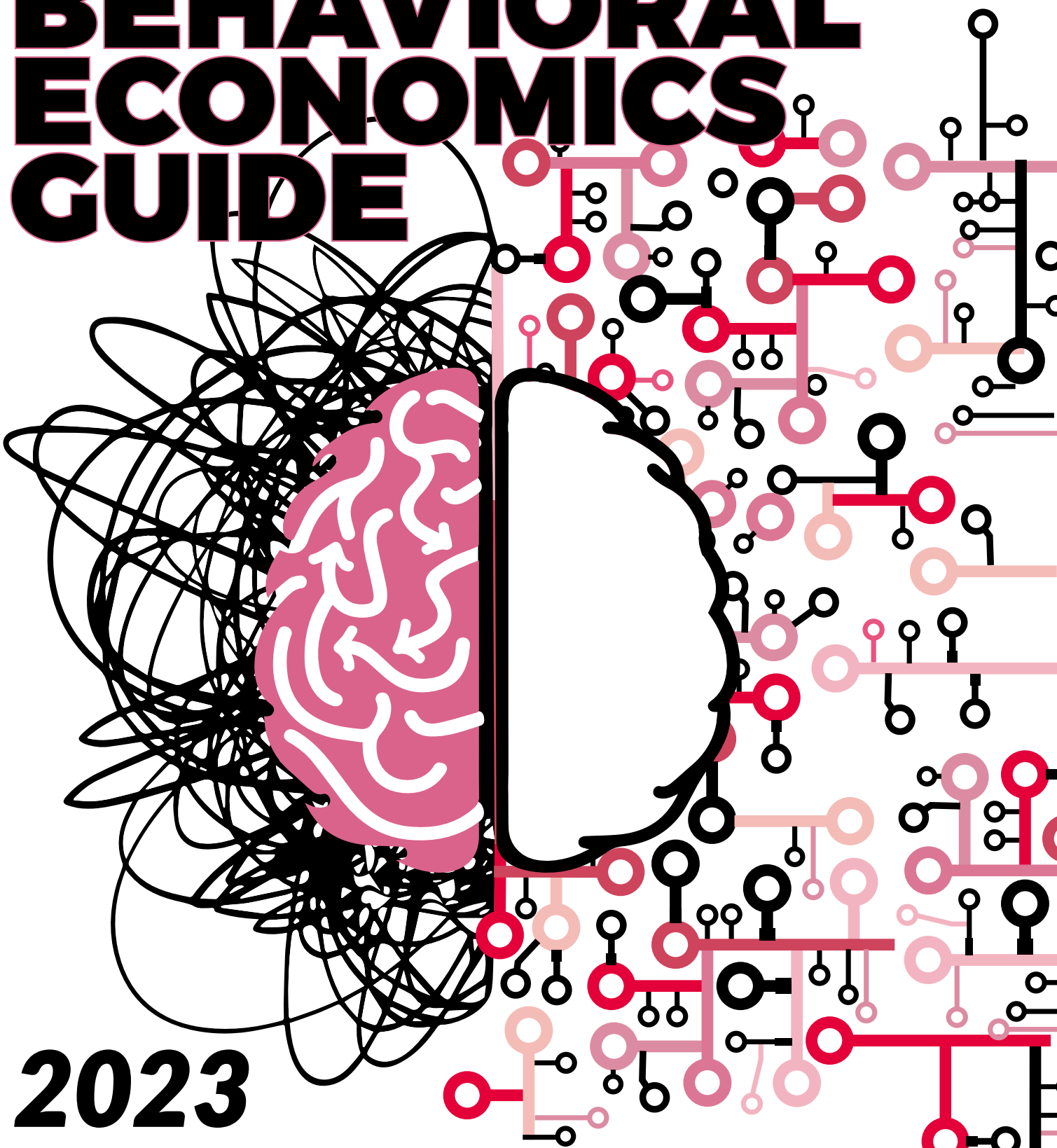
THE BEHAVIORAL ECONOMICS GUIDE



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About the Cover Design

The cover of this year's Behavioral Economics Guide was created by Julie Boake, the winner of a design competition held to mark the 10th anniversary edition of the BE Guide.

Julie Boake describes herself as *an award-winning graphic designer, marketing professional and middle child, behavioural economics enthusiast and the owner of Awedity Creative Inc.*

Describing her artwork, she notes that *the design is meant to highlight our two sides of our thinking, both the logical and emotional (which can be somewhat messy), but they somehow still work together.*

INTRODUCTION

Creative Choices

SHEENA IYENGAR AND WILLIAM DUGGAN

Columbia Business School

Behavioral economics has made great strides in understanding how people make choices, good and bad, among known options. It has not, so far, dealt with how to create new, meaningful choices beyond those known options. These creative choices are the seeds of what economists call "innovations."

We can see this distinction between known and creative choices in some of our own work. The well-known jam experiment showed that more choice is not always good. The more jams there are to choose from, the more people walk away and buy no jam at all (Iyengar & Lepper, 2000). Since then, others have gone on to show similar results in a wide variety of situations. This fits the method of behavioral economics more widely: we offer people known choices and measure how they react. It's the only way to achieve statistically significant results.

For creative choices, economists defer to Joseph Schumpeter (Harper, 2020), who observed that "Innovation is new combination of old ideas." The study of successful innovators shows this to be so. Henry Ford combined the existing elements of the Oldsmobile stationary car assembly line and the moving line of a slaughterhouse to make his new moving assembly line. Picasso combined the distorted volumes of color in Matisse's *Happiness of Life* with the angular distortion of African sculpture to make his new style of Cubism. Nancy Johnson combined a wooden bucket, a hand crank, wooden spatulas, and a bowl of heat-resistant pewter to make the world's first ice-cream machine. And so on, across the world and through the ages.

The question remains: how did these innovators make their creative choices? They found new ways to combine old elements to solve their respective problems – but how did they do it, exactly? Until recently, that mental method remained a mystery, or even seemed like magic. But now, thanks to modern neuroscience, we have a new model of the brain that shows how it actually works to come up with new creative choices.

The most common name for this new model is "learning and memory." A journal by that name began in 1994, and Eric Kandel won the Nobel Prize for his work in this new field in the year 2000. Brain scans and other research methods reveal that the brain acts as the greatest inventory system on earth. It takes in different pieces of information, stores them on various shelves of memory, then selects and retrieves different pieces to combine and recombine until it hits upon a combination that solves the problem at hand.

The more familiar the problem, the faster the answer. The reason is simple: the brain gets used to drawing that piece from that shelf for that problem. The result is habit or expertise. Behavioral economics shows situations where this familiar response can go astray. But what about unfamiliar problems, or new solutions to familiar problems? For that, you need to add new pieces onto the shelves of your memory to enrich the possible combinations your brain can make. In practical terms, you search beyond your field of expertise to find what you need. Think of Ford and the slaughterhouse, Picasso and African art, Johnson and the special properties of pewter.

This process of searching for prior examples both in and out of our domain of expertise determines the overall quality and level of creativity of new ideas. We are now able to formalize the steps of search and combination to match closely what happens in the mind of innovators when they get their new ideas. Mystery solved. Anyone, anywhere can use the same method for any problem they might face.

We call this method Think Bigger (Iyengar, 2023). To "think big," you draw on as much of your expert knowledge as possible. To "think bigger," you search beyond your expert knowledge to find elements to assemble in a new, creative combination. These sources can be from anywhere: a slaughterhouse, an African sculpture, or a pewter bowl. You search for relevant sources according to the problem or

situation you face where you want a new idea. You break down the problem into pieces, and then one by one you take each piece and search widely for examples that have already solved that part of the puzzle. These examples become the material for your new combination.

We can contrast Think Bigger with the most popular current method of creative thinking: group brainstorming. In the same way that Think Bigger springs from recent neuroscience, brainstorming dates from the 1940s and fits the old model of creative thought as a mysterious power of the brain. All ideas are welcome, and somehow you or someone else in the group will toss out a good idea. Learning and Memory tells us where that idea comes from: your own experience.

To be more creative – to Think Bigger – you have to go beyond the experience of the people in the group to search a wider world. And Think Bigger has an immediate filter for what you find: it must have solved a problem for someone else at some other time. Ford, Picasso and Nancy Johnson took elements that already "worked" in some other domain. This raises the quality of your eventual combination. In brainstorming, there is no filter for quality. There is no filter at all.

At first glance, Think Bigger narrows your creative choices. In brainstorming, you can toss out an unlimited number of ideas. In Think Bigger, if your problem has five parts, and you find an average of 5 relevant examples for each part, then you have only 25 pieces to select from to put together your solution. Even so, that makes 3,125 possible combinations. That's certainly narrower than the infinity of brainstorming, but it still leaves a wide field for creative variation.

On the one hand, Think Bigger is a new method, based on the new science of Learning and Memory. On the other hand, it's a very old method indeed. It's the closest we can come at this point to matching how innovators have come up with their creative choices throughout human history. The great polymath Henri Poincaré (1908) summed it up this way:

> *Invention consists in avoiding the constructing of useless combinations and in constructing the useful combinations which are an infinite minority.*

Poincaré himself is perhaps the most famous scientist never to win the Nobel Prize. He made advances in many branches of physics and mathematics, by applying the method we now recognize as Think Bigger.

Here is a corollary to Poincaré's statement: "To choose is to invent." Invention is not the work of only geniuses and so-called "madmen." The act of choosing itself requires engaging in invention and re-invention. Encouraging others to choose enables them to invent. And showing others how to choose well, with attention and practice, leads to the discovery of infinite possibility in that infinite minority.

We conclude with a summary of the six steps of the Think Bigger method.

Step 1: Choose the Problem

The first step is to choose the right problem to solve and to understand it well. The problem must be hard enough that no one has figured it out before but not so ambitious to the point that its solution remains a fantasy. Some problems are too big to solve with the current state of human knowledge and some are too inconsequential to make it worth the effort.

For example, during the COVID-19 pandemic, Stacey Boland and her team at NASA's Jet Propulsion Laboratory asked themselves whether there was anything they could do to help. They narrowed down the problem from "COVID" to "ventilator," and then to a "certain kind of ventilator." In the end, their solution was the VITAL ventilator, which could be used anywhere at any time due to its small, portable size. Hence, Step 1 of Think Bigger helps you solve this very first problem: how to choose the right problem to solve. As Steve Jobs put it "you have to be burning with an idea, or a problem, or a wrong that you want to right. If you're not passionate enough from the start, you'll never stick to it."

Step 2: Break It Down

The second step is all about breaking the original problem into its subproblems. Make a long list of subproblems and then pare it down. There are usually five to seven key subproblems, because that's about as much complexity as the human mind can handle at one time.

As an example, notice how Henry Ford broke down his original problem, how to make the car affordable to the average person, into the following subproblems:

- How to reduce the cost of labor?
- How to reduce production time?
- How to reduce the cost of materials?

Step 3: Compare Wants

Before searching for elements of a solution, it's important to step back and understand the big picture. Identify what you, the target, and any additional and relevant third parties really want from the solution to the problem. List the wants from all three, compare them, and then use that to help select from among the multiple solutions you create.

Bill Gates, for example, initially wanted a monopoly for the Altair, an early computer for which he wrote software. Unfortunately, the Altair didn't lead to the fortune he dreamed of. After briefly pursuing another goal (college) and attending an Altair conference, he switched back to his original want and saw a way to get back into the computer world with an even bigger idea. His focus shifted to what users and other hardware makers wanted: software that any hardware could use. By taking account of what these two groups wanted, Gates became the richest person on earth.

Step 4: Search In and Out of the Box

As mentioned, the most creative solutions will not only be based on in-domain precedents. It's important to look beyond the specific context of the problem and see what others have done across domains. Henry Ford didn't need an expert at meat processing to join his team: he took just one element, the moving line, as part of his own solution. Think Bigger doesn't try to merge disciplines or negotiate across them. It's non-disciplinary rather than interdisciplinary.

Ask yourself if anyone, anywhere, at any time, has solved one of your subproblems. If yes, how? Make a list of these solutions. Collect what works from multiple and disparate sources and even eras.

Step 5: Choice Map

We are now ready to combine and recombine different pieces of the puzzle; in and out of domain precedents to each of our subproblems. Lay out all of the pieces of the puzzle, combine and recombine, until they click into place. Innovators tend to highlight the one solution they put into action. But the reality is that they tried out different combinations, at least in their minds, before arriving at the best one. They tend to forget those previous permutations. Think Bigger brings them to the fore. Keep moving and turning the pieces around until the complete solution to the problem emerges.

Step 6: The Third Eye

The final step of Think Bigger is about going outside of your bubble and seeing what others "see". How does the solution differ from what's already out there?

The "third eye" is a real phenomenon of working memory where an image forms in one's mind. Don't ask for feedback or judgment about the quality of the idea. Rather, find out what others see in the idea which will help you see it better for yourself. This helps to determine if this is actually an idea that should actually be pursued.

The famous song *Yesterday* by the Beatles illustrates this well. According to the song's composer, Sir Paul McCartney, he woke up one day with the tune in his head. He initially added nonsensical words to the tune and sang it to various people. He wanted to make sure it was not a song that he copied without knowing, so he asked them if the tune reminded them of some other song. As he asked around, the song was a little different each time, and McCartney noted people's reactions. The song changed until it sounded right in his head.

The band initially wanted McCartney to sing the song alone with just his guitar, but the band's producer, George Martin, suggested adding a string quartet instead. McCartney didn't like the idea at first, but after listening to the result, it clicked. The story of *Yesterday* illustrates the Third Eye Test well. The ideas McCartney had from his own conception, plus the feedback from others, slowly melded together to become a new and improved product.

The six steps provide a concrete framework that will allow anyone to come up with their next big idea. Innovation is no longer a mystery. Each step of the Think Bigger method is completely within your grasp. It may not always work and it's not possible to solve every problem in our world right now. But Think Bigger shows that the process of coming up

with new choices and new ideas can be broken down, step by step, into something that anyone can pursue.

THE AUTHORS

Sheena Iyengar is the S. T. Lee Professor of Business at Columbia Business School, where she has taught since 1998. A graduate of both Wharton and Stanford, she is one of the world's experts on choice and innovation. Famously known for her "Jam Study," which transformed the way we think about products offered in the marketplace and how we curate them for customers, you may recognize her from one of her TED Talks, which have collectively been viewed nearly seven million times.

In 2010, her book *The Art of Choosing* received the Financial Times and Goldman Sachs Business Book of the Year award and was also ranked #3 on Amazon.com. Her second book, *Think Bigger: How to Innovate*, released in April 2023 has been hailed by The New York Times and Financial Times as a must read for business leaders and was ranked by Thinkers50 as one of 2023's Best New Management Books.

At Columbia Business School, Dr. Iyengar leads the innovation program and teaches "Think Bigger," a hands-on course where MBA students learn to think outside the box so they can solve big problems and come up with their best ideas. An award-winning educator, she earned the Columbia Business School Dean's Award for Outstanding Core Teaching and was named one of the World's Best B-School Professors by Poets and Quants. She is a 2002 recipient of the Presidential Early Career Award and was ranked as a top 50 global management thinker by Thinkers50. The Asian American Business Development Center ranked her as one of 2022's Outstanding 50 Asian Americans in Business. She also regularly appears (2019, 2021) on the Thinkers50 list of the Most Influential Business Thinkers. In 2012, she was recognized by Poets and Quants as one of the Best Business School Professors for her work merging academia with practice. In 2002, she was the only social scientist to receive the Presidential Early Career Award for Scientists and Engineers from the Office of the President.

Iyengar has given talks to over 200 companies and has spoken at Davos. She is regularly referenced in top tier media such as The Wall Street Journal, the Financial Times, The New Yorker, The Economist, Bloomberg Businessweek, CNBC, CNN, BBC, and NPR.

Iyengar holds a dual degree from the University of Pennsylvania, with a BS in Economics from the Wharton School and a BA in psychology from the College of Arts and Sciences. She received her PhD from Stanford University.

