

AN INTRODUCTION TO
**BEHAVIOR
ANALYSIS**

GREGORY J. MADDEN
DEREK D. REED
FLORENCE D. DIGENNARO REED

WILEY

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PREFACE

Why Study Behavior Analysis

The course in which you are currently enrolled will give you substantive training in the behavior-analytic principles that underlie effective behavior-change interventions. For example, the principles covered in this course have proven effective in the treatment of autism spectrum disorders (Bellini & Akullian, 2007; Eldevik et al., 2009), intellectual disabilities (Heyvaert et al., 2012), antisocial behavior (McCart et al., 2006), adult anxiety and depression (Öst, 2008; Powers et al., 2009), and substance-use disorders (Dutra et al., 2008) to name just a few. In this class, you will learn the principles that are foundational to these successes.

Taking a more expansive view, the course will prepare you to pursue further training at one of the more than 250 universities that offer graduate degrees in behavior analysis. Should you choose to pursue this training, you would join more than 51,000 Board Certified Behavior Analysts (BCBA) who are recognized by most US states as the appropriate providers of behavior-analytic services to children and adults with disabilities. These underserved populations depend on students like you to pursue careers in the helping profession of behavior analysis.

For those not drawn to serving those with disabilities, you should know that the principles covered in this book have proven beneficial in the practice of clinical, counseling, and school psychology. For example, in 2012 the *Inter-Organizational Task Force on Cognitive and Behavioral Psychology Doctoral Education* outlined the most important principles that these practice-oriented psychologists must understand to be effective (Klepac et al., 2012). At least 60% of the competencies listed were behavior analytic, and many of these will be covered in this book (e.g., shaping, extinction/exposure).

Perhaps your interests lie elsewhere still. If so, you may be interested to know that the principles covered in this book have been successfully used in business settings. Indeed, some of the most effective managers are those who know how to (1) identify the behaviors of successful employees, (2) measure the occurrence and non-occurrence of those behaviors in all employees, and (3) develop behavior-management plans that encourage those successful behaviors. Managers who can do this are actually managing behavior, rather than acting like authoritarian dictators. Because behavior analysts rely on positive reinforcement in their management practices, employees tend to be happier while being more productive.

Still not interested? Well, consider that most readers of this book will one day be parents, if they are not already. Because the behavior-analytic principles covered in this book have proven so reliable in positively influencing behavior, they constitute the core of most parent-training programs; for example, the *Criando con Amor, Promoviendo Armonía y Superación* [*Raising with Love, Promoting Harmony & Improvement*] program (Baumann et al., 2014). So, if you hope to be a loving parent who helps their children to successfully navigate their world, you would do well to learn all you can from this book. Your children will never thank you for it, but you will thank yourself one day, particularly when you see other parents struggling to understand the behavior of their children.

If you are still not interested in the contents of this book, we have only one more plea – consider the words of Socrates who said, “The unexamined life is not worth living.” Socrates was encouraging those of his age to use logic, wisdom, and philosophy in pursuit of self-knowledge, better relationships, and a harmonious existence with the natural world. These goals are timeless and universal. This book can open doors of self-discovery. So, use what you are about to learn to examine your life, your actions, your goals, your values. The examined life is even more worth living.

How to Use the Features of This Book

This book is designed to help students identify the important information they should know after taking this class. When important terms are first presented, they appear in bold. When you identify one of these terms you should take the following steps:

- 1 Write the term on one side of a 3 × 5 inch flashcard. For example, in Chapter 1, the first term defined is “behavior.”
- 2 The definition of the term will always be provided nearby in *italics*. Once you have found the definition, write it on the back of the flashcard. For example, Chapter 1 defines behavior as *an individual living organism’s activity, public or private, which may be influenced by external or internal stimulation*.
- 3 Sometimes the book will pose a question (e.g., what is behavior analysis?). When you identify one of these, write it on a flashcard and then, as you read on, write the answer to this question on the other side of the card.
- 4 Keep your flashcards with you throughout the day.

Effective Studying

Most college students think reading and rereading the textbook and their lecture notes is a good way to study (Karpicke et al., 2009). It isn’t. This method of studying does little to help you remember the materials when you are taking a test or, more importantly, you are trying to apply the concepts in your everyday life. For example, in a study conducted by Roediger and Karpicke (2006), one group of students was asked to study by reading the materials four times (that’s probably more than you normally study). Although the students thought this would be effective, when they were tested a week later they could recall only about 40% of the materials – that’s a failing grade.

