on the effectiveness of CBCA as a tool to distinguish between truth and deception.

The typical procedure of this research is as follows: People trained in CBCA code statements (sometimes derived from laboratory studies, sometimes using statements derived from real life) and assign scores for each criterion. The results of these codings are then subjected to

---

[8]For a complete list of the criteria and a review of the literature on CBCA, see Vrij (2005).

statistical analysis (e.g., so-called discriminant analysis) in order to establish the accuracy with which statements can be classified as truthful or deceptive.

An overview of the literature on CBCA suggests an average classification accuracy of 73% for lies (meaning that 73% of the actually deceptive statements were classified as such by CBCA) and 72% for truths (Vrij 2005). The accuracy rates differ quite a bit from study to study, but as the average shows, CBCA appears to perform better than human observers.

Whether CBCA should be used in practice is a debated question (Brown 2010). The finding that it outperforms human judgments may be taken as support for its use in practical settings. Still, the error rate is nontrivial, and the weak theoretical rationale of CBCA constitutes a problem. We certainly support CBCA over SCAN, which is pure pseudoscience, but we believe there are more promising methods (which we discuss in Chapter 6).

Advantages:	The data suggest that CBCA performs better at distinguishing between truthful and deceptive statements than human judgments.
Disadvantages:	CBCA has a weak theoretical rationale. Moreover, mastering coding and analysis of statements using CBCA requires quite a bit of training.

Reality Monitoring

In several ways, reality monitoring is similar to CBCA. A list of criteria is applied to written statements in order to establish the extent to which they contain these criteria, which, in turn, forms the basis for classifying the statement as truthful or deceptive. Unlike CBCA, RM is anchored in fundamental social cognitive theory.

The original reality monitoring framework dealt with the processes by which people distinguish between memories of actual events and of those only imagined, dreamt, or planned (Fiske and Taylor 2013). We are all familiar with this problem: We might wonder whether we actually posted that letter or whether we just thought about doing it. We might be confused about whether we have actually told another person a particular story or whether we just planned to do so. Attempts at distinguishing between self-experienced and imagined events are referred to as *reality monitoring*.

In the original framework, it was suggested that people use certain criteria as indications that a memory is based on an external event (as opposed to an internally generated event, like an imagined event or a dream). More specifically, because external events are encoded and committed to memory through sensory experience (e.g., hearing, seeing, smelling), we might use the presence of sensory details as indicators that an event was actually experienced rather than generated internally. For example, if we try to establish whether we indeed posted

a letter, we might conclude that we actually did if we suddenly remember that there was a loud garbage truck passing by on the street just as we dropped the letter into the mailbox.

Of what relevance is this theory for deception detection? It has been suggested that the criteria people use to determine whether their *own* memories are based on external experience or imagination can be used to determine whether statements given by others are self-experienced or derived from imagination or thought.

This interpersonal (rather than intrapersonal) RM approach entails coding written statements in order to establish whether they meet certain criteria (the typical list contains eight criteria; see Vrij 2008), including the level of clarity of the report, the amount of perceptual information, special information, temporal information, and affect.

Reviews of the empirical literature shows that RM performs significantly better than chance at detecting lies (Masip, Sporer, Garrido, and Herrero 2005). In Vrij's (2008) review, the overall classification accuracy using RM criteria is 68.6%, with 71.2% of truth and 66.1% of lies being correctly classified. Therefore, it is believed that RM has substantial benefits compared with CBCA.

Advantages: In contrast to CBCA, RM is anchored in a solid theoretical framework that has shown to be useful in a number of contexts other than deception (Masip, Sporer, Garrido, and Herrero 2005). The list of RM criteria is far shorter than that of CBCA criteria, so it is easier to train people to use and the procedure is more straightforward.

Disadvantages: Manual coding of RM criteria requires training, and the procedure itself can be time consuming.

Linguistic Inquiry and Word Count

Linguistic inquiry and word count (LIWC) is a computerized tool to analyze the linguistic structure of written statements. More specifically, it is a commercially available computer program that carries out automated analyses of text. LIWC counts the number of words in the text belonging to a number of predefined categories (e.g., prepositions, pronouns, conjunctions, emotional words) and provides the proportion of words belonging to each category. One of the primary uses of LIWC is to compare linguistic profiles of different types of statements. It is rarely of interest that a given type of statement—for example, a personal statement written by a college applicant who was eventually accepted—contained 12% references to the self and 4% pronouns. It is much more useful to compare the linguistic profile of applicants who were successful with those who were not (discussed in more detail later)—that is, to use LIWC for the purpose of discrimination.

LIWC has been applied to a number of domains. For example, researchers have compared differences in speech between men and women (Newman, Groom, Handelman, and Pennebaker 2008), between people high and low in social or occupational hierarchies (Sexton and Helmreich 2000), and between people in more and less stable romantic relationships (Simmons, Chambless, and Gordon 2008). LIWC has even been used to settle disputes about the origin of literary work attributed to Shakespeare (Boyd and Pennebaker 2015).[9]

The fundamental premise behind LIWC is that the structure of language can provide insight into a variety of psychological processes. Language, after all, is the product of cognition and emotion. However, LIWC does not itself contain specific theories about exactly how a given psychological phenomenon might manifest itself in speech. Research on LIWC tends to proceed in one of two fashions. First is a completely data-driven approach, which does not involve making any predictions about what patterns are found. Instead, linguistic patterns are extracted from a set of statements where ground truth is known and then applied to a new set of statements that are to be classified. An example of this can be found in Newman, Pennebaker, Berry, and Richards (2003), who explain the process in the following way: "We took an inductive approach to examining the linguistic manifestations of false stories. First, we used a computerized text analysis program to create empirically derived profiles of deceptive and truthful communications. We then tested the generalizability of these profiles on independent samples. Finally, we compared the predictive ability of these profiles to predictions made by human judges" (p. 666). The last step is not strictly necessary, but it may generate interesting information about how the computerized tool performs in comparison to lay judgments.

A second approach draws on theoretical notions about how truths and lies ought to differ and uses LIWC to test these notions. For example, Vrij, Mann, Kristen, and Fisher (2007) used LIWC to measure the presence of RM criteria in a sample of mock police interviews. They also used manual coding of RM criteria. In general, the results showed that RM could distinguish between lies and truth. One might expect that the automated coding approach would yield better discrimination than manual coding, but in fact, manual coding outperformed automated coding using LIWC. It is not entirely clear why this is the case. One possibility is that human coders are able to comprehend subtle, contextual differences in the use of language (e.g., the difference between "mad" as in crazy and "mad" as in angry, depending on the context in which the word is used) that LIWC simply would miss.

Two key questions about LIWC are, (1) What linguistic criteria distinguish between deceptive and truthful statements? and (2) With what accuracy rate can LIWC discriminate between truthful and deceptive statements? With regard to the first question, it seems that

---

[9]For a general overview of LIWC and a review of the application of it to various topics, see Tausczik and Pennebaker (2010). For a popular overview, see Pennebaker (2013).

lies contain fewer self-references, their speech is more negative and less complex, and they include fewer words related to sensation and perception (Hauch, Blandón-Gitlin, Masip, and Sporer 2015; Newman, Pennebaker, Berry, and Richards 2003; Tausczik and Pennebaker 2010). As for the second question, LIWC appears to be able classify lies and truths with a higher hit rate than human judges. The hit rates vary from study to study; in Newman et al. (2003), the average hit rate across a variety of types of lies was 61%. In other studies, the classification rates were higher—for example, 67% in Masip, Bethencourt, Lucas, Segundo, and Herrero (2012).

Advantages: Automated coding is efficient and can be done more rapidly than manual coding. LIWC can be used in a data-driven fashion; that is, it is not necessary to depart from a theory.

Disadvantages: The hit rates, although higher than what people can obtain with naive judgments, are not remarkable.

PSYCHOPHYSIOLOGICAL LIE DETECTION TECHNIQUES

The notion that lying gives rise to physiological arousal has ancient roots. More than 3,000 years ago in China, a popular technique had suspected liars chew on rice powder and spit it out. If the powder was still dry, the person was deemed to be a liar. This technique was rooted in the idea that lying causes stress, which in turn causes physical responses like a dry mouth, faster heart rate, and sweating (Kleinmuntz and Szucko 1984).

In the last century, psychophysiological measures have been tapped using an instrument called the *polygraph*. Although the contemporary polygraph is computerized, the basic processes it measures have remained the same for nearly 100 years. The polygraph typically measures heart rate, breathing patterns, and subtle perspiration from the hands (so-called galvanic skin resistance). It is important to understand that the polygraph itself is not a lie detection tool. It simply measures the extent to which a person experiences psychophysiological activation in the autonomic nervous system. It is the use of systematic questions while a person is connected to the polygraph that constitutes the basis for conclusions about their veracity. Given this, the accuracy of the polygraph is a function of the soundness of the questioning technique used to elicit responses from subjects.

The polygraph is highly controversial (Kircher and Raskin 1992). The opponents of the polygraph dismiss it as mere pseudoscience, whereas proponents argue it is the most effective lie detection technique available. Such extreme positions are unlikely to be warranted: Reducing the polygraph to sheer nonsense entails ignoring a large body of systematic research on its efficacy, but proponents of the test (some of whom have financial interests at stake) probably overestimate its efficacy and underestimate its problems. A balanced view of the

polygraph is more consistent with the scientific literature. Furthermore, the accuracy of the polygraph as a lie detector hinges entirely on the nature of the test protocol. As we shall see, there are different approaches, each with different problems. Finally, the polygraph is often singled out as a potential cause of false confessions (Garrett 2011). That is, law enforcement professionals have been known to give false feedback to suspects after a polygraph test (e.g., telling them that they failed the test even though they passed) and using this falsehood as leverage to generate a confession. Although such a situation is certainly problematic, the problem lies with law enforcement procedures rather than the polygraph itself.

Next, we provide an overview of existing polygraph tests and discuss their accuracy in detecting deception. We also cover the procedure of administering the test and analyze the outcome of it.

Comparison Question Test

The comparison question test (CQT) is the most widely used polygraph test in the United States (Raskin and Honts 2002). Even though it is typically inadmissible in court, it is ubiquitous in police investigations, in employment screenings, and in various parts of military and intelligence agencies. The CQT contains three types of questions: neutral questions ("Is your name Ralph?"), which are not of interest; relevant questions that concern the crime in question ("Did you steal the car?"); and comparison questions, which are designed to generate lies ("During the first 20 years of your life, did you ever take anything that did not belong to you?"). Responding to this last question in the negative is almost certainly a lie: Most people have taken something that didn't belong to them at some point (note that part of the pre-test procedure is designed to induce people to lie to these questions).

The logic of the CQT is that guilty people, who lie in response to both the relevant and the comparison question, ought to display more arousal in response to the relevant question because it concerns a more serious matter. In contrast, innocent people lie to the comparison question but tell the truth to the relevant question; hence, they ought to display more arousal in response to the comparison question. Of course, this logic is not unassailable: It is conceivable that an innocent person finds the relevant questions threatening because they concern the crime in question. This is one of the problems that critics of the CQT have targeted. In response to this criticism, Raskin and Kircher (2014) argued that it is possible to have a functioning test without an understanding of its theoretical rationale.

As for the hit rates obtained by the CQT, they vary considerably from study to study. Providing average accuracy rates is difficult because it involves selecting studies that are considered sound and then calculating the mean hit rates across these studies. Scholars disagree about what studies are of sufficient quality to include in syntheses. Hence, the estimates of average

accuracy rates differ. For example, Raskin and Kircher (2014) reported 90% classification rates across laboratory studies.[10] In contrast, Vrij (2008) discussed several reviews of the CQT literature and concluded that the accuracy rates for classifying actually deceptive statements ranges from 74% to 82% in laboratory studies. Accuracy rates for classifying truthful statements appears to be lower, with several reviews estimating the average between 60% and 66% and others around 83%–84%. Thus, there are some indications that the CQT is prone to false positive errors—misclassifying truth tellers as liars. For a further discussion of the test, see the recent overview by Raskin and Kircher (2014), and for a critical overview of the approach, see Vrij (2008).

Advantages: CQT appears to be able to classify lies and truths with a hit rate higher than chance.

Disadvantages: The rationale behind the technique is controversial. Also, the technique is prone to false positive errors.

Concealed Information Test

The concealed information test (CIT) is based on a different logic than the CQT. Its theoretical foundation is less controversial among scientists (Vrij 2008; for a contrasting view, see Honts 2004), but it is less widely used in practice. The CIT is based on theory about the orienting reflex (Sokolov 1963), which is a psychophysiological response to personally salient stimulus. For example, if we are in a crowd and hear our name spoken, we automatically attend to this stimulus and that attention is accompanied by physiological responses. That the orienting reflex occurs is an uncontroversial notion in psychology. The CIT draws on this literature in order to produce a question protocol that evokes orienting reflexes from liars but not truth tellers.

More specifically, the premise of the CIT is as follows. Imagine that a person has broken into a house and stolen a valuable painting from the master bedroom. The guilty person would be familiar with some of the details that an innocent person would not know (assuming this information has not been leaked somehow, which is one of the concerns of the critics of the CIT; see Honts 2004). Furthermore, let us assume that a person takes a polygraph test and the polygrapher asks the following question: What was the item stolen from the house: a necklace, a statue, a painting, or cash? The polygrapher might also ask, From where was this item stolen: the guest room, the master bedroom, the living room, or the dining room? Presumably, an innocent person who does not know the details of the crime reacts similarly to all the alternatives proposed. In contrast, a guilty person who knows the answer ought to,

---

[10]See the review in Raskin and Kircher (2014) for a discussion of field studies.

in line with the orienting reflex theory, experience a subtle (but detectable by the polygraph) increase in physiological arousal when the correct alternative is mentioned.

Reviews of the CIT across laboratory and field studies show that it achieves hit rates around 80% for classifying guilty people. The hit rates for identifying innocent people are exceptional, around 95%. In other words, the CIT appears to have a truth bias, whereby it is easy to pass the test as a truthful person, which comes at the cost of misclassification of some deceptive people as innocent.[11]

Advantages:	The CIT has a stronger theoretical foundation than the CQT. Its accuracy rates are relatively high, especially for classifying truthful statements.
Disadvantages:	The CIT is less accurate at classifying lies. Also, the test requires careful construction of the question protocol. If the innocent examinee happens to know the answers to the questions about the crime (e.g., through leakage of information from the media), he would respond like a guilty person.

SUMMARY

In this chapter, we reviewed a number of traditional methods that are design to assist with the process of establishing truth or deception. One of the oldest methods of improving lie judgments is using information programs designed to disabuse people of false beliefs about lying. These training programs do not have much merit. We have also discussed verbal content analyses. Out of the techniques we reviewed, we believe the strongest ones are RM and LIWC. LIWC in particular may be feasible for use in a financial context because its automated nature is relatively efficient. We have also discussed polygraph techniques. Although these do appear to provide classification rates higher than chance, they have various limitations. For practical purposes, the fact that they require special training and equipment may present problems. In the next chapter, we discuss techniques that rely on questioning people, thereby (ideally) eliciting different responses from liars and truth tellers.

---

[11]For an in-depth discussion of the CIT, including its limitations, see Verschuere and Meijer (2014).

