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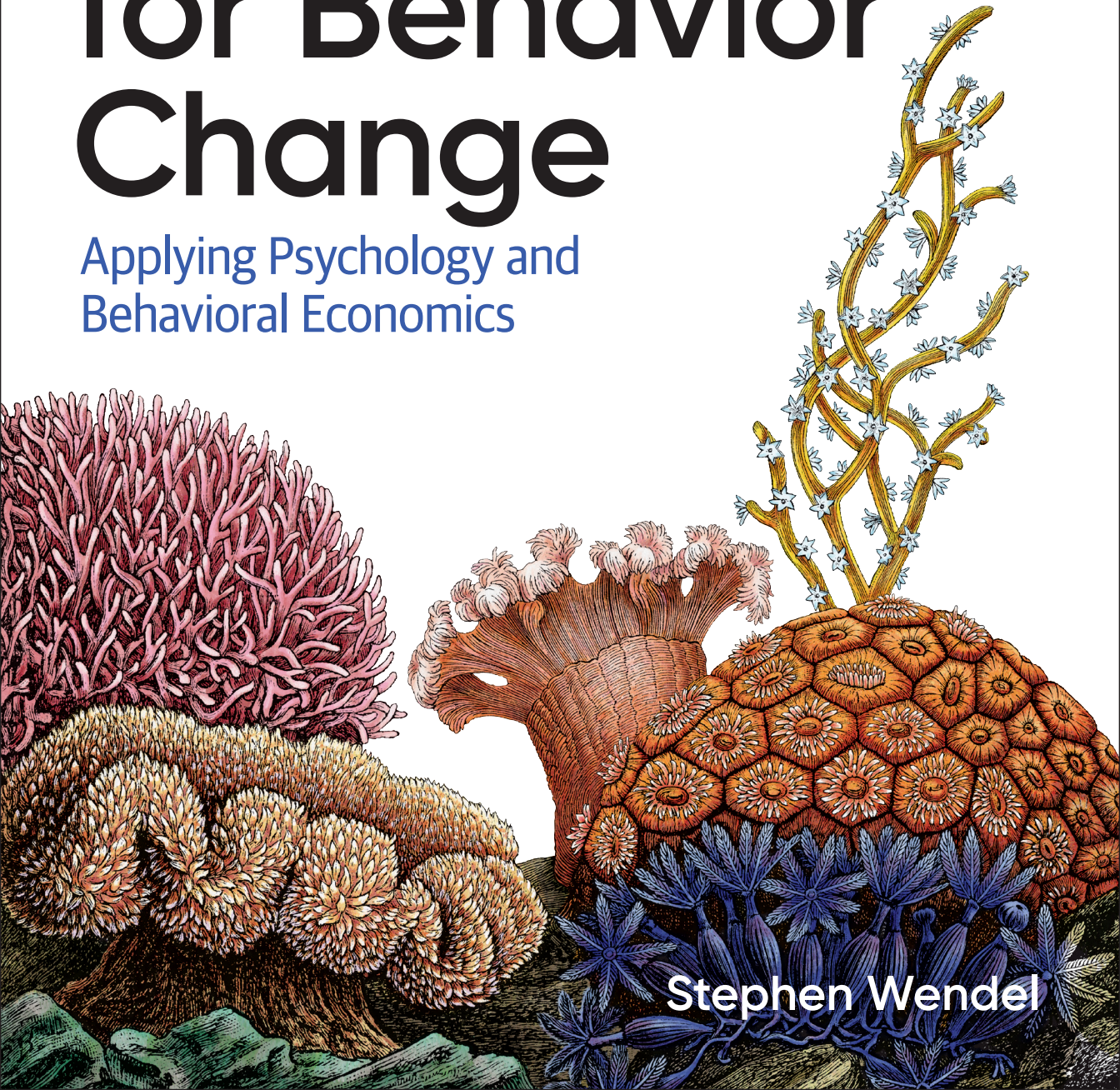
Second Edition

Designing for Behavior Change

Applying Psychology and Behavioral Economics



Stephen Wendel

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Designing for Behavior Change

Designers and managers hope their products become essential for users—integrated into their lives like Instagram, Lyft, and others have become. Such deep integration isn't accidental: it's a process of careful design and iterative learning, especially at major technology companies. This guide shows you how to apply behavioral science: the interdisciplinary research behind behavior-changing products and communications.

In this updated edition, Stephen Wendel, head of behavioral science at Morningstar, takes you step-by-step through the process of incorporating behavioral science into product design and development. Product managers, designers, and data scientists will learn a simple and effective approach to helping your users overcome behavioral obstacles and take action in your product and their lives.

- Learn the three main strategies to help people change behavior
- Identify behaviors your target audience seeks to change—and obstacles that stand in their way
- Develop effective designs that are enjoyable to use
- Measure your product's impact and learn ways to improve it
- Combine behavioral science with data science to pinpoint problems and test potential solutions

"For anyone involved with designing products or services, this book offers both a valuable introduction to the field of behavioral science and a playbook of strategies for leveraging this foundation in practice."

—**Darrin Henein**
Director of UX, Shopify

Stephen Wendel leads the behavioral science team at Morningstar, conducting original research on financial behavior. Author of *Designing for Behavior Change*, *Improving Employee Benefits*, and *Spiritual Design*, Dr. Wendel founded the nonprofit Action Design Network to educate the public on how to apply behavioral research to product development.

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Praise for *Designing for Behavior Change*

"For anyone involved with designing products or services, this book offers both a valuable introduction to the field of behavioral science and a playbook of strategies for leveraging this foundation in practice."

—Darrin Henein, Director of UX at Shopify

"This is one of the most immediately useful UX books I've read in a long time. More than just understanding how our minds work and why we behave the way we do, Stephen shows us how to use that knowledge in our work and on ourselves—not just building better products for our users, but better practices for our teams. Most importantly, he calls out the unethical and irresponsible use of behavioral science in our industry and shows us ways to clean up our act. As Stephen says, human behavior is complicated, and this stuff is hard! But I feel like I understand both better after reading it."

—Clay Delk, Senior Staff Content Strategist at Shopify

"*Designing for Behavior Change* is a fantastically practical guide on how make a positive difference in the lives of people. I work for a nonprofit organization where our influence on the lives our constituents is often subtle. This book provides excellent advice on how we can maximize our impact, and we've already started putting it into practice."

—Shayne C. Kavanagh, Senior Manager of Research at Government Finance Officers Association

"This is an excellent *read this first!* guide for designers, product owners, and entrepreneurs taking their first steps into the field of behavioral science."

