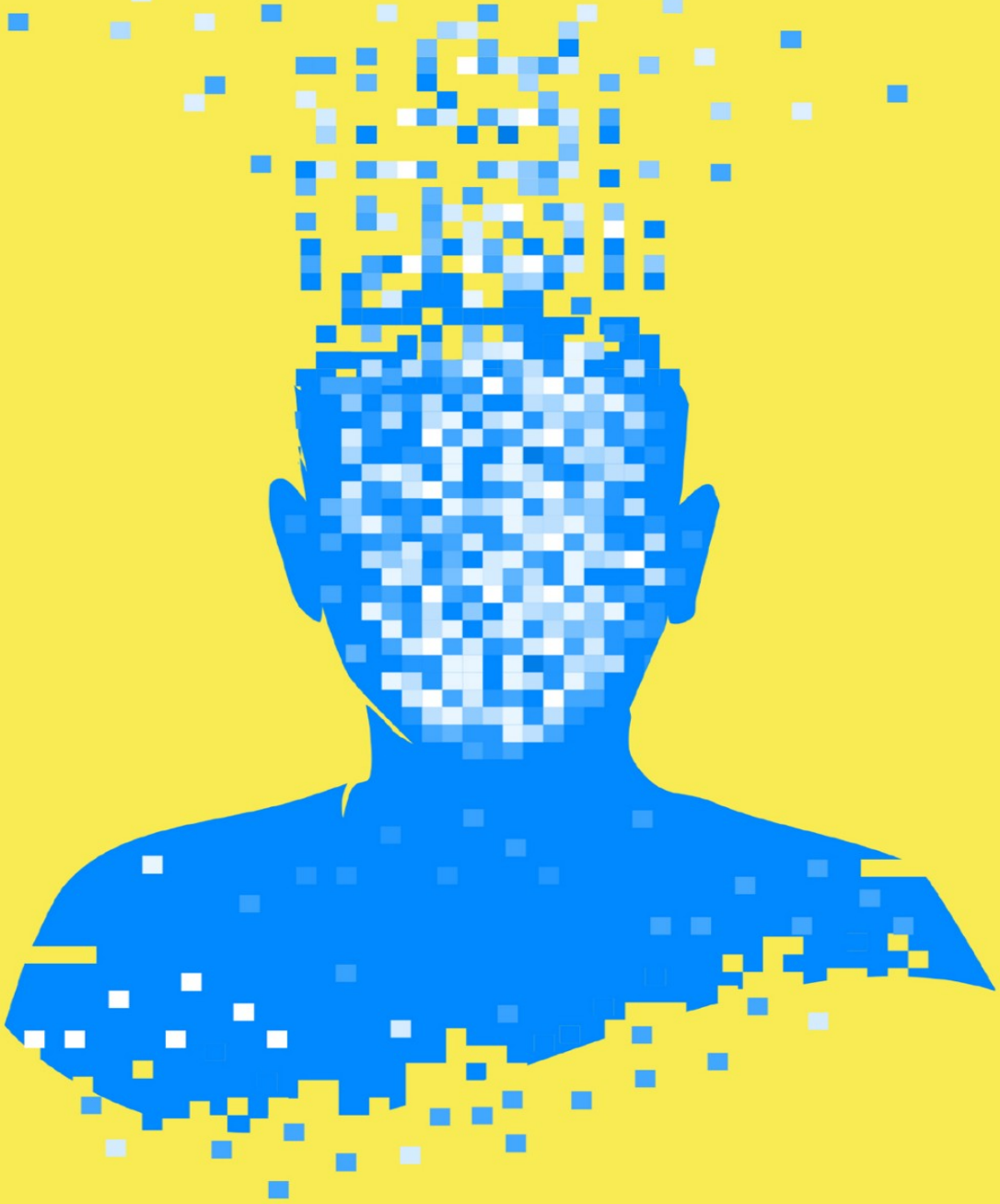
THE DATA-DRIVEN SCIENCE OF PREDICTING AND CHANGING HUMAN BEHAVIOR

MINDMASTERS



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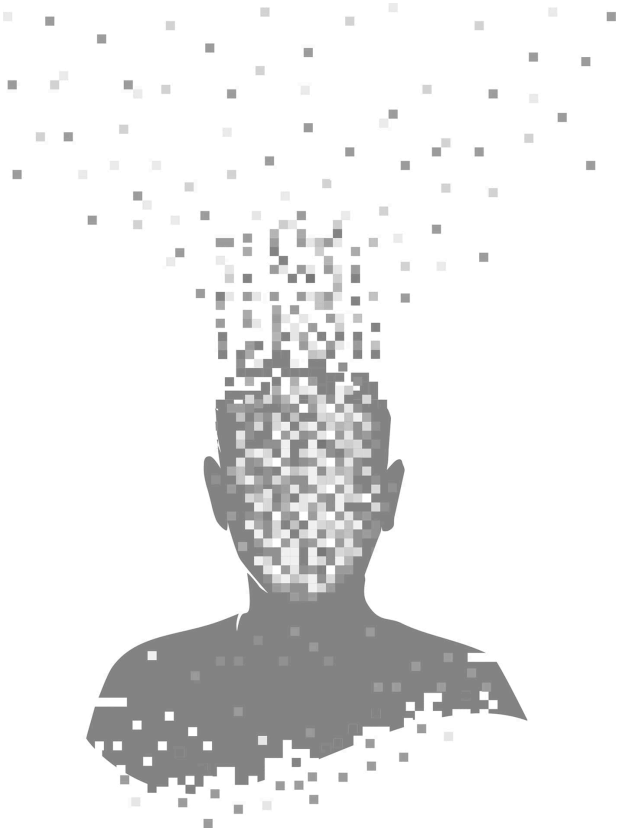

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To Moran and Ben, whose love and laughter
fill my life with magic every day.

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INTRODUCTION

The Digital Village

I had begged my boyfriend for weeks to let me ride his motorcycle. A Suzuki Bandit 600. In a deep, shimmering red. It was beautiful.

We loved to take the bike on adventures together. Up the serpentine roads of the mountains surrounding the small village I grew up in, and through the curvy roads of the countryside. But I was tired of being in the back. I wanted to be in the driver's seat.

When he finally agreed to let me try, I found an abandoned military airfield nearby.

His instructions were simple: "Let's sit on the bike first. You in the front and me in the back. And then I'll explain." I was enthralled but nervous, too. I was only fifteen, and I didn't have a license. "Don't worry," he assured me, "I'm sitting right behind you."

I don't know exactly what happened next. I remember that we somehow rolled into the grass on the side of the airfield. When I tried to pull the bike back out, I must have accidentally twisted the throttle and let the clutch snatch.

A few seconds later, the front wheel of the motorcycle rose into the air like a rearing horse. My boyfriend was thrown off the back (so much for "I'm

sitting right behind you"), and I sped off without the slightest idea of how to control the bike.

Without thinking, I pulled and pushed the bike's handlebars, trying to keep my balance. For what felt like an eternity, I swerved left, right, left again, before I came crashing down on one side, sliding for a few feet before coming to a stop.