In her personal life, as a blind woman, Iyengar intuitively used Think Bigger to find her calling and strives to inspire others to do the same.

William Duggan is the author of four books on innovation: *Strategic Intuition: The Creative Spark in Human Achievement (2007); Creative Strategy: A Guide for Innovation (2012); The Seventh Sense: How Flashes of Insight Change Your Life (2015);* and *The Art of Ideas (2020).* In 2007 the journal Strategy+Business named *Strategic Intuition* "Best Strategy Book of the Year." He has BA, MA and PhD degrees from Columbia University, and twenty years of experience as a strategy advisor and consultant.

Professor Duggan teaches innovation in three venues at Columbia Business School: MBA and Executive MBA courses, and Executive Education sessions. In 2014 he won the Dean's Award for Teaching Excellence. He has given talks and workshops on innovation to thousands of executives from companies in countries around the world.

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EDITORIAL

The Between Times of Applied Behavioral Science

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BING FENG

TD Wealth

In the 15 years since the publication of *Nudge* (Thaler & Sunstein, 2008) and the beginnings of applied behavioral science, the field has notched up a fair bit of success, and there are now about 600 behavioral units operating in government, business, and not-for-profit organizations. Yet, despite the growing acknowledgement of the centrality and value of the science, 600 units seems like the proverbial drop in the bucket against the backdrop of 333 million companies and 195 countries across the world. In this editorial, we look at the adoption of behavioral science as a specific case of an adoption challenge. We draw insights from prior work on why potentially blockbuster products and technologies take time to gain widespread acceptance (Gourville, 2006; Agrawal et al., 2022), in order to identify factors that influence adoption, to identify challenges in adoption, and to suggest approaches to mitigate these challenges. We close with five principles for moving applied behavioral science further along the adoption curve!

> *Every organization—regardless of industry, mission or location—shares a common quest: they are all in the business of changing human behaviour. (Soman, 2015, p. 19).*

Introduction

It is perhaps uncontroversial to say that this claim that one of us made eight years ago (Soman, 2015) is now accepted as universal truth. Governments, for-profit organizations, not for profits, startups, consumer protection agencies, financial market regulators, and welfare organizations all likely believe that a good understanding of behavioral science is critical to behavior change—and therefore to organizational success.

While the academic field of behavioral science is old, the publication of the 2008 book *Nudge* (Thaler & Sunstein, 2008) thrust it into the spotlight and made it an applied discipline. *Nudge* not only made the science accessible and understandable to the general public, but it also showed that behavioral science has a fundamental role to play in the success of organizations (Soman, 2015). Changing the situation in which decisions are made can change the choices that people make. The book made a case for reverse engineering this phenomenon and asked the following: can we create suitable situations that will steer people towards appropriate choices (a process they called "choice architecture"), without significantly changing economic incentives, persuasion attempts, or through legislations and restrictions? Utilizing numerous examples from a wide array of application areas, the book showed that organizations can use choice architecture to harness the science and help stakeholders make better choices (see also Johnson, 2021).

Nudge was followed by the birth of the first government behavioral science unit (then referred to as the "Nudge Unit" and subsequently as the *Behavioural Insights Team*, Halpern, 2015) by the UK government[2]. Subsequently, many other governments followed suit. The OECD estimates that there are at least 200

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2 The terms "behavioral science" and "behavioral insights" are often used interchangeably (see also Table 1). We view behavioral science as the process (e.g., the use of literature to generate hypotheses and experiments to test them) and behavioral insights as the outcome of the science (e.g., use of prior results, empirical generalizations). We use the term "science" throughout, except when the term "insights" has been explicitly used by others.

different units across 40+ countries working in the areas of public policy and citizen welfare (OECD, 2023), whilst another survey documents about 600 behavioral science units operating in governments and businesses (Wendel, 2020). It is tempting to conclude that applied behavioral science has been a success in organizations and to thus rest upon our laurels.

However, when one considers the fact that there are an estimated 333 million companies (Clark, 2022) and 195 countries worldwide, 600 units seems like a miniscule drop in the bucket. Note that we do not claim that an organization must have a dedicated behavioral science unit to say that it uses the science. Even if one in ten organizations that use the science have a unit, we are still left with just a proverbial drop! If behavioral science is as influential and as central to the success of an organization, why has it barely scratched the surface when it comes to organizations globally?

The Adoption Challenge

To answer this question, we turn to what we know more generally about the adoption of innovations. We believe that the hesitation shown by organizations in embracing behavioral science isn't unique to behavioral science. Indeed, we see some of the same challenges in the successful adoption of electric vehicles by consumers, artificial intelligence by firms, and even electricity by society. We ask the question: why might organizations (or customers) not adopt innovations (products) that might have clearly demonstrated benefits? What might the barriers to adoption be, and how might they be overcome? In studying this problem through a marketing lens, the first question to think about is, "What exactly is our

Table 1: Applied Behavioral Science as a Product

Features	Positioning Statement
What is it?	*The use of behavioral science as a process to result in products, systems of interventions to create behavior change* (adapted from Wallaert, 2021). This is also referred to as *Behavioral Insights* (Hallsworth, 2023). This working definition allows for various elements of the scientific process (e.g., synthesis or literature reviews of past research, hypothesis generation, lab or field experiments) to create any output (e.g., new or redesigned product, service delivery system, internal or external processes, choice architecture interventions), as long as the ultimate goal is behavior change.
Core benefits	Decision-making is evidence-based, and if evidence is collected in the right context, it may generate better (more relevant) results, especially when environments are not stable over time or in a given situation.
What value does it add?	It augments and improves upon other (competing) approaches to making decisions. These might include: 1. Decisions made by managerial judgment 2. Resorting to "tried and tested" approaches, precedence-based decisions 3. Use of non-evidence-based (or theoretical) approaches 4. Decisions made by consultation with end-users or other stakeholders 5. Decisions made using surveys that measure attitudes, intentions, or liking 6. Decisions suggested by experts, consultants, or other agents 7. Other forms of "rule- or norm-based" decision-making (e.g., being consistent with corporate strategy)

product, and what does it do?" (see Table 1).

The psychology behind new product adoption was discussed in an excellent treatise entitled "Eager Sellers and Story Buyers" (Gourville, 2006). Gourville argues that the advocates of any innovation (here, behavioral science) have garnered sufficient evidence to showcase its value. They are well versed with how the science works, how it can be used within organizations, and the processes needed to make it succeed, and they have personally tasted success. However, they might not be sensitive to the fact that other organizations might operate in different circumstances than theirs—and consequently not value the innovation as much. Advocates often wrongly assume that organizations will leap at the chance to embrace behavioral science.

In using an innovation, the adopter gets something new (gets a "gain") in exchange for something they already have (a "loss"). These losses often take the form of discomfort of moving away from familiarity or losing an extant feature. In addition, the adoption of behavioral science also involves costs, which might include learning costs (training existing staff to do things differently and building appropriate processes), resource-building costs (hiring people, developing scientific capacity), and time costs (science usually takes longer to deliver answers than other approaches). Perhaps more so than individuals, organizations find comfort in familiarity, as processes become etched into routines, accounting and finance systems, compliance procedures, and other forms of rituals—and they are slow to change. Organizations also run on timelines that are not kind to science; while good science is slow, iterative and thoughtful, most practitioners have hard and non-negotiable deadlines to work with.

Innovations will be adopted if the gains are salient (even if small) and the costs of adoption (e.g., changes in processes) are small. As an example, if an applied behavioral science unit provides internal consulting services to a marketing communication or a program team on what the science would say about message design, there is a potential benefit without much of a cost to the communications or program team. Table 2 uses terminology from Gourville (2006) and captures four situations as a function of the benefit of behavioral science as well as the costs required to use it.

From Easy Sells and Quick Wins to Fundamental Innovations

Much like the simple claim at the beginning of this article, three of our University of Toronto colleagues begin their most recent book with another uncontroversial claim, namely, "Electricity has changed our society. It changed the way we live. It also changed the way we work" (Agarwal et al., 2022). They also showcased the fact that while electricity is all around us and it is hard to imagine a world without it, it took a good amount of time (40 years at the least) for its benefits to be experienced widely. When electricity was first introduced, the incumbent competitor was the steam engine. The immediate opportunity for the former was to provide an alternative source

Table 2: Four Approaches to Adopting Behavioral Science

Situation	Benefit	Cost	Example
Easy sells	Small	Small	Internal behavioral science consulting
Sure failures	Small	Large	Requiring an RCT to test for a product that is already a top-seller
Long haul	Large	Large	Using behavioral science to overhaul design, segmentation, recruitment, compliance (or other) processes
Smash hits	Large	Small	Behaviorally informed products or programs (e.g., Save More Tomorrow, Self-Control Products). Using quick online experiments to help a product that is struggling

of power in manufacturing factories by replacing the latter, and electric engines did this at a lower cost and were more efficient and tidier to operate, which in turn created immediate economic value (Soman & N-Marandi, 2022). Factories that used steam engines could now replace them with electric engines, thereby resulting in cost savings. The authors refer to these as "point solutions", i.e., situations in which a new innovation is able to improve a specific part of an existing process, without any need to change the process itself. In our world, using an internal behavioral scientist or a quick online experiment to test a behavioral assumption, rather than calling in a consulting or market research agency, is one such point solution, because it is an easy sell for the science and a quick win for the organization.

However, electricity had other benefits. For instance, electrical power could be stored and used later, therefore eliminating the need to run an engine precisely at the time at which power was needed. Furthermore, electric power could be generated and transmitted over great distances, thus removing the need for engines to be co-located in the place where power was required. This created new uses of power (e.g., household lighting) and also allowed for the nature of manufacturing to change over time. It was now possible to redesign factories so as to streamline the movement of materials without them being disrupted by steam engines and associated belts and pulleys on the shopfloor. The resulting benefits could only be accrued if the design of the workplace itself changed completely. This is referred to as a "system solution", i.e., the idea that an innovation is valuable but only if changes to the basic operating procedures are made.

History has shown that organizations that use innovations for point solutions alone might not win in the long run. BlackBerry was once a leader in the advanced phone space, controlling 20% of the global smartphone market; however, the launch of the iPhone in 2007 led to the ultimate demise of this giant. Despite being one of the first smartphones, BlackBerry failed to adapt to the changing needs of the smartphone market (McNish & Silcoff, 2015), and its core capabilities (security, operating system, and hardware) became its core rigidities that prevented radical transformation (Leonard-Barton, 1992). The iPhone didn't simply make an existing system better—it completely restructured what a phone was by adopting a "system solutions" mindset.

Behavioral science could similarly create significant system changes, because it has the potential to fundamentally change the product or service design process (Trump et al., 2020). As a concrete example, a whopping 98% of people read online reviews for local businesses (BrightLocal, 2023). Thus, designing consumer feedback systems that actually help ease shoppers' decision-making processes and lead to desirable outcomes is imperative. Among different configurations of rating systems, the 5-star scale is one of the most popular types; albeit shoppers assign different meanings to the same scale (Yu et al., 2022). While some users really prioritize 1- and 5-stars, others perceive 2-stars to be just as negative as 1-stars and 4-stars just as positive as 5-stars. These distinct interpretations lead to different behavior patterns when deciding between alternatives. This variation really manifests itself when choosing between two options with the exact same average rating and numbers of reviews and differing only in the mix of star ratings they have received. This knowledge has great potential to inform system-user design and is only uncovered through behavioral data.

In addition, the dynamic nature of human behavior in different contexts could call for heterogeneous solutions, and it could even change the manner in which decisions are made within organizations. These are significant sources of value, but they will take a lot of time and patience to accrue. Agarwal and colleagues poetically refer to this passage of time as *The Between Times* (Agrawal et al., 2022, p. 3).

While on the subject of electricity, we note two features of the state of that innovation today. First, with a few minor exceptions, it is available everywhere and is not concentrated in a relatively small number of central pockets. Second, it gets no (or very little) credit for value-creating inventions that it has enabled. Eventually, we suspect that when behavioral science is completely embraced by organizations and the end of its between times, these two properties will also hold, and it will become a true enabler of value creation—a means to an end beyond the science.

What does this mean for behavioral science? Well, behavioral science can clearly offer point solutions. We can imagine that the use of simple experiments can allow marketers to design better communication

campaigns, governments to design better programs and policy, or charities to design campaigns that maximize donations. None of these changes fundamentally changes the way in which the organization operates, but behavioral science has the potential to be a disruptive force that entirely reshapes an organization's value creation processes, such as design (as discussed earlier) or segmentation (Soman & Kwan, 2022). It could also fundamentally change the way in which organizations think about issues ranging from online privacy (Kim et al., 2021) to regulatory governance (Drummond, Shephard & Trnka, 2021). To achieve this aim, we believe that organizations need to go beyond point solutions and embrace system solutions (see Feng & Soman, 2021). These promises direct us back to our initial question of why, despite its fundamental importance to organizational successes, the adoption of behavioral science is not as prevalent as we would have hoped. Is it just a matter of waiting out *The Between Times*? Furthermore, what factors influence the organizational adoption of behavioral science?

Factors Influencing the Organizational Adoption of Behavioral Science

Based on our reading of the literature, we identify four categories of factors influencing the adoption of behavioral science: psychological, technological, organizational, and environmental. The section below explains these four factors in detail, and Table 3 provides an overview.

Psychological Factors

Employee resistance is one of the most frequent root causes for failing to implement innovation, and it is responsible for almost 70% of organizational failure in relation to innovative efforts (Burnes & Jackson, 2011).

Perceived Switching Cost

People's behavior is driven by their psychological reactions to gains and losses instead of objective gains and losses; thus, perceived switching cost can be an innovative effort's worst enemy or best ally. To activate and sustain change, the benefits of the designed change should be perceived subjectively higher than the benefits people must give up (Gourville, 2004), whilst being behaviorally informed means organizations forgo stability and predictability for a change of mindset and approach. One way to reduce employees' perceived switching cost is to build upon their current behavior as opposed to requiring entirely new behavior.

Interpretation of Change

Sometimes, employee resistance may not be due to the changes that leaders of an organization plan to make per se but how these changes are interpreted by the employees, which can be shaped by the leader-member exchange relationship (Furst & Cable, 2008; Erwin & Garman, 2010). Employees will be more reluctant to cooperate if they interpret adopting behavioral science as a denial of their competence or an effort to replace them with behavioral scientists.

Information Asymmetry

Behavioral science advocates may fixate so much on the successes of behavioral science that they fail to recognize and anticipate the skepticism and unfamiliarity others may experience. Just as early adopters and early majority adopters live in totally different worlds, applied behavioral science enthusiasts may overweight its expected benefits (due to reasons such as publication bias), whereas outsiders—practitioners that are not close to the science—may overweight the benefits of the existing solution.

Technological Factors

Technological factors refer to the available resources important to an organization, both internal and external. Herein, we divide them into two groups: 1) behavioral science know-how ("tools") itself, which comes with human resources, and 2) technology used to administer and scale the science.