CHAPTER 6

INTERVIEWING TO DETECT DECEPTION

This chapter discusses techniques that aim to improve lie detection through various forms of questioning. These techniques share the premise that liars and truth tellers might respond differently when asked questions in a strategic fashion. We discuss an approach derived from law enforcement practice and a number of techniques rooted in psychological science. The bulk of the chapter is devoted to a technique called *strategic use of evidence* (SUE), which encompasses a number of tactics aimed to produce verbal indicators of deception that have earned the highest scores yet recorded for lie detection success.

BASIC PRINCIPLES OF INTERVIEWING TO DETECT DECEPTION

Half a century of accumulated data from research on deception demonstrates that the primary reason for poor accuracy in lie detection is because the behavioral signs are so weak (if they exist at all). The common-sense notion that lying is accompanied by leakage of cues to deception is a fiction, according to the vast body of work on the subject.

If lies do not show, how can lies ever be detected? It is possible to improve people's ability to detect deception, but what is needed is a reconceptualization of the task of lie detection itself. For many decades, lie detection was thought of as a task of passive observation. That is, the implicit assumption was that if someone simply looks carefully and closely enough at the right channels of communication, one can see or hear traces of deception. But this assumption should be discarded.

Hartwig et al. (2005) proposed that lie detection is more fruitfully conceived of as an interactive enterprise, where lie-catchers play an active role in eliciting responses from the sender. Consider the task of a psychiatrist who has to generate a diagnosis about the mental condition of a given patient. It is ludicrous to think that this psychiatrist can simply carefully observe the patient in order to "see" what diagnosis is appropriate.

Obviously, part of the psychiatric method is to pose questions and listen to the answers and through such interaction arrive at a sense of what the patient is experiencing. This oversimplification of psychiatric assessment neatly illustrates the importance of actively using questions. Similarly, lie-catchers must ask systematic, strategic questions that elicit different responses from liars versus truth tellers (Levine, Shaw, and Shulman 2010; Vrij and

Granhag 2012). Expressed differently, instead of expecting liars and truth tellers to differ automatically, lie-catchers have to provoke cues to deception through active interventions. The types of interventions differ in their underlying assumptions and also to what degree they have empirical support (more on this later). Most importantly, for investment professionals, both the skillsets and settings needed are part of the normal research process of fundamental analysts.

BEHAVIORAL ANALYSIS INTERVIEW

The notion that cues to deception can be elicited by systematic questioning is the premise of an interview protocol that forms part of the Reid technique. The Reid technique is considered the standard of US criminal interrogation, with hundreds of thousands of law enforcement officers trained in the technique to date (Kassin et al. 2007).

The Reid technique consists of two broad phases:

1. *The pre-interrogation interview.* Investigators are instructed to use a behavioral analysis interview (BAI) protocol designed to establish whether the suspect is guilty or innocent.

2. *Confession.* Investigators use a nine-step procedure designed to elicit a confession from suspects that they deemed guilty during the first step.

The BAI consists of a series of behavior-provoking questions designed to elicit different responses from liars and truth tellers (Inbau, Reid, Buckley, and Jayne 2005). For example, the interviewer is supposed to ask who the suspect thinks is guilty of the crime under investigation. Inbau et al. (2005) predicted that liars are less likely to mention other suspects. Concerning the interviewee's guilt, the prediction is that liars are less emphatic in their denials. When asked what the suspect thinks should happen to the person who committed the crime, liars are apt to suggest more serious punishment.

One of the problems with the BAI is that there is no logical coherence to it. That is, it is not at all clear why liars would recommend that the perpetrator should be punished more harshly or that liars are less likely to point their finger at another potential perpetrator. In other words, the BAI has no theoretical basis. As for its empirical support, only one study has examined the validity of the BAI where ground truth was properly established (Vrij, Mann, and Fisher 2006). The results were clear and unfavorable to the BAI; in fact, the results were directly opposed to those predicted by the BAI.

Interestingly, a series of studies showed that the predictions of the BAI are in line with widespread stereotypes about deceptive behavior. For example, the BAI suggests that liars are more nervous and display less eye contact—exactly the kinds of naive beliefs held by

lay people (Masip, Barba, and Herrero 2012). Recall from Part I that there is no empirical evidence supporting this contention. Sadly, it is likely that such training only reinforces already-held false beliefs about lie catching.

Advantages: There are no advantages to this method.

Disadvantages: The BAI has no theoretical rationale and no empirical support.

THE COGNITIVE LOAD APPROACH

In the last decades, researchers have drawn on the cognitive load theory of deception to develop a lie detection tool. As described in Chapter 2, the cognitive load theory holds that lying is a more mentally taxing task than telling the truth (Vrij et al. 2011). Vrij, Mann, Fisher, Leal, Milne, and Bull (2008) extended this theory by suggesting that placing liars and truth tellers under additional cognitive load hampers liars more than truth tellers.

In technical terms, Vrij et al. (2008) predicted an interaction effect, whereby increased cognitive load is more difficult to handle for liars than for truth tellers. They tested this hypothesis by having participants lie or tell the truth about a mock crime. In one condition, participants told the story in ordinary chronological order. In the cognitive load condition, participants were asked to tell the story in reverse chronological order, which is difficult even when one is telling the truth. Their reasoning is that it should be even more difficult when one is already facing the cognitively demanding task of lying.

Indeed, Vrij et al.'s (2008) predictions were supported: When people provided their statements in regular chronological order, there were barely any behavioral differences between liars and truth tellers. A sample of police officers watching these statements obtained an accuracy rate of only 42% in the control condition compared with the cognitive load condition in which the accuracy rate was 60%.

Since this first study on the cognitive load approach to lie detection, Vrij and colleagues have explored the method further by varying the experimental paradigm and by imposing cognitive load in other ways that reverse order recall (Vrij, Leal, Mann, and Fisher 2012; Vrij, Mann, Leal, and Fisher 2010). The literature on the technique shows favorable results; across studies, there is an improvement in lie detection accuracy when interviewers use interventions that increase the level of cognitive demand (Vrij, Fisher, and Blank 2015).

Advantages: The notion that liars experience more cognitive load is theoretically sound. Furthermore, the literature supports that imposing cognitive load facilitates lie detection.

Disadvantages: There are very few disadvantages; the technique is flexible and simple to implement.

UNANTICIPATED QUESTIONS APPROACH

Like the cognitive load approach to lie detection, the unanticipated questions approach relies on a cognitive model on deception. However, it is based on a somewhat different core assumption: Although liars plan and prepare their statements in order to come across as credible (Granhag and Hartwig 2008), they cannot prepare for every possible question. This notion now has substantial empirical support.[12]

The unanticipated questions approach works by asking liars questions that they are unlikely to have prepared answers for. For example, in one study, pairs of participants were interviewed. Some pairs had eaten lunch together, and others had been involved in a mock crime. Subsequent to these events, they were separated and asked a series of questions. Some of these questions were anticipated (e.g., open-ended questions about the restaurant where they had lunch and what the topics of conversation were), whereas others were unanticipated (e.g., spatial questions about the seating arrangements of the couple and the layout of the restaurant, as well as temporal questions, such as questions about who finished their meal first).

As predicted, there were very few differences between liars and truth tellers when they responded to anticipated questions. However, when unanticipated questions were asked, it was far easier to tell the difference between the pairs of liars and the pairs of truth tellers, partly because of discrepancies between the liars' statements (Vrij, Leal, Granhag, Mann, Fisher, Hillman, and Sperry 2009).

In follow-up work, Vrij, Granhag, Mann, and Leal (2011) extended these ideas to interviews with individuals. In a particularly promising line of work, they examined the effects of asking liars and truth tellers to produce drawings in support of their story. Of course, in order for this approach to be applicable, the story in question needs to be episodic in nature. That is, the statement needs to refer to an event that is anchored to a time and place—for example, a meeting between two people in a given location and a claim by one person that she has been at a particular place.

When this approach is used, the drawings that truth tellers produce to accompany their story are far more detailed than liars', and truth tellers are more likely to include depictions of other people. There are probably multiple reasons for the differences between liars and truth tellers when they are asked to produce a drawing. First, people most likely do not anticipate having to produce a spatial depiction. Therefore, it is unlikely that liars have a clear, pre-made plan

---

[12]For a review of the literature on this issue, see Granhag, Hartwig, Mac Giolla, and Clemens (2015).

for what such a spatial depiction looks like. Second, drawings prevent people from being evasive. For example, instead of verbally stating that the room had a desk and two tables, a drawing forces specificity about the placement of the object in relation to each other. Liars ought to find this task more difficult than truth tellers, which should be apparent in their drawings (Vrij, Leal, Mann, Warmelink, Granhag, and Fisher 2010).

Advantages: The technique is rooted in sound ideas about the strategies of liars and truth tellers. The available empirical evidence supports the technique.

Disadvantages: The use of the technique requires some degree of planning (although one could argue that this is true for most interviews).

STRATEGIC USE OF EVIDENCE: THEORETICAL PRINCIPLES

Similar to the strategic questioning approaches, the SUE technique is based on the idea that there are cognitive differences between liars and truth tellers. Specifically, the SUE technique posits that liars and truth tellers use different strategies in order to convince (Granhag and Hartwig 2008). The SUE technique exploits these differences in order to improve people's ability to distinguish between true and false statements.[13]

SELF-REGULATION THEORY

The SUE technique is based on psychological theories of self-regulation.[14] Self-regulation theory is a psychological model of how people control their behavior to steer away from undesirable outcomes (e.g., threats) and toward desired goals. Translated to the current context, the desired goal for both liars and truth tellers is to convince the person they are speaking to that their statement is truthful.

In general, people identify goals and use a variety of self-regulatory strategies in order to reach these goals. Research in the basic psychological domain shows that self-regulatory responses are provoked by threatening events, especially those that one lacks complete knowledge about (Johnson 1984). Following self-regulation theory, it is conceivable that both liars and truth tellers perceive a situation where they have to deliver their statement (e.g., a public speech or an interview) as a potential threat. Specifically, the threat consists of the prospect that the individual will fail to convince the audience of the truth of her

---

[13]Recently, we have also explored how the SUE technique may be used in order to produce admissions during interviews (Tekin, Granhag, Strömwall, Mac Giolla, Vrij, and Hartwig 2015). Because the focus of this monograph is on lie detection, we do not discuss this research further here.

[14]For in-depth reviews of the literature on self-regulation, see Carver and Scheier (2012) and Forgas, Baumeister, and Tice (2009).

statements.[15] Furthermore, not knowing exactly what or how much the audience knows may add to this threat.

SELF-REGULATORY DIFFERENCES BETWEEN LIARS AND TRUTH TELLERS

Although liars and truth tellers share the same goal (i.e., being perceived as a truth teller) and face the same potential threat (i.e., being perceived as a liar), there is a critical difference between the two: the information they hold. Liars are, by definition, attempting to conceal information—in this context, typically involvement in a transgression or knowledge about other people's involvement in a transgression. For liars, the main threat is that people they interact with come to find out this information. In contrast, a truth teller who is not deliberately concealing information about any wrongdoing is facing the reverse threat—that his audience may *not* come to know the truth.

To summarize, it is plausible that liars and truth tellers are engaged in self-regulatory activities in order to reach the goal of being believed by their audience. Because they differ in whether they conceal information, however, we can expect liars and truth tellers to use different strategies regarding the management of information. These strategies are referred to as *information management* and concern what information to include in one's account (Hartwig, Granhag, Strömwall, and Doering 2010).

LIARS' AND TRUTH TELLERS' INFORMATION MANAGEMENT STRATEGIES

We have explained that the primary threat for liars is that the audience will come to know the information the liar is attempting to conceal (e.g., their involvement in a transgression). In order to avoid this outcome, liars must balance multiple risks in order to convince an audience. Most obviously, they must suppress critical, incriminating information. In order to appear convincing, however, they need to provide some sort of account in place of the truth. Offering false information to conceal their actions (e.g., claiming that they have never visited a place) is risky because if the audience holds information that the person indeed visited this place, the person's credibility is surely in doubt. In simple terms, liars must find the right balance between (1) hiding incriminating knowledge and (2) providing enough details for the account to appear credible.

In broad terms, liars face a number of strategic choices regarding the information they have—that is, what information to omit, deny, and admit (Gudjonsson 2003). When it comes to the critical information that they must conceal, they have two broad information management strategies at their disposal:

---

[15]It should be noted here that a threat does not necessarily entail being faced with legal consequences. It can also entail less tangible consequences such as the loss of social capital (e.g., others' trust).

1. They can avoid the critical information. For example, when they have the opportunity to provide a narrative in the format of their choosing, they can avoid discussing their knowledge of the incriminating information.

2. They can choose so-called escape strategies—for example, denials like, "No, I do not know that person," when asked direct questions about the incriminating information.

Basic behavioral research shows that avoidance and escape responses are fundamental strategies used to avert threats (Cain and LeDoux 2008; Carlson, Buskist, and Martin 2000). For example, a rat placed in a box that contains an electrical wire avoids the wire by moving around it to the extent possible. If the wire is placed in such a way that the rat is cornered, it instead attempts more direct strategies to avoid the threat, like jumping over the wire or climbing the wall of the cage.

Truth tellers are in a different situation with regard to information management. Critically, truth tellers are not engaged in deliberate concealment of information, which has important consequences for their strategies and, in turn, their verbal behavior. Because they do not have incriminating information to withhold, they typically use a fairly simple strategy of forthcomingness.

At times, forthcomingness causes problems for truth tellers. For example, psycholegal research has established that innocent people suspected of committing crimes tend to act in highly forthcoming ways, such as waiving their constitutional rights to silence and subjecting themselves to interrogation (Kassin, Meisner, and Norwick 2005). Often, their reasoning seems to be that they have nothing to hide.[16] There appear to be several psychological forces leading truth tellers toward forthcomingness.

Belief in a Just World

First, truth tellers usually do not fear incrimination because of their belief in a just world (Hafer and Bègue 2005). This belief, which is held to various extents by people all over the world, holds that the world is inherently fair, that good things happen to good people and bad things to bad people (Hafer and Bègue 2005). It would be a violation of this belief to be thought a liar when one is not. In some sense, then, people may think that if they tell the truth as it happened, they will be believed simply because they deserve it.

---

[16]For an in-depth discussion of this so-called phenomenology of innocence, see Kassin et al. (2005).

The Illusion of Transparency

Second, research shows that people have a tendency to overestimate the extent to which their internal states show—referred to as an *illusion of transparency* (Gilovich, Savitsky, and Medvec 1998). For example, a person who is nervous during a first date might believe that it is entirely evident to the other person (who might actually be more consumed by her own experience). Interestingly, research shows that this illusion applies to truth tellers (Strömwall et al. 2006); they often report highly forthcoming strategies when about to be questioned and justify it by claiming that their innocence is evident.

EMPIRICAL FINDINGS ON LIARS' AND TRUTH TELLERS' STRATEGIES

Researchers have mapped liars' and truth tellers' strategies for around a decade (Granhag et al. 2015). Because this research is often framed around interviews and interrogations with suspects, these strategies are frequently referred to as *counterinterrogation strategies*. However, the psychological principles of counterinterrogation strategies apply to most contexts in which a person—either a liar or truth teller—must convince an audience (consisting of a single or multiple receivers) that his statement is truthful.

In the standard experimental procedure, some people are randomly assigned to commit a mock transgression (e.g., a simulated theft), whereas others commit a neutral act (e.g., running an errand for the experimenter). They are then told they are about to be interviewed about their possible involvement in the mock crime and are asked to deny it. Thus, half of the people lie, and half tell the truth. Prior to giving their statement, they are asked, "Do you have a strategy in order to be believed?" and "If yes, what is the strategy?"