—Nelson Taruc, Principal Designer at Lextech

"*Designing for Behavior Change* has been an invaluable resource to me while launching my career in applied behavioral science. The book is thorough, informative, and

accessible. The new edition's thoughtful discussion of ethics should be required reading for any practitioner."

—Jesse Dashefsky, Behavioral Scientist at Symend

"An indispensable resource for applied behavioral science practitioners. One of the few books I recommend to all my new hires."

—Florent Buisson, Behavioral Science Manager at Allstate

"I really admire how Steve Wendel uses his expertise in behavioral science to solve critically important problems in household finance and share his insights with the world."

—Katherine L. Milkman, Ph.D., Professor at the Wharton School of The University of Pennsylvania, Codirector at The Behavior Change for Good Initiative

"*Designing for Behavior Change* is a foundational book in applied behavioral science. This second edition includes welcome additions that reflect the growth of the field and the maturity of the practice. It's full of valuable insights relevant to both veterans and new practitioners looking to develop their expertise."

—Zarak Khan, Behavioral Innovation Director at Maritz

"Steve has been applying behavioral science in organizations longer than almost anyone and he truly understands behavior change at scale. This book is a practical guide for anyone who wants to begin their own journey along the same path."

—Matt Wallaert, Chief Behavioral Officer at Clover Health and Author of Start at the End

"*Designing for Behavior Change* will help you create an effective process for applying behavioral insights during the product development cycle. A must-read for anyone who wants to use behavioral design to build great products."

—Samuel Salzer, Behavioral Strategist and Creator of Habit Weekly; Coauthor of Nudging in Practice

"*Designing for Behavior Change* is essential reading for anyone who creates products and services. As a user experience design leader, I use Wendel's CREATE action funnel to help my teams understand the preconditions that must exist for a customer/user to complete an action."

—Brian Verhoeven, Head of Design Operations at Morningstar

SECOND EDITION

Designing for Behavior Change

Applying Psychology and Behavioral Economics

Stephen Wendel

Beijing • Boston • Farnham • Sebastopol • Tokyo

O'REILLY®

Designing for Behavior Change
by Stephen Wendel

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Part II. A Blueprint for Behavior Change

Preface

Eight years ago, when I started writing the first edition of this book, behavioral science consisted of a few prominent researchers and PhD students scattered across business schools and psych departments, along with some humorous books about the mistakes people make. Very few companies were trying to bridge the gap between academic theory and real products that helped real people in their lives. Personally, I had to scrounge to find companies where anyone was even familiar with the research, let alone formally trained in it. The idea of intentionally designing products to change user behavior was strange or even alarming to many people. There were pockets of innovative work—from the UK government's Nudge Unit to BJ Fogg's Persuasive Technology Lab to the behavioral consulting firm ideas42—but they were not well known outside of their communities.

That's all changed now. In partnership with the Action Design Network and the Behavioral Science Policy Association—two nonprofit organizations dedicated to fostering the practical application of behavioral science, which didn't exist eight years ago—we recently surveyed the landscape of applied behavioral science. Over two hundred teams, representing behavioral science teams with over 1,500 members, responded—and we know there are many more out there.

There are now dedicated teams applying behavioral science to develop new products, communications, and policies that serve their users across the world: from Qatar to Spokane, Washington. While Silicon Valley firms like Google and Uber are well represented, so are stalwart mainline companies like Walmart and Aetna, with dozens of small consulting shops scattered around the US, Europe, and beyond.

What are they doing? While each effort is unique, each of these groups is trying to develop products, communications, or policies that cause their users to do *something different* in their lives. In other words, they are designing for behavior change. Whereas traditional design is fundamentally about solving a user need, behavioral design is about solving a user need where doing so entails, in a sense, "solving the user" too: changing the person in order to solve the problem.

And that's where this book comes in. This is a guidebook on how to do it yourself: how to identify behavioral problems your users face, develop clever solutions to help them overcome those obstacles, iteratively learn from the process, build a team that does this, and make it successful in an organization. And, underneath it all, how to think about this work in an ethical, thoughtful way and avoid the serious mistakes and abuses that some practitioners are facing now—and that threaten our field as a whole.

Along the way, I'll try to teach you the fundamental understanding of the mind that many behavioralists like me have: of a quirky, elegant, but necessarily imperfect decision-making process that guides your users' decisions and actions. I'll give you the core lessons and a framework to understand the research literature, but this book isn't fundamentally about behavioral science theory (for me, Nobel Laureate Daniel Kahneman's *Thinking, Fast and Slow* is still the best introductory book on behavioral science out there—I highly recommend it). Instead, our focus will be on *action*: what you can do, in your work, right now.

How This Book (and This New Edition) Came About

In 2019, O'Reilly asked if I could do a second edition of the book, updating it for tremendous growth in the field since it first came out. I was happy to do so—if only to celebrate that growth and help support its further advancement in my small way.

The ideas and process I discuss here come, foremost, from my own experience working in this field over the last 11 years: first at the personal finance company HelloWallet, and now at the investment research company Morningstar. It is enriched by countless conversations with other practitioners in the field: those with existing teams and those just seeking to enter the field. I'm particularly grateful to the Action Design Network, the nonprofit organization that I helped start in 2013, which has grown far beyond my dreams or certainly my intentions, with events all across North America on applied behavioral science. I will also be weaving in lessons from the survey I mentioned before, which we believe is the largest and most comprehensive survey of teams designing for behavior change ever conducted (though the way the field is growing, it won't be for long!).

Personally, I started doing applied behavioral science while completing my PhD and working at HelloWallet. HelloWallet began as many start-ups do: with a great deal of energy, a clear problem to solve, and a fundamentally misguided notion of how to solve it. We wanted to help everyday Americans improve their finances—and wrote an application that encouraged them to set up budgets and save for the future. There was just one little problem: everyone already knew how to do that. The problem people faced wasn't a lack of understanding; it was that they didn't act on it. There was a tremendous gap between people's intentions and their actions.

Thankfully, in addition to having a great (but misguided) idea, we had the ability to measure whether we were being successful. We looked at whether people used our app. They didn't. We also looked at whether it was helping the few people who used it to improve their finances. It wasn't. I'm thankful for those hard lessons because it's better to know *early* when something isn't working and to be able to learn from that and do better—which will be a recurring theme throughout this book.

At HelloWallet, we set up an engine for behavioral experimentation: building scientific experiments into the underlying platform of the application. My motto was to make it "easier to test than to argue"—i.e., where product managers or designers disagreed about which version of a feature would more effectively change spending behavior, it was better to test both approaches in the field than to argue about which *might* be right. And by and large we succeeded—both in making it easy to run tests and in having the impact we sought.