A better way to study is called “repeated retrieval,” but most college students don’t use it (Karpicke et al., 2009). Repeated retrieval involves reading the information that you are studying and then, without peeking, saying everything you can remember (you can say it out loud or to yourself, both work equally well; Smith et al., 2013). Want to try it right now? If so, without looking, say, write, or think the definition of behavior that was given in the previous section.

If you could not recall all of the important components of the definition, that’s not a problem. Compare what you *could* recall with the definition provided above and then (without peeking) try again. When Karpicke and Roediger (2010) asked students to repeat this

read-and-retrieve process three times, the students remembered about 80% of the materials one week later. That's twice as much as the students who read the book four times.

Repeated Retrieval Made Easy

The following steps outline a practical way to use repeated retrieval to improve the efficiency and efficacy of your studying (Karpicke et al., 2014):

1. Make the flashcards discussed previously.
2. At least twice a day, go through your flashcards:
 - a. Look at the term and say out loud (or to yourself) as much of what's on the back of the card as you can.
 - b. Turn the card over and see which parts you missed. If you were not 100% correct, try it one more time before moving on to the next card.
3. If you do this a couple times a day, most every day, you will study less and learn more than ever before.

An Added Benefit

Students who use repeated retrieval, by studying their flashcards 3-4 times a day, don't cram the night before an exam. They sleep anxiety-free. They also have a stack of flashcards to help them study for any comprehensive exams taken later in the semester. So, what are you waiting for? Get some flash cards and start earning better grades. Flash cards too old-school for you? There are several flash card apps you can use on your phone.

The Behavior Analysis Task List

Some readers of this book will be interested in earning the credential of BCBA. This credential is granted by the Behavior Analysis Certification Board (BACB) and it is the gold-standard credential of practicing and applied behavior analysts. The BACB's *Fifth Edition Task List* outlines the *Foundational* principles and concepts that students must master before beginning an internship as a behavior analyst and before earning the BCBA credential. The Appendix of this textbook provides the BACB's list of *Foundations* and indicates the chapter in which each topic is discussed.

Animal Research

As you read this textbook, you will find that many of the foundational principles of behavior analysis were discovered in research conducted with nonhuman animals. It is hard to overstate the importance of this research. What we know today about attention, perception, learning, and

decision-making were first discovered by studying the behavior of nonhumans. Current research with nonhuman animals continues to expand our understanding of behavior in important ways. For example, these research findings have proven important in understanding similarities and differences in the behavior of different species. Understanding the unique behavioral abilities of each species is important in guiding conservation efforts around the world (Higham, 2016; O'Brien & Robeck, 2010; Swaisgood et al., 2003; Zimbler-DeLorenzo & Stone, 2011).

Importantly, the findings of research conducted with nonhuman animals have improved the efficacy of the work done by psychologists and behavior analysts tasked with improving the lives of individuals with disabilities, addictions, phobias, anxiety, depression, and so on (Carroll & Overmier, 2001; Madden et al., 2016). For these reasons, the American Psychological Association and the Association for Behavior Analysis International strongly support research and teaching with nonhuman animals. Therefore, this book will draw heavily on research findings from the nonhuman laboratory.

Trigger Warning

This book discusses many different categories of human behavior. Behavior analysts and psychologists are asked to help people who suffer from a myriad of difficulties. This includes anxiety, depression, and posttraumatic stress disorder. So that students will have the opportunity to see the utility of behavior analysis in the treatment of these disorders; this book will discuss them. Examples will be provided. If you believe an unexpected encounter with descriptions or visual depictions of these disorders would be unnecessarily stressful for you, we recommend that you share your concerns with your instructor. They will take care to let you know in advance where these sensitive topics are discussed in the book and in lectures.

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An Introduction to Behavior Analysis

1

What Is Behavior?

The primary subject matter of this book is *behavior*. Thus, it is important to begin by defining that term. In this book, **behavior** is defined as *an individual living organism's activity, public or private, which may be influenced by external or internal stimulation*.