We were lucky. Neither of us got injured. And nobody had witnessed the accident. But there was a problem: we were in the middle of nowhere and the bike wouldn't start.

After weighing our options, I sat down on the grass to calm my nerves, took a deep breath, and hit the call button on my phone. Part of me was hoping no one would pick up. With every ring, my heart started beating louder, my mind racing. When I was almost ready to hang up, my dad answered the phone.

"Hi, Dad, … uh … we had a motorcycle accident. But don't worry, we were going slow, and we're both fine."

"It was you driving, right?"

In addition to a serious conversation with my parents (who were actually surprisingly cool about it), I had to pay for the repairs. A full year's salary of tutoring gone. Painful, but not the worst part.

The minute we dropped the bike at the local repair shop, the news about my misfortune spread through my village like wildfire. It was the perfect story. Not just because I was fifteen and didn't have a license. I also happened to be the daughter of a local police officer.

There was no place to hide. The next day, on my way to the school bus, Mr. Werner from across the street waved me over to inquire if I was doing OK. He had heard about the crash. I got trapped in a ten-minute recounting of his own teenage offenses.

A few houses down, Ms. Bauer looked up from weeding the little garden in the front of her house, shaking her head. How could I be so irresponsible? She had always thought of me as a smart girl.

The motorcycle crash was no longer my own private embarrassment. Everyone—and I mean *everyone*—knew my business.

The Village Paradox

Welcome to Vögisheim! A tiny village in the southwest corner of Germany surrounded by pretty vineyards, fields, and rolling hills. Population: five hundred. Restaurants: two. Churches: one. Shops: zero.