We found that we could help people change their bank habits, to cut the money they lost to ATM and other banks fees by 25%; for lower-income families that equated to nearly a day's wages per month. We found that we could successfully nudge people to put aside money for savings by giving them a simple and easy-to-understand display of their finances, compared to that of their peers. And we also found that some of our efforts—like congratulating people on their budgeting success—actually backfired: they spent more! We quickly discontinued that feature. The first edition of *Designing for Behavior Change* was, in many ways, a description of what we were learning as we learned it. It detailed the process we were using in practice. In fact, the book arose out of an internal guidebook that I'd written for my teammates on applied behavioral science.

Since then, I've gained a great deal more experience with the challenges of designing products that help people change behavior. But, I've also verified that the fundamental approach was sound; the four-step process laid out in the book is what I still use today—though I've started using different names for the steps. I've modified the process around the edges, making it more efficient and flexible, but it is still tremendously useful in my own work. After the first edition, I also subsequently learned that many other teams had independently developed a similar iterative approach.

About five years ago, I moved to Morningstar (along with some of my teammates from HelloWallet) and was given the opportunity to set up a much larger behavioral science team. We work across the company, on issues ranging from effective investing to retirement saving and spending to challenges of internal decision making. We conduct applied research both with our in-house team and with leading behavioral scientists from academia.

This edition draws upon my more recent work at Morningstar, formal and informal consulting I've done with other organizations in our space, and especially work through the Action Design Network. The Action Design Network has grown from

our initial monthly meetup in DC to a broad base of volunteers organizing events across 15 North American cities. Through it, I was able to learn from the challenges many other teams face, the approach they use, and their solutions.

In this new edition of the book, I've sought to bring together these diverse streams of insight to a coherent guidebook for practitioners to help you learn from the best of our knowledge in the field so you can design your own products to more effectively help users change their own behavior.

Who This Book Is For

As you can probably tell by now, this book is aimed at practitioners—the people who design and build products or communications with specific behavioral goals. Teams that design for behavior change should generally include the following roles, and individuals in each of these roles will find practical, how-to instructions in this book:

- Interaction designers, information architects, user researchers, human factors experts, human–computer interaction (HCI) practitioners, and other UX folks
- Product managers, product owners, and project managers
- Marketing and communications professionals
- Behavioral scientists (including behavioral economists, psychologists, and judgment and decision-making experts) interested in products and communications that apply the research literature

The person doing the work of designing for behavior change could be any one of these people. At Morningstar, we have each of these roles, but most of my team is composed of behavioral researchers. This work can be, and often is, done wonderfully by UX folks. They are closest to the look and feel of the product and have its success directly in their hands. This approach enriches their current practice by adding an extra theoretical layer to design hypotheses and tests.

Product owners and managers are also well positioned to seamlessly integrate the skills of designing for behavior change to make their products effective. Finally, there are other behavioral scientists (like me) working in applied product development and consulting at organizations like ideas42 and the Center for Advanced Hindsight. So, the people designing for behavior change probably wear other hats as well.

In addition, this book is for entrepreneurs and managers. If you've ever read *Nudge, Blink*, or *Predictably Irrational*,[1] and wondered how you could apply them to your own product and users, read on. While the book is about helping users take action in

1 Thaler and Sunstein (2008), Gladwell (2005), Ariely (2008).

their lives, that doesn't mean that designing for behavior change is incompatible with a for-profit business model. Businesses make a profit; that's how they exist. So, you'll find suggestions for building a successful business model on voluntary behavior change. If in addition to making a profit, you are helping your users take action and change their behavior, this book can help you do it.

Nonprofit entities and some government agencies often explicitly focus on helping users change their behavior; *Designing for Behavior Change* can help. For example, the UK's Behavioural Insights Team is widely applying behavioral research to public policy and services around the world. Where relevant, I'll note parts that are particularly important for nongovernmental organizations (NGOs) and government agencies. Because it's more compact to write, I'll refer primarily to "companies" here. In almost all cases, I really mean companies, organizations, and relevant government agencies.

Finally, my expertise is software development, so I'll use the terminology that I use in my day-to-day life—applications, software, and programs. You don't need to be in software development to find this relevant to you. In fact, some of the most innovative work in persuasive design, one of the fields that this book draws inspiration from, is in the design of everyday objects.[2] As you apply *Designing for Behavior Change* to your work, whether in software or beyond, I'd love to talk with you and share notes! You can reach me at *steve@behavioraltechnology.co*.

Combining Research, Data, and Product Expertise

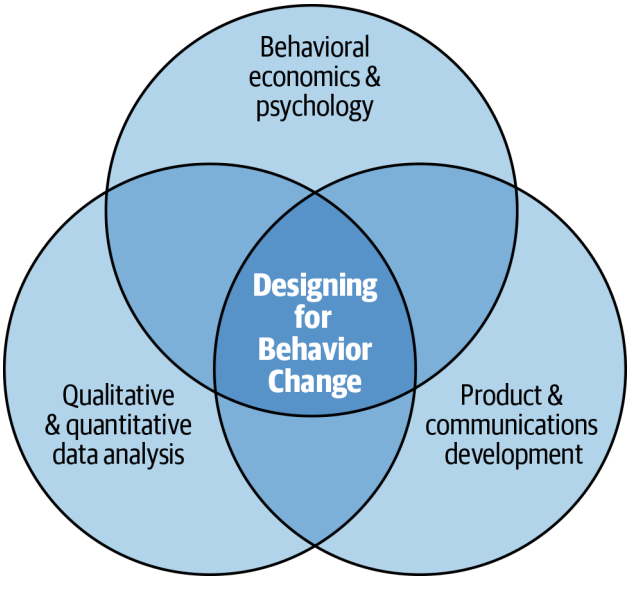
One of the book's recurring themes is that understanding how the mind works is not enough to build behaviorally effective products.

In addition to behavioral science research, we need two sets of skills to support the process. First, we need to plan for data analysis (both qualitative and quantitative) and for refinement and iteration based on that data. That means adding metrics to the application and conducting user research to understand individual behavior, analyzing the data, and making improvements over time based on it.

Second, we need to build products that people actually enjoy using. I know it sounds obvious, but it's something that's often forgotten as we build products designed to educate, motivate, or otherwise help our users. We tend to focus on the behavior change (and how important it is) and forget the fact that people still have to *choose* to use our products. Users avoid boring, frustrating, ugly applications, so we should remember the lessons of good product design, from identifying user needs and frustrations to designing an intuitive, beautiful user interface.