The research on liars' and truth tellers' strategies generally support the reasoning already outlined (e.g., Hartwig, Granhag, and Strömwall 2007). First, in line with the argument that lying demands strategic decision making, liars are much more likely than truth tellers to report having a strategy to be believed. When truth tellers do report a strategy for being believed, it tends to be a straightforward strategy of forthcomingness—what Strömwall et al. (2006) sum up as "telling it like it happened."

Liars, however, report a number of information management strategies—for example, avoiding disclosing incriminating information and telling a story that is streamlined enough that they can repeat it later on if necessary. Moreover, they express awareness of the risk of not providing too much information lest they contradict information held by the interviewer. Importantly, these strategies seem robust across several populations; for example, children display similar strategies (Clemens, Granhag, Strömwall, Vrij, Landström, Roos af Hjelmsäter, and Hartwig 2010), as do people with criminal experience (Clemens, Granhag, and Strömwall 2009).

FROM PSYCHOLOGICAL THEORY TO QUESTIONING TACTICS

We can now discuss how the different strategies used by liars and truth tellers can be exploited in order to detect lies. SUE is different from the observational approach because the aim is to elicit cues to lying not through an observation but through an interaction (i.e., an interview). These interactions need not be formal; they can take place in any context where one person has the opportunity to pose questions to another. Imagine a conversation with a sell-side analyst if you are buy-side analyst or with a buy-side analyst or portfolio manager if you are a consultant; imagine a conversation with an investor relations professional, a company executive, or your trader at a sell-side firm's trading desk. The possibilities for interactions in finance are nearly endless.

In the SUE framework, the background information—or "evidence" (not used in a legal sense)—plays a critical role in a lie-catcher's success at uncovering lies. As the name of the technique clearly implies, it involves the systematic use of background information and evidence in order to produce different responses from liars and truth tellers.

Background information can include practically any piece of evidence gathered through fundamental analyses that indicates a different understanding of reality than that reported by the subject under examination, which could be a company, an executive at a company, an analyst, a trader, and so on. Examples of background information (i.e., evidence) include inventory channel checks that seem to imply a different revenue growth rate than that reported by a company; financial statement analysis that indicates that long-term receivables are growing faster than revenues while the company reports the improving credit quality of its new customers; a conversation with a factorer that indicates a company in which you are invested is shopping around for better or more lenient terms; separate conversations with two different executives of the same firm in which one unwittingly contradicts the other; when trading, the bid on a security rising quickly and away from you despite a trader's assurances that she has broken up the trading block; and so forth.

STRATEGIC USE OF EVIDENCE: AN INITIAL EXAMPLE

Using an experimental approach, our research team has tested whether and how evidence can be used in order to generate cues to deception using a strategic questioning approach (Hartwig, Granhag, Strömwall, and Vrij 2005). We use a mock crime paradigm in which participants were randomly assigned as either guilty (i.e., liars) or innocent (i.e., truth tellers). Liars were instructed to leave the laboratory to go to a nearby store to find a briefcase in a corner, to open the briefcase, and to take a wallet from it. By contrast, truth tellers were instructed to go to the same store and look for an object in the same corner. We arranged the situation in such a way that all truth tellers had to move the briefcase in order to look for the object.

In this study, we collected several pieces of evidence. First, a witness who was standing by the entrance of the store saw participants enter it. Second, the store clerk saw participants in the corner of the store where the briefcase was placed. Third, participants' fingerprints were on the briefcase. It is important to note these pieces of evidence were true for both innocent and guilty participants. Moreover, the evidence suggested that the participants were involved in the theft of the wallet without conclusively proving it.

All participants were then informed that a theft had occurred and that they were to be interviewed about their recent actions. Liars and truth tellers were both told that their goal was to convince the interviewer that they were not involved in the theft, but they did not receive any further information on how to go about doing so. The interview took one of two forms: In one condition, the available evidence was disclosed in the beginning of the interview (which is common in interviews), after which the interviewer posed questions about the participants' actions and whereabouts.

Truth tellers and liars provided similar accounts in this condition: They both provided a statement that included the evidence while maintaining their innocence. For example, liars and truth tellers both acknowledged that they had been in the store and that they had handled the briefcase while searching for an object (recall that this was true for some, but not all, suspects). When we showed these tapes to lie-catchers, their accuracy level in distinguishing between lies and truths was around chance. In other words, when traditional interview techniques were used, the result was the same as the classic finding from lie detection research—that observation alone results only in an approximate 50:50 chance of detecting a lie.

In the second condition (the SUE condition), the interviewer withheld the evidence until the end of the interview. While the evidence was withheld, the interviewer asked a series of questions: First, he asked the participant to provide a *free recall* of her recent actions. Second, the interviewer posed a number of *specific questions* that addressed the evidence but did not disclose that the interviewer possessed any crucial evidence.

For example, participants were asked what locations they had visited during the day, whether they had visited the store from which the wallet was stolen and, if so, what part of the store they were in. They were also asked whether they had seen a briefcase and whether they had handled it. It is critical to understand the purpose of these questions: They were designed to highlight the differences in strategies used by truth tellers and liars. That is, these questions highlight truth tellers' strategy of forthcomingness and liars' strategies of avoidance and denial.

In the SUE interviewing condition, the difference between the statements given by liars and truth tellers was apparent. More specifically, there were two key differences:

1. In response to the request for a free recall, liars displayed avoidance strategies. For example, they often refrained from mentioning they were in the store, and they never volunteered any information about the briefcase. Truth tellers, in contrast, were far more forthcoming. For example, their free recall statement often included information about visiting the store, and they even mentioned seeing and moving the briefcase at times.

2. When the interviewer posed specific questions following the free recall phase, there were further verbal indicators of liars' and truth tellers' diverging strategies. When asked direct questions—such as whether they had been in the corner of the store or whether they had seen the briefcase, truth tellers' responses were in line with the evidence. Meanwhile, liars' responses often contradicted the evidence; for example, they might admit being in the store but deny that they had been in contact with the briefcase.

The cues to lying that appeared when suspects were questioned strategically about the evidence are referred to as *statement–evidence consistency*, which is a measurement of the extent to which the statement given by a person is in line with the evidence. As you would expect, lie-catchers who saw these statements were significantly more accurate in distinguishing between true and false statements when compared with those who saw statements in the initial situation (61.7% compared with 42.9%). In a recent meta-analysis of the entire literature on the SUE technique, the effect size of the statement–evidence consistency cue was substantial (d = 1.89, Hartwig, Granhag, and Luke 2014).

QUESTIONING TACTICS

This study illustrates two fundamental aspects about the SUE technique.

1. In order to elicit differences in the statements from truth tellers and liars, *the interviewer must withhold the potentially incriminating information or evidence at hand.* Only then are liars' strategies of avoidance and escape apparent (Granhag and Hartwig 2015).

2. Second, when liars are unaware or unsure about what the interviewer knows, their strategies of avoidance and denial become evident in their verbal behavior.

It is crucial to realize that the SUE technique is much more than simply not telling the interviewee what you know; in order to produce signs of deception, the lie-catcher must pose questions in a systematic fashion.

Also, the nature of cues to deception that appear when the SUE technique is used is a function of the form of question being asked. When an interviewer asks a person a broad, open-ended question (e.g., "Tell me as much as possible about _____"), this question is likely to invite an avoidance strategy and, hence, omissions from liars. When the interviewer asks more specific, narrow questions about a piece of information she holds (but the person

being interviewed doesn't know that she holds), liars are forced into escape responses—that is, outright denials, which lead to direct contradiction with the known information.

In summary,

- open-ended SUE questions invite an avoidance strategy, likely manifesting in important omissions, and

- closed-end SUE questions invite outright denials, likely manifesting in contradictions with evidence.

Furthermore, a series of studies on the SUE technique (e.g., Hartwig et al. 2005; Hartwig, Granhag, Strömwall, and Kronkvist 2006; Hartwig et al. 2011; Jordan, Hartwig, Wallace, Dawson, and Xhihani 2012) demonstrated that the more incriminating the information the interviewer probes about, the more pronounced the liars' strategies of escape and avoidance. For practical purpose, if an interviewer has only very vague information pointing to a possible transgression, it is conceivable that liars won't have very pronounced strategies of avoidance; hence, their statements may be quite similar to those provided by truth tellers.

To illustrate this point in more depth, consider the following example. In another laboratory study (Hartwig et al. 2011), liars and truth tellers were instructed to go to the far corner of a library to commit either a mock crime or an innocent act. In order to reach the destination, participants had to pass several different "check points." For example, after entering the library, they passed by a helpdesk, followed by tables close to a window (where both groups of participants were to complete their task). The specific questions addressed these different check points—for example, "In the library, did you pass by a helpdesk?" and "Did you see tables by a window?"

The liars' escape responses became more noticeable the closer the questions came to addressing the most critical information. For example, quite a few liars admitted to being in the library. However, fewer admitted to passing by the helpdesk, and even fewer admitted to being by the group of tables where the mock crime was carried out.

We have now discussed several principles derived from laboratory research on the SUE technique. From a practical perspective, how would an interviewer implement these principles? That is, how would you go about eliciting forthcomingness from a truth teller or avoidance and escape responses from a liar?

In order to understand how to implement SUE questioning, imagine a funnel, such as that shown in **Figure 2**. At the very top of the funnel are the broadest possible invitations for information (i.e., free recall prompts), where the person being interviewed is asked to provide as much information as she can, without being steered by the interviewer, about an event

or action. Closer to the bottom of the funnel, the interviewer's questions zero in on the evidence he holds. Note that during the interview, the critical evidence should be withheld from the interviewee.

SITUATIONS FOR THE SUE TECHNIQUE

- The interviewee must believe she is lying because SUE relies on the assumption that liars and truth tellers use different strategies when trying to convince questioners about the truth of their statements. So, if you are questioning an executive at a firm who likely had no knowledge about a possible fraud at a business, then you should not use the SUE technique with that person.

- You need to be able to interview the person you believe is deceiving you either in person or remotely (e.g., via phone or Skype).

- You need to have information pointing to a transgression. Importantly, the evidence should be indicative of wrongdoing but likely won't be incontrovertible proof. If it were definitive proof of wrongdoing, then you would not need to use the SUE technique to increase the certainty that deception has occurred.

- You need time prior to the interview to plan how to use the background information you have—for example, what questions to pose.

- You need enough time with the person to properly implement the funnel structure.

FIGURE 2.   FUNNEL APPROACH TO QUESTIONING

Elicit free narrative

Gradually narrow
focus of narrative

Ask specific
question
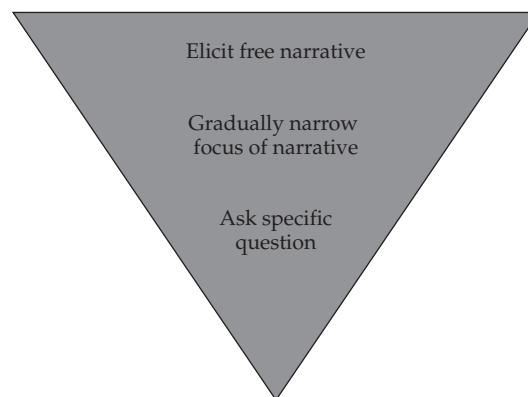
EVIDENCE IN FINANCIAL SETTINGS

Fortunately, as investment professionals, we are constantly gathering evidence both for and against our investment theses for businesses and securities. The following are among the common types of evidence we gather:

- Illicit activities uncovered when doing financial statement analysis of a business

- Financial results that differ from the conference call, conference presentation, regulatory document, and annual report narrative promulgated by business management

- Financial results that differ from the narrative promulgated by sell-side analysts

- Inconsistent statements shared by different members of the same management team

- Inconsistency between what the board of directors communicates and what executive management shares

- Onsite examinations—such as channel checks, visits to company headquarters, visits to retail shopping locations—of company activities

- Conversations with employees of the business ranging from retail employees to executive management

- Conversations with businesses whose operations are tangential to a company's, such as suppliers, distributors, retailers, commercial banks, factorers, auditors, and so on

- Conversations with fellow analysts who believe something suspicious is going on

- An experience of a company's product that differs from the narrative promulgated by management

- Marketing materials from the company that presage a change in direction, strategy, or success of a company

By no means is this list exhaustive. In fact, every single activity by a company, its employees, its management, its board, its suppliers, its distributors, its financiers, and its customers is evidence of something. The larger and more complex the organization, the more potential evidence about it.

It is important to remember that the type of evidence used in the SUE technique is not definitive proof of wrongdoing. If it were definitive proof, then the decision about what to do with that evidence would also be definitive. Most investors, for example, would sell their securities invested in the business. Instead, the SUE technique is just one tool for helping you to assess ambiguous evidence, which is much of the evidence in investing. Ultimately, it should help you to make more accurate judgments and to take fewer leaps of faith in buying and selling securities.

DISCLOSURE TACTICS

Research on the SUE technique has also addressed how an interviewer might go about disclosing evidence. There are three primary considerations.

1.   Do you disclose the evidence at all?

In some cases, evidence disclosure is moot. Imagine you go through the SUE questioning protocol and the subject volunteers information that explains your evidence during a free recall. Furthermore, in response to specific questions, the subject provides answers that are consistent with your evidence. In this case, where there are no statement–evidence inconsistencies, disclosure of your evidence makes little sense.

Imagine another interview, where the SUE technique results in a statement that is inconsistent with the evidence you hold. It might be prudent for you to simply end the questioning without disclosing the evidence and thus unnecessarily revealing that the subject's statement is inconsistent with your evidence. Such instances might occur when your source of evidence is sensitive in some way—for example, when you want to protect the source of the information. Also, there is no reason that you have to reveal that you believe the person is lying. In fact, it is entirely possible that the interview can continue for some period of time after you have formed the impression that the person is lying. This strategic choice might be appropriate if you want to be able to maintain a relationship with the interviewee, especially if you have spent years developing it.

2.   When do you disclose your evidence?

A second consideration is the *timing* of evidence disclosure. That is, *when* should your evidence be disclosed? Early disclosure of your evidence is inferior to keeping the interviewee unaware of the evidence throughout your questioning (Hartwig et al. 2005).

There are alternatives to bulk disclosure of your evidence at the end of an interview—for example, disclosing parts of the evidence throughout the interview. The result of this research is mixed, and as of yet, no clear conclusions can be drawn.[17]

---

[17]For a further discussion, see Dando and Bull (2011) and Sorochinski, Hartwig, Osborne, Wilkins, Marsh, Kazakov, and Granhag (2014).

3.   How do you disclose your evidence?

Recent developments in the SUE technique incorporate tactics related to *how* evidence is best disclosed (Granhag and Hartwig 2015). In order to begin to understand these tactics, you must first understand that a given piece of evidence can be framed in several different ways.

One way would be to frame evidence very specifically, such as phone records showing that John Doe called Jane Doe at 9 p.m. on 11 August. But this evidence can be framed far more generally, simply as evidence that John called Jane with no mention of the time or date. Understanding how evidence can be framed differently further helps you to both plan and carry out an interview for the purpose of detecting lies. Next, a framework is discussed that helps elucidate evidence framing and its purpose as a tool to detect deception.