Technology Readiness

Technology readiness consists of infrastructure and professionals with relevant expertise (Zhu et al., 2006). For organizations that are thinking about establishing internal behavioral science units, infrastructure is especially crucial in two dimensions: 1) space and time, to explore what the right team structure would look like, and 2) data structures

Table 3: Factors Influencing the Organizational Adoption of Behavioral Science

Type of Factor	Factor	Factor Meaning
Psychological	Perceived switching cost	The gains of the designed change should be *perceived subjectively* higher than the losses of giving up old behavior
	Interpretation of change	The intention of change should be interpreted as positive as opposed to negative
	Information asymmetry	Avoiding the curse of knowledge by recognizing others' unfamiliarity with behavioral science and listening to their concerns and skepticism
Technological	Technology readiness	Talents who understand how to apply behavioral science and infrastructure that supports the application and scaling
	Technology integration	Interconnectedness of technologies, applications, and solutions that justifies and necessitates the adoption of behavioral science
	Legitimacy	Security measures, procedures, and guiding principles to ensure ethical application of behavioral science
Organizational	Senior buy-in	P&L leaders who believe in and have personally witnessed and experienced the benefits of behavioral science are great allies in terms of leading and supporting the adoption of the science
	Value alignment	Aligning stakeholders' value systems by starting from a shared reality (e.g., satisfying citizens and customers, increasing profitability, achieving sustainability)
	Inertia	A tendency to resist efforts to change when the existing solutions still work. Disruption (both internal and external) creates momentum for the adoption of behavioral science
	Exposure and dissemination	A lack of exposure to behavioral science and its potential preempts the possibility of adopting it. Behavioral scientists should help get the word out to a wider audience, and organizations should keep an open mind and seek more opportunities to learn about behavioral science
Environmental	Mimetic pressure	Witnessing competitors' successes with their own behavioral science practices motivates organizational adoption of the science. A high level of similarity to early adopters of behavioral science can also encourage adoption
	Coercive pressure	The dependence between a target organization and other organizations. Clients' needs for behavioral interventions may accelerate the adoption of behavioral science
	Normative pressure	Values, norms, and expectations shared among an organization's social network, which at some point may turn a behavioral science practice into a must, in order to fit into a broader social structure

for easy access, retrieval, and segmentation. On the people side, being a behaviorally informed organization requires people that not only know behavioral science, but also understand how to apply it in practical contexts. A successful behavioral science practice requires individuals who understand the nuance of human and organizational behavior and internalize the dos and don'ts (Soman & Feng, 2023) of running a healthy, behaviorally informed organization.

Technology Integration

Technology integration highlights the degree of interconnectedness of various technologies, applications, and solutions, and while behavioral science may not be the solution to any problem, it is an essential part thereof (Nesterak, 2021). A mix of behavioral science and other existing capabilities within an organization is likely to yield synergetic rather than additive outcomes. In our interviews with leading behavioral science practitioners, we have learned that those with extensive behavioral knowledge collaborate frequently with other talents such as data scientists, designers, and change management experts. Leadership of the practices has also proactively created offerings that leverage behavioral insights in capabilities such as customer insights and post-merger integration. These examples demonstrate how behavioral science is a necessary but not sufficient ingredient for creating sustainable value for stakeholders. The presence of other closely related capabilities helps justify and accelerate the development of a behavioral science practice.

Legitimacy

An organization may have concerns over its ability to address issues related to ethics and privacy. Critics hold that choice architecture can clash with central moral values such as liberty, autonomy, and dignity (Schmidt & Engelen, 2020), and organizations may worry about stakeholders' reactions to behavioral interventions and/or detailed behavioral data collected for testing purposes. A lack of proper security measures, procedures, or guiding principles to ensure ethics and protect privacy tends to deter organizations from adopting behavioral science.

Organizational Factors

Organizational factors refer to characteristics of an organization such as scope, size, and managerial structure (Oliveira & Martins, 2010), as well as concepts such as beliefs, values, and attitudes (Ostroff et al., 2013; Bunch, 2007). While we acknowledge the influence of the former on the adoption of behavioral science, we focus herein on the latter.

Senior Buy-in

The ability to secure top-down buy-in is fundamental to organizations adopting behavioral science. Moreover, it is key for leaders to understand its value proposition, and having believers at the leadership level significantly expands awareness and promotes the use of behavioral science. According to our conversation with a leading behavioral science team in a for-profit organization, one effective way of encouraging the adoption of behavioral science is to find P&L leaders who believe in and have personally witnessed and experienced the benefits thereof.

Value Alignment

Alignment between the values underpinning the change, the values of people implementing the change, and the values of those affected by the change accelerates the adoption of behavioral science (Burnes & Jackson, 2011). If stakeholders are allowed to participate in change decisions in a manner that makes sense to them, and they are given the opportunity to understand how a change process relates to their beliefs, they cooperatively engage in it (Burnes, 2015). Furthermore, the adoption of behavioral science can be facilitated if stakeholders have a firm belief that a behavioral lens leads to solutions that suit "humans" rather than "econs" (Thaler & Sunstein, 2008). Even when stakeholders might not on board immediately, proponents of adopting behavioral science need not feel defeated—the key is to start by finding common ground, no matter how narrow may be. There are many common organizational goals and levels of value—such as satisfying customers and citizens, increasing profitability, and achieving sustainability—that can create a common platform on which to discuss behavior change. Skepticism and reluctance to adopt behavioral science do not necessarily mean opponents discount its value, and they definitely should not be taken as an attack on

either the science or its practitioners.

Inertia

If it is not broken, don't fix it. This common adage in organizations arises when the loss of giving up on the familiar looms large. Organizations are prone to inertia; that is, they tend to resist efforts to change (Hannan & Freeman, 1984), and this reluctance is most prevalent among complex or opaque organizations. Existing resources and capabilities can act as barriers to innovation, and disruption creates momentum for change. In one organization that we have worked with, the establishment of a behavioral science unit was accelerated by an internal disruption. Conversely, a lack of any disruption might result in low motivation to embark on a behaviorally informed journey. One way out of the rut of inertia is to adopt a long-term perspective (Holland et al., 2019), shifting the focus from replacing existing solutions to old problems to generating new solutions to emerging problems.

Exposure and Dissemination

Sometimes, the reason for a lack of adoption can be as simple as the lack of familiarity and relevance on the part of potential adopters. There has been a rapid growth of behavioral science units since the 2018 Behavioral Exchange Conference (BX2018) in Sydney, and many other conferences and publications have also help get the word out. When the organizational application of applied behavioral science first started, it was mostly in the realm of government (OECD, 2017), but now these applications can be found in various domains, including healthcare, financial services, and product development. A lack of exposure can be the result of active choice (I do not want to know) or passive selection (the knowledge is not available) and if organizations are not exposed to the latest approaches and frameworks, they have no avenues to learn about behavioral science and how they can leverage a behavioral lens. In order to maximize the likelihood of exposure, we thus believe that applied behavioral scientists need to showcase their capabilities, not just at specialized conferences like Behavioral Exchange, but also at conferences with a broader appeal. If behavioral science wants to solve marketing, operational, policy, or poverty problems, it should feature in forums where the top leaders in those respective fields are to be found. On the other hand, we also encourage top leaders or organization representatives to attend (whenever possible) conferences/workshops where new trends and applications in the science are often discussed.

Environmental Factors

Environmental factors influence the context in which an organization conducts its business. They are external to an organization and include the industry itself, its competitors, resources supplied by other entities, end-users, regulations, and relationships with the government (DePietro et al., 1990; Zhu et al., 2006).

Mimetic Pressure

Mimetic pressure arises when organizations try to model successful peers, seeking superior performance in competition (Latif et al., 2020). These early adopters can either be groups within the broader organization or groups from outside. An organization is usually motivated to follow earlier adopters of a given practice for at least two reasons: 1) outcome-based imitation, when other adopters have shown favorable results from the new adoption, and 2) trait-based imitation, when it shares important attributes with earlier adopters (DiMaggio & Powell,1983). Many successes have been documented across a wide range of behavioral science applications, from internal organizational structures to external client engagements. Through our conversations with various behavioral science units, we learned that these successes attract attention from not only stakeholders, but also competitors. Competitors' successes fuel a strong interest in incorporating behavioral science in organizational problem-solving.

Coercive Pressure

Coercive pressure highlights the dependence between a target organization and other organizations. It is exerted by both government authorities and non-governmental organizations such as suppliers, customers, and the parent corporation (DePietro et al., 1990; Teo et al., 2003; Roxas & Coetzer, 2012). Government mandates and regulatory policies are key drivers of coercive pressure, presenting both opportunities and constraints for organizational change and innovation efforts. Green economic policies require a large-scale mindset and behavioral change to address climate change and sustainability, where behavioral science is necessary. Dependence

on customers stems mainly from those that account for a majority of sales (Teo et al., 2003). As a result, witnessing an increase in the number of projects calling for behavioral interventions can be a catalyst for introducing a behavioral science capability.

Normative Pressure

Normative pressure originates from values, norms, and expectations shared among an organization's social networks (Son & Benbasat, 2007). A wide range of sources may impose normative pressures, including trade associations, professional associations, accreditation agencies, and channel members (Grewal & Dharwadkar, 2002). Through both direct and indirect interactions with various members of social networks, organizational decision-makers learn about the good, the bad, and the ugly of certain practices. A great magnitude of adoption within the network is interpreted as signaling the value and legitimacy of an organizational practice, even if it is still questioned by some actors in the institutional environment (Sanders & Tuschke, 2007). As the number of organizations adopting behavioral science increases, this adoption may be perceived as normatively appropriate for businesses in the same network. At some point, adopting behavioral science may simply become the right thing to do, because it fits into a broader social structure (Li & Ding, 2013).

Moving Behavioral Science Further Along the Adoption Curve

Agrawal et al. (2022) use the description "plenty of enthusiasm, but not much to show for it" to describe "the between times" in electricity and artificial intelligence. In the context of applied behavioral science, we believe that while there is a fair bit to show, the untapped potential is very significant by comparison. Is there anything other than waiting out the "between times", and can this period be shortened? Indeed, if something like electricity (without which we cannot imagine life today) took at least 40 years to be accepted, what chance does applied behavioral science have in a mere 15 years since the publication of *Nudge*? We discuss different approaches organizations can take to take advantage of behavioral science. These guiding principles help accomplish fundamental innovations and ease adoption and application, and depending on organizations' psychological, technological, organizational, and environmental contexts, they can determine specific steps that run consistent with these principles.

Start With Easy Sells (Row 1, Table 2; Small Benefits, Small Cost)

Change does not happen overnight. One strategy to work towards the adoption of behavioral science is to start with small and easy wins and roll it out gradually. Organizations could begin by auditing their current business processes and identifying potential areas that need a point solution and others that need a system solution. For example, in the sales and marketing function, behavioral scientists could advise and change the language of their website, their marketing campaign message, and the design of the loyalty program to increase the customer acquisition and retention rate. Behavioral interventions and point solutions can be easily implemented to drive short-term success. Other system solutions, such as changing the face-to-face sales process to online sales, rebuilding the delivery of training, and redesigning an operating model, will take longer to trial by behavioral science. Additionally, organizations could focus on point solutions to help demonstrate proof of concept before jumping into system solutions. Early wins also serve as good use cases and as advertising for the value that behavioral science can bring to the organization.

Don't Forget the Smash Hits (Row 4, Table 2; Large Benefit Small Cost)

Smash hits are usually high-impact solutions that do not require the adopting organization or the end-user to do things dramatically differently from what they are used to doing. They often take the form of behaviorally informed products (Soman & Ly, 2018), and while they may sound too good to be true, examples do exist, such as the Save More Tomorrow (SMarT) program (SMarT; Thaler & Benartzi, 2004), which encourages people to commit in advance a portion of their future salary increases towards retirement savings. This behavioral intervention includes three key components to circumvent human biases: 1) a commitment to save in the future to avoid present bias, 2) a linkage between planned increases in saving rates and future pay rises, to minimize the influence of loss aversion, and 3) enrollment in

the program unless actively opting out by making good use of inertia. Given the relative ease of implementing this program, SMarT became part of the Pension Protection Act of 2006 and has helped over 15 million Americans effortlessly increase their retirement savings. This classic example shows that designing programs that avoid or capitalize on human tendencies can have an outsized impact. Another recent example comes from a large Australian bank that introduced a feature called "Benefits Finder" on their webpages and app (Commonwealth Bank, 2023). The initiative removed sludge (Soman et al., 2019) and made it easy for individual and business customers to find government benefits, rebates, and concessions that they might not have otherwise thought about. A third smash hit is a website and an app called stickK (www.stickk.com; Ayres & Nalebuff, 2010), which is designed to use the principles of pre-commitment coupled with monetary or psychological contracts to get people to achieve goals they have been putting off. On the day this sentence was written, people had put a total of $62 million on the line (stickK, 2023), qualifying stickK as a smash hit!

Find Allies Who Can Be Advocates for the Behavioral Science

Not all stakeholders will effortlessly embrace the adoption of behavioral science, so it is important to spot allies that can support and champion the idea and help make a case to apply it in the organization. These allies can be individuals and teams who understand the science and therefore can assist with regular tasks of applying behavioral science to point and system solutions. They can also be senior management members who will support the initiative and help sell the idea to other business divisions and units that are willing to partner and work together to make the long-term changes. Online tools can help in identifying and creating allies (MindTools, 2023). To seek internal allies, one can start with employees with a more experimental or evidence-based mindset. They can be found in what we traditionally perceive to be more testing-heavy and evidence-driven roles such as R&D and data analytics, but they could also be found in other functions where experimentation is not a defining feature (e.g., an HR professional with a forward-looking mindset who continuously works on streamlining workflow). Sometimes, external partners can be allies as well. Many behavioral science units in the government and business sectors, for instance, have partnered with academia to build case studies that have been shared internally and publicly to drive the buy-in and adoption of behavioral science, thereby emphasizing the importance of "getting out" to venues where behavioral scientists share their latest insights. Doing so not only exposes organizations to the science, but also provides opportunities to find external allies.

Brace for the Long Haul (Row 3, Table 2; Large Benefit Large Cost)

Easy sells and quick success are necessary for an organization to adopt behavioral science in the early stage, but one should also plan to move towards system solutions and aim for the long haul. Organizations could embed behavioral science in all business aspects, including designing and developing behaviorally informed products and services, creating a human-centric marketplace, and generating a culture of experimentation (Feng, et al., 2019; Feng & Soman, 2021). Some behavioral science units have been able to drive organic growth by first working on some point solutions, building a case based on their early success, creating more opportunities internally to work on various point solutions from different business aspects, earning acceptance and support for their work, generating system solutions, and bracing for the long haul. In this process, organizations may need to consider questions such as what systems need to be changed, what parameters can and cannot be changed, and what capabilities we now have but did not have before. These changes take time and need patience, but a gradual increase in ambition over time, coupled with some early wins, will set up the organization for success in the long term.

Embrace Humility and Use Nuance to Counter the Naysayers

It is inevitable that any process that spans over a long period will attract critics and naysayers. A product or service adoption process is particularly likely to attract naysayers because the gain of the new innovation usually comes at a loss to the incumbent. It is therefore important to position applied behavioral science as something that will augment and improve other forms of decision-making rather

than claiming that it will replace them, especially as the latter positioning will immediately put people on the defensive. Furthermore, the early enthusiasm to promote applied behavioral science as a "low-cost and light touch" solution to any problem, coupled with publication bias in our journals (which portray successes more often than failures), might create the (easily fallible and obviously incorrect) belief that behavioral science always works (Mažar & Soman, 2022; DellaVigna & Linos, 2022). Indeed, our field has recently seen a number of recent debates between proponents and the naysayers (see Hallsworth, 2023).

We believe that the question of whether behavioral interventions work or not is an inappropriate enquiry. Responding to critiques with dogged rebuttals is counterproductive and can be distracting; indeed, this approach could prolong the between times. A more pertinent question is *when* (i.e., under what situation and time) they work and for *whom* (i.e., what populations). An explicit acknowledgement that not every intervention will work all the time, aligned with the humility to accept that the field does not have the answers, will go a long way to not only recognizing the concerns of critics, but also working towards commonality and a more nuanced science. We applaud a recent opinion piece by Hallsworth (2023) as an excellent example of a healthy debate on how the field can better navigate the between times. Furthermore, we join Hallsworth (2023) and others in calling for greater transparency and sharing of (both positive and negative) results to increase trust and to counter the effects of publication bias (Mažar & Soman, 2022; Soman, 2023).

Conclusion

Adopters are humans, and humans are more sensitive to losses than gains (loss aversion). Furthermore, humans evaluate outcomes with respect to some salient reference point (reference point matters), and they prefer to leave things the way they are over changing them (status quo bias). Moreover, humans value an object that they own higher than they would value it if they did not own it (the endowment effect), and they make judgments based on how easily an example comes to mind (availability heuristics) or how similar a target is to a prototype (representativeness heuristic). Organizations cannot force humans to be more rational, but they can leverage the knowledge of human behavior to design better solutions in order to get the best outcomes for stakeholders. While the economic downturn following the pandemic and ongoing military conflicts may limit an organization's ability to build a new behavioral science capability, this disruptive force may heighten the importance of incorporating the knowledge of human behavior to achieve the adaptability, sustainability, and scalability of any solutions.