2 Dan Lockton has a set of papers that provide an extensive review of the various domains in which intentional behavior change has been applied.

When you bring these raw ingredients together—behavioral research, product design or marketing expertise, and data analysis—you have what's needed to design for behavior change:



What You Need to Know to Benefit from This Book

This book gives you enough knowledge in each of these three areas to get oriented and to start working on concrete products and communications. It covers most of the behavioral research you'll need to finish the products as well, but at some point along the way, you'll need people who are experts in qualitative or quantitative data and in product design. Chapter 17 provides a detailed look at the skills required for a team that designs for behavior change, including where you can find (or develop) them.

If you *are* an expert in one of these areas, all the better. The book will show you how designing for behavior change builds upon and complements your existing expertise. You'll find out how to leverage your existing skills to play a leading role in the development of behaviorally effective products and communications within your organization.

What Types of Behaviors This Can Help With

The techniques I'll talk about here assume that the product will support an action that people aspire to but have had difficulty undertaking. Learning a language. Sticking to a diet. Meeting new people. This may seem like it applies only to a narrow set

of products, but I've found that there are two big groups of behaviors that fit these criteria:

- Behaviors that users want to change *within their daily lives*
- Behaviors *within the product itself* that are part of using the product effectively

Or, from the perspective of the company making the product, behavior change is either:

- The core value of the product for users
- Required for users to extract the value of the product

In the first case, users have some behavioral problem in their daily lives and buy the product to help them with it. In the second case, users have some other need that the product solves, but they must adapt and change their behavior in order for the product to deliver on its promise.

The first case includes:

- Controlling diabetes
- Paying off credit card debts
- Getting back in shape
- Getting involved in their communities

Often these behaviors relate to big-picture social issues like health and wellness. When we design products that support these behaviors, we help the individual and impact our society at the same time. Oracle Utilities's Opower and Google's Nest, for example, are products that help individuals decrease individual energy usage: saving people money and helping the environment at the same time. Other products that change behavior in this way are Fitbit (exercise) and Weight Watchers (diet).

As I send this book off for final production, the coronavirus COVID-19 is spreading across the globe. We've seen a rapid mobilization in the healthcare community, including work by behavioral scientists to help promote social distancing and handwashing behavior.[3] Researchers are mounting large-scale, rapid turnaround studies to test techniques to keep people safe—by applying behavioral science to the design of communications and products.[4] It's an impressive display of the power of behavioral

3 See recommendations to the Irish government, for example.

4 Kwon (2020); Jachimowicz (2020)

science to help people take action that's in the best interest of the individual and society as a whole.[5]

The second type of behavioral change is far more mundane. Individuals often seek to change behavior as a means to an end. Let's say a user wants to learn a new language and gets a software package to help do it. Simply learning how to effectively use the software can take some substantial changes in behavior *within the product*—building new habits to log in daily and practice the language, overcoming fears about looking foolish while doing it, and so on. The user wants to take an action (learning the language) but struggles. A well-designed product can help the user make those personal adjustments.

This second type, and the products that require it, is much broader than the first. It covers the sweep of voluntary changes in behavior that people might make to benefit from products they've already chosen to use. It touches upon a huge swath of the consumer product space, from Yelp to Square to Rosetta Stone. Some examples of actions that occur *within software products* that one might try to improve include:

- Organizing email contacts
- Drawing decent flowcharts
- Formatting documents

As with many other behavioral scientists and designers, I believe that no design is neutral.[6] Anything we design that interacts with other people—communications, products, services, etc.—has an impact on their behavior and ultimately their lives and outcomes. Here, we talk about how to make that process intentional and, hopefully, beneficial.

For both types of behavior change, the goal is to develop products that help users take action and to deliver the value that the company offers. This voluntary, transparent support for behavior change helps companies be successful as well.

5 We've also seen what happens when incomplete *lessons* from behavioral science are divorced from the *process* of science (including rigorous testing and empirical validation)—in the furor over the UK government's initial resistance to strict social distancing based on the concept of behavioral fatigue. See Yates (2020) for the political debate, and UK Behavioural Scientists (2020) for a thoughtful response calling for proper scientific testing of the concept before using it in government policy with lives at stake.

6 In *Nudge*, Thaler and Sunstein make this case, for example, and a discussion of the unintentional and intentional impact of design has long been a part of the design community (e.g., Nusca 2019, Vinh 2018).

What This Book Is Not About

If you're looking for a book on how to make people do something *you* want them to do (even if they don't want to do it), you're in the wrong place. I'm not necessarily judging your motives or aims; I just can't help you much.

In particular, this book isn't designed to help with persuasion. There are many ethical and thoughtful uses of persuasion—and we all seek to persuade each other in our daily lives. While there are many similarities with designing for *voluntary* behavior change, other issues arise such as educating users about a product, building a convincing argument, rhetorical delivery, building rapport over time, and more. We won't cover them here. The topic of voluntary (i.e., pre-persuasion) behavior change is big enough as it is!

In addition, this book isn't intended to help with trickery or coercion (for both practical and ethical reasons). Sadly, there are many companies trying to do just that, though—and it's dangerous for our field. I'll delve into the details of what's happening across our industry and how we're starting to face well-deserved backlash from both government regulators and thoughtful technologists in Chapter 4.

The Chapters Ahead

In the following pages, I walk you through each of the skills you need to design for behavior change, starting with a firm foundation in how the mind makes decisions. Then, I show each step that's required to develop a new product: moving from discovery to design to implementation and refinement. I introduce each concept where it is first needed. In Part III, I step back and give some additional information on the scope of the industry (and where the jobs are), how to build a behavioral team at your organization, and likely problems you'll face along the way. That's it.

However, if you're looking for a more formal chapter outline, here you go:

Part I: How the Mind Works

Chapter 1 arms you with your first skill: an understanding of how the mind makes decisions. You'll get an overview of the current literature on decision making, as well as a dozen key lessons and their implications for the design process.

Chapter 2 then describes the six high-level factors that must come together at the same time for a person to take action. They form the CREATE Action Funnel—Cue, Reaction, Evaluation, Ability, Timing, and Experience—which shows you what needs to be addressed in your product and where users usually drop off.

Chapter 3 looks at the reverse problem: how to help your users stop unwanted habits or improve poor decisions.