EVIDENCE FRAMING MATRIX

As part of the SUE framework, Granhag, Strömwall, Willén, and Hartwig (2013) introduced the so-called evidence framing matrix (EFM), as shown in **Figure 3**. The EFM is a tool that helps lie-catchers understand how a piece of information can be placed with differing degrees of specificity. The EFM serves two different purposes. First, it helps lie-catchers better understand how to think about a piece of evidence, which, in turn, can help them refine their strategic thinking about that evidence. Second, it helps lie-catchers understand how they can use that evidence during questioning and, more specifically, how they can disclose the evidence in a strategic manner, as **Figure 4** shows.

The EFM consists of two dimensions on which any piece of evidence can be placed. The first is the *specificity of the information*—that is, *what* it is we know. For example, consider the piece of information that a CCTV camera has captured a person in Times Square, New York, around the time when a crime was committed. This information can be phrased in more general terms—for example, that a CCTV camera shows that a person was in Midtown Manhattan or, even more generally, that she was in the United States.

The second dimension is the *specificity of the source of the information*—that is, *how* we know what we know. For example, the source of the piece of evidence—CCTV footage—can be framed in more general terms: simply as "information" that a person has been in Times Square. By framing the evidence in different ways, a lie-catcher can vary how much of a single piece of evidence to reveal.

FIGURE 3.   EVIDENCE FRAMING MATRIX

Precise source

CCTV footage of
person in Midtown

CCTV footage of
person in Times Square

Low degree
of specificity

High degree
of specificity

Information about
person in Midtown

Information about
person in Times Square

Vague source
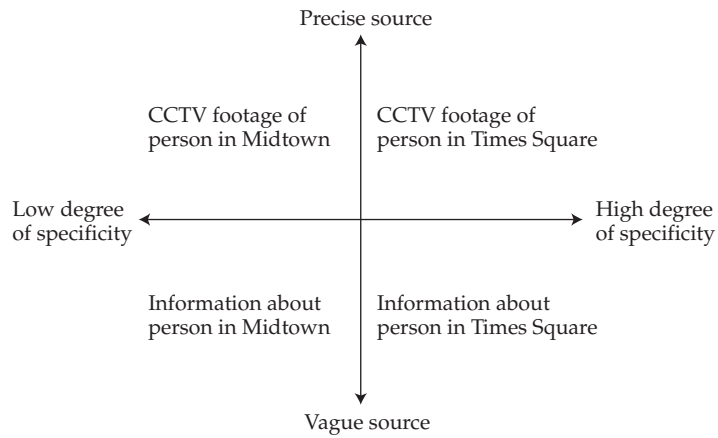
**FIGURE 4.   EVIDENCE FRAMING MATRIX, INCREASING
SPECIFICITY OF EVIDENCE**

Precise source

FINISH

CCTV footage of
person in Midtown

CCTV footage of
person in Times Square

Low degre
of specificity

High degree
of specificity

Information about
person in Midtown

Information about
person in Times Square

START

Vague source

 ****
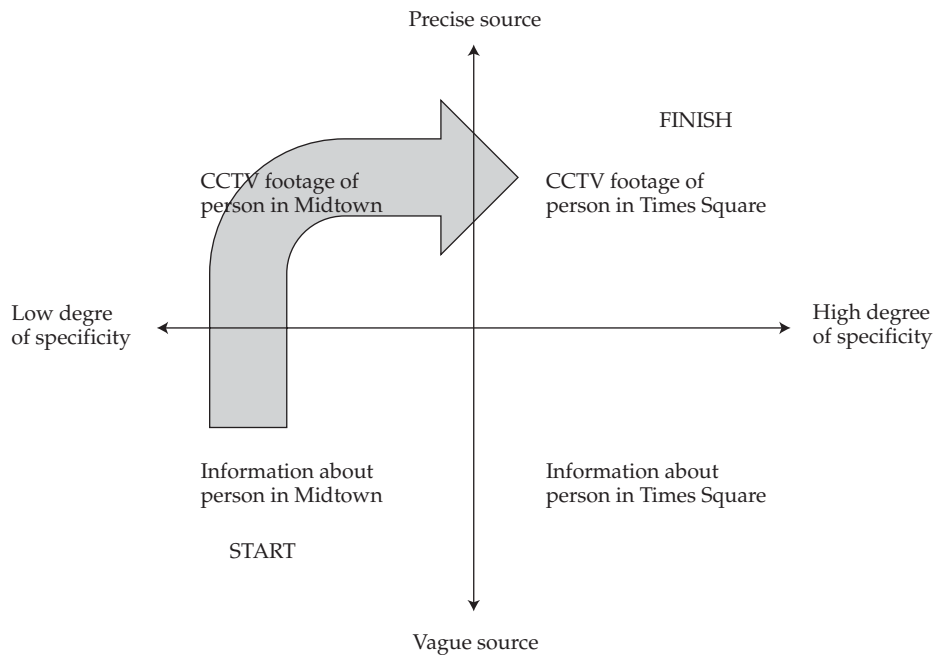
Beyond helping lie-catchers engage in more flexible thinking about the information they have, the EFM can help them disclose the evidence in a manner that causes further difficulties for a liar to maintain denials. Recall that the primary strategy of liars is to conceal their knowledge of incriminating information. Consider an interviewer who has knowledge, based on phone records, that John Doe has called Jane Doe several times during the year 2015. Imagine that the interviewer is investigating the connection between these two people. We can imagine a scenario in which such a connection constitutes a transgression (e.g., during this time, Jane Doe was secretly supplying John with information to which he is not entitled).

If the interviewer asks John Doe a series of questions in line with the funnel structure of the SUE technique, it may lead John Doe to deny that he has had any contact with Jane. For example, he might say he has heard of her through his company but that he has never met her. If so, then the interviewer has successfully elicited a statement–evidence inconsistency that may suggest that John is lying.

How is the interviewer to proceed? The most straightforward way, though not very strategic, is to disclose the evidence in its most specific form ("We have phone records showing that you do know Jane—that, in fact, you called her repeatedly last year"). The interviewee can attempt to refute this evidence and persist in his denials ("That information must be incorrect; I have never talked to her"), or he can backtrack and admit that he indeed has communicated with her.

By contrast, the interviewer can disclose this piece of information in a more strategic fashion. For instance, if the interviewer begins the disclosure phase by disclosing the evidence using a general framing of the evidence, she can move to a more specific framing of the evidence to potentially force the interviewee to change his story. Imagine the following hypothetical sequence of evidence disclosure after John Doe has denied ever speaking to Jane Doe.

> Interviewer: "*We have information that you have called Jane Doe.*"

Here, the interviewer is neither disclosing that he knows this occurred repeatedly during 2015 (the content of the evidence) nor that this information stems from phone records. General evidence might elicit a denial from John Doe.

> John Doe: "*Whoever told you that must be wrong; I have only heard her name around the office.*"

In response, the interviewer counters with more specific evidence about John Doe's interactions with Jane:

> Interviewer: "*In fact, we have phone records showing that you have called her.*"

Notice that the interviewer provides more specific information about the source of the evidence but does not disclose further information about the content of the evidence, such as the number of exchanges between John and Jane. Presumably, the more tangible source of the evidence is more difficult to "wriggle out" of, and the subject might thus have to revise his story to fit the evidence.

> John Doe: "*Actually, it totally slipped my mind: A couple of years ago, I was asked by my boss to invite her to an office party, so I did actually call her, but we never spoke because she was not available. I just forgot because I never actually spoke to her.*"

This is an example of a *within-statement inconsistency*—an instance of a person contradicting himself. The interviewer can then specify the content of the evidence further.

> Interviewer: "*The phone records show that you called Jane Doe repeatedly during 2015.*"

Here, the subject faces several unpalatable choices. First, he can persist in his denial, which would sound rather implausible at this point. Next, the liar can attempt to refute the evidence (e.g., "those records must be incorrect"), which may not sound plausible either. Last, the liar may begin to admit the truth.

As this example illustrates, moving from general to specific framing of the evidence can produce within-statement inconsistencies. Indeed, research has supported this point. In a laboratory study, we found that when disclosure was structured in line with the EFM and the interviewer disclosed the evidence in an increasingly specific form, a portion of liars did indeed change their statements to fit the evidence (Granhag, Strömwall, Willén, and Hartwig 2013). There were no such contradictions when the interviewer started the disclosure phase by disclosing the evidence in its most specific (and least strategic) form.

EFFECTIVENESS OF TRAINING IN THE SUE TECHNIQUE

To what extent has the SUE technique actually helped practitioners who make judgments of credibility as part of their professional life? To date, there are two studies on the effectiveness of SUE training, both focusing on law enforcement professionals, some of whom have to conduct formal and informal interviews as part of their work.

In the first training study, we taught a group of Swedish police trainees (1) the basic theoretical principles behind the SUE technique and (2) how to plan and implement a line of questions using the funnel approach (Hartwig et al. 2006). After training them, we tested their performance during a brief interview where the purpose was to determine whether

the interviewee was lying or telling the truth. The police trainees received a case file that contained several pieces of background information. Among other things, the evidence included a witness who had seen the person in the neighborhood where a mock crime occurred and that the person had been seen close to specific location where the crime was committed. We compared the trainees' performance with that of a group of otherwise comparable participants.

As we hoped, the trained group differed from the untrained group in a number of important ways:

1. The trained group of interviewers were much more likely to withhold the evidence while questioning the subject.

2. As recommended by the funnel approach, the trained group asked far more specific questions that addressed the evidence but did not disclose it.

3. The interview techniques used by the trained group produced very clear differences in the statements given by liars and truth tellers; the untrained group did not accomplish this. That is, in the SUE training condition, liars were noticeably more inconsistent with the evidence (e.g., they claimed that they had not been in area X but the evidence showed that they indeed had been in area X).

4. Perhaps the most remarkable finding was the interviewers' accuracy rate in detecting lies and truths. In the untrained condition, they performed significantly in line with chance at 56.1%. Yet, in the SUE training condition, interviewers' accuracy rate at distinguishing between true and false statements was 85.4%—one of the highest lie detection accuracy rate ever observed in the literature (Vrij 2008).

More recently, we conducted another SUE training study using a sample of US law enforcement officers from a variety of federal agencies (Luke et al. 2016). The methodology was similar to the study just described. In the untrained condition, accuracy rates were very low; only 43% of test subjects' judgments of deception and truth were accurate. It is important to realize that some of these participants had interviewing experience and that they were using this expertise (and past training) to attempt to establish whether the interviewee was truthful and deceptive. Still, they performed very poorly.

In contrast, the participants who received four hours of training in the SUE technique achieved a hit rate of 65%. There are two things to note about these findings. First, overall, accuracy rates were lower in the US sample than in the Swedish one. Second, although there was substantial improvement in the US sample (the difference in accuracy levels between the trained and the untrained group was 22%), the improvement was smaller than in the Swedish study, where the difference in accuracy levels between the groups was 29.3%. It may

be that accuracy levels were generally lower because of some deficiency in the decision-making and interviewing skills of the US sample. It is also possible that the improvement in accuracy rates was not quite as high in the US sample because many of the participants were seasoned professionals, who may already have developed their personal approach to interviewing. In other words, it may be easier to teach more-naive law enforcement officers than seasoned ones.

These studies taken together show that a relatively brief training session in the SUE technique can produce a marked improvement in lie detection accuracy.

CASE STUDIES OF THE SUE TECHNIQUE USED IN INVESTING

The SUE technique has not, to our knowledge, been used in investing settings, but it is a proven technique for uncovering deception in other similar domains. We are hopeful that the SUE technique can be adapted well to investing because the conditions necessary for SUE to be used are present in our domain, too. Specifically, professional investors gather tremendous amounts of evidence, have the ability to interview possible deceivers, and operate in a high-stakes domain where an accurate assessment of truth or lie is critical. Here are several case studies of SUE in action in investing designed to help you see the potential utility of the technique in financial settings.

CASE STUDY: IMPENETRABLE ACCOUNTING

Context and Facts

Rocket Company is experiencing an extremely high period of earnings growth. Consequently, Rocket Company and its executives are lauded in the business and investing press as visionaries for their business strategy of reducing the capital intensity of the business (i.e., an asset-light strategy) and only investing in new businesses that require low levels of capital. Ultimately, Rocket Company believes this strategy should lead to a new business model and sustained growth far into the future, and the quantitative evidence seems to bear this belief out so far. The company's earnings growth has exceeded that of the overall market for the last five years.

As an analyst, you feel compelled to examine Rocket Company, including its management team, business model, performance, and financial statements. Listening to management on conference calls and at industry events is an eye-opening experience. Management seems to be one step ahead of other businesses, not just in its industry but among all businesses. In particular, you believe that its emphasis on low capital intensity is a smart new strategy that other businesses should emulate.

This first approach at understanding the business leaves you impressed, so you decide to read Rocket Company's annual report and regulatory documents (e.g., 10-Ks, 10-Qs, and so forth). You confirm that the performance of the company is outstanding based on its financial statements. Not only has the company slowly reduced the size of its balance sheet, but it has also grown net income. In reading through the company's accounting footnotes, however, you become suspicious.

First, there are extended disclosures about special purpose entities (SPEs) that are difficult to understand. Second, when you take out a piece of paper and attempt to map out the relationship between Rocket Company and its SPEs—and the economic exchanges between the parties—you cannot fully describe or understand what is taking place.

Third, you look up the accounting standards surrounding special purpose entities and discover that SPEs must be consolidated with a parent company's financial statements if the equity investment of the parent is enough to finance the activities of the SPE. You also discover that if the parent company's voting power is enough to influence the activities of the SPE, the parent is obliged to absorb losses by the SPE (i.e., it has issued an IOU), or if the parent has rights to receive residual returns from the SPE, then the SPE must be consolidated with the parent.

Fourth, the information contained in the financial statements does not allow you to evaluate whether or not the criteria for SPE consolidation have been fully met. Fifth, you notice that over time the footnote about SPEs is growing in size and seemingly in conjunction with the company's rhetoric about its asset-light strategy.

The preceding five points highlight the importance of the lack of good disclosure on the part of Rocket Company's footnote about SPEs. But the actual evidence to use in the SUE technique is the lack of information in the footnote that would allow you to assess whether or not the SPEs are truly independent from Rocket Company. Because the accounting of this footnote is impenetrable, you decide a call with management is necessary.

Evidence used: Discrepancy in financial statements.

Possible SUE Approach

- You check to see that the evidence you have meets the "evidence criteria" described previously. You conclude that it does meet the criteria.

- Next, because the SUE technique relies on interviewees' belief that they are engaging in deceptive activities, you set up an interview with those likely to have intimate knowledge of the SPEs. Individual conference calls are set up with the chief financial officer,

treasurer, and controller. The subject of each conference call is that you are a long-term investor who wants to understand how the company's strategy is working because you're considering an investment in Rocket Company.

- You develop your questioning strategy using the funnel strategy, and you attempt to hold on to your critical piece of evidence until the very end. **Table 2** shows how the interview might go if Rocket Company is lying and if Rocket Company is being forthright.