Our point is simple: while the between times are real and patience is called for, we believe they could be shortened by embracing the five principles outlined herein.

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APPLICATIONS

When "Nudge It" Can't Budge It: Applying Motivation Research to Organizational Behavior Design

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As organizational nudge units increase in popularity, it's important to consider both the promise and the limitations of the nudge approach. Nudges provide a quick and inexpensive way to change one-time behaviors in environments that we can monitor and control; however, they are insufficient for driving longer-term patterns of behavior change that span across time and situations. When we can't constantly control (architect) the environment, when we can't directly observe people, and when we want people to be consciously committed to a course of action, nudges fall short. We must tap into people's deeper values and motives. This article offers research-based advice on how to apply motivation research to shape behavior patterns within organizations. Practical considerations are discussed, such as the cost of different initiatives, how long behavior change is likely to last, and how to anticipate and avoid unexpected negative consequences of mandates and incentives.

Introduction

The field of behavioral science began its mainstream ascent in the late 2000s with the publications of books like *Nudge* (Thaler & Sunstein, 2008), *Predictably Irrational* (Ariely, 2009), and *Thinking Fast & Slow* (Kahneman, 2011). Business leaders who once assumed that formal training and financial incentives were the best ways to shape behavior learned from these books that people's behavior is shaped by myriad factors, many of which are outside the actor's conscious awareness. Nowadays, many organizations are increasingly looking to behavioral scientists to use this body of knowledge to help them solve key business problems that are rooted in employee or customer behavior. They are doing this by standing up behavioral science teams and trying to determine the best way to leverage them (Khan & Newman, 2021).

Some behavioral science units focus on nudges. Some are even called "nudge units". According to Thaler & Sunstein (2008, p. 6), a nudge is:

> *Any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.*

Classic examples of nudges include defaulting people into 401K programs, offering smaller buffet plates to curb overeating, and etching flies on the bowls of urinals to decrease "spillage" in restrooms. As nudges are usually quick and cheap to design and test, they are a great option in cases where they can move the needle.

As a rule of thumb, nudges work best when you're influencing a one-time behavior in a particular context, and they are often effective when the stakes of the decision are perceived by the user as being relatively low. It will be easier to nudge someone's sandwich preference than to nudge their college or job selection. Also, when people are motivated and able

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to do the desired behavior—they just forget—a nudge can make a huge difference. Nudges are unlikely to work, however, when the suggested choice conflicts with people's existing habits or conscious preferences (de Ridder et al., 2022).

Nudges are also used in higher-stakes situations when the full implications of all options are too complex for people to fully understand (Neth & Gigerenzer, 2015; Thaler & Sunstein, 2008). For example, an insurance broker might tell customers that "most people in their situation" prefer a particular life insurance policy, and so because it would take hours of time we don't want to spend to understand the complexities of all possible policies, we're often content to use "what most people choose" as a proxy for "the best choice".

But there are many behaviors—and patterns of behavior—that simply cannot be nudged (Bucher, 2020; Hertwig, & Grüne-Yanoff, 2017). You can't nudge a sales person into putting forth her best effort to acquire new clients. You can't nudge a leader to review all applicants for a promotion in an unbiased and equitable way. You can't nudge someone with diabetes to regulate their diet in the long term. *For longer-term behavior patterns, behaviors with major System 2 (consciously decided upon) components, and when there are critical consequences for the actor, you must go beyond nudges.*

This article focuses on interventions that leverage *motivation* for behavior change. It does not tell the whole story of behavior design, but it does reveal the segment that's often overlooked by nudge units and behavioral science teams. Many behavior design experts teach that we should leverage the simplest tools first, such as nudges and reducing friction (Benartzi et al., 2017; Fogg, 2020). These approaches are often simple, there's little risk to doing them imperfectly, and the same principles work across all people. For example, reducing friction in a sign-up process will work the same for everyone (a "main effect"). But motivation design is more complex:

- It's nuanced: There are different kinds of motivation, and you want to leverage them in different situations.
- It's individualized: What motivates one person may not matter to another.
- It can backfire: As you'll soon see, pulling the wrong motivation lever can result in a reduction—not an increase—in the desired behavior... along with some grumpy participants.
- It can be expensive, especially if you are using ongoing financial incentives.

That withstanding, there is research out there that can help us do this well. This article will review relevant empirical research in the motivation space and provide concrete suggestions for how to apply these findings in organizations to shape employee behavior.[2] The advice provided herein will add a data-driven, empirical basis for guiding your day-to-day motivation strategy. When the stakes for the organization are very high, such as in a compensation and IRR (incentives, rewards, recognition) redesign, or when you face specific motivation challenges, it may be worth hiring an expert in this space.

To help readers make the leap from understanding to actually using this information, the article is written in an accessible *Q&A of the most common questions business leaders have about motivation design.* Each section will provide guidance that is as concrete as it can be, absent the details of a unique business context.

Question #1: How can I motivate people to do something?

We use several behavioral models to determine the best way to influence behavior. One that holds true across situations is the Fogg Behavior Model, which states that behavior is a function of three necessary ingredients:

a) Motivation: Do they want to do the behavior?
b) Ability: Can they do the behavior? How difficult is it to do?
c) Prompt or Awareness: At the key time, do they know they need to do it?

If any one (or more) of these ingredients is lacking, people will not do the behavior. This model is similar to the well-known COM-B model (Michie et al., 2011), but its categories are more intuitive and its language is more familiar to business stakeholders.

Here is perhaps the single most important point in behavior design: *Your strategy for changing behavior should address the underlying barriers to the behavior.*

2 These rules also apply for shaping customer motivation and behavior, but there is more contextual variability in how companies would approach this scenario.

Just as a doctor asks what your symptoms are before prescribing a medicine to ameliorate them, behavioral scientists learn what is missing in the situation (motivation, ability, or awareness) so they can address it directly. Pepto Bismol will not fix a headache, a reminder will not fix a motivation problem, and an incentive will not fix an ability problem.

When *motivation* is the problem, you need a careful approach to motivation design. This is the subject of the remaining Q&As.

Question #2: What different kinds of motivation could I leverage?

Motivation refers to a person's desire to complete a behavior or task. It can be organized along a continuum, running from fully intrinsic to fully extrinsic (Deci & Ryan, 1985; Deci & Ryan, 2000; Ryan & Deci, 2000). As the following figure shows, *intrinsic motivation occurs when you want to do something because of the benefits that are naturally built in to it* (intrinsic to it);[3] you enjoy it or derive meaning from it, for example. Motivation is also intrinsic if you don't enjoy an activity but you do it because its natural consequences are worth it to you, such as brushing your teeth because you want to have healthy teeth and good breath.

Extrinsic motivation occurs when we do something to earn a reward, to avoid a punishment, or because of some other consequence that has been "artificially" attached to the behavior by an outside force. If you brush your teeth because your dentist has a rewards program that tracks your brushing and sends you prizes, this would be extrinsic. There are "shades of gray" in between as well, such as when we do something to gain status or reputational benefits.

When people are more intrinsically motivated, they're more likely to put forth their best effort even when there is no reward, when it's challenging, and when no one is looking (Cho & Perry, 2012; Grant, 2008; Ryan et al., 2008). They are more creative and innovative in their work (Amabile, 1983), and they are less likely to cut corners or behave unethically to reach their goals (for research reviews, see Doshi & McGregor, 2015; Pink, 2011). Intrinsic motivation also predicts adherence to health-related activities (Williams et al., 1996; Williams et al., 1998a;

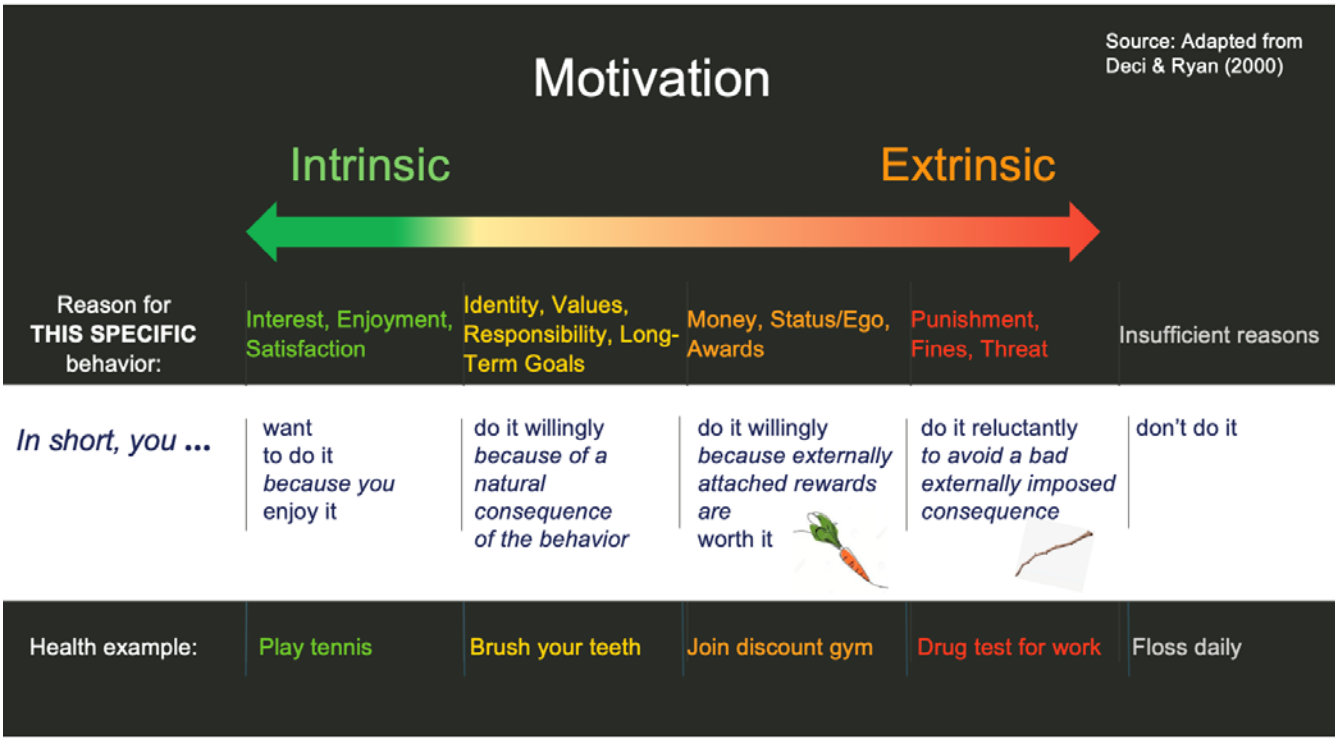

Figure 1: Intrinsic vs extrinsic motivation. Adapted from Deci & Ryan (2000).

3 Some researchers define intrinsic motivation as "motivation *internal to the person*" vs "benefits that are *intrinsic to the task itself*". However, extrinsic motivators also create motivation within the person. I favor Ryan & Deci's definitions: 'The term extrinsic motivation refers to the performance of an activity in order to attain *some separable outcome* and, thus, contrasts with intrinsic motivation, which refers to doing an activity for the *inherent satisfaction of the activity* itself' (Ryan & Deci, 2000, p. 71), i.e., intrinsic means benefits that are naturally within the *task*, not the *person*.

Williams et al., 1998b; Williams et al., 2002). Importantly, there are no known drawbacks to being intrinsically motivated, so for these reasons, it is wise to attempt to shape behavior through intrinsic motivation. This is especially true for shaping patterns of behavior that are longer term and not easily measured and tracked (Bucher, 2020).

Extrinsic motivation is more often used in corporate settings to drive discretionary effort towards fixed-term, measurable outcomes (Conly et al., 2003). Often, these are performance metrics or other factors that contribute to a company's bottom line, in which case the use of transactional "if/then" incentives is appropriate and can be powerful in shaping behavior when designed well. Indeed, in 2022, companies spent an estimated $176B on non-cash incentives alone. Relying on extrinsic motivation in the wrong circumstances or in the wrong ways can backfire, however, as exemplified in Question #5.

Question #3: How can I create intrinsic motivation to do things?

Several contextual factors have been found to increase intrinsic motivation (Deci & Ryan, 1985; Doshi & McGregor, 2015; Pink, 2011; Sinek, 2011).

Autonomy

People are more motivated in environments that provide additional control and choice over the things they care about. In the workplace, this means allowing them at least some power over which projects to pursue, how to allocate their time, who to collaborate with, what hours and location to work from, etc. When people have more autonomy over how they do the behavior, they enjoy it and want to do it more.

Competence

This refers to the satisfaction we get form learning, growing, or improving. When people feel like a behavior or project moves them "up and to the right" in a meaningful way, they are more committed to it. This includes both real growth (learning, creating something new, getting promoted) and things that are less tangible but still make us feel a sense of progress (such as praise from a manager).

Social Connection

People enjoy activities and workplaces that foster a sense of belonging and connection to others, such as their colleagues or customers. Feeling seen, understood, and genuinely cared about is a universal human need, even for the most introverted people. Simply being around others or offering group happy hours or events where people do not connect in a meaningful way does not accomplish this aim. Reinforcing people's social or group identity can also be a powerful and inexpensive motivator.

Fun

The purest form of intrinsic motivation involves doing something simply because you enjoy doing it. The popularity of gamification stems from this fundamental fact: if you make something enjoyable, people will want to do it more, and if you make it awful, they will not engage (see, e.g., Sunstein, 2020). Ironically, gamification often uses the strategies outlined throughout this article, such as badges and levels (competence), teams (social connection), leaderboards (status), and tangible rewards ("carrots"). Why? Because they feel intrinsically rewarding!

Icebreakers, ping pong tables, and team lunches may make the time between work enjoyable, but making the work itself enjoyable to the person—or connecting them with work they enjoy doing—is the ideal outcome.

Purpose

People are intrinsically motivated to make an impact on the world that is meaningful to them. It may be enough for some to see an improvement in metrics or numbers, but for most of them a sense of purpose is particularly deeply felt when they see the positive impact their work has on others (clients, colleagues, or society).

Many companies have organized recognition programs. There is no doubt that feeling valued is critical for an employee's engagement and loyalty, and recognition can also pull on several of the intrinsic motivators listed above, such as purpose (when we thank someone for making a difference in someone's life) or competence (when we congratulate an accomplishment). Once you start attaching points, money,

or other tangible rewards, you begin to blur the line between intrinsic and extrinsic motivation. There's nothing inherently bad about this, but it should just be done strategically and with an awareness of how it will affect employees.

This is not an exhaustive list of intrinsic motivators, but it does include the heaviest hitters.

There are also ways to use extrinsic rewards to boost intrinsic motivation! One such example involves giving an employee who goes the extra mile a surprise recognition reward at a town hall meeting. Incentives create an "if/then" agreement, whilst unexpected "now that" or surprise rewards do not, and are received as social gestures that show an employee they are seen and valued, as opposed to the "payment for services" provided by incentives.[4] Other ways to make rewards feel less transactional include making them personally meaningful, giving them with a heartfelt note of appreciation, and concealing their price.

Question #4: Can't I just force people to do the behavior? That seems easiest.

The two main extrinsic motivation levers are casually referred to as "sticks and carrots". In psychological terms, sticks involve the threat of punishment, whereby people do the desired behavior to avoid a negative, externally imposed consequence such as being embarrassed, fined, or fired. Doing this may increase the behaviors you want in the short term; however, it can backfire in the longer term.

The most obvious issue is "reactance": Just as we love autonomy, we hate being controlled. At a minimum people become resentful, and often they do the opposite of what you want, in order to regain a sense of control. If they can't do that, they may look for other ways to creatively regain control, such as by breaking another rule that you're unlikely to notice. One hospital, for instance, began monitoring nurses and punishing them when they left patients on hold for too long. The nurses reacted by simply putting the phone down on the desk while they ran around looking for answers (vs formally putting them into the hold system). Not only did this *not* shorten waiting times (the intent), but it also created more confusion and frustration for everyone.