I was born and raised there. Just like my mom, her mom, and her mom's mom. I lived there for the first eighteen years of my life—and for what felt like an eternity as a teenager craving the stimulation of busier places. Vögisheim is where I spoke my first words, took my first steps, fell in love for the first time, had my first heartbreak, decided to travel the world, and eventually embarked on a journey to study psychology.

As in any small village, the other 499 residents of Vögisheim didn't just know about my motorcycle crash. They knew every little detail of my life. They knew that I loved listening to the Ramones, that my favorite place for weekend nights was the local pirate bar, and that I simply couldn't stand my geography teacher.

Those details alone might not have felt that intrusive. But, as if I were a human puzzle, my neighbors put the pieces of my existence together to construct an intimate picture of my inner mental life: my hopes, fears, dreams, and aspirations. They seemed to *truly* know me. Which allowed them to do what village neighbors do best … offer (un)solicited advice and interfere with my personal life.

For me, this meant two things. On the one hand, I felt supported by a community of people who understood me. They knew I was ambitious and longed for a life outside the village. So, when the time came for me to figure out what to do after high school, they were there to offer advice and

opportunities; they passed on my curriculum vitae to friends and helped me decide whether a gap year was the right choice for me.

On the other hand, I felt exposed and manipulated by the same community. It was a poorly kept secret that I had a hard time saying no to people. This made me an easy target for anyone who needed a favor. Moving apartments? Ask Sandra. In need of a ride home from the club? Ask Sandra (if the vehicle of choice wasn't a motorcycle, of course).

Growing up being seen by others was a blessing and a curse at the same time.

From the Village to the World

I left Vögisheim after graduating from high school and today live in New York City where I am a professor at Columbia University.

A difference like day and night. I barely know my neighbors. And they barely know me. We say hi to each other when we meet in the corridor. But they don't know what I do for work. They don't know my friends and family. And they certainly don't know anything about my deepest fears or aspirations.

But as it turns out, you don't have to live in a small, rural community to have someone watch and influence every step you take and choice you make. That's because we all have *digital neighbors*.

Think of it this way: the data-crawling digital equivalent to my sixty-year-old neighbor Klaus reads my Facebook messages, observes which news I read and share on X/Twitter, collects my credit card purchases, tracks my whereabouts via my smartphone's GPS sensor, and records my facial expressions and casual encounters using some 50 million public cameras across the United States.

In the same way my neighbors became expert snoopers and puppeteers over time, computers can translate seemingly mundane, innocuous

information about *what we do* into highly intimate insights about *who we are* and ultimately prescriptions of *what we should do*.

I call this process of influencing people's thoughts, feelings, and behaviors based on their predicted psychological characteristics *psychological targeting*. And I've been studying it—and practicing it—for over a decade now.

My colleagues and I have published numerous articles showing how computers—powered by machine learning and AI—can get to know you intimately. It doesn't matter which psychological trait or data source you pick. For example, algorithms can tell whether you are excited, sad, sociable, or anxious by tapping into your phone's microphone or camera. They can predict your income from your social media posts. And they can tell whether you are likely to develop depression or suffer from schizophrenia by tracking your GPS location.

But that's only half the story. I've spent most of my career tackling the glaring "So what?" question. What does it mean that computers can peek into our psychology and understand what lies below the surface of the behaviors they can observe? What does it mean for you and me? And for society at large? It doesn't take much imagination to understand that psychological targeting, in the wrong hands, could be a powerful weapon.

When I was a teenager, I struggled with low self-esteem. I wanted nothing more than to belong and be liked. But it was my best friend who was popular, not me. I became very good at hiding my self-doubts from the other people in the village, putting on a facade that bordered on arrogance. On the outside, I was strong and confident. Inside, I doubted myself. I shared these feelings in my diary.

If I were a teenager today, I would probably ask Google for advice. "How can I become more popular?" "How do I feel better about myself?" These questions would build up in my search history. And the resulting profile could easily be used against me. In 2017, Facebook was accused of predicting depression among teenagers and selling this information to advertisers.[1] No easier target than insecure, struggling teens. Pretty gloomy.

But let's look at this in a more positive light. What if we could use psychological targeting to help millions of people lead healthier and happier lives? My research, for example, has been used to predict and prevent college dropouts, guide low-income individuals toward better financial decisions, and detect early signs of depression.

Yes, that's right. The very thing I accused Facebook of doing in the "gloomy" section could also be a real opportunity. Depression affects approximately 280 million people around the world. Every year, about 1 million of them commit suicide. That's more people dying from the consequences of depression than from homicide, terror attacks, and natural disasters together.