TABLE 2. ROCKET COMPANY INTERVIEW USING SUE TECHNIQUE

Question	Answer from Liar	Answer from Truth Teller
I have been an admirer of Rocket Company from afar but am late to the company's story. I wonder if you could walk me through the company's "asset-light" strategy.	Sure, we get this question a lot. Several years ago, we realized that because of advancements in information technology, the increasingly electronic nature of commodities trading, and the high levels of liquidity provided by investment banks, we could generate a lot of revenue using very low levels of capital.	We have done it by creating independent SPEs that remain economically interested in doing business with us. This strategy is causing some confusion, and we will be improving disclosures about it in the future.[a]
How is the current composition of your balance sheet different from what it was when you started the "asset-light" strategy?	Well, we either did not replace assets at the end of their useful lives, or we sold a number of them to other organizations.	Our secret is creating economically interested SPEs that, for a certainty of cash flow return, have agreed to domicile assets we previously owned. We get a lot of questions about this, and we promise to improve disclosures in the future.
Out of curiosity, what percentage of those assets were sold to other entities?	Most.	Most, however each of our SPEs meet all of the GAAP standards for independence. They maintain the right to refuse to do business with us.

(continued) |

 73

TABLE 2. ROCKET COMPANY INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
And were those transactions arm's-length transactions?	Yes.	Yes. Independence is maintained by the SPEs. We will improve our disclosure in the future.[b]
What types of buyers were they?	Mostly they were private entities.	
Were these sales to special purpose entities/vehicles?	Yes.	
What was the consideration?	We sold some of our underperforming assets to the entity, and in exchange we received cash.	
Did you provide any performance guarantees?	Yes.	
How do you explain that these underperforming assets were removed from Rocket Company's financials but you still owe performance guarantees to the SPE that purchased those assets?	Well, that's a matter of interpretation.	
Why did you not provide these details in Rocket Company's financial statements?	I don't know; we probably should have. [or] That's really not my department.	

[a]Likely, this would be the end of the interview because this response directly addresses your concerns. However, for the purpose of illustration, we provide examples of further truthful responses, in case the company's answer does not address the evidence.

[b]At this point, the level of forthcomingness is evident, and further questions regarding the matter would be superfluous.

Here is how the interview goes in a case where the interviewer does not use the SUE technique.

- Question 1: I am having trouble understanding your footnote disclosure about special purpose entities/vehicles. Can you explain what's going on there?

- Answer 1: Sure, that's easy. We occasionally use SPEs to isolate some of our financial risks with some of our new business undertakings.

In the hypothetical scenario using the SUE technique, notice the adherence to the technique's format—specifically, the use of the funnel approach to questioning that begins with very broad questions whose context is distant from the evidence. Notice also how, in the different scenarios depicted, the interviewee's responses are indicative of either avoidance/denial or forthcomingness.

Result

Based on the results of your conversations with multiple executives at Rocket Company, you are convinced that the company is misleading its investors and you decide not to invest in its shares. Furthermore, you decide to share the results of your research with your compliance department.

CASE STUDY: VIOLATION OF ECONOMIC LAW

Context and Facts

Low Stan, Inc., is a consumer mortgage company well known for its rapid growth relative to other lending companies. It has achieved this growth by lowering its underwriting standards for individual mortgages, thereby driving mortgage volumes. Many in the industry consider this practice to be "playing with fire."

Unlike many mortgage companies, Low Stan likes to hold on to some of its mortgages. The company assures its investors, including you, that its proprietary quantitative portfolio management modeling significantly lowers the overall risk of loss. Management points to its long track record of delivering profits in excess of earnings estimates because of its proprietary quantitative/black box portfolio construction techniques. Additionally, Low Stan's excess profits relative to its peers ensure that it has a higher credit rating and thus a lower cost of funding for its mortgages. Lastly, home prices have continued to increase for many years, thus increasing the equity/loss-absorption power of even the most credit-poor borrowers in its portfolio.

Recently, economic conditions seem to have slowed, including a slowdown in manufacturing, an uptick in unemployment, and a deceleration in GDP growth. In fact, Low Stan's competitors have already preannounced that they expect to either be at the low end of their quarterly earnings estimates or that they are lowering estimates to reflect the worsening economic conditions. Yet, Low Stan has not lowered its earnings estimates. In fact, at an industry conference webcasted live, management reiterates the power of its proprietary modeling of

portfolios and its ability to lead to outsize returns, and it has announced an increase in its stock buyback program.

Suspicious, you decide to conduct your own independent research into regional home prices, as well as the average number of days on market for different regions. Based on management's limited disclosure, you know that these inputs into their proprietary model are important. As a check on this data, you also decide to see whether the number of people looking for work regionally features a higher number than usual of people with real estate licenses listed on their resumes.

You discover that in markets in which Low Stan has traditionally performed well, average real estate prices are falling over the previous eight weeks, especially in low-income areas; the average number of days on the market is lengthening over the previous two months; and there seems to be a flood of job seekers with real estate licenses listed among their qualifications. Additionally, you see these trends in nearly all regions in your country, with only small population centers being the exception.

If Low Stan is lying about its results, then your portfolio will experience large losses. Yet, if the company is telling the truth, it may be a tremendous buying opportunity. Therefore, you decide to interview Low Stan's management to determine the truth of its operating results.

> **Evidence used:** Independent research separate from that provided by a company.

Possible SUE Approach

- You check to see whether the evidence you have meets the "evidence criteria" and conclude that it does.

- Next, because the SUE technique relies on interviewees' belief that they are engaging in deceptive activities, you set up an interview with those likely to have intimate knowledge of the underwriting standards, as well as the proprietary quantitative model. Individual conference calls are set up with the chief financial officer and the chief technology officer, who oversees administration of the proprietary portfolio construction algorithms. The subject of each conference call is that you are a long-term shareholder and want to ask the company about the current economic environment.

- You develop your questioning strategy using the funnel strategy and you attempt to hold on to your critical piece of evidence until the very end. **Table 3** shows how the interview might go if Low Stan is lying and if Low Stan is being forthright.

TABLE 3.   LOW STAN INTERVIEW USING SUE TECHNIQUE

Question	Answer from Liar	Answer from Truth Teller
As you know, I am a shareholder of Low Stan and have noticed the deteriorating economic conditions, and I wanted to check in with you to see how the quarter is going.	Sure, no problem. It's quite simple actually; the quarter is going as planned.	In scheduling our meeting today, we delayed until we had updated data for our model and updated our inputs. Later today, in fact, we are putting out a press release indicating our changed outlook.[c]
What about the fact that some of your competitors are pre-announcing poor quarterly results?	You would have to talk to them about their performances.	Again, we underwrite things slightly differently from our competitors. But your questions have helped us to realize that disclosing some of the details about our increased sales force and the outputs of our proprietary model to shareholders and the public via a press release might alleviate concerns about increasing economic weakness. Thank you![d]
So, you are not seeing any economic weakness in your markets?	No we are not.	
Are you seeing weakness in some of your tradition-ally stronger individual markets?	We are, but it is being offset by stability in other markets.	
So, I take it that the under-writing mix has shifted into newer markets?	Yes, that is correct.	

(continued)

TABLE 3. LOW STAN INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
I wonder whether you could discuss the conditions you are seeing in the northeastern region?	Originations remain strong.[a]	
I wonder whether you could discuss the conditions you are seeing in the northwestern, southeastern, and southwestern regions?	Originations remain strong.[a]	
A deep-dive check of home sale websites shows that the average sales price of homes is decreasing across each region and in almost every market. What do you make of that trend?	It isn't affecting our business.	
A similar check about the average time on market shows that it is increasingly difficult to sell a house. How is that affecting your originations and the credit quality of your portfolio of mortgages?	Again, it isn't affecting our business.	
So, your model looks the same as it did two quarters ago?	Did you see that we announced an increase to our share buy-back program?[b]	

(continued)

TABLE 3.   LOW STAN INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
Would it be possible to see a copy of the output of your model over the last three quarters? I don't mean seeing into the black box, but just to see how it is tracking the economy and adjusting the weightings in the portfolio?	No, what goes into our model is proprietary.	

[a]Management did not directly answer the question about conditions, just about originations.

[b]This is an attempt to change the subject away from the context of your question.

[c]Likely, this would be the end of the interview because this response directly addresses your concerns. However, for the purpose of illustration, we provide examples of further truthful responses, in case the company's answer does not address the evidence.

[d]At this point, the level of forthcomingness is evident, and further questions regarding the matter would be superfluous.

Here is how the interview goes in a case where the interviewer does not use the SUE technique.

- Question 1: I conducted independent research and know that each major region is showing softness, in contrast to your public statements. Why are you not lowering expectations as all of your peers are?

- Answer 1: Sorry, not to be rude, but we are not responsible for your research.

Result

Your conversations with Low Stan convince you that the company is evasive when discussing the economy and its results. Proof of this is that they do not answer questions directly and they attempt to change the subject during the interview. Additionally, your thorough, independent research agrees with the narrative being shared with the public by Low Stan's competitors. That the company points to its proprietary black box portfolio construction model as the only counterweight to bad economic news also makes you uncomfortable. Consequently, you decide to sell your stake in Low Stan despite being a shareholder for many years.

CASE STUDY: NEW SALES PROVE TOUGH

Context and Facts

Gold Card, Inc., is a preeminent issuer of credit cards whose financial results are incredibly consistent, to the point where its ability to deliver earnings per share growth is annuity like. Unlike other global credit card companies, Gold Card issues cards to only the most creditworthy and wealthiest consumers. In exchange for delivering this high-end cardholder to merchants, the company charges a slightly higher per transaction fee. Consequently, merchant acceptance of the Gold Card's credit cards is lower than that of other credit card companies.

The company's customers, however, appreciate the more generous loyalty rewards program that offers extensive flexibility in point redemption, as well as numerous other perquisites. Among these benefits is the ability to pay your bill almost two months after the first day of a payment period. For example, if on 1 February, you make a purchase of an expensive watch—say, €4,500—payment is not due until 27 March. Gold Card, therefore, offers its customers substantial cash flow management abilities, or float.

Currently, the global economy is in expansion mode, and it is widely believed that Gold Card will be able to offer its cards to the growing global upper middle class. Research analysts have a strong buy recommendation on the company and expect the firm to meet or slightly beat consensus earnings forecasts. Your investment management firm owns shares in Gold Card and believes that the company is likely to have a more difficult time selling into its new markets because of cultural differences between the company's home market and foreign markets. As evidence of this, Gold Card, which normally handily beats quarterly earnings consensus, has been beating estimates by lower amounts and, in a recent quarter, even was "just" at the top end of estimates.

You are a research analyst covering the firm as well as a happy customer. Enter into this mix the fact that you receive a notice in the mail informing you that Gold Card's customers' payment dates are being switched from the 27th of the following month to the 16th of the following month, an 11-day difference. Because this action gives a temporary bump to revenues, and consequently earnings, you are surprised that the company has made no announcement about the effect of this change. You believe this is a troubling sign that the company is likely to miss the coming quarter's earnings estimates as well as evidence that the company's sales strategy in overseas markets may be meeting greater resistance than the company anticipated.

You are also concerned that the company's business model may be in jeopardy because this tweaking of the timing of payments is a very short-term action, the benefits of which are likely going to be experienced in only one, or at most two, quarters. Thus, you decide to call

the company to investigate whether or not the firm is going to be able to deliver on its results through savvy operations rather than payment date trickery.

Evidence used: Firsthand experience as a customer of the business.

Possible SUE Approach

- You check to see that the evidence you have meets the "evidence criteria" and conclude that it does.

- Next, because SUE relies on interviewees' belief that they are engaging in deceptive activities, you set up an interview with those likely to have intimate knowledge of the forthcoming earnings perspective. An individual conference call is set up with your investor relations contact, who normally impresses you with her knowledge of the operations of Gold Card. The subject of the call is that you are a long-term shareholder and want to engage in your routine, quarterly check-up call.

- You develop your questioning strategy using the funnel strategy and attempt to hold on to your critical piece of evidence until the very end. **Table 4** shows how the interview might go if Gold Card is lying and if Gold Card is being forthright.

TABLE 4. GOLD CARD INTERVIEW USING SUE TECHNIQUE

Question	Answer from Liar	Answer from Truth Teller
I am doing my normal check in with you about the company and how it is performing. How is the company doing in the current quarter?	We are doing well.	Results are probably going to be at the low-end of our guidance, and as always, we reserve the right to revise our estimates.[d] OR Results are probably going to be at the low end of our guidance. We are drafting a press release as we speak.[e]

(continued)

TABLE 4.   GOLD CARD INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
Could you provide some color about that?	We are meeting and achieving our business goals for the quarter.	Well, we are tracking well in our core markets, but we are having some trouble getting the messaging right in our new markets. There, the growth is less than we would like. In order to rectify the situation, we are working with some local marketing firms to tweak our sales strategy. Yes, there is some risk that we might miss our estimate range. We are drafting a press release as we speak.[f]
And does that mean you are also meeting your investor goals for the quarter?	Yes, it does.	
So, concerning those business goals, is new card growth going according to plan?	Yes, new card growth is according to plan.	
And what about customer acquisition costs? Are they tracking according to plan?	Yes, they are.	
Please talk about each of the regions in which you operate?[a]	North America and Europe are tracking as they always do, 6%–8% up. [After discussing the traditional regions, the investor relations professional says…] And our other regions are performing, too.[b]	

(continued)

TABLE 4. GOLD CARD INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
And what about the newer regions where the company has just started actively looking for customers in the last six months? Could you provide some details?	Hong Kong and Singapore are doing very well, and tracking ahead of what we expected, with 10%–12% growth expected.[c]	
So, everything is a success with the company's new strategy?	Yes.	
As a customer, I received a notice about the change in the payment date from the 27th to the 16th. I believe this change positively affects earnings, and significantly, yet you have not revised earnings estimates upward. Also, it seems to me that it will cause some blowback from your customers. The company also did not discuss this forthcoming change previously. Why now?	We felt the timing was right.	
What exactly made the timing right?	We have been discussing making this change for some time. Yes, maybe we could have communicated better with shareholders that we were going to change the payment date.	

[a]You are most interested in the performance of the new operating regions because it is where you anticipate the company may run into trouble.

[b]You note the omission of specific detail about the regions and the fact that this statement may be interpreted to mean almost anything. Also, you know that the traditional regions being up just 6%–8% means that the company is likely to miss its earnings expectations because most of the excess earnings growth is anticipated to come from the newer regions.

 83

TABLE 4. GOLD CARD INTERVIEW USING SUE TECHNIQUE (CONTINUED)

[c]Again, you note the lack of detail about the entirety of the region.

[d]This answer is forthcoming. However, it still does not indicate whether or not the company is likely to miss earnings estimates completely or just be at the low end of their guidance. It might be the end of the SUE portion of your interview, or you might want to ask another follow-up question.

[e]Likely, this would be the end of the interview because this response addresses your concerns. For the purpose of illustration, we provide examples of further truthful responses in case the company's answer does not address the evidence.

[f]At this point, the level of forthcomingness is evident, and further questions regarding the matter would be superfluous.

Here is how the interview goes in a case where the interviewer does not use the SUE technique.

- Question 1: As a customer, I received a notice about the change in the payment date from the 27th to the 16th. I believe this positively affects earnings, and significantly, yet you have not revised earnings estimates upward. Also, it seems to me that this will cause some blowback from your customers. The company also did not discuss this forthcoming change previously. Did you make this change to make up for worse-than-expected sales in your newer regions?

- Answer 1: No, this is something we have been planning on doing for awhile.