Sticks are sometimes needed, but it's good practice to reserve them for a) when the stakes of people not doing the behavior are high for the company and b) other, "softer" approaches have been tried and have not worked (or you simply have no time to test more subtle approaches). Consider Covid vaccines. Some people did not like being forced to get vaccinated, but the costs of an unvaccinated work force were high, and in some cases (such as medical and caregiving settings), decisions had to be made quickly before softer approaches could be tested. The risk of irritating or even losing some resistant employees may have been outweighed by the collective benefits of vaccination.

Question #5: If I offer a payment or an incentive, would it send the wrong message or backfire?

It could. If someone is intrinsically motivated to do something and you put an extrinsic reward in place, people often *lose their original intrinsic motivation* and lead to a *reduction* in the behavior in the long term (Deci et al., 1999; Frey & Oberholzer-Gee, 1997; Frey & Jegen, 2001; Lepper & Greene, 1978). This is called "crowd-out," because the extrinsic reward crowds out the initial intrinsic motivation. Consider these counterintuitive findings:

- Kids who were rewarded for playing with markers used them *less* than other kids once the reward was discontinued (Lepper et al., 1973).
- Citizens were *less* willing to allow a nuclear waste facility (for public benefit) in their neighborhood when they were offered monetary compensation than when they were not (Frey & Oberholzer-Gee, 1997).
- A daycare center instituted a $3.50 fine for parents who picked up their kids after 6 pm and found that *more* parents started to pick their kids up late (Gneezy & Rustichini, 2000).
- A cash incentive at a factory increased performance in the short term, but once it was

4 People can either be in the "social norm" phase, where they do things for social reasons and are likely to help others without expectation of a reward, or in a "market norms" phase, where they only do things in exchange for a reward that's worth it; they can't exist in both phases simultaneously (Ariely, 2009). A reward strategy should be mindful of whether you wish to activate social or market norms in a given situation.

removed, performance *dropped to below baseline* (Ariely, 2016).

- In a public radio membership renewal initiative, people were *less* likely to renew and donate money when they were offered a tangible gift in exchange (Chao, 2017).

Why does this happen? Initially, people are doing the behavior for intrinsic reasons. Kids make art because it's fun. We pick up our kids on time to respect the childcare providers' personal lives. *Once you attach a price tag, however, our focus shifts from social norms to market norms* (Ariely, 2009). We ask, "Is this worth it?" and forget about the intrinsic reasons. I only made art to get that reward. Paying $3.50 for my kids to stay in daycare longer is a steal. Actually, making art is still fun, and childcare providers still have a right to personal time—it's just that we forget these factors when money is introduced. You're at the greatest risk of crowd-out when people are intrinsically motivated to do the thing in the first place because the task is interesting, personally rewarding, or people feel socially or morally compelled to do it (e.g., see Weibel et al., 2010). In situations where this is not the case, you're at less risk.

Interestingly, some research suggests we can "crowd-in" certain behaviors. If the person is not intrinsically motivated to begin with, and you can create a compelling extrinsic reward structure to build a habit, people may continue the behavior after the rewards are removed, if there are intrinsic rewards that kick in on their own. For example, people who are paid to exercise regularly may keep it up when the payment is removed, because they have learned that it makes them feel better, look better, and reduces their stress (Charness & Gneezy, 2009).[5] Similar effects have been found with smoking cessation (Williams et al., 2002). Crowding-in is most likely to happen when a) the person is *not already doing* the behavior and b) the incentive structure *creates a habit* that c) "unlocks" *natural intrinsic benefits* that result from the behavior. It's unlikely that we could crowd-in a behavior that carries with it no intrinsic benefits.

Besides crowd-out, there are other potential unexpected negative consequences to incentives. People may have "tunnel vision", i.e., they focus more effort on the incentivized behaviors and reduce effort towards other desirable behaviors that are not incentivized. Furthermore, they may game the system and earn the incentive in creative ways that do not align to your wishes (see the nursing example above, and the 2002-2016 Wells Fargo scandal). Even when incentives are well-designed and they work perfectly, they can be expensive to keep up (Gneezy & Rustichini, 2000b), and people may experience loss aversion (Kahneman & Tversky, 1979) if the incentive is removed (Jeffrey, 2004).

Despite these challenges, incentives are still extremely common and effective ways to focus attention behavior towards a goal (Lazear, 2000; McKinsey, 2022; Rynes et al., 2005). Just proceed carefully!

Question #6: If I DO pay people, how can I get the most bang for my buck?

An incentive is essentially a "do this/get that" commitment from a company to an actor (employee or customer) whose behavior they want to influence. There's a great deal of discussion over how to maximize the subjective value of rewards for the recipient on the "get that" side of an incentive program. It's unclear whether cash rewards or non-cash experiential rewards such as travel are more motivating for people in high-income brackets who can already afford the things they need and want. In this regard, some research supports both sides of the argument (Condly et al., 2003; Jeffrey, 2004). Employees consistently prefer cash when asked (e.g., Schweyer, et al., 2022); however, there are also compelling reasons to use non-cash rewards.[6] Lower-wage workers may be particularly motivated by cash rewards that they can use for things they need (e.g., rent, childcare, food) or things they want (Johnson & Whillans, 2022).

Points based systems and gift cards are common in the business world, but they carry concerns. Points and gift cards don't create much dopamine; the thing we cash them in for (ideally) does. As a result, the real reward is delayed, which in turn weakens its effect (Miltenberger, 2008; Woolley & Fishbach,

5 For an elegant overview of research on the effectiveness of incentives for health behaviors, see Sen et al. (2017).

6 Experiential rewards are less transactional and carry a high emotional benefit when the experiences go well. Also, companies often use "in-kind" non-cash rewards (such as free flights) to reward customers and employees, because a) it helps the company, too, and b) the cost to provide them is less than the recipient would pay as a regular consumer.

2018). Moreover, the real reward is only valuable if the options in the reward catalog are compelling, which is not the case for all recipients. And finally, points and gift cards can be fiscally wasteful. Merchandise is marked up in its exchange rate, and "breakage" is baked into the system to increase the provider's profit.[7]

There is surprisingly little experimental research comparing the actual *behavioral efficacy* of points-based systems or gift cards to that of cash or experiential rewards. There are challenges to experimentally testing these elements against one another, but the benefits of doing so could be great for companies and employees.

Holding the reward itself constant, any reward is more impactful when provided in a more timely way and when the salience (conscious awareness) of the reward is high for the recipient. One behavioral science podcast on this topic speculated that a voucher for a free lunch (worth $10) given to the person in real time is probably more effective than $100 added to their next pay check (Stielstra, 2019). The reward (check) is delayed, and the money is buried in a direct deposit they will probably not look at.

In addition to the "get that" side, be mindful of what's on your "do this" side. There is a science to setting goals that are a stretch but obtainable for each person, and an art to creating enterprise-wide motivation portfolios that drive a clear and complete set of metrics and behaviors that embody the organization's goals.

And remember, *when the outcomes you are designing for are not related to performance optimization, but instead are more interpersonal or cultural, consider taking a more intrinsic approach to behavior design.* This can mean increasing autonomy, purpose, etc., or using rewards in ways that build relationships by "catching your people doing something right" and reinforcing it in unexpected, non-monetary ways, as non-monetary rewards are less likely to crowd out intrinsic motivation (Costa-Font et al., 2011).

Summary

Nudges are generally easy to design, cheap to implement, and quick to test (Thaler & Sunstein, 2008), and they can have a quick impact on some business outcomes in a short period of time. When products are digital in nature and their primary goal is to influence digital (in-app) behavior, companies can lean in to this especially hard, as A/B tests of digital nudges can often be run in a matter of hours or days.

For companies whose goals are more complex and long term, however, such as influencing customer or employee loyalty or impacting customers' financial or health behaviors outside of digital channels, it's wise to take a deeper approach that includes a research-based motivation strategy. Hopefully, the information in this article will help ensure you're designing the best (not just the quickest) intervention when you're up against a motivation problem.

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7 Breakage refers to points or gift cards that a company pays for but that are never cashed in.

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A Better Way: How to Reduce Bias and Improve Decision-Making in Multidisciplinary Teams

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If you have worked as part of a multidisciplinary team before, you may have experienced a similar situation to this: a scenario where you and your coworkers, all experts in your own fields, were unable to achieve optimal decision-making as a team. The process was tricky, each member had their own set of biases, and there was informational asymmetry between members that impeded the team from realistically considering everything they needed before coming to a decision. So, how can you come together as a group to make a well-informed decision? In this article, we combine previously disconnected streams of research on technical, traditional, and modern approaches to group deliberation to create a process-focused set of guidelines to help teams overcome these challenges. Our guidelines emphasise collaboration, learning from one another's perspectives, valuing diverse opinions, and encouraging reasoning, in order to ultimately help overcome information asymmetries and achieve more successful outcomes.

Introduction

Monday morning. A behavioural designer, a data analyst, and a compliance officer are working together on a project that aims to increase employee wellbeing within their organisation. Planning to run an experiment, they meet to discuss and decide which behavioural interventions to test. What could possibly go wrong (aside from not having enough coffee)?

As a multidisciplinary team of experts, each one possesses distinct knowledge and information that is relevant to the group's task at hand. For example, the behavioural designer understands the evidence base of each intervention under consideration, whereas the data analyst is savvy regarding the challenges that each alternative poses in terms of data collection. In technical terms, this division of expertise is related to the concept of *unique information* as opposed to *shared information*; both studied under the *hidden-profile paradigm* in the process of group decision-making. The former refers to information that is uniquely held by individual members, while the latter refers to information that is shared or already available to the whole group. To reach an optimal decision, team members must identify their unique relevant information, effectively share it with others, and integrate the information collectively (Sawyer, 2017; Tindale et al., 2003; van Veen et al., 2020; Wuchty et al., 2007).

In the best-case scenario, the behavioural designer explains the strength of each intervention on the basis of previous evidence, the data analyst accurately conveys data collection considerations, and the compliance officer states how each proposal is in line (or not) with the organisation's policies. After sharing all the relevant information, they assess each intervention alternative in terms of feasibility,

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timing, and resources. Finally, the team selects the most promising interventions to test, informed by this fruitful discussion (they obviously forgot to invite someone from the finance department).

However, this is easier said than done. As shown by decades of empirical research in social psychology (Stasser & Titus, 1985), groups tend not to sufficiently share and thoughtfully evaluate unique information, which often leads to suboptimal decisions (Lu et al., 2012). In this article, we draw on behavioural insights to highlight key challenges that groups face when it comes to sharing and evaluating information to make decisions. We then review widely implemented—as well as less explored—methods that are used to facilitate group consensus-reaching and decision-making. Finally, we propose an original framework that combines tools from different fields to help group decision-making processes, in and beyond organisations.

Barriers That Jeopardise Group Decision-Making

Making good group decisions requires that relevant information be shared properly and evaluated without bias. However, research shows that groups made up of professionals from different fields face multiple challenges when coming together to make decisions (Geimer et al., 2015; Lamprell et al., 2019; Rogelberg et al., 2012; Wojahn et al., 2001, 2004). From myriad barriers identified in our review of the literature, herein we describe six common ones that prevent groups from sharing and evaluating information effectively (illustrated by Figure 1).

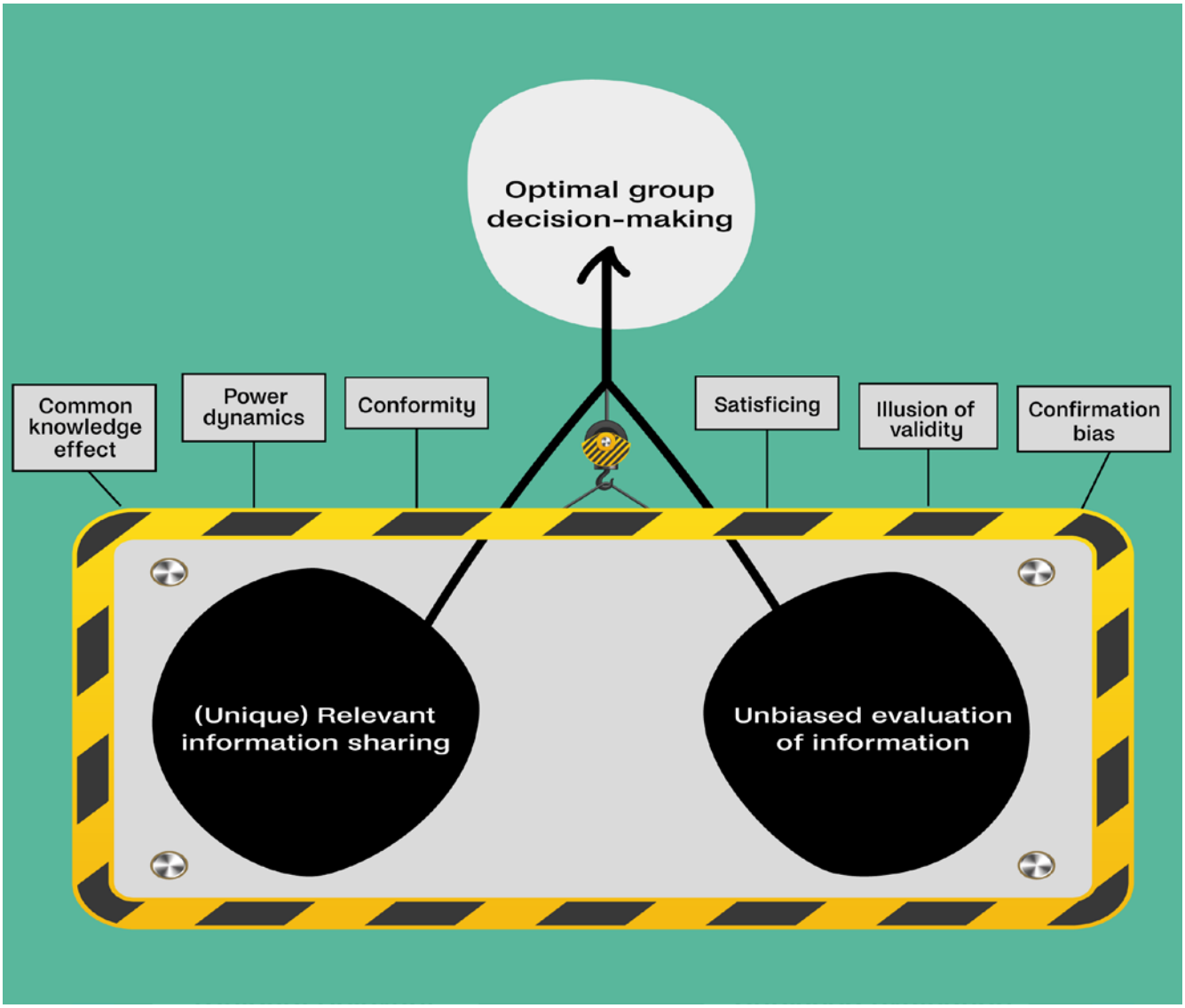

Figure 1: Illustrative barriers that hamper information-sharing and evaluation in multidisciplinary team settings.

The first issue groups may face is known as the *common knowledge effect* (or *shared information bias*), which describes a group's tendency to spend more time sharing and discussing information that everyone already knows, instead of exploring unique and new information that only some members have (Tindale & Winget, 2019). This can lead to important but less-known information being ignored, and missed opportunities for good ideas to feed into decision-making (e.g., Kerr & Tindale, 2011).