What makes these numbers particularly upsetting is that depression is treatable. The problem is that many people are never diagnosed. Even if they are, the diagnosis often arrives too late. It is much harder to fight your way back from the bottom of the valley than from the initial descent.

What if, instead of selling you out to advertisers, we used the insights into your mental health profile to build an early warning system? GPS records or tweets could alert you to changes in your behavior that resemble patterns observed in other people suffering from depression. It's not only a chance to detect depressive symptoms early (before they develop into a full, clinical depression) but also to offer personalized advice or resources.

We might observe that you are not interacting with your friends as much anymore, or you're spending a lot more time at home than usual. Why not encourage you to reach out to a few of your friends or spend some time in the park nearby? And, if necessary, provide you with contact details of a few therapists in the area that might be of help.

Predicting and influencing mental health outcomes is merely one of many examples demonstrating the power of psychological targeting. What if we could make education more engaging, help people achieve their fitness goals, or facilitate a more constructive dialogue across the political divide?

For the better part of my academic career, I've felt somewhat helpless and lost in the tension between the perilous and promising sides of analyzing

personal data. Was I in the camp of techno pessimists arguing that technology fails to deliver on its promises and actively harms humanity? Or was I in the camp of techno optimists who believe in a bright future where technology helps us become better versions of ourselves?

I often felt like a hypocrite—excited about new findings, with this nagging feeling that, in the wrong hands, those findings could have horrible consequences. Or vice versa, talking to media about the dangers of psychological profiling, while fearing I was backstabbing my students and industry partners who saw the potential promises of psychological profiling.

It wasn't until a Christmas trip back home (and after multiple rounds of mulled wine) that I realized how similar my current struggle was to my experience in the village—constantly torn between the desire to break free and the appreciation for what my community had to offer. The more I thought about this analogy (in a sober state), the more glaringly obvious it became.

I was dealing with a new manifestation of a tension that has been part of the human experience for centuries. How much of our private lives are we willing (or even happy) to disclose to those around us? How much of our privacy and autonomy are we willing to give up for the security and strength provided by the collective?

What this all comes down to is power. In the same way my neighbors had an easy time convincing me to do chores for them because they knew I was a crowd pleaser, understanding your psychological needs, preferences, and motivations gives others power over you. Power to influence your opinions, emotions, and ultimately behavior. Sometimes this is good; sometimes it's bad.

But life in the village taught me that whether we win or lose is—at least in part—up to us. Even though I never had full control over my life, I still managed to navigate the ups and downs. As a kid, I had no idea how the village operated. But over time, I learned more about the system I was embedded in. I understood people's motivations, figured out who was talking to whom, and learned who could be trusted with information.

Once I understood the game that was played and had a clear sense of what I wanted out of it, I learned to play it to my advantage. Suddenly, I was winning more than I was losing.

We need to do the same—and more—for the digital village. We need to understand the players that control the current data ecosystem, figure out how they use our personal data for and against us, and identify the leverage we have (or need) to come out on top.

But merely becoming better at playing the game won't be enough. We need to redesign it.

Redesigning the Data Game

I have argued that the tension we experience in today's data-driven world is the same as the one our ancestors experienced two thousand years ago, or the one I struggled with in my village. But that's not entirely true.

While I was exposed to the prying eyes of villagers (and maybe their friends in the adjacent villages looking for juicy gossip), our digital behavior today exposes us to the entire world. The rules of the game have changed.

Growing up in a village, my neighbors knew a lot about me. But trust me, I also knew a lot about them. I knew who was struggling with alcoholism, who was unhappy in their marriage, and who was evading taxes. We all played the game as equals. We all paid the price, and we all benefited.

Today's data game looks nothing like this. Its rules are opaque, and its playing field is highly tilted. There are a few people and organizations that know an awful lot about many of us and that benefit greatly from this knowledge. We may get certain things from the exchange (free-of-charge search engines and social media, for instance), but we don't get reciprocal knowledge about the people and organizations that track us so zealously.

Even though the game we play in the digital village might have slightly different rules, the best starting point to stack the deck in our favor remains

the same. We need to understand what novel predictive technologies such as psychological targeting are capable of and collectively decide which applications are conducive to a thriving society, and which aren't. Once we do, it is within our control to design a system that amplifies the positive sides of psychological targeting and makes it work *for* us, instead of *against* us.