Chapter 4 delves into detail about the ethical challenge facing the field: how too many practitioners have used these techniques to manipulate users into buying (or overusing) their products, how we're fooling ourselves if we think we wouldn't do the same under the right (or wrong) conditions, and how we can tackle these problems head on.

Part II: A Blueprint for Behavior Change

Chapter 5 introduces you to the larger process of designing for behavior change —how your new knowledge about the mind can be used in practice—using the acronym DECIDE: Define the problem, Explore the context, Craft the intervention, Implement within the product, Determine its impact, and Evaluate next steps.

Chapter 6 starts charting your course by defining the problem: the overall outcomes you hope the product will deliver and who it seeks to help. From there, it demonstrates how to elicit a potential idea for behavior change—how, specifically, your users will get fit or take control of their finances, for example.

Chapter 7 explores the context in which your users will act with a behavioral map: a narrative of how the product team envisions user interaction with the product and how users will change their behavior. It then evaluates the various behaviors they *could* change in light of their needs, interests, and prior experience. It refines your initial plan to finalize the specific behavior the product will support.

Chapter 8 introduces you to the meat of the DECIDE process: designing the intervention itself. We look, at a high level, at the main strategies you can use to help users change behavior, using the story of a fish stranded on the beach.

In Chapters 9 and 10, we look at how to craft specific interventions, based on behavioral research, to support your users to take action. Chapter 9 presents interventions that are appropriate when users face problems of Cue, Reaction, or Evaluation; next, Chapter 10 looks at interventions for Ability, Timing, and Experience.

Chapter 11 wraps up the discussion of crafting an intervention with two extensions: how you can handle multi-step complex interventions and how to help the user hinder negative unwanted actions.

Chapter 12 presents some tips for implementing the intervention within the product itself. Applied behavioral science doesn't require a particular development approach or technology; it does, however, require high-quality data on outcomes. We discuss how to build those metrics, and the ability to measure changes in them, in the initial product development—rather than as a hacked-up afterthought.

Chapter 13 focuses on determining the product's impact, its success or failure. It starts with the most powerful tool there is for impact measurement: the humble A/B test. Since most readers are likely familiar with A/B tests already, this chapter dives into the details of how to use it effectively to gather rigorous data and the common pitfalls that practitioners face.

Chapter 14 looks at other ways to determine impact, when A/B tests or other randomized control trials aren't available. I cover how to utilize statistical models to gain insight. I talk about the challenges of gauging the causal impact of software on real-world behavior and how to overcome them.

Chapter 15 concludes the DECIDE blueprint for behavioral design by helping you Evaluate next steps after your implementation. It looks at how to find problems that limit impact, including how qualitative and quantitative analyses are both needed, and work hand in hand.

Part III: Build Your Team and Make It Successful

Chapter 16 provides the results from the Behavioral Teams survey in detail. Case studies are scattered throughout the book, but here we dig into the numbers: how large the field is, where the jobs are, and what challenges and successes other teams are having.

Chapter 17 looks at what it takes to start applying behavioral science at your organization with a team of 1 or a team of 20. We look at how to make the case to stakeholders in-house and the skillset you or other team members will need.

Finally, Chapter 18 wraps things up with a quick review of the designing for behavior change process and key takeaways on how to make it happen in your organization. It also covers many of the questions that can arise when putting these lessons into practice.

At the end of the book, there's information for those who are looking to dive even deeper:

- Glossary of Terms: a glossary of key terms, like *behavioral map* and *data bridge*
- Bibliography: a comprehensive list of the works cited in this book

In the first edition of this book, there was a list of online resources (Appendix B). We've moved that online. Each of the core chapters in Part I ends with "A Short Summary of the Ideas" if you only have a few minutes. They are a useful wrap-up that also give advice if you're just looking for an informal process to sketch things out before you jump in head first.

The core chapters of Part II wrap up with "Putting It into Practice"—sections with concrete examples and exercises to help you put each chapter's ideas to work.

Let's Talk

My hope with this book is to further the conversation about voluntary behavior change and help build up the tools needed to develop behaviorally effective products. However, even after writing two editions (and likely even after 20) I have no illusions about the completeness of this work—there's still a tremendous amount to figure out. We're all going to learn as we go along.

Personally, I'm always looking to learn, share, and collaborate, so don't hesitate to reach out if you have a cool story to share, an idea for a research project that would further develop the field, or an idea for a behavior-changing project that you'd like to bounce off someone. You can find me under *sawendel* on Twitter, LinkedIn, and AngelList; my contact information is on my website, *http://about.me/sawendel*.

If you think there's something that can be improved in this book or find something that is inaccurate, please reach out to me and tell me about it. One of the many benefits of working with O'Reilly Media as a publisher is that a lot of you will be reading this book in an electronic format and can quickly get an updated version of the book if corrections need to be made. For those who are reading this in paper form, I'll keep a list of corrections, additions, and other updates online at *behavioraltechnology.co*.

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Since the first publication of *Designing for Behavior Change*, I've continued to build upon and refine the theoretical and practical tools presented in the book. The tools that I use with my own team, that I've trained other companies and organizations with, are extensions of those initial ideas (and indeed, the first edition itself was a description of our practice and approach at HelloWallet at the time). In this edition, I've brought together a number of those artifacts and lessons from applying this approach over that last six years. In particular:

- The exercises in the "Putting It in Practice" sections of Chapters 6–14 incorporate parts of a workbook I developed for my team at HelloWallet to apply these concepts.
- Chapter 13 incorporates sections from a guide to experiments I wrote for my team at Morningstar.
- Chapters 1, 3, and 4 incorporate part of an introduction to behavioral science that I wrote for a book exploring the applications of behavioral science to one's personal and spiritual life.
- Chapter 16 describes a survey I conducted in 2019 with the nonprofit organizations the Behavioral Science Policy Association and Action Design Network, and have published separately on our websites.

In each case, the source material was used as a starting point, often with significant adaptations and changes. All materials are used with permission.

Acknowledgments

With the first edition of this book, I had many people to thank for their help in developing the ideas and process presented within. The list has only grown.

I continue to talk with and gain inspiration from people I started working with on the first edition—from Rob Pinkerton and Katy Milkman to the Action Design Team, especially Zarak Khan, Matthew Ray and Erik Johnson. Here, I'd like to call attention to additional people I've learned from since that first edition. Top of the list would be my intellectual sparring partner, Ryan Murphy, and my team at Morningstar: Heymika Bhatia, Sarwari Das, Jatin Jain, Sam Lamas, Sagneet Kaur, Alistair Murray, Sarah Newcomb, Shwetabh Sameer, Stan Treger, and Leon Zeng. Many thanks to Ray Sin as well, for your thoughtful research. Outside of Morningstar, I'm particularly grateful to Paul Adams, Julián Arango, Florent Buisson, May C., Jesse Dashefsky, Clay Delk, Barbara Doulas, Darrin Henein, Fumi Honda, Peter Hovard, Anne-Marie Léger, Jens Oliver Meiert, Brian Merlob, Shafi Rehman, Neela Saldanha, Nelson Taruc, and Mark Wyner for their comments on the draft.