The second issue is *power dynamics*. Dominant personalities or tight and vertical hierarchies can lead to unequal participation in group discussions, preventing team members from sharing their unique perspectives or their true feelings (Geimer et al., 2015; Rogelberg et al., 2012). Power dynamics may also lead groups to silence or punish dissent, which is highly valuable for generating innovative ideas and correcting shortcomings but can be seen as a threat to a group's positive image, cohesion, or ability to achieve goals (Jetten & Hornsey, 2014). To encourage healthy dissent, multidisciplinary teams need psychological safety that instils team members with a sense of safety when taking interpersonal risks, such as speaking up without fear of being embarrassed or punished (Bradley et al., 2012).

Along similar lines, research in social psychology shows that individuals can also be influenced by authoritative figures and sources (Dolan et al., 2012; Milgram, 1974) and tend to conform to group pressure or norms instead of searching for information and eliciting valuable judgments individually (Asch, 1955; Miller & Prentice, 2016). A high degree of *conformity* can lead to team members copying opinions expressed by others in authoritative positions (known as "imitation" heuristic; Gigerenzer et al., 2022) or endorsing the majority opinion, even if they would privately disagree.

Another potential hindrance is *satisficing*, a decision-making strategy used by individuals when they have limited information, time, or cognitive capacity (Simon, 1956, 1990). Satisficing can lead to group members choosing an alternative based on simple heuristics rather than complex information processing (i.e., attribute substitution; Kahneman & Frederick, 2002). This is especially the case when trade-offs between options are difficult to make, both cognitively and emotionally (Hogarth, 1987; Luce et al., 1999). Although heuristics are generally adaptive, they can also lead to biases and suboptimal decision-making.

The *illusion of validity* is yet another way in which professionals may make overconfident intuitive claims when weighing in with their opinions on issues beyond their domain of expertise (Kahneman & Klein, 2009). Unfortunately, strong confidence is not a reliable indicator of the validity of intuitive judgments and decisions (Einhorn & Hogarth, 1978). As Kahneman and Klein (2009) suggest, true experts should know when they don't know, but this doesn't occur often or in many professions. It's like when your friend who can barely microwave food insists on helping you cook for your dinner party. Sure, they might be confident, but that doesn't mean they won't burn your appetisers!

Finally, there is *confirmation bias* (Nickerson, 1998). When individuals have pre-existing beliefs, preferences, or ideas, they tend to search for or more readily accept supporting evidence while dismissing contradictory information (e.g., Schulz-Hardt et al., 2000). In a group setting where discussion ensues, contrary opinions backed up by confirmatory processes can engender or increase polarisation, even when common information is available and shared among members (e.g., Lord et al., 1979). As such, individuals within groups may excessively "stick to their guns" to the detriment of objective evaluation of an idea's merit and group consensus-building.

To summarise, a host of biases and relational issues can severely hinder information-sharing and evaluation and lead group decision-making astray. In order to be successful, multidisciplinary teams must properly address these challenges.

Social and Health Science: Consensus Methods

Let's go back to our initial example of the multidisciplinary team. Being aware of the above-described obstacles, the team is motivated to avoid their usually unstructured discussions during meetings. Instead, the group decides to try out a formal methodology in the hope of improving information-sharing and ensuring everyone is on the same page when deciding which interventions to test. To do so, they turn to well-known consensus-reaching methods such as the *Delphi* and *Nominal Group* techniques.

Such techniques have been implemented across multiple fields (especially healthcare) to gather expert opinions, forecasting and establishing research partnerships that involve multiple stakeholders (e.g., Cary et al., 2022; Flostrand et al., 2020; Niederberger & Spranger, 2020).

The team would proceed as follows (for extensive guidelines of these methods see, e.g., Manera et al., 2019; Waggoner et al., 2016):

1. Each member anonymously writes down their preferences in the form of numeric scores and comments on each proposed intervention.
2. Through a fixed number of feedback rounds, members read each other's scores and comments, after which they may update their own preferences.
3. Finally, the alternatives are ranked based on the average scores to determine consensus and guide their decision.

These methods are very useful in fostering information-sharing and equal participation. However, they are far from ideal. For example, they don't necessarily avoid the tendency of overestimating shared views and silencing dissenting ones, especially when ranking or voting is used to guide decisions. Indeed, only a few studies using these techniques have been shown to address issues of power in group composition and relational dynamics (Cary et al., 2022). Additionally, the literature describing these methods highlights several limitations, such as lack of reporting and a high degree of flexibility concerning the process structure, the definition of consensus, and the analysis procedures used to determine it (Cary et al., 2022; Diamond et al., 2014; Grant et al., 2018).

Information Science: The Analytic Hierarchy Process

Our multidisciplinary team has started to feel they are speaking the same language but decide to keep exploring and try out something a bit more structured and reportable. They turn to the *Analytic Hierarchy Process* (AHP), one of several established mathematical frameworks provided by information science to optimise consensus-reaching processes (Zhang et al., 2019).

The AHP is a mathematical methodology (Saaty, 1980, 1990, 2005b, 2005a, 2008) aimed at solving multi-criteria decision-making (MCDM) problems. It structures decisions into a hierarchy to find the best answer to a specified goal (Qazi & Abushammala, 2020). While this may sound scary, don't worry: in its simplest form, decision-making under the AHP is based on two elements: *decision alternatives* (e.g., behavioural intervention alternatives) and *decision criteria* (i.e., valued aspects to consider when deciding between alternatives). In the team's case, the group goes through the following steps (Saaty, 2005b):

1. A *decision hierarchy* is structured by defining a goal (i.e., choosing between behavioural interventions), the alternatives (e.g., intervention A, B, C), and decision criteria (e.g., feasibility, compliance and cost).
2. Each member first compares the decision criteria—through pairwise comparisons—to assess their relative importance with respect to the goal (e.g., if feasibility is more, equally, or less important than cost). Then, the alternatives with respect to each decision criterion are evaluated (e.g., alternative A has high feasibility, alternative B low feasibility).
3. Data from the previous step is used to compute, for each team member, the overall priority level (or importance score) of each alternative. For example, if feasibility is the most important criterion for the data analyst, the intervention with the highest feasibility will probably have the highest importance score.

The AHP is a great way to prioritise alternatives by clearly identifying which criteria the group relies upon to make a decision, how much each member values a criterion compared to others, and how each alternative taps into each criterion. It is also easily scalable and provides precise numerical reports for the process and outcome. However, consider a case where the behavioural designer and the compliance officer both judge "compliance" as critical compared to the other criteria. The compliance officer knows that intervention A risks violating organisational policies and therefore gives it the lowest score in "compliance". The data analyst, unaware of this information, gives this same intervention a higher score for "compliance". A classic situation of unshared unique information! Unfortunately, this leads to a markedly misleading result when their opinions (or importance scores) are pooled together. The uninformed opinion of the analyst makes a low

compliance level intervention become a possibly high-priority one.

Consequently, the AHP does not guarantee optimal information-sharing either. Bummer. In addition, at the time of averaging results, Saaty (2005b) suggests using a weighted geometric mean to give more weight to certain judgments considered to be more important, albeit, some may argue, this is not the best way to address power dynamics...

A Missing Ingredient: Value-Based Consensus Methods

At this point, the team realises that the tools they have tried so far are useful for organising and formalising interactions and reasoning. Nonetheless, they cannot fully resolve the problems they face in regards to information-sharing and evaluation. We dare to say that this is because effective information-sharing and decision-making in group settings is not just a matter of problem-solving and, in turn, is heavily influenced by motivations, principles, and worldviews that guide group dynamics (Tindale & Winget, 2019). These are foundational premises of what we will call *value-based consensus methods.*

Value-based consensus methods are ethical decision-making methods and value-based practices used in African and Western clinical and social settings (Cottone, 2001; Crepaz-Keay et al., 2015), as well as some less-explored frameworks that belong to traditional and indigenous societies. Examples include the Indaba meetings in South African traditions (van Staden & Fulford, 2015), used during the negotiations of the 2015 Paris Agreement (Jepsen et al., 2021), the Ohazurume decision-making practice among Igbo-speaking people of Nigeria (Muo & Oghojafor, 2012), consensus methods shaped by Australian Aboriginal communities (Maar et al., 2010), and the Quaker business model (Burton et al., 2018). While this is not an exhaustive list and we cannot provide herein an extensive description of these methodologies, we highlight some common features that address those same issues of information-sharing in group decision-making that other fields have tried to solve, focusing on aspects that are not usually emphasised (or not enough) in the literature on this topic.

First, value-based consensus methods are grounded in worldviews and *principles* that guide how information is shared and handled during group decision-making: 1) group ownership of decisions (based on the co-creation of narratives and co-design of solutions), 2) respect and empowerment of dissent, 3) inclusive participation, 4) circularity of group dynamics, and 5) focus on the process rather than the outcome.

Importantly, these principles and worldviews are not just theoretical guidelines but are enacted in decision-making practices through *behavioural prescriptions.* For example, voting and ranking systems are commonly avoided, and several rounds of sharing can take place until 'no new ideas or issues [are] tabled during a discussion and participants [voice] agreement with all prioritized items' (Maar et al., 2010). All stakeholders have the right to speak but often cannot converse twice during the same round or voice the same opinion twice. Group members practise active listening, cultivate skills such as awareness and reasoning, and meetings may feature moments of silent reflection. Moreover, the notion of "expert" is not always welcomed, especially when it conveys culturally charged significance. Instead, leaders grant space and responsibilities to other stakeholders while focusing on facilitating rather than ruling decisions.

Grounding principles "enforced" by behavioural prescriptions, such as those previously mentioned, could more effectively address the challenges that the multidisciplinary team faces when deliberating which behavioural interventions to test. Such principles shift the focus away from the problem-outcome and into the process of coming together (i.e., a process-focused approach).

A Proposal and Work-In-Progress: Combining the Best of Many Worlds

As stated in the introduction, optimal group decision-making requires team members to have all the relevant information available to them. In this vein, the idea of consensus makes sense only if it is reached after having all the information available, for it to properly be evaluated (e.g., reducing bias). To that end, we propose a framework that leverages existing methods combined with principles and behavioural prescriptions which emphasise the actual process of coming and deciding together.

As summarised in Figure 2, we start with the *problem definition*, essential in establishing the

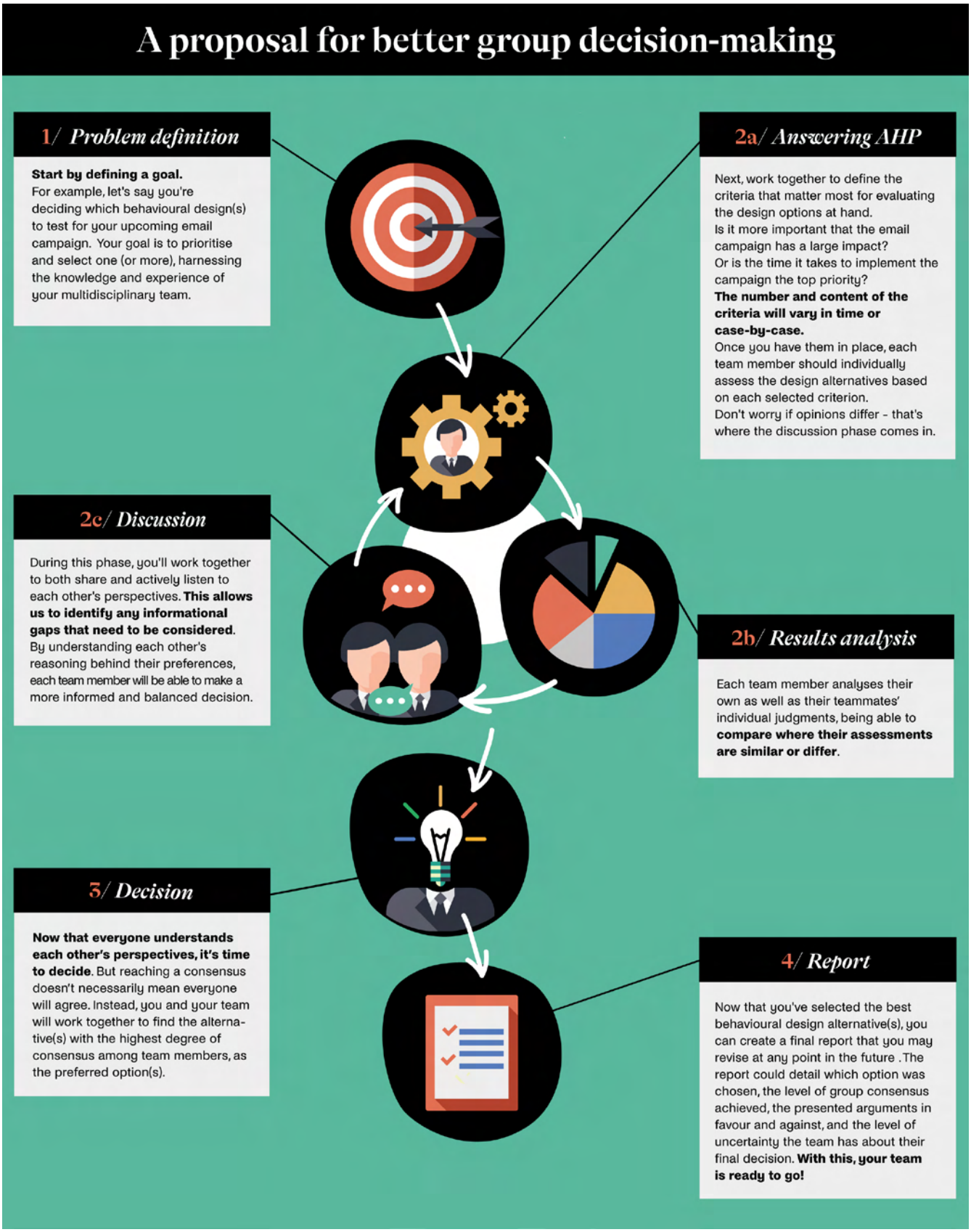

Figure 2: You might be wondering how to apply what you just learned within your team. Don't worry, we've got you covered! You may start with this framework, step-by-step, and adapt it to fit your specific needs and context.

decision-making goal (i.e., prioritisation of alternatives). Next, we go on to *answer the AHP*. While the tool by itself has limitations, it provides a structured basis from which to explore decision alternatives and evaluation criteria. Moreover, it fosters equal participation and offers results that are easy to analyse and report. In a standard AHP application, the group decision-making process would end here. At this point, the individual judgments would be aggregated using a (weighted) average, and the highest-rated alternative(s) would then be selected.

Drawing from tools used in social and health science, such as the Delphi technique, we further add feedback and discussion rounds. As such, in the *results analysis* and *discussion* steps, members explore their teammates' individual judgments and identify points of agreement and disagreement. Critically, this entails an explicit opportunity to openly discuss these points and learn from each other's unique knowledge and opinions. By having access to all the relevant information, team members may better calibrate and update their own judgments.

Instead of having a fixed number of feedback rounds, we suggest that the *AHP answering*, *results analysis* and *discussion* steps are repeated until the exchange of information among team members only produces repetitive arguments and no one changes their opinion further. This is based on the principles of circularity and respect of dissent. Team members should engage in an iterative dialogue that explicitly values dissenting views, fosters awareness and reasoning, and only stops when information asymmetries are resolved.

Engaging in a circular dialogic process empowers healthy dissent, fosters reasoning, and maximises shared information. Sounds great, but how can we pull it off? This is undoubtedly a tough one. While it is true that high epistemic and prosocial motivation help groups to better share information (Tindale & Winget, 2019), embodying principles and values in group interactions is a process of slow transformation, of trying out and observation. Inspired by value-based methods, a way forward would be to begin by introducing desirable "rules", such as "we speak in turns clockwise" or "we stay silent for a couple of minutes after every round of discussion", and then adjust depending on group dynamics.

Next, in the *decision* step, the group assesses the degree of consensus among team members for the most preferred alternative(s). We envision this step as one of *exploring different ways to reach consensus*, according to each group's values and preferences. If a team is confident that all the information is present and accurately evaluated, it may resort to classic processes of ranking, averaging, and voting. Here, we would caution against the use of a weighted average for two reasons: (i) it could foster or sustain power imbalances and (ii) it is not necessary, given that every individual already has all the relevant information. Yet, there are other ways to reach consensus that teams may explore, such as those that aim to choose alternatives that minimise resistance, rather than maximising preferences. Also, are we sure that the whole group understands and respects the dissenting voices in the room? This is something to keep in mind, in order to avoid a skewed decision.