A fish watches the current, looking for edible materials. When something tasty floats by, the fish strikes. This strike is a **response** – *a single instance of behavior*.

You think about your future and consider what kind of job will make you happy, while simultaneously allowing you to pay the rent on time. Having a thought is also a response – a single instance of a different kind of behavior.

Let's dissect the definition of behavior provided in italics above. The first word indicates behavior is something *individuals* do – the fish that strikes a bug does so as an *individual*. Likewise, when you think about your job prospects, you think your own thoughts, as an individual. Behavior is something *individuals* do.

Focusing on individual behavior is consistent with the goals of those who seek the expertise of a psychologist, counselor, or behavior analyst. The individual experiencing depression, the parent of a child diagnosed



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Source: Mimagephotography/Shutterstock.com

with autism, the manager of an underperforming employee, they all want the behavior of an individual – self, child, and employee, respectively – to change in an adaptive direction, that is, a reduction in depression, an increase in social interactions, and an increase in productivity. If you were depressed, you would not be satisfied with the services of your therapist if they said, “Sorry you aren’t doing any better, but 4 of my other 10 patients are getting better.” While that is great for them, this helps you in no way. Your depression is experienced as an *individual*, and an effective therapist who treats individuals will seek to understand *your* behavior and the factors that can effectively reduce *your* depression. This requires a focus on the behavior of the *individual* – you.

The second component of our definition of behavior is that it is something that individual *living organisms* do. Applying an electric current to a dead fish will produce reflexive movement, but it will not produce a fish that strikes when its next meal floats downstream. Likewise, if you were dead, no amount of electrical stimulation to precise brain regions would revitalize your ability to contemplate a future career path. Moreover, while we acknowledge that advancements in the field of artificial intelligence and robotics have created robots that learn and behave in ways remarkably similar to animals, we will restrict our definition of behavior to the actions of biological organisms.

The next part of the definition – *public or private* – simply means that some behavior is *public* (everyone can observe it happening) and some behavior is *private* (you are the only person who can observe it). The bug-striking behavior of our fish is *public* – it can be observed by the fish, other nearby fish, and by anyone who takes the time to set up an underwater camera to watch the fish strike its prey.

By contrast, thinking about your career is a *private* behavior. Only you can observe the entirety of your thoughts as you think them. If you did your career contemplation while lying in a functional magnetic resonance imaging device, we could observe the areas of your brain that are active as you are thinking, but it gives us no access to the content of your thinking. Hence, this behavior remains *private*.

The final component of the definition – *which may be influenced by external or internal stimulation* – means behavior can be affected (changed) by **stimulus events** (*things you see, hear, smell, taste, or feel*) and these stimulus events can occur outside or inside your body. For example, the bug floating toward the fish is an *external* visual stimulus – the bug is outside the fish’s body and when the fish sees it the visual stimulus increases the probability of a striking action. Without the visual stimulus, the probability of striking is very low. Likewise, the *internal stimulation* of hunger increases the probability of searching for food and striking a bug when one is encountered.

Just like the fish, your own private behavior – contemplating career choices – is influenced by *external and internal stimulation*. If your biology instructor is charismatic and speaks convincingly of the joys of being a professor (external stimuli), the probability of contemplating this career path is increased. Simultaneously, a number of internal stimuli can increase (e.g., caffeine’s stimulating effects) or decrease (e.g., a headache) the probability of a career contemplation session.



Source: Hero Images/Getty Images

What Is Behavior Analysis?

Behavior analysis may be defined by its goals, its assumptions, and its major activities. We discuss each of these in the sections that follow. But before you read on, you should read the “How to Use the Features of This Book” section of this book’s Preface. There you will find important advice about how to read this book and how to study so that you can maximize your learning, enhance your ability to use what you learn to improve your life (and the lives of those around you), *and* to earn a better grade in this class. The advice comes from scientific studies identifying effective ways to study. Interestingly, these studies find very few students use these techniques, opting instead for study methods that are much less effective (e.g., highlighting your textbook and rereading it the night before the exam). You will find the advice provided in the Preface useful not only for this class, but for all of your classes. So, take a few moments to read the “How to Study” section now.

The Goals of Behavior Analysis

The broad goal of any science is to understand the phenomena being studied. Entomologists want to understand insects. Astronomers want to understand the universe. Similarly, behavior analysts seek to understand the behavior of individuals. Whether it’s you, me, your pet, or a mountain lion, behavior analysts are interested in the behavior of individual organisms.