Result

Normally forthright Gold Card is volunteering very little information about its strategically most important regions, as well as very little information about why it changed the timing of its customers' bill due dates. You believe it is a sign that the company is likely to miss its next quarter's earnings estimates. More disturbing is that management's character seems to be in jeopardy. Therefore, you consider selling a portion or the entirety of your position in Gold Card.

CASE STUDY: ALL FORM, NO SUBSTANCE

Context and Facts

Alright-Mart is an also-ran discount retailer whose glory days are behind it, mostly because of a superior competitor with a superior strategy as well as a superior logistics infrastructure. Currently, the company is in the midst of its second major restructuring in less than five years. Shepherding the current effort is an ex–Wall Street investment banker renowned for her highly original thinking in retail. She is a part of an entirely new upper-management team brought on board by Alright-Mart's board.

Restructuring efforts are focusing on selling underperforming stores and shuttering those that cannot be sold; selling the real estate owned by Alright-Mart; signing up celebrities to co-brand with the company's major product offerings, such as well-known chefs for the food products and lifestyle icons for homewares; and altering the company's logistics. All seems to be going well, with earnings per share growth looking to expand for the first time in years. Also, new management seems laser-focused on returns on capital and cash flow generation.

Several months ago, you purchased a small position in Alright-Mart, although you are cautious about whether or not the company can actually turn itself around. Principally, you bought shares because the firm was trading at a 40% discount to net working capital per share and you believe a bankruptcy is highly unlikely despite the company's woes.

Recently, however, you heard some troubling news. One of the professionals you routinely check in with is a factorer. These pros purchase other firms' accounts receivable at a significant discount to book value. It turns out that business is booming for the factoring firm, and its fastest-growing customer is Alright-Mart. The story coming from Alright-Mart, however, is that its restructuring plans are on track and that it is not suffering any imminent cash flow problems. You decide to travel to Alright-Mart's headquarters in Oregon to have a meeting with upper management to discover whether things really are going as well as advertised.

> **Evidence used:** Conversation with an industry expert.

Possible SUE Approach

- You check to see that the evidence you have meets the "evidence criteria" and conclude that it does.

- Next, because the SUE technique relies on interviewees' belief that they are engaging in deceptive activities, you set up an interview with those likely to have intimate knowledge of the state of the company's accounts receivable. Individual meetings are set up with the chief financial officer and controller. The subject of each meeting is that you are a new shareholder and want to ask the company about the progress of its strategic turnaround efforts.

- You develop your questioning strategy using the funnel strategy and attempt to hold on to your critical piece of evidence until the very end. **Table 5** shows how the interview might go if Alright-Mart is lying and if Alright-Mart is being forthright.

TABLE 5. ALRIGHT-MART INTERVIEW USING SUE TECHNIQUE

Question	Answer from Liar	Answer from Truth Teller
I wonder if you could discuss the company's long-term strategy.	As you know, we are engaged in a multi-year, top-to-bottom, bottom-to-top restructuring. We are changing our revenue strategy to include not just discount elements but also some premium elements, which is why we are signing contracts with celebrities to pitch our wares. Our sales and marketing professionals are being compensated on a more aggressive, incentive-driven basis. On the expense side of things, we are selling or closing non-performing stores. In some cases, our shuttered stores are sitting on top of valuable real estate, so we are selling the real estate. We are working with our various unions to see whether they will hold hourly wages flat in exchange for equity positions in the company, and so on.	Well, things are not going as we expected. Although we believe we have the right strategy, we might be too late in implementing it to save the company. We are considering all strategic options and are putting out a press release to this effect soon.[a]

(continued)

TABLE 5. ALRIGHT-MART INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
I am sure it is a lot of work. I know shareholders are generally happy with this effort, but what about debtholders?	We hold routine conference calls for our debtholders, as well as the ratings agencies. Thus far, they seem happy with the turnaround strategy and our execution of it.	I think our debtholders might be disappointed. Although we are tracking well to our strategy, you know we have a forthcoming interest payment, and cash is—to be blunt about it—tight. We will be putting out a press release soon to disclose our cash troubles.[b]
When you talk with the debtholders, is most of the weight of their questions on the assets (the security and collateral) side of the equation or more on the cash flow (pay my interest payments) side of the equation?	A bit of both, really.	
I'm sure. But what do you mean by, "a bit of both?" Are a majority interested in the collateral or in the interest payment?	Well, very few of the debtholders are interested in the collateral side of things. If they were, we would really be in trouble, wouldn't we?	
Yeah, I guess you would be. Is it fair to say that Alright-Mart does not need any additional capital at this time, that it is self-funding?	Yes, that's fair to say. Wait until you see the latest marketing campaign. Management is extremely excited by it, and we believe it is a real game-changer for us.	

(continued)

TABLE 5.   ALRIGHT-MART INTERVIEW USING SUE TECHNIQUE (CONTINUED)

Question	Answer from Liar	Answer from Truth Teller
I know one of the problems that you have run into in the past is having to aggressively discount your wares in order to lure customers away from Giant-Mart. I have done some channel checks, and it looks as if you are holding the line on pricing. I wonder if you could talk about discounting throughout the whole store network?	We have massively cut discounting, and there are very few differences in our stores throughout the network. We want a better customer than we had in the past.	
It seems to me that your old customers probably couldn't afford the prices you are charging.	You would be surprised.	
So, you aren't having trouble collecting on your receivables?	What do you mean by that?	
Just what I asked: You aren't having trouble collecting on your receivables?	No.	
I regularly speak with factorers, and they say that you are their best customer right now. What do you have to say about that?	Look, the new strategy *is* working, and we are glad to have you as a shareholder. Is there anything else I can help you to understand?	

[a]Likely, this would be the end of the interview because this response addresses your concerns. However, for the purpose of illustration, we provide examples of further truthful responses, in case the company's answer does not address the evidence.

[b]At this point, the level of forthcomingness is evident, and further questions regarding the matter would be superfluous.

Here is how the interview goes in a case where the interviewer does not use the SUE technique.

- Question 1: I regularly speak with factorers, and they say that you are their best customer right now. What do you have to say about that?

- Answer 1: Sure, we work with factorers. Previous management was terrible at collecting its receivables, and we basically just want to clear those bad debts and get on with executing our new strategy.

Result

You strongly believe that management of Alright-Mart is running into trouble with its customers adapting to the new corporate strategy. Management is certainly saying and doing the right things to impress shareholders, but the strategy ultimately must change the company's business reality, not just the perceptions about it. Alright-Mart, you conclude, is a classic case of form over substance. Consequently, you decide to sell your stake in the company.

SUMMARY

In this chapter, we have described a number of lie detection tools that are based on the assumption that cues to deception can be elicited through systematic questioning. One of these, the behavioral analysis interview, which is derived from law enforcement practice, is widely taught but has poor theoretical and empirical support. A more promising family of techniques is based on social cognitive psychology and derives from the notion that liars' attempts to convince can backfire if the interviewer asks questions in a strategic manner.

We devoted most of the chapter to the SUE technique, which draws on an understanding of the strategies liars and truth tellers use in order to convince. More specifically, the SUE technique incorporates several tactics for how to plan, structure, and execute an interview with a person that helps to elucidate whether the person is engaged in evasion and concealment or actually being forthcoming. As we have discussed, the SUE technique has substantial empirical support, and we believe it has much potential for application in the financial industry.

CONCLUSIONS

In the guide, we provided a broad overview of the available scientific literature on deception and its detection. Summarizing the results from many hundreds of studies spanning half a century is a daunting task, and there are bound to be omissions in our review. Even so, there are a number of critical points to remember.

1. *Body language cues are not reliable "tells."* Despite hundreds of studies mapping the behaviors of liars and truth tellers across numerous situations, there is little evidence of any systematic differences between them. Despite the strong appeal of the notion that lies show, research suggests that liars and truth tellers behave similarly. This finding holds true across a number of conditions and context, including the financial domain.

2. *Across numerous studies, people show lie detection accuracy rates just slightly above chance.* Given the finding that cues to deception are scarce, at best, it should come as no surprise that people have a difficult time distinguishing between truthful and deceptive statements. Syntheses of the literature suggest a hit rate around 54%—a number that is only marginally higher than chance. From a practical perspective, it is very problematic that this finding holds true even for experienced professionals, such as law enforcement officers. Experience and training ought to have equipped such professionals with special skills, but the scientific research consistently shows that they too struggle with this task.

3. *Lie detection is very difficult because lies barely show*. Researchers have attempted to understand why it is that people consistently perform so poorly when attempting to detect deception. Although research shows that people subscribe to a number of false beliefs about the nature of deceptive behavior, which might play a role in their poor lie detection accuracy, the most compelling explanation for poor hit rates is likely to be the fact that lies barely show. In simple terms, the task is very difficult.

4. We reviewed a number of traditional approaches to aid lie detection, including training techniques, statement analysis, and polygraph tests. While some of the methods promoted and sold to practitioners lack a scientific basis, others show some promise in that they appear to generate hit rates beyond what human observers can obtain. For example, text-based analysis seems promising.

5. The most promising lie detection methods seem to be the interviewing methods developed starting around 2005. These techniques are based on the assumption that cues to deception are likely to be weak and that lie-catchers must assume a more active role in eliciting or provoking different behavioral differences from liars versus truth tellers. Despite the fact that this research is rather new, there are already several innovative methods being used in settings where lie-catchers have the opportunity to interact with

the subjects. Fortunately, the world of investing affords these kinds of opportunities. These techniques are based on a sound cognitive model of deception, and they are tested using rigorous scientific methods.

In summary, although the scientific literature points to many pitfalls for lie-catchers, we believe that there is also reason for optimism. Lie detection is difficult, but by understanding the mechanisms and procedures of scientifically grounded techniques, it may be possible to improve accuracy in judgments of deception.

CE Qualified Activity · CFA Institute · This publication qualifies for 2.5 CE credits under the guidelines of the CFA Institute Continuing Education Program.

Claim your CE credits: www.cfainstitute.org/learning/ products/publications/car/Pages/car.v2017.n1.1.aspx

BIBLIOGRAPHY

Allwood, C.M., and P.A. Granhag. 1999. "Feelings of Confidence and the Realism of Confidence Judgments in Everyday Life." In *Judgment and Decision Making: Neo-Brunswikian and Process-Tracing Approaches*. Edited by P. Juslin and H. Montgomery. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Anderson, D.E., M.E. Ansfield, and B.M. DePaulo. 1999. "Love's Best Habit: Deception in the Context of Relationships." In *The Social Context of Nonverbal Behavior*. Edited by P. Philippot, R. S. Feldman, and E.J. Coats. New York: Cambridge University Press.

Anderson, N.H. 1968. "Likableness Ratings of 555 Personality-Trait Words." *Journal of Personality and Social Psychology*, vol. 9, no. 3 (July): 272–279.

Backbier, E., J. Hoogstraten, and K. Meerum Terwogt-Kouwenhoven. 1997. "Situational Determinants of the Acceptability of Telling Lies." *Journal of Applied Social Psychology*, vol. 27, no. 12 (June): 1048–1062.

Bok, S. 1999. *Lying: Moral Choice in Public and Private Life*, 2nd edition. New York: Vintage Books.

Bond, C.F., and B.M. DePaulo. 2006. "Accuracy of Deception Judgments." *Personality and Social Psychology Review*, vol. 10, no. 3: 214–234.

———. 2008. "Individual Differences in Judging Deception: Accuracy and Bias." *Psychological Bulletin*, vol. 134 , no. 4 (July): 477.

Bond, C.F., and W.E. Fahey. 1987. "False Suspicion and the Misperception of Deceit." *British Journal of Social Psychology*, vol. 26, no. 1: 41–46.

Bond, C.F., T.R. Levine, and M. Hartwig. 2015. "New Findings in Non-Verbal Lie Detection. In *Detecting Deception: Current Challenges and Cognitive Approaches*. Edited by P.A. Granhag, A. Vrij, and B. Verschuere. Chichester, UK: John Wiley & Sons.

Boyd, R.L., and J.W. Pennebaker. 2015. "Did Shakespeare Write Double Falsehood? Identifying Individuals by Creating Psychological Signatures with Text Analysis." *Psychological Science*, vol. 26, no. 5 (May): 570–582.

Brown, J.M. 2010. "Statement Validity Analysis." In *The Cambridge Handbook of Forensic Psychology*. Edited by J.M. Brown and E.A. Campbell. New York: Cambridge University Press.

Bull, R. 2004. "Training to Detect Deception from Behavioural Cues: Attempts and Problems." In *The Detection of Deception in Forensic Contexts*. Edited by P.A. Granhag, and L.A. Strömwall. New York: Cambridge University Press.

Burgoon, J.K., D.B. Buller, A.S. Ebesu, and P. Rockwell. 1994. "Interpersonal Deception: V. Accuracy in Deception Detection." *Communication Monographs*, vol. 61, no. 4: 303–325.

Cain, C.K., and J.E. LeDoux. 2008. "Brain Mechanisms of Pavlovian and Instrumental Aversive Conditioning." In *Handbook of Behavioural Neuroscience*, vol. 17. Edited by R.L. Blanchard, D.C. Blanchard, G. Griebel, and D. Nutt. Amsterdam: Elsevier.

Carlson, Neil R., William Buskist, and G. Neil Martin. 2000. *Psychology: The Science of Behaviour*. Columbus, OH: Allyn and Bacon.

Carver, C.S., and M.F. Scheier. 2012. "A Model of Behavioral Self-Regulation." In *Handbook of Theories of Social Psychology, Vol. 1*. Edited by P.M. Van Lange, A.W. Kruglanski, E.T. Higgins. Thousand Oaks, CA: Sage Publications Ltd.

Carver, R.P. 1978. "The Case against Statistical Significance Testing." *Harvard Educational Review*, vol. 48 (Fall): 378–399.

———. 1993. "The Case against Statistical Significance Testing, Revisited." *Journal of Experimental Education*, vol. 61, no. 4: 287–292.

Christianson, S.Å., and H. Merckelbach. 2004. "Crime-Related Amnesia as a Form of Deception." In *The Detection of Deception in Forensic Contexts*. Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

Clemens, F., P.A. Granhag, L.A. Strömwall, A. Vrij, S. Landström, E. Roos af Hjelmsäter, and M. Hartwig. 2010. "Skulking around the Dinosaur: Eliciting Cues to Children's Deception via Strategic Disclosure of Evidence." *Applied Cognitive Psychology*, vol. 24, no. 7 (October): 925–940.

Cohen, J. 1988. *Statistical Power Analysis for the Behavioral Sciences*, 2nd edition. Hillsdale, NJ: Erlbaum.

Cumming, G. 2014. "The New Statistics: Why and How." *Psychological Science*, vol. 25, no. 1 (January): 7–29.

Cutler, B.L., S.D. Penrod, and H.R. Dexter. 1990. "Juror Sensitivity to Eyewitness Identification Evidence." *Law and Human Behavior*, vol. 14, no. 2 (April): 185–191.

Dando, C.J., and R. Bull. 2011. "Maximising Opportunities to Detect Verbal Deception: Training Police Officers to Interview Tactically." *Journal of Investigative Psychology and Offender Profiling*, vol. 8, no. 2 (June): 189–202.

Darwin, C. 1872. *The Expression of the Emotions in Man and Animals*. Chicago: University of Chicago Press.

DePaulo, B.M. 1992. "Nonverbal Behavior and Self-Presentation." *Psychological Bulletin*, vol. 111, no. 2 (March): 203–243.