Finally, the *report* step harnesses the structure of the AHP methodology and provides an output to document the details of the process: selected alternative, degree of consensus, and arguments in favour and against. Although these process and outcome records may seem an unnecessary hassle to produce, they can be highly informative for accountability purposes, as well as future projects or organisational decision-making within any company or institution.

Conclusion

By combining previously disconnected streams of research covering technical, traditional, and modern approaches to group deliberation, we have proposed an original framework designed to aid multidisciplinary teams' decision-making. Specifically, our process-focused approach aims to overcome pernicious obstacles that hamper effective information-sharing and evaluation in group settings while providing a structured basis for systematic and comprehensive reporting. To be clear, we by no means see these as definitive guidelines. In fact, empirical research should ideally follow, to test our proposal's assumptions and predictions. As such, and especially given that these ideas are broadly applicable to multidisciplinary teams within any organisation—independent of size or sector—we hope that they will spark increased interest in conducting research on this topic, exploring different ways of

reaching consensus, and ultimately contributing to higher-quality decision-making in real-world settings.

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Navigating Uncertainty: Combining Behavioural Science and Strategic Foresight for a Systemic Approach to Decision-Making

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A systemic and multidisciplinary approach to public policy is increasingly required to navigate the complex policy challenges of today. Herein, we encourage the integration of behavioural science and strategic foresight methodologies to support the development of public policies that are well-positioned to respond and adapt to future disruptions. To guide decision-making in a complex, interdependent and adaptive global system, policymakers should be ready to move away from being methodology specialists and embrace a future in which they are proficient at leveraging insights from different, complementary tools to prepare policies that will successfully deliver on outcomes in a rapidly evolving environment.

Strategic Foresight for Public Policy in an Uncertain World

The reliance of modern society on complex and interdependent systems means that the world is facing more frequent and intense global challenges, and this pattern is likely to continue in the coming years and decades (Hynes et al., 2002a; Office of the Director of National Intelligence, 2021; OECD 2021). There is increasing recognition of the trade-offs between the efficiency of a system and its resilience to disruption (Jin et al., 2021), whereby prioritising efficiency to meet the rising demands of society can result in systems that are prone to catastrophic failure (Trump et al., 2020). In a world designed for maximum efficiency, small shocks in one system can be amplified and cause cascading second-, third- or fourth-order consequences that can be even more dramatic than the initial disruption (Hynes et al., 2022b).

In the face of this uncertainty, the field of strategic foresight – designed to anticipate, explore and shape the future in a structured and systematic way – is quickly growing and becoming a necessary tool for modern management (see Box 1). It recognises that there are multiple possible futures and allows decision-makers to go beyond forecasting based on

Box 1: Increasing focus on strategic foresight for public policy development.

Interest in strategic foresight for public policy is increasing globally. The **OECD** has championed futures thinking and strategic foresight since the 1960s. Furthermore, it has a centrally located Strategic Foresight Unit in the Office of the Secretary-General, and over the last decade it has expanded foresight practices across many areas of its mandate. In 2019, the **European Commission** nominated a Vice President in charge of strategic foresight and asked member states to each designate a "Minister for the Future", acknowledging the need to embed strategic foresight and long-term thinking into EU policymaking. The **UN** Secretary-General's "Our Common Agenda" report names strategic foresight (alongside behavioural insights) as part of the quintet of capabilities that will guide the UN's evolution in the coming generation, and in this regard the UN announced a Summit of the Future to be held in 2024.

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extrapolation of current trends, and instead imagine and prepare for a range of future possibilities. For example, the OECD Strategic Foresight Unit helps policymakers use foresight to stress-test their net-zero emission commitments. Policymakers are invited to examine a range of possible future societal changes and develop contingency plans for how net-zero ambitions could be achieved under each of these very different future scenarios. Strategic foresight can also be used earlier in the policy cycle, for example by analysing the system-level implications of a proposed strategy under conditions of high uncertainty about the future (Tõnurist & Hanson 2020).

Improving Policy Outcomes by Linking Behavioural Science and Strategic Foresight

A more systemic approach to decision-making could be achieved by integrating behavioural science and strategic foresight methodologies, which would provide a multi-disciplinary perspective that allows for the development of robust public policy that is able to respond to the complexities of an increasingly uncertain world. Including behavioural insights into strategic foresight processes will bring a more nuanced understanding of how humans respond to societal disruptions. Behavioural scientists are uniquely positioned to draw on a rich body of scientific literature to bring to light the complexities of human behaviour and provide examples of how people might respond to change in ways that may at first seem surprising, irrational or unexpected. Conversely, using strategic foresight methodologies as part of the behaviourally informed policy development process will allow for a future-ready approach that breaks the silos between policy areas and government departments and provides more robust policy outcomes. Employing a strategic foresight process can provide an avenue to support behavioural scientists seeking to integrate more systems-level interpretations of behavioural public policy that are more suited to the complex policy challenges of today (Schmidt & Stenger, 2021).

The OECD's Strategic Foresight Unit, in partnership with the Observatory of Public Sector Innovation, has started to create better methodological links between behavioural science and foresight, namely (i) a streamlined foresight process, to help behavioural insights practitioners integrate systems thinking into their design process, and (ii) a prompt to help foresight practitioners better consider the drivers of human behaviour. Our work shows that behavioural scientists have a unique opportunity to both assist in the field of strategic foresight and be assisted by using strategic foresight methodologies as part of the behaviourally informed policy development process.

Integrating Strategic Foresight for a Systems Approach to Behaviourally Informed Policy Development

A single-issue focus is increasingly insufficient for responding to the complex and emerging public policy threats and opportunities present in modern

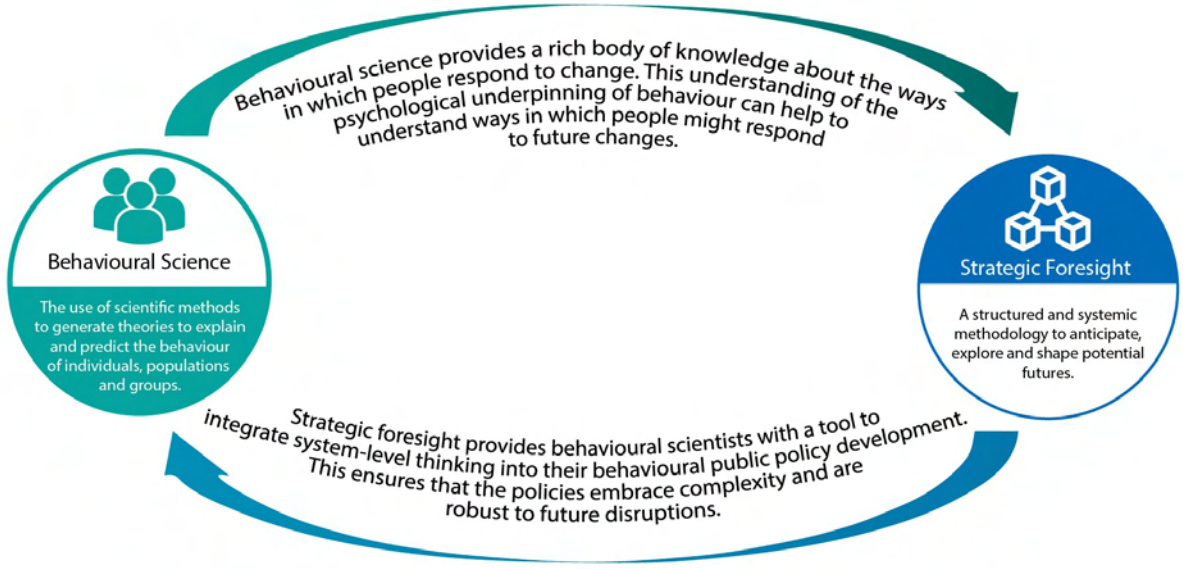

Figure 1: The benefits of better methodological linkages between behavioural science and strategic foresight.

society (Habegger, 2010). Many of the most important policy challenges occur as part of complex adaptive systems where interactions between the elements of the system can cause unpredictable results. Recognition of this complex systemic interplay of factors has led to calls for behavioural science to move beyond a focus on individual behaviour to embrace a focus on systemic change (Chater & Loewenstein, 2022; Hallsworth, 2023) and to avoid a narrow interpretation of behavioural science as being "nudges" which overlook the economic and market factors influencing human behaviour (Loewenstein & Chater, 2017).

One way in which behavioural scientists might develop skills in complexity thinking and systems dynamics is via a move away from applying behavioural insights to policy delivery and towards applying them to the public policy development process (Hansen, 2018). However, applying behavioural insights to the system, rather than the individual, requires a significant revision of the go-to methodologies currently employed by behavioural scientists. Herein, we argue that strategic foresight could be integrated into the toolkit of behavioural scientists to promote a system-level and multidisciplinary focus for public policy delivery and development.

Strategic foresight, i.e. a methodology for thinking about the future in a structured way, offers a valuable tool that could be used by behavioural scientists to incorporate a systems-level focus into the policy cycle. Including strategic foresight as a component of behaviourally informed public policy could thus provide a systemic, long-term, participatory and interdisciplinary process that could assist in robust policy development. Foresight allows for the establishment of professional networks, promotes reflexive social learning and provides an avenue for citizen participation in the policy cycle (Habegger, 2010). Its use could allow a move away from behaviourally informed "technocratic tweaks" (Hansen, 2018) and towards a more thorough and profound understanding by challenging some of the fundamental policy assumptions. Hansen (2018) notes that: "(I)t is my repeated experience that we can easily run a letter-tweaking experiment involving thousands of taxpayers, but only provoke strenuous smiles when we say, 'We could also try to rethink the policy assumptions'".

Incorporating strategic foresight into the toolkit of behavioural scientists has previously been proposed as a way of reducing "anticipatory brittleness", which refers to a behavioural intervention that fails over time because it wasn't designed to be resilient to possible future scenarios (Schmidt & Stenger, 2021). Foresight not only allows for an exploration of how policy interventions might affect both desired outcomes and other factors that might not be obvious at first, but it also provides a way to stress-test proposed policy interventions against possible future changes, thereby allowing for the development of more resilient policies. To this end, the OECD has developed a streamlined strategic foresight process that can be integrated into the toolkit of behavioural scientists to evaluate the systems-level consequences of proposed policy interventions, stress-test them against possible future disruptions and build greater stakeholder engagement to develop common visions of success. The methodology guides behavioural scientists through four key steps.

Step One: Surface Core Assumptions

The first step is to develop a list of the assumptions underlying the policy intervention or strategy under development. These could be specific and precise (e.g. we are expecting 2% inflation over the coming 5 years) or consider the bigger picture (e.g. we are assuming there will not be a global recession). These policy assumptions can be generated via a brainstorming session with relevant thematic experts and members of the policy development team.

Step Two: Identify Possible System-Level Changes

In this step, behavioural scientists are invited to obtain information on four to ten trends, change drivers or disruptions and facilitate a discussion of these in a workshop with members of the policy development team and key stakeholders. Trends, change drivers and disruptions (herein referred to as "disruptions") are the basic building blocks of foresight processes and are regularly published by foresight teams around the world. They outline a change that may (or may not) happen in the coming years but which would significantly alter the policy landscape if they did occur. Links to existing published disruptions are given in Box 2. The disruptions chosen

Box 2: Where to find information on trends, change drivers and disruptions.

Trends, change drivers and disruptions describe possible future changes that could occur. The identification and exploration of these possible future changes form the basic building blocks of all foresight processes. Foresight teams regularly publish information on disruptions, and these can be found online by searching for key terms such as "change drivers" or "megatrends". By leveraging the work of these foresight teams, behavioural scientists can streamline their own foresight exercises. Below is a small sample of the work available:

- Sitra's Megatrends. An annual review of megatrends: Megatrends - Sitra
- Centre for Strategic Futures. Driving forces cards.
- Eurasiagroup. The Top Risks of 2023
- OECD Strategic Foresight Unit: Global disruptions.
- European Commission. The Megatrends Hub.

Case study: Using strategic foresight to stress-test core policy assumptions.

Policy: A commitment to reach net-zero greenhouse gas emissions by mid-century.

Step 1. Surface core assumptions: Public support for achieving greenhouse gas emission targets will continue.

Step 2. Systems level changes:

- Green technology failure: a world in which progress in the development of green technologies is underwhelming and is not scaling to the extent needed to contribute meaningfully to net-zero emission goals. In this world, investors may lose faith in green technologies and thus reduce investment flows. Governments may need to rely on large-scale and radical behavioural change programmes to meet their net-zero ambitions.
- Virtual living: a world in which citizens increasingly spend large portions of their social, work and recreational time online in virtual worlds. In this world, large tech corporations could become more powerful than governments. Remote work could become the norm, and citizens may find their online social relationships becoming increasingly important. New ways of manipulating information could arise.

Step 3. Explore possible interactions: In this future, citizens spend more and more time online, reducing the emissions associated with commuting and travel. However, these reductions are not nearly enough to offset the underwhelming progress of green technologies that have failed to scale at the rate that was once anticipated. With investment flows to green tech companies drying up, governments try to implement radical behavioural change projects to curb emissions. These projects are hampered by new online tools for manipulating information, which have become more pervasive as people gravitate to small, online niche communities. This misinformation has reduced trust in government and undermined the evidence base of behaviour change policies. Citizens are left confused about who and what to believe, and they no longer support the policy interventions necessary to meet net-zero ambitions.

Step 4. Develop anticipatory strategy: Citizen trust in governments is a key driver of the success of net-zero emission policies, and methods to promote trust should be integrated into every policy proposal. Greater citizen engagement in the policy development cycle could be used to build transparency and create "micro-influencers" that are empowered to communicate on behalf of the government to their niche community.

Note: This hypothetical case study is based on materials created by the OECD's Strategic Foresight Toolkit for Net-Zero Transitions.