In terms of the rich stream of behavioral research that I draw upon here, there are simply too many people than can be thanked. Even though it is not the current fashion to do so in popular-press books, I make a point to cite authors of the specific studies I reference throughout the body of the book, though I don't have space to offer a full literature review. For some readers, this may seem overly academic or, frankly, boring. That's certainly not my goal! Rather, it is the simple acknowledgment of the many thoughtful researchers who have done great work and that both I and you, as readers of this book, benefit from. I want never to overstate my ingenuity or to dim the glow of their bright light. My primary error, I fear, is not giving enough credit to the amazing work of other researchers. Please accept my apologies for any citations that are missing.

And as always, I'd like to thank Alexia, Luke, and Mark—for putting up with me and my obsession with writing and for loving me nevertheless.

PART I

How the Mind Works

CHAPTER 1
Deciding and Taking Action

On the day I got married, I was lying on the bathroom floor of the church because my back hurt to move. I'd been out of commission and in bed for almost three weeks, but now my family and my wife-to-be, Alexia, were waiting for me in the aisles. My best man Paul had to pull me up from the floor and get me out there to say my vows. My back had seized up weeks before because I hadn't been getting enough exercise.

Now I was born skinny, but that hides the fact that I've had musculoskeletal problems all my life—lower back problems, pinched nerves in my hands and neck, and so forth. I've seen many doctors over the years, and they've all said about the same thing: you'll be OK, if you just exercise regularly.

So I've long known about the importance of exercise; I don't have a problem with motivation. There's nothing more motivating or scarier than almost canceling your own wedding. I've certainly intended to exercise. But, like many other people who struggle with this, I haven't done as much as I should.

For me, and for many others, there's a gap between our sincere intention to act and what actually happens. There's something more going on in our heads and in our lives than a simple cost–benefit analysis about what we should do. Even though the benefits clearly outweigh the costs, we struggle. To change this pattern—to help ourselves and others take action when needed—we must first understand how our minds are wired.

In my research and that of many other behavioral scientists in the field, we've found that people don't always make decisions and take action in a straightforward way. People struggle to turn their intentions into action. People struggle sometimes to make good decisions—even if, at another time, they might have done fine.

We recognize this for ourselves and our own lives, but we tend to forget this when it comes to our users. We assume that if they like our products, they'll use them. If they want to do something, they'll figure out how. But they don't.

I'm not the only person who struggles with a lack of exercise. Many of your users might too. Or, they struggle with poor eating or bad sleep habits or distractions that keep them from their family and friends. Often, motivation isn't the problem: like me, they know what they should do and even want to do it. Other things get in their way. This book is about how to help your users, and all of us, change behavior when we need to.

Behavior Change…

All around us, people try to change our and each other's behavior. Negative examples are often obvious: from ads that entice us to buy stuff we don't need to apps that try to swallow our attention and time. Positive examples are there too, but perhaps not as obvious; for example, the loving parent teaching a child to share. Support programs helping addicts break free from their demons. Apps helping us track our weight and encouraging us as we diet and exercise.

In a sense, we're all in the "behavior change" business. When we're falling short of our own goals and want to make a change in our lives, that usually means our behavior must change first. Moreover, we're a social species; in order to achieve our goals, even altruistic goals of helping another person succeed, often someone must do something differently. To effect change *is* to effect behavior change.

Yet we rarely talk about it that way. In the product world, we talk about features delivered, user needs met, and so forth. Those things are all important, certainly, but none of them matters unless people adopt and apply our products (i.e., we need our users to change their behavior in a meaningful way).

Perhaps we don't talk about behavior change so directly because it's uncomfortable: we don't want to be seen as manipulative or coercive. So we end up with sanitized conversations distanced from real people changing their behavior because of our products and communications: key performance indicators for adoption and retention; objectives and key results for click-through rates and usage.

It shouldn't be that way. When we don't talk about what we're actually doing, we are both less effective at helping others when we should and more likely to try to change behavior in ways we shouldn't. This book is about designing products intentionally to change behavior—how to ethically and thoughtfully help others succeed, without, I hope, falling into trickery or manipulation.

In this book we'll have an open discussion about how to help people decide what to do and how to help them act on their intentions and personal goals. We'll talk about

how to build products that influence that process and how to assemble and run a team that does so. Nothing presented here is perfect, but I hope this book can help you make better products and better serve your users.

. . . And Behavioral Science

One of the best toolsets to accomplish this task—intentionally designing for behavior change—comes from behavioral science. And, in addition to being useful, behavioral science is fascinating.

Behavioral science is an interdisciplinary field that combines psychology and economics, among other disciplines, to gain a more nuanced understanding of how people make decisions and translate those decisions into action. Behavioral scientists have studied a wide range of behaviors, from saving for retirement to exercising.[1] Along the way, they've found ingenious ways to help people take action when they would otherwise procrastinate or struggle to follow through.

One of the most active areas of research in behavioral science is how our environment affects our choices and behavior, and how a change in that environment can then affect those choices and behaviors. Environments can be thoughtfully and carefully designed to help us become more aware of our choices, shape our decisions for good or for ill, and spur us to take action once we've made a choice. We call that process *choice architecture*, or *behavioral design*.

Over the past decade, there has been a tremendous growth of research in the field and also of best-selling books that share its lessons, including Richard Thaler and Cass Sunstein's *Nudge*, Daniel Kahneman's *Thinking, Fast and Slow*, and Dan Ariely's *Predictably Irrational*.[2] They give fun introductions to the field, including anecdotes of how:

- Putting a picture of a fly in the center of a men's urinal can help reduce the mess that men make far more than exhorting them not to make a mess.
- Giving people many small bags of popcorn makes them eat less of it.[3]

In fact, Thaler and Kahneman have each won the Nobel Prize largely because of their work in behavioral science.

1 There are hundreds, if not thousands, of papers and books one can draw from. Benartzi and Thaler (2004) is a good start for retirement research.