Mindmasters is an invitation to do just that—an invitation to join an informed, nuanced discussion of psychological targeting. Cases like Cambridge Analytica's alleged interference in the 2016 US presidential election (a story I helped break and will talk more about in chapter 5) have caught the public eye and informed much of the public debate on the topic.

My goal for *Mindmasters* is to pull back the curtain, separate narrative from facts, and offer a science-based account of psychological targeting. I will do so across three parts, each touching on an important puzzle piece of the overall process.

Part 1 takes you on a journey through how computers learn to translate your digital footprints into intimate predictions of who you are: your personality, sexual orientation, political ideology, mental health, moral values, and more. We'll open a digital window into our psyche by entering the worlds of deliberately shared identity claims (e.g., Facebook likes, social media posts, and pictures) and innocuous behavioral residue (e.g., Google searches, credit card data, and GPS records). And we'll explore the role of contextual cues in giving away information about who we are at any given point in time.

As we open the black box and look under the hood of some of the AI-powered predictive models that my colleagues and I have built over the years, you will realize that it doesn't take rocket science to translate what we do online to who we are on the inside.

To be clear, computers don't necessarily need to translate your behavior into psychological profiles to know you intimately and interfere with your choices. Many of the potential benefits and dangers I discuss in later parts of the book apply to the use of personal data more broadly. But cases like Cambridge Analytica have caught the public imagination because they allow us to relate to our data in a fundamentally human way. You don't think of

yourself as a combination of spending records, GPS-tracked longitude and latitude coordinates, and Google searches. You think of yourself as extroverted or introverted, liberal or conversative, and cooperative or competitive.

Part 2 directly builds on the insights from part 1 to discuss the glaring "So what?" question. Why should we care about the proliferation of technologies like psychological targeting? What does it mean for us—and society at large—that algorithms can decode the inner mental lives of millions of people and alter the way they think, feel and behave? Should we be scared or elated?

I will argue that we should be both. As the tech historian Melvin Kranzberg famously said: "Technology is neither good nor bad, nor is it neutral."[2] The exact same mechanisms can be used to accomplish diametrically opposed goals. By tapping into your psychology, I can get you to buy products you might not need, but also to save more money for a rainy day. I can exploit your emotional vulnerabilities but also help you overcome them. And I can reinforce your existing worldviews but also encourage and enable you to expand them.

The impact of psychological targeting ultimately depends on *us* and the choices *we* make. At its worst, psychological targeting manipulates, exploits, and discriminates. At its best, it engages, educates, and empowers.

As advanced AI technology—including generative AI—makes the creation and targeting of hyperpersonalized content easier than ever before, we need a clear vision for how to amplify the opportunities afforded by psychological targeting while mitigating its risks. That's what part 3 of the book is all about. How do we redesign the data game to create a better future for all of us?

I will argue that creating this future requires us to return to the village. Not literally. No need to pack your bags, take the kids, and move to your version of Vögisheim. I'm talking about small village-style communities designed to help you manage your personal data. Entities that are legally obliged (e.g., through fiduciary responsibilities) to act in the best interest of their members. A data trust or data co-op.

Today's data landscape is simply too complex to fight this fight alone. I might have been able to look after myself in the game we played in the village, but I don't stand a chance in today's global arena. And neither do you. No one has the knowledge, time, and energy to manage their personal data all by themselves.

We need allies. Like-minded people who have similar interests and share the same goals. Expectant mothers, for example, sharing their medical and biometric data with one another to figure out the best nutrition for a safe pregnancy. Or educators pooling performance data from their classrooms to develop more effective teaching strategies.

Unlike village neighbors, your digital allies don't have to live in the same place as you. Technology solves that problem (and many more, as I will describe in more detail later). With about eight billion people around the world, you will eventually find someone with the same problems and values as you.

What I am suggesting isn't simply a return to the old ways of the village. It's not just a one-to-one translation of tried-and-tested solutions to a new problem. The game we play online today is different from the game I played in Vögisheim, and so are the solutions. The good news is that if we get this right, we might be able to have it all: the benefits that come with letting others into our lives without the costs of losing our privacy and self-determination.

Although *Mindmasters* centers around data and technology, it is, at its core, an exploration of the human experience: how we want to both reveal and conceal, how we gain and lose by letting others into our lives, and how new technologies like psychological targeting require us to rethink the social contract. It's as much an attempt at sharing my learnings with you as it is an invitation for you to join the conversation. To become part of redesigning the game.

PART ONE

DATA IS A WINDOW INTO OUR PSYCHOLOGY