There are many different approaches to understanding. Behavior analysts take a pragmatic approach. They want to improve the human condition (and that of the nonhuman animals with whom we share the planet) and this is reflected in the two goals of behavior analysis.

THE FIRST GOAL OF BEHAVIOR ANALYSIS

The first goal of behavior analysis *is to accurately predict behavior.* To understand why behavior analysts want to predict behavior, ask yourself, which would you prefer: a bus that arrives at a *predictable* time or a bus that arrives at an *unpredictable* time? The predictable bus arrives at the hour and the half-hour; it is never late. The unpredictable bus arrives at no particular time, but it arrives at the bus stop twice per hour. So, which bus would you prefer? The answer is obvious. We would all prefer the predictable bus.

Let’s make obvious why we prefer the predictable bus. If the bus always arrives on time, then we can plan for its arrival. We can enjoy our conversation with friends a little longer, study a little longer, or finish a meal at a casual pace before we leave to catch the bus. By contrast, if the bus is unpredictable then our behavior will be less efficient as we must spend more time doing what we don’t want to do (sitting at the bus stop) and less time doing what we want to do (eating and talking with friends). We prefer the predictable bus because *predictability allows adaptive behavior.*



Source: Wangkun Jia/Shutterstock.com

It’s not just buses. We also like to predict the weather and we check our weather apps regularly. Why – because *predictability allows adaptive behavior.* If we know it’s going to

rain, we can wear a raincoat or grab an umbrella. If we know it's going to be sunny, we can leave both of these at home and save the hassle of carrying them.

Of course, behavior analysts are interested in predicting the behavior of individuals, not of buses or the weather. **What is the utility in predicting the behavior of individuals?** To answer this question, consider your roommate who predictably joins you for breakfast at 8:30 each weekday morning. The utility in accurately predicting when your roommate will arrive, is that *it allows adaptive behavior* – you can make extra coffee, clear a spot at the table, and leave out the box of cereal. Your roommate appreciates this, and these actions increase the probability that your roommate will be nice to you at a later time.

If your roommate's behavior suddenly became unpredictable, sometimes getting up at 3 am, other times at 11 am; your acts of kindness would no longer be *adaptive* – the coffee would go to waste, the spot cleared would not be used, and the cereal box would go unopened.

Predicting behavior is important to all of us because *it allows adaptive behavior*. Have you ever noticed that when you meet someone new (e.g., a new coworker) you ask a lot of questions: What is your name? Where are you from? Are you in school? Which school? What's your major? Do you work? How many brothers and sisters do you have?

We all do this. Why? Because *it allows adaptive behavior*. If you learn, for example, that your new coworker likes street tacos, then you can behave adaptively at lunch time by saying “Hey, want to go to the taco truck for lunch?” There is no guarantee that the answer will be “yes,” but the probability is higher than if you had said “Hey, want to go to the vegan restaurant for lunch?”

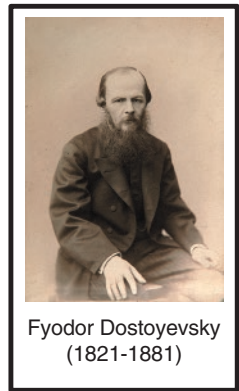
All of us try to accurately predict long-term patterns of behavior in those around us. We refer to this as a “reputation”. If Chauncey has a reputation as a liar, we will not believe it when he tells us that his start-up company is a great investment. If Winter has a reputation for generosity, we will ask her for a ride to work when our car will not start. We keep track of the behavior of others and we use this information adaptively. If we did not track the reputations of others, we would invest in worthless ventures, walk to work, and would, ourselves, get a reputation for being naïve.

Although it is useful to accurately predict behavior, some have argued that it is either impossible or ill-advised to do so. For example, the famous Russian author Fyodor Dostoyevsky commented on the unpredictability of behavior in this way,

If you say one can also calculate all this according to a table, this chaos and darkness, these curses, so that the mere possibility of calculating it all in advance would stop everything and that reason alone would prevail – in that case man would go insane deliberately in order not to have reason, but to have his own way!