DePaulo, B.M., M.E. Ansfield, S.E. Kirkendol, and J.M. Boden. 2004. "Serious Lies." *Basic and Applied Social Psychology*, vol. 26, no. 2/3: 147–167.

DePaulo, B.M., K. Charlton, H. Cooper, J.J. Lindsay, and L. Muhlenbruck. 1997. "The Accuracy–Confidence Correlation in the Detection of Deception." *Personality and Social Psychology Review*, vol. 1, no. 4: 346–357.

DePaulo, B.M., J.A. Epstein, and M.M. Wyer. 1993. "Sex Differences in Lying: How Women and Men Deal with the Dilemma of Deceit." In *Lying and Deception in Everyday Life.* Edited by M. Lewis and C. Saarni. New York: Guilford Press.

DePaulo, B.M., and D.A. Kashy. 1998. "Everyday Lies in Close and Casual Relationships." *Journal of Personality and Social Psychology*, vol. 74, no. 1 (January): 63–79.

DePaulo, B.M., D.A. Kashy, S.E. Kirkendol, M.M. Wyer, and J.A. Epstein. 1996. "Lying in Everyday Life." *Journal of Personality and Social Psychology*, vol. 70, no. 5 (May): 979–995.

DePaulo, B.M., J.J. Lindsay, B.E. Malone, L. Muhlenbruck, K. Charlton, and H. Cooper. 2003. "Cues to Deception." *Psychological Bulletin*, vol. 129, no. 1 (January): 74–118.

DePaulo, B.M., and W.L. Morris. 2004. "Discerning Lies from Truths: Behavioural Cues to Deception and the Indirect Pathway of Intuition." In *The Detection of Deception in Forensic Contexts*. Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

DePaulo, B.M., W.L. Morris, and R.W. Sternglanz. 2009. "When the Truth Hurts: Deception in the Name of Kindness." In *Feeling Hurt in Close Relationships.* Edited by A.L. Vangelisti. New York: Cambridge University Press.

Driscoll, L.N. 1994. "Validity Assessment of Written Statements from Suspects in Criminal Investigations using the SCAN Technique." *Policy Studies*, vol. 17, no. 4 (Winter): 77–88.

Driskell, J.E. 2012. "Effectiveness of Deception Detection Training: A Meta-Analysis." *Psychology, Crime & Law*, vol. 18, no. 8: 713–731.

Druckman, D., R. Rozelle, and J. Baxter. 1982. *Nonverbal Communication: Survey, Theory and Research.* Beverly Hills, CA: Sage.

Dunning, D. 2011. "The Dunning-Kruger Effect: On Being Ignorant of One's Own Ignorance." In *Advances in Experimental Social Psychology*, vol. 44. Edited by J.M. Olson and M.P. Zanna. San Diego: Academic Press.

Dunning, D., D.W. Griffin, J.D. Milojkovic, and L. Ross. 1990. "The Overconfidence Effect in Social Prediction." *Journal of Personality and Social Psychology*, vol. 58, no. 4 (April): 568–581.

Ekman, P. 2009. *Telling Lies: Clues to Deceit in the Marketplace, Politics, and Marriage*, revised edition. New York: W.W. Norton & Co.

Ekman, P., and W.V. Friesen. 1969. "Nonverbal Leakage and Clues to Deception." *Psychiatry*, vol. 32, no. 1 (February): 88–106.

Fiske, Susan T., and Shelley E. Taylor. 2013. *Social Cognition: From Brains to Culture*. 2nd ed. London: Sage Publications.

Forgas, J.P., R.F. Baumeister, and D.M. Tice. 2009. The Psychology of Self-Regulation: An Introductory Review. In *Psychology of Self-Regulation: Cognitive, Affective, and Motivational Processes*. Edited by J.P. Forgas, R.F. Baumeister, D.M. Tice. New York: Psychology Press.

Frank, M.G., and P. Ekman. 1997. "The Ability to Detect Deceit Generalizes across Different Types of High-Stake Lies." *Journal of Personality and Social Psychology*, vol. 72, no. 6: 1429–1439.

Frank, M.G., and T.H. Feeley. 2003. "To Catch a Liar: Challenges for Research in Lie Detection Training." *Journal of Applied Communication Research*, vol. 31, no. 1: 58–75.

Garrett, B.L. 2011. *Convicting the Innocent: Where Criminal Prosecutions Go Wrong*. Cambridge, MA: Harvard University Press.

Garrido, E., J. Masip, and C. Herrero. 2004. "Police Officers' Credibility Judgments: Accuracy and Estimated Ability." *International Journal of Psychology*, vol. 39, no. 4 (August): 254–275.

Gilbert, D.T. 1991. "How Mental Systems Believe." *American Psychologist*, vol. 46, no. 2 (February): 107–119.

Gilovich, T., K. Savitsky, and V.H. Medvec. 1998. "The Illusion of Transparency: Biased Assessments of Others' Ability to Read One's Emotional States." *Journal of Personality and Social Psychology*, vol. 75, no. 2: 332–346.

Global Deception Research Team. 2006. "A World of Lies." *Journal of Cross-Cultural Psychology*, vol. 37, no. 1 (January): 60–74.

Goffman, E. 1959. *The Presentation of Self in Everyday Life*. New York: Anchor.

Government Accountability Office. 2010. "Aviation Security: Efforts to Validate TSA's Passenger Screening Behavior Detection Program Underway, but Opportunities Exist to Strengthen Validation and Address Operational Challenges." GAO-10-763. US Government, Washington, DC (www.gao.gov/products/Gao-10-763).

Granhag, P. A., F. Clemens, and L.A. Strömwall. 2009. "The Usual and the Unusual Suspects: Level of Suspicion and Counter-Interrogation Tactics." *Journal of Investigative Psychology and Offender Profiling*, vol. 6, no. 2 (June): 129–137.

Granhag, P.A., and M. Hartwig. 2015. "The Strategic Use of Evidence (SUE) Technique: A Conceptual Overview." In *Deception Detection: Current Challenges and New Directions.* Edited by P.A. Granhag, A. Vrij, and B. Vershuere. Chichester, UK: Wiley.

———. 2008. A New Theoretical Perspective on Deception Detection: On the Psychology of Instrumental Mind Reading. *Psychology, Crime & Law*, vol. 14, no. 3: 189–200.

Granhag, P.A., M. Hartwig, E. Mac Giolla, and F. Clemens. 2015. "Suspects' Verbal Counter-Interrogation Strategies: Towards an Integrative Model." In *Deception Detection: Current Challenges and New Directions.* Edited by P.A. Granhag, A. Vrij, and B. Vershuere. Chichester, UK: Wiley.

Granhag, P.A., and L.A. Strömwall. 2002. "Repeated Interrogations: Verbal and Non-Verbal Cues to Deception." *Applied Cognitive Psychology*, vol. 16, no. 3 (April): 243–257.

Granhag, P.A., L.A. Strömwall, R. Willén, and M. Hartwig. 2013. "Eliciting Cues to Deception by Tactical Disclosure of Evidence: The First Test of the Evidence Framing Matrix." *Legal and Criminological Psychology*, vol. 18, no. 2 (September): 341–355.

Griffin, D., and A. Tversky. 1992. "The Weighing of Evidence and the Determinants of Confidence." In *Heuristics and Biases: The Psychology of Intuitive Judgment.* Edited by T. Gilovich, D. Griffin, and D. Kahneman. New York: Cambridge University Press.

Gudjonsson, G.H. 2003. *The Psychology of Interrogations and Confessions. A Handbook*. Chichester, UK: John Wiley & Sons.

Hafer, C.L., and L. Bègue. 2005. "Experimental Research on Just-World Theory: Problems, Developments, and Future Challenges." *Psychological Bulletin*, vol. 131, no. 1: 128–167.

Hartwig, M. 2011. "Methods in Deception Research." In *Research Methods in Forensic Psychology.* Edited by B. Rosenfeld and S. Penrod. Chichester, UK: John Wiley and Sons.

Hartwig, M., and C.F. Bond. 2011. "Why Do Lie-Catchers Fail? A Lens Model Meta-Analysis of Human Lie Judgments." *Psychological Bulletin*, vol. 137, no. 4 (July): 643–659.

———. 2014. "Lie Detection from Multiple Cues: A Meta-Analysis." *Applied Cognitive Psychology*, vol. 28, no. 5 (September/October): 661–676.

Hartwig, M., and P.A. Granhag. 2015. "Exploring the Nature and Origin of Beliefs about Deception: Implicit and Explicit Knowledge among Lay People and Presumed Experts." In *Deception Detection: Current Challenges and New Directions.* Edited by P.A. Granhag, A. Vrij, and B. Vershuere. Chichester, UK: Wiley.

Hartwig, M., P.A. Granhag, and T.J. Luke. 2014. "Strategic Use of Evidence during Investigative Interviews: The State of the Science." In *Credibility Assessment: Scientific Research and Applications.* Edited by D.C. Raskin, C.R. Honts, and J.C. Kircher. Oxford, UK: Academic Press.

Hartwig, M., P.A. Granhag, L.A. Strömwall, and L.O. Andersson. 2004. "Suspicious Minds: Criminals' Ability to Detect Deception." *Psychology, Crime & Law*, vol. 10, no. 1 (March): 83–95.

Hartwig, M., P.A. Granhag, L.A. Strömwall, and N. Doering. 2010. "Formulating True and False Denials: Exploring the Social Cognitive Psychology of Guilt and Innocence." *Open Criminology Journal*, vol. 3: 10–26.

Hartwig, M., P.A. Granhag, L.A. Strömwall, and O. Kronkvist. 2006. "Strategic Use of Evidence during Police Interviews: When Training to Detect Deception Works." *Law and Human Behavior*, vol. 30, no. 5 (October): 603–619.

Hartwig, M., P.A. Granhag, and L.A. Strömwall. 2007. "Guilty and Innocent Suspects' Strategies during Police Interrogations." *Psychology, Crime & Law*, vol. 13: 213–227.

Hartwig, M., P.A. Granhag, L.A. Strömwall, and A. Vrij. 2004. "Police Officers' Lie Detection Accuracy: Interrogating Freely versus Observing Video." *Police Quarterly*, vol. 7, no. 4 (December): 429–456.

Hartwig, M., P.A. Granhag, L.A. Strömwall, and A. Vrij. 2005. "Deception Detection via Strategic Disclosure of Evidence." *Law and Human Behavior*, vol. 29, vol. 4 (August): 469–484.

Hartwig, M., P.A. Granhag, L.A. Strömwall, A. Wolf, A. Vrij, and E. Roos af Hjelmsäter. 2011. "Detecting Deception in Suspects: Verbal Cues as a Function of Interview Strategy." *Psychology, Crime & Law*, vol. 17, no. 7: 643–656.

Hartwig, M., J.A. Voss, and D.B. Wallace. 2015. "Detecting Lies in the Financial Industry: A Survey of Investment Professionals' Beliefs." *Journal of Behavioral Finance*, vol. 16, no. 2: 173–182.

Hauch, V., I. Blandón-Gitlin, J. Masip, and S.L. Sporer. 2015. "Are Computers Effective Lie Detectors? A Meta-Analysis of Linguistic Cues to Deception." *Personality and Social Psychology Review*, vol. 19, no. 4 (November): 307–342.

Hogarth, R.M. 2001. *Educating Intuition.* Chicago: University of Chicago Press.

Honts, C.R. 2004. "The Psychophysiological Detection of Deception." In *The Detection of Deception in Forensic Contexts.* Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

Honts, C.R., and M. Hartwig. 2014. "Credibility Assessments at Portals." In *Credibility Assessment: Scientific Research and Applications*. Edited by D.C. Raskin, C.R. Honts, and J.C. Kircher. San Diego: Academic Press.

Inbau, F.E., J.E. Reid, J.P. Buckley, and B.C. Jayne. 2005. *Essentials of the Reid Technique: Criminal Interrogation and Confessions*. Sudbury, MA: Jones and Bartlett.

Johnson, M.K., and C.L. Raye. 1981. "Reality Monitoring." *Psychological Review*, vol. 88, no. 1: 67–85.

Jordan, S., M. Hartwig, D.B. Wallace, E. Dawson, and A. Xhihani. 2012. "Early versus Late Disclosure of Evidence: Effects on Verbal Cues to Deception, Confessions, and Lie Catchers' Accuracy." *Journal of Investigative Psychology and Offender Profiling*, vol. 9, no. 1 (January): 1–12.

Kassin, S.M., S.A. Drizin, T. Grisso, G.H. Gudjonsson, R.A. Leo, and A.D. Redlich. 2010. "Police-Induced Confessions: Risk Factors and Recommendations." *Law and Human Behavior*, vol. 34, no. 1 (February): 3–38.

Kassin, S.M., R.A. Leo, C.A. Meissner, K.D. Richman, L.H. Colwell, A.-M. Leach, and D. La Fon. 2007. "Police Interviewing and Interrogation: A Self-Report Survey of Police Practices and Beliefs." *Law and Human Behavior*, vol. 31, no. 4 (August): 381–400.

Kassin, S.M., C.A. Meissner, and R.J. Norwick. 2005. "'I'd Know a False Confession If I Saw One': A Comparative Study of College Students and Police Investigators." *Law and Human Behavior*, vol. 29, no. 2 (April): 211–227.

Kircher, J.C., and D.C. Raskin. 1992. "Polygraph Techniques: History, Controversies, and Prospects." In *Psychology and Social Policy.* Edited by P. Suedfeld and P.E. Tetlock. Washington, DC: Hemisphere Publishing Corp.

Kleinmuntz, B., and J.J. Szucko. 1984. "Lie Detection in Ancient and Modern Times: A Call for Contemporary Scientific Study." *American Psychologist*, vol. 39, no. 7 (July): 766–776.

Köhnken, G. 2004. "Statement Validity Analysis and the 'Detection of the Truth.'" In *The Detection of Deception in Forensic Contexts.* Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

Kraut, R.E., and D.B. Poe. 1980. "Behavioral Roots of Person Perception: The Deception Judgments of Customs Inspectors and Laymen." *Journal of Personality and Social Psychology*, vol. 39, no. 5 (November): 784–798.

Kruger, J., and D. Dunning. 1999. "Unskilled and Unaware of It: How Difficulties in Recognizing One's Own Incompetence Lead to Inflated Self-Assessments." *Journal of Personality and Social Psychology*, vol. 77, no. 6: 1121–1134.

Leal, S., and A. Vrij. 2008. "Blinking during and after Lying." *Journal of Nonverbal Behavior*, vol. 32, no. 4 (December): 187–194.

Levine, T.R., T.H. Feeley, S.A. McCornack, M. Hughes, and C.M. Harms. 2005. "Testing the Effects of Nonverbal Behavior Training on Accuracy in Deception Detection with the Inclusion of a Bogus Training Control Group." *Western Journal of Communication*, vol. 69, no. 3: 203–217.

Levine, T.R., R.K. Kim, H.S. Park, and M. Hughes. 2006. "Deception Detection Accuracy Is a Predictable Linear Function of Message Veracity Base-Rate: A Formal Test of Park and Levine's Probability Model." *Communication Monographs*, vol. 73: 243–260.

Levine, T.R., H.S. Park, and S.A. McCornack. 1999. "Accuracy in Detecting Truths and Lies: Documenting the 'Veracity Effect.'" *Communication Monographs*, vol. 66: 125–144.