2 Ariely (2008), Thaler and Sunstein (2008), Kahneman (2011)

3 Krulwich (2009); Soman (2015)

That said, we're not trying to re-create *Nudge* or *Predictably Irrational* here. This book is about *how to apply lessons from behavioral science to product development*; in particular, how to help our users do something they want to do, but struggle with. Whether that's dieting, spending time with their kids, or breaking a social media app's hold on their lives. It's about arming you with a straightforward process to design for behavior change.

Some of those lessons are what you'd expect: when designing a product, look out for unnecessary frictions or for areas where a user loses self-confidence. Build habits via repeated action in a consistent context. Some of those lessons are far less expected, and you may not even want to hear them; for example, most products, most of the time, will have no unique impact on their user's lives. For that reason, we need to test early and often, and use rigorous tools to do so. Other lessons are simply fun and surprising; for example, make text *harder* to read if it's important that users make a careful and deliberative decision.

With that, let's dive into a primer on behavioral science!

Behavioral Science and Design

In addition to research in behavioral science, there are wonderful tools in the design community—from user-centered design to design thinking—that can help us intentionally design for behavior change. In fact, in many places where I discuss lessons from behavioral science in this book, you could readily substitute in terminology from the design community (and vice versa). People are people, and user-focused design techniques and behavioral science seek to understand them on their own terms. It's for that reason that many designers now study psychology and behavioral science in particular as part of their training and that many behavioral scientists, like myself, seek out and learn from lessons in the design world.

Throughout this book, we'll honor the existing expertise and skillset in the design community, and offer unique tools and techniques that aren't part of that discipline yet.

Behavioral science has a particular understanding of the mind that I think enriches the discussion and goes beyond current practice in design. It also has a commitment to experimental testing that is invaluable. So, throughout this book, I'll talk about many lessons and techniques that are common to the two fields or unique to design, but my focus will be on the areas that are less covered and more unique from behavioral science. As you'll see, behavioral science and design overlap and complement each other in many wonderful ways.

Behavioral Science 101: How Our Minds Are Wired

Last summer, my family and I were on vacation and having a great time. One afternoon, we decided we'd eaten out way too much and we wanted something cheaper and more familiar than another restaurant meal. So we went to a grocery store.

Now, the first thing we looked for was cereal. We found the aisle and there were far too many options to choose from. As they often do, our kids were running up and down the aisle, pulling and swinging each other around. Somehow, all of that movement makes them unable to hear us telling them to stop. It's clearly loads of fun—until they crash into something. So we had to make a quick decision.

Unfortunately, my kids and I have lots of allergies. My allergies are lethal, and my kid's allergies cause pain but thankfully not too much more. So as we're standing in the aisle trying to make a choice and keep our kids out of trouble, my wife and I were torn: we simply couldn't read all of the boxes for their ingredients.

Thankfully, we have some simple rules we know to follow. Any cereal with cartoons on the box is automatically out; those are often crammed full of sugar, and our kids have enough energy already. Second, cereals that are gluten free (which one of our sons needs) usually proclaim it proudly on the box—easy to scan for. And third, after decades of practice, I have a really useful habit: I automatically pick up food and recognize ingredients on the list that would kill me. It only takes a split second and I hardly think about it unless I see something that's a problem.

After a little while, we picked up a nice bag of corn flakes, grabbed a box of some granola-like stuff, and went on to the next aisle. No problem. Unfortunately, we did forget to grab milk and a few other things in that aisle. We'd intended to get them, but in the moment, we missed those items on our mental checklist.

Now, when we got home, the granola stuff was actually really good. The corn flakes were terrible—in all of the hurry, we missed a key sign: dust on the bag. They'd been sitting there a long time, and everyone else clearly knew not to buy them.

In everyday life and in (true) stories like this one, we can find the core lessons of behavioral science if we know where to look. I like to start with a basic, and often overlooked, one: as human beings, we're all limited. We can't instantly know which cereal is best just by thinking about them. We have to take time and energy to sort through the options and make a decision. That time and energy is scarce—if we spend too much time on one thing, there's a cost (like our kids crashing to the shelves). Similarly, we're limited in our attention, our willpower, our ability to do math in our heads, and so on. You get the picture.

Our limitations aren't *bad*, per se; they just are facts of life. For example, I can't even imagine what it would mean to have *unlimited attention*—to be simultaneously aware of absolutely everything at once. That's just not how we're made.

Given these limitations, our minds are really good at making the best of what we have. We *economize* on our time, attention, and mental energy by using simple rules of thumb to make decisions; for example, by excluding cereals with cartoons. As researchers, we call these results of thumb *heuristics*. Another way our minds economize is by making split-second *nonconscious* judgments; for example, *nonconscious habits* are automated associations in our heads that trigger us to take a particular action when we see a specific trigger (like scanning for deadly ingredients whenever I see unknown food). Habits free up our conscious minds to think about other things.

While these economizing techniques are truly impressive, they aren't perfect. They falter in two big ways. First, we don't always make the right decision; for example, sometimes we don't pay attention to something important (dust on the bag). As researchers, we often call the results of a heuristic or other shortcut going awry a *cognitive bias*: a systematic difference between how we'd expect people to behave in a certain circumstance and what they actually do.[4] Second, even when we make the right choice, our inherent human limitations mean we don't always follow through on our intentions (getting the milk). We call that the *intention–action gap*.

And finally, context matters immensely. It mattered that our kids were running around; we had less of our limited attention to pay to the task (reading ingredients, remembering milk). If milk were in a different aisle, we might have seen it and remembered it. If our kids weren't running around…never mind. That wouldn't happen.

So, if I were to put decades of behavioral research into a few bullet points (please forgive me, my fellow researchers!), it would be these:

- *We're limited* beings in attention, time, willpower, etc.
- *We're of two minds*: our actions depend on both conscious thought and nonconscious reactions, like habits.
- In both cases, our minds *use shortcuts* to economize and make quick decisions because of these limitations.
- Our decisions and our behavior are *deeply affected by the context* we're in, worsening or ameliorating our biases and our intention–action gap.
- One can *cleverly and thoughtfully design a context* to improve people's decision making and lessen the intention–action gap.

Let's look at each of these points in a bit more detail.

4 Soman (2015). Not all biases are directly caused by heuristics gone awry, but many can be traced back to time- or energy-saving devices in the mind. One major category that isn't from heuristics consists of identity-preserving biases (mental quirks that make us feel better about ourselves), like overconfidence bias.

We're Limited

Who hasn't forgotten something at some point in their lives? Heck, who hasn't forgotten something in the last hour, or the last five minutes? Forgetfulness is one of our many human frailties. Personally, the older I get, the longer that list seems to grow. There are sadly many ways in which our minds are limited and lead us to make choices that aren't the best, including limited attention, cognitive capacity, and memories.