The ironic thing, of course, is that in arguing against a behavioral science, he made a *prediction* about behavior – the individual would deliberately go insane.

The extent to which we can accurately predict human behavior is a topic that we will return to throughout this textbook. For now, it is enough to remind you that the first goal of behavior analysis is to predict behavior and the reason that predicting behavior is important is that *it allows adaptive behavior*. Table 1.1 shows some predictions about behavior, adaptive behaviors that can occur if the prediction is correct, and the beneficial outcome of this adaptive behavior.



Fyodor Dostoyevsky
(1821-1881)

Source: Fine Art Images/
AGE Fotostock

Table 1.1 Predicting behavior is useful.

Prediction about behavior	Adaptive behavior	Beneficial outcome
I will snooze my alarm clock three times tomorrow morning	Set the alarm to go off 45 minutes before I need to get out of bed	Arrive at my appointment on time
Within the next 6 months, I will drop my phone and crack the screen	Buy insurance	Save money when I need a new screen
My roommate will eat my favorite leftovers	Hide the leftovers behind something my roommate dislikes	Leftovers are there when I want them
My boss will be grumpy during the dinner rush	Avoid talking to my boss during the dinner rush	Avoid getting yelled at

* This table shows some predictions about behavior, the adaptive behavior that the prediction allows, and then the beneficial outcome expected because the adaptive behavior occurred.

THE SECOND GOAL OF BEHAVIOR ANALYSIS

The ability to accurately predict behavior is great, and in some sciences, prediction is all you can do. For example, astrophysicists can precisely predict where Mars will be two years from now, but they cannot practically influence the trajectory of the planet. Within a science of behavior, we seek to do more than just predict behavior; we want to influence it. Stated more formally, **the second goal of behavior analysis is to discover functional variables that may be used to positively influence behavior.** A **functional variable** is a variable that, when changed, reliably and systematically influences behavior.

Throughout this book we will discuss how behavior analysts have discovered functional variables. For now, let's focus on what we mean when we say our goal is to *positively influence behavior*. We mean that the behavior analyst is able to change behavior. Where we predict that a maladaptive behavior will occur (e.g., drunk driving), the behavior analyst can use existing knowledge of functional variables to do something that decreases the probability of this behavior and increases the likelihood that the individual will choose to do something else – something more adaptive (e.g., call an Uber™ when intoxicated).

There are many ways to positively influence the behavior of individuals, and this textbook provides an introduction to these techniques. By carefully studying these techniques, you will acquire insights into how you can improve lives by positively influencing behavior.

DEMAND MORE OF YOUR SCIENCE

We encourage readers to embrace the twin goals of behavior analysis and apply them to all sciences. These goals are practical, useful, and, if realized, will improve our own lives and those of others (Baer et al., 1968). As you evaluate the progress of any science, it is worth asking, does this science make accurate predictions? If not, that is a problem. If astrophysicists cannot predict exactly where Jupiter will be on a specific date four years from today, then they cannot send a probe to the planet to study its atmosphere. That is a problem.

Likewise, it is worth asking if the social and behavioral sciences have identified functional variables that may be used to positively influence behavior. The more functional variables the science has identified, the more it allows us to improve the human condition. Again, by changing those variables (something that behavioral scientists call “therapy” or an “intervention”) we change people’s behavior and improve their lives. So, whatever social/behavioral science you study, it is worth asking: Can this science accurately predict and positively influence behavior and, in so doing, prove beneficial to society at large?

Reading Quiz 1

Each chapter in this book will include a few reading quizzes embedded within the text. If you can answer all of these questions correctly, then you will know that you are understanding this book. The answers to these quiz questions are provided at the end of the chapter.

1. Behavior is something that _____ living organisms do.
2. _____ is defined as an individual living organism’s activity, public or _____, which may be influenced by external or _____ stimulation.
3. A _____ is something you see, hear, smell, taste, or feel. These events can occur outside or inside your body.
4. Stimuli is the plural of _____.
5. One stimulus, two _____.
6. Buying a car is an instance of _____ (public/private) behavior.
7. Changing your clothes is an instance of _____ (public/private) behavior.
8. Thinking that you should not have bought that car because now you don’t have enough money for new clothes is an instance of _____ (public/private) behavior.
9. The first goal of behavior analysis is to _____ behavior.
10. The second goal of behavior analysis is to discover _____ variables that may be used to _____ behavior.
11. Accurately predicting behavior is important because it allows _____ behavior.