Levine, T.R., A. Shaw, and H.C. Shulman. 2010. "Increasing Deception Detection Accuracy with Strategic Questioning." *Human Communication Research*, vol. 36, no. 2 (March): 216–231.

Lichtenstein, S., and B. Fischhoff. 1977. "Do Those Who Know More Also Know More about How Much They Know?" *Organizational Behavior and Human Performance*, vol. 20, no. 2: 159–183.

Luke, T.J., M. Hartwig, E. Joseph, L. Brimbal, and G. Chan, E. Dawson, S. Jordan, P. Donovan, and P.A. Granhag. 2016. "Training in the Strategic Use of Evidence Technique: Improving Deception Detection Accuracy of American Law Enforcement Officers." *Journal of Police and Criminal Psychology*, vol. 31, no. 4: 270–278.

Mac Giolla, E., P.A. Granhag, and A. Vrij. 2015. "Discriminating between True and False Intentions." In *Detecting Deception: Current Challenges and Cognitive Approaches*. Edited by P.A. Granhag, A. Vrij, and B. Verschuere. Chichester, UK: Wiley-Blackwell.

Mahon, J.E. 2006. "Kant and the Perfect Duty to Others Not to Lie." *British Journal for the History of Philosophy*, vol. 14, no. 4: 653–685.

Malle, B.F., and S.D. Hodges. 2005. *Other Minds*. New York: Guilford.

Mann, S., A. Vrij, and R. Bull. 2002. "Suspects, Lies, and Videotape: An Analysis of Authentic High-Stake Liars." *Law and Human Behavior*, vol. 26: 365–376.

Martin, C. ed. 2009. *The Philosophy of Deception*. New York: Oxford University Press.

Masip, J., H. Alonso, E. Garrido, and C. Antón. 2005. "Generalized Communicative Suspicion (GCS) among Police Officers: Accounting for the Investigator Bias Effect." *Journal of Applied Social Psychology*, vol. 35, no. 5: 1046–1066.

Masip, J., A. Barba, and C. Herrero. 2012. "Behaviour Analysis Interview and Common Sense: A Study with Novice and Experienced Officers." *Psychiatry, Psychology and Law*, vol. 19 (February): 21–34.

Masip, J., M. Bethencourt, G. Lucas, M.S. Segundo, and C. Herrero. 2012. "Deception Detection from Written Accounts." *Scandinavian Journal of Psychology*, vol. 53: 103–111.

Masip, J., S.L. Sporer, E. Garrido, and C. Herrero. 2005. "The Detection of Deception with the Reality Monitoring Approach: A Review of the Empirical Evidence." *Psychology, Crime & Law*, vol. 11, no. 1: 99–122.

Meissner, C.A., and S.M. Kassin. 2002. "'He's Guilty!': Investigator Bias in Judgments of Truth and Deception." *Law and Human Behavior*, vol. 26, no. 5 (October): 469–480.

Nahari, G., A. Vrij, and R.P. Fisher. 2012. "Does the Truth Come Out in the Writing? SCAN as a Lie Detection Tool." *Law and Human Behavior*, vol. 36, no. 1 (February): 68–76.

Newman, M.L., C.J. Groom, L.D. Handelman, and J.W. Pennebaker. 2008. "Gender Differences in Language Use: An Analysis of 14,000 Text Samples." *Discourse Processes*, vol. 45, no. 3 (June): 211–236.

Newman, M.L., J.W. Pennebaker, D.S. Berry, and J.M. Richards. 2003. "Lying Words: Predicting Deception from Linguistic Styles." *Personality and Social Psychology Bulletin*, vol. 29, no. 5 (May): 665–675.

Overschelde, J.P.V. 2008. "Metacognition: Knowing about Knowing." In *Handbook of Metamemory and Memory.* Edited by J. Dunlosky and R.A. Bjork. New York: Psychology Press.

Pennebaker, J.W. 2013. *The Secret Life of Pronouns: What Our Words Say about Us.* Bloomsbury Press.

Porter, S., and L. ten Brinke. 2008. "Reading between the Lies: Identifying Concealed and Falsified Emotions in Universal Facial Expressions." *Psychological Science*, vol. 19, no. 5 (May): 508–514.

Porter, S., and J.C. Yuille. 1996. "The Language of Deceit: An Investigation of the Verbal Clues to Deception in the Interrogation Context." *Law and Human Behavior*, vol. 20, no. 4 (August): 443–458.

Porter, S., M. Woodworth, and A.R. Birt. 2000. "Truth, Lies, and Videotape: An Investigation of the Ability of Federal Parole Officers to Detect Deception." *Law and Human Behavior*, vol. 24, no. 6: 643–658.

Raskin, D.C., and C.R. Honts. 2002. "The Comparison Question Test." In *Handbook of Polygraph Testing.* Edited by M. Kleiner. San Diego: Academic Press.

Raskin, D.C., and J.C. Kircher. 2014. "Validity of Polygraph Techniques and Decision Methods." In *Credibility Assessment: Scientific Research and Applications.* Edited by D.C. Raskin, C.R. Honts, and J.C. Kircher. San Diego: Academic Press.

Sapir, A. 2000. *The LSI Course on Scientific Content Analysis (SCAN).* Phoenix: Laboratory for Scientific Interrogation.

Schlenker, B.R. 2002. "Self-Presentation." In *Handbook of Self and Identity.* Edited by M.R. Leary and J.P. Tangney. New York: Guilford Press.

Schwarz, N. 2012. "Feelings-as-Information Theory." In *Handbook of Theories of Social Psychology*, vol. 1. Edited by P. Van Lange, A. Kruglanski, and E. Higgins. London: SAGE Publications Ltd.

———. 2015. "Metacognition." In *APA Handbook of Personality and Social Psychology, Volume 1: Attitudes and Social Cognition.* Edited by M. Mikulincer, P.R. Shaver, E. Borgida, and J.A. Bargh. Washington, DC: American Psychological Association.

Serota, K.B., and T.R. Levine. 2015. "A Few Prolific Liars: Variation in the Prevalence of Lying." *Journal of Language and Social Psychology*, vol. 34, no. 2 (March): 138–157.

Sexton, J.B., and R.L. Helmreich. 2000. "Analyzing Cockpit Communications: The Links between Language, Performance, Error, and Workload." *Human Performance in Extreme Environments*, vol. 5, no. 1 (October): 63–68.

Simmons, J.P., L.D. Nelson, and U. Simonsohn. 2011. "False-Positive Psychology: Undisclosed Flexibility in Data Collection and Analysis Allows Presenting Anything as Significant." *Psychological Science*, vol. 22, no. 11 (November): 1359–1366.

Simmons, R.A., D.L. Chambless, and P.C. Gordon. 2008. "How Do Hostile and Emotionally Overinvolved Relatives View Relationships? What Relatives' Pronoun Use Tells Us." *Family Process*, vol. 47, no. 3 (September): 405–419.

Smith, N. 2001. *Reading between the Lines: An Evaluation of the Scientific Content Analysis Technique (SCAN).* London: UK Home Office, Research, Development and Statistics Directorate.

Smith, R.M., and P.J. LaFreniere. 2013. "Development of Tactical Deception from 4 to 8 Years of Age." *British Journal of Developmental Psychology*, vol. 31, no. 1: 30–41.

Sokolov, E.N. 1963. "Higher Nervous Functions: The Orienting Reflex." *Annual Review of Physiology*, vol. 25 (March): 545–580 (http://dx.doi.org.ez.lib.jjay.cuny.edu/10.1146/annurev.ph.25.030163.002553).

Sorochinski, M., M. Hartwig, J. Osborne, E. Wilkins, J. Marsh, D. Kazakov, and P.A. Granhag. 2014. "Interviewing to Detect Deception: When to Disclose the Evidence?" *Journal of Police and Criminal Psychology*, vol. 29, no. 2 (October): 87–94.

Sporer, S.L. 2004. "Reality Monitoring and Detection of Deception." In *The Detection of Deception in Forensic Contexts.* Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

Sporer, S.L., and B. Schwandt. 2006. "Paraverbal Indicators of Deception: A Meta-Analytic Synthesis." *Applied Cognitive Psychology*, vol. 20, no. 4 (May): 421–446.

———. 2007. "Moderators of Nonverbal Indicators of Deception: A Meta-Analytic Synthesis." *Psychology, Public Policy, and Law*, vol. 13, no. 1 (February): 1–34.

Strömwall, L.A., P.A. Granhag, and M. Hartwig. 2004. "Practitioners' Beliefs about Deception." In *The Detection of Deception in Forensic Contexts.* Edited by P.A. Granhag and L.A. Strömwall. New York: Cambridge University Press.

Strömwall, L.A., M. Hartwig, and P.A. Granhag. 2006. "To Act Truthfully: Nonverbal Behaviour and Strategies during a Police Interrogation." *Psychology, Crime & Law*, vol. 12, no. 2: 207–219.

Tabernik, H., and M.J. Vitacco. 2015. Finding the Truth in the Lies: A Practical Guide to the Assessment of Malingering. In *Troublesome Disguises: Managing Challenging Disorders in Psychiatry*, 2nd edition. Edited by D. Bhugra, and G.S. Malhi. Chichester, UK: Wiley-Blackwell.

Talwar, V., and A. Crossman. 2011. "From Little White Lies to Filthy Liars: The Evolution of Honesty and Deception in Young Children." In *Advances in Child Development and Behavior*, vol. 40. Edited by J.B. Benson. San Diego: Elsevier Academic Press.

Tausczik, Y.R., and J.W. Pennebaker. 2010. "The Psychological Meaning of Words: LIWC and Computerized Text Analysis Methods." *Journal of Language and Social Psychology*, vol. 29, no. 1 (March): 24–54.

Tekin, S., P.A. Granhag, L. Strömwall, E. Mac Giolla, A. Vrij, and M. Hartwig. 2015. "Interviewing Strategically to Elicit Admissions from Guilty Suspects." *Law and Human Behavior*, vol. 39, no. 3 (June): 244–252.

Toomey, J.A. 2013. "Understanding the Role of Psychopathic Characteristics in Deceptive Behavior." Unpublished study.

Tourangeau, R., and T. Yan. 2007. "Sensitive Questions in Surveys." *Psychological Bulletin*, vol. 133, no. 5: 859–883.

Trafimow, D., and M. Marks. 2015. "Editorial." *Basic and Applied Social Psychology*, vol. 37: 1–2.

Transportation Security Administration. 2006. "Train Police Officers to Spot Terrorist Related Activity: TSA Designs and Tests Curriculum to Train Police Officers to Spot Terrorist-Related Activity." Press release, Department of Homeland Security, Transportation Security Administration (6 April): (www.tsa.gov/press/releases/2012/04/06/train-police-officers-spot-terrorist-related-activity).

Vallone, R.P., D.W. Griffin, S. Lin, and L. Ross. 1990. "Overconfident Prediction of Future Actions and Outcomes by Self and Others." *Journal of Personality and Social Psychology*, vol. 58, no. 4 (April): 582–592.

Verschuere, B., and E.H. Meijer. 2014. "What's on Your Mind? Recent Advances in Memory Detection using the Concealed Information Test." *European Psychologist*, vol. 19, no. 3: 162–171.

Vrij, A. 2005. "Criteria-Based Content Analysis: A Qualitative Review of the First 37 Studies." *Psychology, Public Policy, and Law*, vol. 11, no. 3 (March): 3–41.

———. 2008. *Detecting Lies and Deceit: Pitfalls and Opportunities*, 2nd edition. New York: John Wiley & Sons Ltd.

Vrij, A., R.P. Fisher, and H. Blank. 2015. "A Cognitive Approach to Lie Detection: A Meta-Analysis." *Legal and Criminological Psychology*.

Vrij, A., and P.A. Granhag. 2012. "Eliciting Cues to Deception and Truth: What Matters Are the Questions Asked." *Journal of Applied Research in Memory and Cognition*, vol. 1, no. 2: 110–117.

Vrij, A., S. Leal, S. Mann, and R. Fisher. 2012. "Imposing Cognitive Load to Elicit Cues to Deceit: Inducing the Reverse Order Technique Naturally." *Psychology, Crime & Law*, vol. 18, no. 6: 579–594.

Vrij, A., S. Leal, P.A. Granhag, S. Mann, R.P. Fisher, J. Hillman, and K. Sperry. 2009. "Outsmarting the Liars: The Benefit of Asking Unanticipated Questions." *Law and Human Behavior*, vol. 33, no. 2 (April): 159–166.

Vrij, A., P.A. Granhag, S. Mann, and S. Leal. 2011. "Outsmarting the Liars: Toward a Cognitive Lie Detection Approach." *Current Directions in Psychological Science*, vol. 20, no. 1 (February): 28–32.

Vrij, A., S. Leal, S. Mann, L. Warmelink, P.A. Granhag, and R.P. Fisher. 2010. "Drawings as an Innovative and Successful Lie Detection Tool." *Applied Cognitive Psychology*, vol. 24, no. 4 (May): 587–594.

Vrij, A., and S. Mann. 2001. "Who Killed My Relative? Police Officers' Ability to Detect Real-Life High-Stake Lies." *Psychology, Crime & Law*, vol. 7, no. 2: 119–132.

Vrij, A., A. Mann, and R.P. Fisher. 2006. "An Empirical Test of the Behaviour Analysis Interview." *Law and Human Behavior*, vol. 30, no. 3 (June): 329–345.

Vrij, A., S.A. Mann, R.P. Fisher, S. Leal, R. Milne, and R. Bull. 2008. "Increasing Cognitive Load to Facilitate Lie Detection: The Benefit of Recalling an Event in Reverse Order." *Law and Human Behavior*, vol. 32, no. 3: 253–265.

Vrij, A., S. Mann, S. Kristen, and R.P. Fisher. 2007. "Cues to Deception and Ability to Detect Lies as a Function of Police Interview Styles." *Law and Human Behavior*, vol. 31, no. 5 (October): 499–518.

Vrij, A., S. Mann, S. Leal, and R. Fisher. 2010. "'Look into My Eyes': Can an Instruction to Maintain Eye Contact Facilitate Lie Detection?" *Psychology, Crime & Law*, vol. 16, no. 4: 327–348.

Vrij, A., and G.R. Semin. 1996. "Lie Experts' Beliefs about Nonverbal Indicators of Deception." *Journal of Nonverbal Behavior*, vol. 20, no. 1 (March): 65–80.

Weinberger, S. 2010. "Airport Security: Intent to Deceive?" *Nature*, vol. 465: 412–415 (http://www.nature.com/news/2010/100526/full/465412a.html).

Wiseman, R., C. Watt, L. ten Brinke, S. Porter, S.-L. Couper, and C. Rankin. 2012. "The Eyes Don't Have It: Lie Detection and Neuro-Linguistic Programming." *PLoS One*, vol. 7, no. 7.

Zuckerman, M., B.M. DePaulo, and R. Rosenthal. 1981. "Verbal and Nonverbal Communication of Deception." In *Advances in Experimental Social Psychology*, vol. 14. Edited by L. Berkowitz. New York: Academic Press.

Zuckerman, M., R. Koestner, and A.O. Alton. 1984. "Learning to Detect Deception." *Journal of Personality and Social Psychology*, vol. 46: 519–528.

Zuckerman, M., R. Koestner, and M.J. Colella. 1985. "Learning to Detect Deception from Three Communication Channels." *Journal of Nonverbal Behavior*, vol. 9, no. 3 (September): 188–194.