These limitations string together. In terms of our *attention*, there are nearly an infinite number of things we could be paying attention to at any moment. We could be paying attention to the sound of our own heartbeat, the person who is trying to speak to us, the interesting conversation someone else is having near us, or the report that's overdue and we need to complete. Unfortunately, researchers have shown again and again that our conscious minds can really pay proper attention to only one thing at a time. Despite all of the discussion in the popular media about multitasking, multitasking is a myth.[5] Certainly we can *switch* our attention back and forth; we can move from focusing on one thing to focusing on another—and we can do so again and again and again. But the reality is, switching focus frequently is costly; it slows us down, and it makes it harder for us to think clearly. Given that we can only focus on one thing at a time and that there are so many things that we could focus on (many of them urgent and interesting), it's no wonder that sometimes we aren't thinking about what we're doing.

Similarly, our *cognitive capacity* is limited: we simply can't hold many unrelated ideas or pieces of information in our minds at the same time. You may have heard the famous story about why phone numbers in the United States are seven digits plus an area code: researchers found that we could hold seven unrelated numbers in our heads at a time, plus or minus two.[6] And, of course, there are so many other ways in which our cognitive capacity is limited. For one, we have a particularly difficult time dealing with probabilities and uncertain events, and with realistically predicting the likelihood of something happening in the future. We tend to over-predict rare but vivid and widely reported events like shark attacks, terrorist attacks, and lightning strikes.[7]

In addition, we can become overwhelmed or paralyzed when faced with a wide range of options, even as we consciously seek out more choices and options. Researchers call this the *paradox of choice*: our conscious minds believe that having more choices

5 Hamilton (2008)

6 Miller (1956)

7 For example, see Manis et al. (1993). These outcomes are actually the result of reasonable but imperfect shortcuts that our minds use to *counter* our limitations; we'll talk about those shortcuts shortly.

is almost always better, but when it actually comes time to make a decision and we're faced with our limited cognitive capacity and the difficulty of the choice ahead of us, we may balk.[8]

Lastly, when it comes to our memories, they simply aren't perfect, and nothing is going to change that. And, for most of us, having a "not perfect" memory is a significant understatement. Our memories usually aren't crystal-clear videos, but a set of crib notes from which we reconstruct mental videos and pictures. We remember events that occur frequently (like eating breakfast) in a stylized format, losing the details of the individual occurrences and remembering instead a composite of that repeated experience. Additionally, in some circumstances, we remember the peak and the end of an extended experience, not a true record of its duration or intensity.[9]

What do all of these cognitive limitations mean? They are important to product people for two main reasons. First, these cognitive limitations mean that *sometimes our users don't make the best choices*, even when something is in their best interest. It's not that they're bad people; it's that they are, simply, people. They get distracted, they forget things, they get overwhelmed. We shouldn't interpret a few bad choices as a sign that they are fundamentally disinterested in doing better (or using our product); instead, it's just that their simple human frailties may be at work. We can design products to avoid overburdening users' limited faculties.[10]

Second, our limitations matter because our minds cleverly work around them by having two semi-independent systems in the brain and by using lots and lots of shortcuts. When developing products and communications, we should understand those shortcuts and use them to our advantage or work around them.

Start with Our Limitations: It Only Gets Better from There

If you're familiar with some of the books on behavioral science for a general audience, you might have noticed that this description of behavioral science is different. Many of them start with the foolish things we do: our cognitive mistakes or mental biases. As someone who develops products, that's not a great starting place. It gives the incorrect impression that our users are obtuse, and it's not actually how many behavioral researchers see people and the mind. My goal here is to give you a deeper understanding of how decision making and behavior works and why our seemingly foolish choices arise. Your users (and you) are really smart, given our limitations.

8 See Schwartz (2004, 2014), Iyengar (2010), and Solman (2014). As we should expect with all behavioral mechanisms and lessons, the paradox of choice isn't universal or without disagreement.

9 Kahneman et al. (1993)

10 As many designers have argued, including Krug (2006).

We're of Two Minds

You can think about the brain as having two types of thinking: one is deliberative and the other is reactive; it's a useful metaphor for a complex underlying process.[11] Our reactive thinking (aka *intuitive*, or System 1) is blazingly fast and automatic, but we're generally not conscious of its inner workings. It uses our past experiences and a set of simple rules of thumb to almost immediately give us an intuitive evaluation of a situation—an evaluation we feel through our emotions and through sensations around our bodies like a "gut feeling."[12] It's generally quite effective in familiar situations, where our past experiences are relevant, and does less well in unfamiliar situations.

Our deliberative thinking (aka *conscious*, or System 2) is slow, focused, self-aware, and what most of us consider "thinking." We can rationally analyze our way through unfamiliar situations and handle complex problems with System 2. Unfortunately, System 2 is woefully limited in how much information it can handle at a time—like struggling to hold more than seven unrelated numbers in short-term memory at once! It thus relies on System 1 for much of the real work of thinking. These two systems can work independently of each other, in parallel, and can disagree with each other—like when we're troubled by the sense that, despite our careful thinking, "something is just wrong" with a decision we've made.[13]

What this means is that we're often not "thinking" when we act. At least, we're not choosing consciously. Most of our daily behavior is governed by our intuitive mode. We're acting on habit (learned patterns of behavior), on gut instinct (blazingly fast evaluations of a situation based on our past experiences), or on simple rules of thumb (cognitive shortcuts or heuristics built into our mental machinery).[14] Researchers estimate that roughly half of our daily lives are spent executing habits and other intuitive behaviors, and not consciously thinking about what we're doing.[15] Our

11 That is, the family of theories referred to as *dual process theory* in psychology. Dual process theories give a useful abstraction—a simplified but generally accurate way of thinking about—the vast complexity of our underlying brain processes.

12 Damasio et al. (1996)

13 There are great books about dual process theory and the workings of these two parts of our mind. Kahneman's *Thinking, Fast and Slow* (Farrar, Straus and Giroux, 2011) and Malcolm Gladwell's *Blink* (Back Bay Books, 2005) are two excellent places to start; I've created a list of resources on how the mind works (including dual process theory).

14 The boundaries between "habit" and other processes (intuition, etc.) are somewhat blurry; but these terms help draw out the differences among types of System 1 responses. See Wood and Neal (2007) for the distinction between habits and other automated System 1 behaviors; see Kahneman (2011) for a general discussion of System 1.

15 Wood (2019); Dean (2013)