The Assumptions of Behavior Analysis

Recalling from above that behavior analysis may be defined by its goals, its assumptions, and its major activities, we now turn to two assumptions that guide behavior analysis.

Assumption #1: Behavior is determined

Behavior analysts assume that behavior is determined.² **What does it mean to say, “behavior is determined?”** It means that *behavior has a cause, or multiple causes*. This is an appropriate assumption for scientists who study behavior. If they assume that behavior is caused by knowable variables, then behavioral scientists will set out to discover those functional variables. If one assumes that behavior is not determined (i.e., behavior occurs without a cause), then one would not bother trying to discover functional variables that are assumed not to exist.

Here is a quick note about the distinction between *functional variables* and *causes*. Behavioral scientists are reluctant to discuss “causes” because it implies that we know everything there is to know about behavior, and that clearly is not the case. In recognition of this incomplete knowledge, we talk about “functional variables.” When a functional variable is changed, we can be confident that it will influence behavior. However, to suggest that the functional variable “caused” the behavior change is more than the evidence supports. Perhaps, for example, the functional variable plays no causal role, but is merely correlated with behavior change. We will have more to say about correlations, functional variables, and behavior change in Chapters 2 and 3. For now, we return to the assumption that behavior is determined.

For most members of Western cultures, this assumption of determinism is difficult to accept because we have been taught that some, if not all, of our behavior is self-determined and free from external causal variables. For example, most westerners embrace the concept of *free will*. However, a careful consideration of this issue leads us to reject the idea that behavior is self-determined.



Source: rudall30/Getty Images

Consider your behavior right now. If we accept the concept of free will, then your current behavior (reading this book) is not influenced by any causal variables. If that were true, then it would not be influenced by biological variables; for example, that you have a brain capable of decoding the symbols on this page into meaningful sentences. It would not be influenced by experiences from long ago, such as learning to speak your native language or learning to read through systematic instruction provided by teachers and parents. It would not be influenced by experiences a few months ago; for example, a friend that you trust recommended that you take this class. And your behavior would not be influenced by recent experiences; for example, the instructor assigned this chapter and said that some materials from the book will appear in upcoming exams. Behavior analysis holds that this complex of causal biological and experiential variables combines to determine your behavior.

MENTALISTIC EXPLANATIONS OF BEHAVIOR

When we learn how biological and environmental events combine to influence behavior (like your reading this textbook right now), it makes sense to us. More importantly, understanding how biological and environmental events can change behavior enhances our ability to accurately predict and positively influence behavior. But this scientific way of thinking stands in contrast to how most of us explain why we, or those around us, do the things we do. Consider these examples of everyday explanations of behavior:

- “I ate a sweet potato because I decided I needed more potassium.”
- “I went to a movie because I felt like laughing.”
- “I hit him because I was angry.”

In these sentences, the words before “because” identify the behavior that needs to be explained. The words after “because” provide the sorts of explanations that we all hear

and give every day. In the first example, eating a sweet potato (behavior) is said to be caused by “I decided that I needed more potassium.” If your brother or sister said this while eating a baked sweet potato you would accept the explanation without a second thought. However, this explanation has a fundamental problem – it explains the first behavior by appealing to a second behavior:

- I ate because I decided
- I went because I felt
- I hit because I was angry

So, now instead of having one behavior to explain (I ate), we have two behaviors to explain (I ate *and* I decided). These everyday explanations of behavior violate Occam’s *law of parsimony*, which, when applied to behavior, holds that, all else being equal, the best explanations of behavior are the simplest explanations. Explaining one behavior by appealing to a second behavior lacks parsimony – what was once a simple task (explaining one behavior) is now more complex (explaining two behaviors).

To make matters worse, when we explain one behavior by appealing to a second, the second behavior usually occurs *privately* (mentally) where others cannot observe it. “I decided...” appeals to private decision-making. “I felt...” and “I was angry...” appeal to private sensations. Behavior analysts refer to these as mentalistic explanations of behavior. Behavior analysts reject mentalistic explanations of behavior.³

To get a better understanding of the problems with mentalistic explanations, imagine you are a behavior therapist and your patient (a college student identifying as a female) complains that she has no self-control. Her diet is atrocious, she is constantly skipping classes, and when she attends she mostly looks at her social media feed and posts selfies for her friends. In addition, she has occasional anger outbursts, particularly with her partner. Your job, as the therapist, is to help your patient change her behavior.

If you believe one behavior (making the wrong food choice) is caused by a second behavior (I mentally decided to eat...), then the way to change the first behavior is to change the second behavior. Sounds like we have a plan – to change her food choices we need to change a *private behavior* – her mental decision-making. How do we do that? If we follow the logic of our explanation of bad food choices (Behavior 1), that these choices are caused by mental decision-making (Behavior 2), then we would look for a Behavior 3 that caused Behavior 2. Of course, if you found Behavior 3, you would be no closer to improving your client’s food choices because to change Behavior 3 you would have to find its cause – Behavior 4. Obviously, this search for mental causes is never ending, and it will not help your patient improve her diet.

To change dietary behavior, we must identify functional variables that can positively influence this behavior. Invariably, these functional variables will be biological and environmental events. A nice thing about this approach is that we can often change biological and environmental events and, when we do, we can evaluate if they change behavior. If they do, then we have found a functional variable that can be used by other behavior therapists to positively influence behavior. For this reason, behavior analysts focus their attention on biological and environmental events that influence behavior. As you will learn throughout this book, this approach has proven effective.

I’M NOT BUYING IT. I DETERMINE MY OWN BEHAVIOR

For many people, the idea that behavior is determined by biological and environmental variables is not easily accepted. Instead, most of us feel that we *will* our own behavior; that is, we

feel that we mentally direct our own actions. The main evidence for this feeling is that, occasionally, just before we engage in a behavior we have an internal (private) dialogue in which we actively decide what to do next. For example, when deciding where to eat lunch, we might mentally consider how hungry we are, how we love hamburgers, how much money we have, how far we are from home, and if there is any food at home. All of this private decision-making gives us the feeling that we will our decision – to go home and make a sandwich.

This is an alluring idea because we can hear the internal dialogue that constitutes this mental decision-making process and this dialogue immediately precedes some of our deliberative actions:

Man am I hungry. I sure could go for a hamburger. But I don't have enough money for a hamburger. I guess I could go home and eat. Yeah, I've got that bread that's going to go stale if I don't eat it soon. I think I'll go home and make a sandwich.



Source: AA Film Archive / Alamy Stock Photo

Because we hear this internal dialogue many of us picture this process as a tiny person, or several tiny people inside our head, much like the characters in the Pixar movie, *Inside Out*.

Although *Inside Out* was a great movie, there are at least **three problems** with the theory that a mental decision-maker wills behavior into motion:

1. **Choice is behavior.** Engaging in a mental decision-making process (choice) is an activity that meets the definition of behavior – it is an individual living organism's private activity, which may be influenced by external or internal stimulation. As noted earlier, suggesting that one behavior (choice) causes another behavior (making a sandwich) is unsatisfying because it leaves unanswered the question, what causes the choice? Another choice? If so, what causes that choice? You can see the parsimony problem here.
2. **Choice is determined.** When one makes a choice, what factors are considered before the choice is made? In the sandwich example, public events (the lack of money, bread at home) combined to influence the decision to eat a sandwich. If any of these factors were different, it would influence the choice *and* what was eaten for lunch. For example, if bread was unavailable at home, the probability of choosing to eat a sandwich would be greatly reduced. If money was more abundant, we would have eaten hamburgers. These *functional variables* influence the choices we make.
3. **Spurious reason-making.** One reason we all *feel* like we will our own behavior is because we are good at providing mentalistic reasons for our actions (I'm eating sweet potatoes because I decided...). The problem with this evidence is that Nobel Prize winning research shows that these reasons are spurious (false, fake) – we make these spurious reasons up when asked to do so, even though those “reasons” have nothing to do with our behavior. This was made clear in the 1960s by Roger Sperry and Michael Gazzaniga. They worked with epilepsy patients whose left and right brain hemispheres were surgically disconnected to reduce seizures. After the surgery, the two sides of the brain had no way to communicate. So, when the left ear was told to “get up and go for a walk,” only the right part of the brain heard it