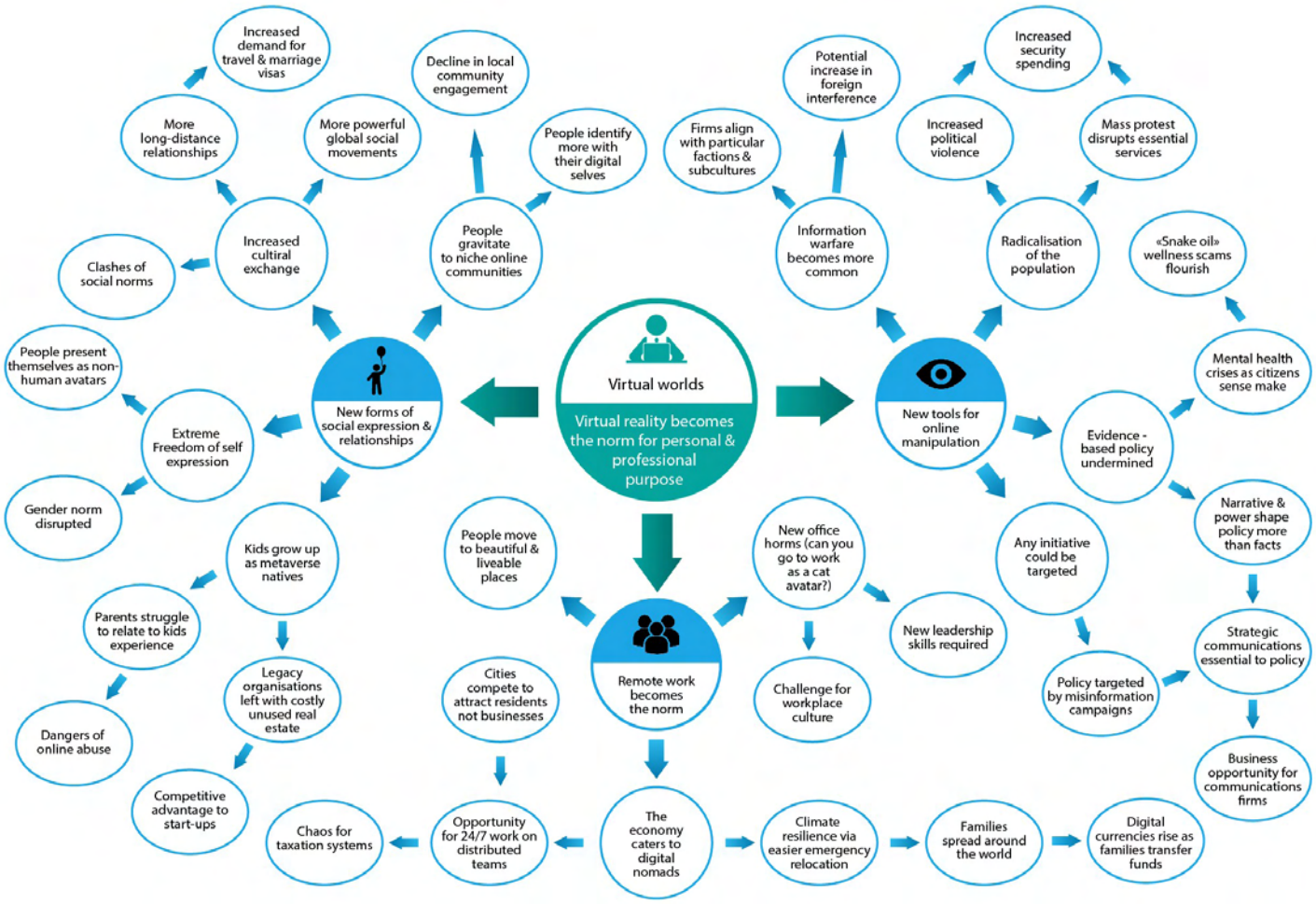

Figure 2: Example futures wheel showing the implications of living in an increasingly digital world.

for consideration should include ones that are outside of the domain of expertise of the organisation or policy area. This is an important requirement, because the most surprising changes generally come from outside of the system at hand, and so they are not as readily "on the radar" of policymakers.

Once the disruptions are chosen, behavioural scientists can facilitate a workshop with the policy development team and other relevant thematic experts to examine each disruption and use them to develop a "futures wheel", i.e. a structured analytic technique to elucidate how disruptions might influence the policy under development, as well as the broader landscape. The disruption is placed at the centre of the futures wheel, and then participants are invited to build out the spokes of the wheel by identifying the direct ("first-order") consequences of the disruption and the second- (or third-) order consequences that might occur as a result of the direct consequences. An example of the futures wheel is shown in Figure 2, using the rise of the virtual world as an example disruption.

Step Three: Explore Possible Interactions

After exploring each possible change independently, in this step participants are invited to explore the possibility that different possible future disruptions might occur simultaneously. Called a "cross-impacting exercise", this brainstorming session examines pairs of disruptions and considers how they might change the policy landscape. In this step, policymakers should examine various combinations of disruptions and for each one ask themselves:

a. What would the world look like if these two disruptions occurred simultaneously?
b. How might this influence the relevant policy

Figure 3: Application of behavioural sciences at four stages of the strategic foresight process.

landscape?

c. What challenges and opportunities might these co-occurring disruptions present for our policy intervention?
d. Which of our assumptions may no longer hold under these circumstances?

Step Four: Develop Anticipatory Strategy

In the final step, policymakers are invited to identify potential responses to the trends or disruptions that could cause the most problems for the policy implementation strategy. This could be in the form of contingency plans that could be implemented should a disruption occur. Even better is the identification of alterations to the existing policy design that better incorporate the possible changes that a disruption could produce. The ultimate goal here is to facilitate a policy design that is robust to the greatest number of possible future outcomes.

Advancing Foresight with Behavioural Insights: Exploring Human Responses to Change

In addition to being well-positioned to use strategic foresight techniques as part of the policy development process, behavioural scientists have much to offer the field of strategic foresight. At its core, strategic foresight explores possible indicators of societal change and examines how these might evolve, if pushed to their plausible extreme. This extrapolation requires estimations not only of the change, but also of the consequences of the change for human behaviour and society. The OECD recently held a forum to bring together experts to discuss how a better understanding of behavioural insights principles could be applied at four different stages of the strategic foresight process (Figure 3). This section will share some early work on the second point, namely how the integration of behavioural insights principles into the foresight process can generate greater nuance and bring a richer psychological underpinning to discussions about how citizens may respond to future disruptions.

Behavioural scientists can draw on a vast body of literature to anticipate how humans might respond to possible disruptions. Incorporating this body of knowledge into the strategic foresight process would enable a more comprehensive assessment of the surprising and unexpected ways in which people might respond to these possible future events. For example, research in behavioural science has consistently shown that people tend to underestimate how much of their behaviour is driven by social norms (Cialdini, 2005) and habits (Wood et al., 2002), compared to personal preferences. And because we underestimate the influence of these factors, we tend to systematically underestimate how easily citizens will emotionally adapt to changes that do not align with their previous preferences or best interests (Mazar et al., 2021; Ubel et al., 2005).

The OECD's BASIC Toolkit is an overarching framework for applying behavioural insights to public policy from the beginning to the end of the policy cycle (OECD 2019). At the heart of BASIC is a framework called ABCD, which prompts analysts to consider various psychological factors that influence people's behaviour. ABCD stands for Attention, Belief formation, Choice and Determination.

- Attention is about what people focus on in a given context. It assumes that they cannot concentrate on everything and so give their attention to what is the most important aspect in terms of their individual knowledge and

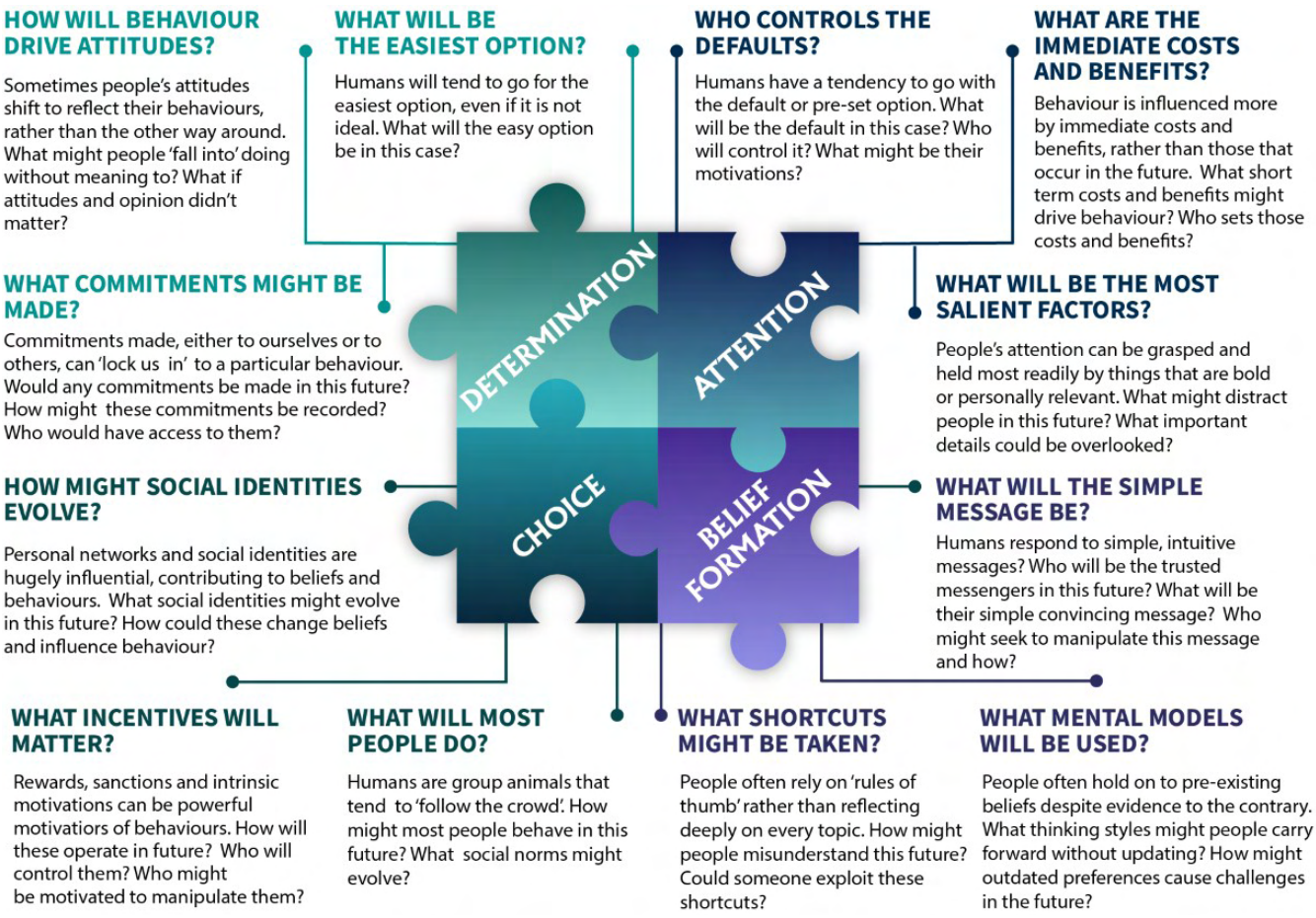

Figure 4: A prompt for incorporating behavioural science principles into the strategic foresight process.

preferences.

- Belief formation involves making judgments based on the information that one has available. It assumes people form their beliefs by using heuristics and mental shortcuts that often over/underestimate outcomes or probabilities.
- Choice is about making decisions between the available choices and based on one's preferences. It assumes that people's choices are influenced by "supposedly irrelevant factors" such as the situational context, how the choice is framed, and social factors.
- Determination means sticking to one's choices, but it also includes a consideration of self-control and willpower.

Recently, the OECD's Strategic Foresight Unit has piloted the use of the ABCD framework to prompt foresight practitioners to think about the ways that citizens might respond to future disruptions in surprising or unexpected ways (Figure 4). It is hoped that sharing this prompt will encourage these experts to consider a broader range of possible responses to the disruption under consideration. The prompt has been designed to be an evidence-based tool that can assist in both the divergent thinking phase, by encouraging the brainstorming of a broader range of possible behavioural responses to the disruption, and in the convergent phase, whereby foresight practitioners are called upon to narrow down the possible consequences that are most worthy of greater analytical attention.

In pilots of this prompt, the OECD provided Figure 4 to foresight participants after an initial "futures wheel" brainstorm of the implications of a given disruption. Consideration of the prompt yielded significant new avenues of exploration and discussion and shone a light on areas where initial implications might not be as plausible as first thought. An example of such a discussion is given in the case study below, in which participants discussed the possible disruption of the "rise of a well-being economy" – a future in which governments move away from Gross Domestic Product (GDP) as a metric of success and instead focus on the well-being of citizens. Initial discussions of this disruption looked at ways in which society might need to be re-designed to ensure citizens were able

Case study: Thinking through the implications of a move towards well-being as a metric of societal success.

Disruption: The rise of a well-being economy.

Possible future: Backlash against increased societal inequalities creates overwhelming public demand for policies (and collective actions) that prioritise inclusive and sustainable well-being. A social and economic paradigm shift takes place, whereby metrics relating to good lives for all (diverse groups of people, the planet and future generations) overtake GDP to become the core focus of government action.

Initial thoughts on implications of the disruption: In a world where citizens are given the opportunity and encouragement to pursue healthy behaviours, this may become the primary focus of many citizens. How might an educational curriculum need to be revised to ensure that learning does not supplant the time available for physical exercise? Organisations that help people to monitor their health and well-being goals could proliferate. Might governments need to take a role in ensuring that these organisations provide information based on the best available science, in order to prevent a rise in "health-washing" and other marketing ploys?

Relevant behavioural science prompt: What are the immediate costs and benefits?

Underpinning research: People are more likely to value immediate rewards over delayed rewards, even if the delayed rewards are greater or more valuable (Ainslie, 1975).

Implications of the disruption: In a world where citizens want policies that promote collective well-being, but delay discounting pushes individuals towards short-term gratification, there may be a backlash against governments encouraging or incentivising healthy behaviours. In what ways could governments intervene to align short-term gratification with long-term well-being goals in areas (such as health) where there are often tensions between the two? Could access to real-time monitoring of health indicators, such as blood glucose levels or the presence of stress hormones, be used to "gamify" health and allow citizens to see the immediate benefits of acting in healthy ways? What narratives might citizens use to justify – to themselves or others – the gap between their intentions and their actions? How might governments help citizens overcome "all-or-nothing" narratives and see the benefit of even small increases in healthy behaviours?

to meet their health and well-being goals. However, after being prompted to think about research on delay discounting, participants then considered a world in which citizens, unable to maintain progress on their health and well-being goals, pushed back against government intervention to promote healthy behaviours as a way of justifying their own inaction. Strategic foresight does not attempt to predict the future; rather, it aims to examine possible futures, and so being able to stimulate new avenues of thinking with this prompt was a valuable addition to the process.

Conclusion

Herein, we demonstrate the power of integrating strategic foresight and behavioural science methodologies to support a systems approach to effective decision-making. In a world of increasing uncertainty, the limitations of a single-issue focus for policy development have become increasingly clear. Similarly, a single-methodology focus no longer provides the depth needed by policymakers to design innovative policies for the global and interconnected adaptive system in which we live. Driving broad and comprehensive societal change, which may be necessary to respond to the complex challenges of today, will require a comprehensive framework of epistemological and methodological approaches. Modern policymakers must therefore move away from being specialists in their methodology of choice and instead embrace a future in which they are confident and proficient in leveraging insights from different tools to navigate the complex challenges of today and prepare for a rapidly evolving future.

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Evacuation Behavior: Lessons for and From the War in Ukraine

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Evacuations from natural disasters or war zones can save thousands of lives. While there is a substantial amount of literature on evacuation behavior in the context of natural disasters, the literature on evacuations from conflict zones is scarce. In this paper, we examine the existing literature on evacuation behavior, including our own studies conducted during the ongoing war in Ukraine. Most (but not all) of the findings from the natural disaster evacuation literature seem to be applicable to evacuation from war zones.

Introduction

Evacuation is one of the most basic protective actions in times of emergency. It consists of moving people from at-risk to safe areas during dangerous events, which can arise from natural disasters such as floods, hurricanes, earthquakes, volcanic eruptions, or armed conflicts.

Despite the efforts of government authorities to prompt people to evacuate, a significant portion of the population consistently fails to comply with recommendations and orders in this regard, resulting in hundreds of preventable deaths in the US alone (Noe et al., 2013). Most of the literature focuses on hurricanes, flooding, and wildfires (e.g. Stein et al., 2010; Charnkol & Tanaboriboon, 2006; Thiede & Brown, 2013), whereas relatively little is known about evacuation behavior in the context of war.

Wars are distinct from other types of disasters for a variety of reasons. One key difference is that while natural disasters are the result of natural activities, wars are the results of human actions (Meyers, 1991).[2] Additionally, the decision to evacuate during a natural disaster is typically a short-term solution that usually lasts only a few days or weeks, whilst in contrast, in a war, evacuation may entail leaving everything behind for an indefinite period of time. Furthermore, people tend to perceive risks and their own agency differently; they might, for instance, perceive the danger of drowning very differently from that of being tortured or raped. They might also think that they have a larger influence on the risks to their lives in the case of war, if, for instance, they can submit to the occupiers. Finally, evidence suggests that intentional human violence has a stronger effect on

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2 What does and does not constitute a disaster has been a source of debate within the literature (for a summary see Quarantelli, 1998).

mental health compared to natural disasters (for a review of the literature see Goldmann & Galea, 2014).

The largest and most severe ongoing conflict at this moment is the Russo-Ukrainian war. The fully fledged invasion started in the early hours of February 24, 2022 (albeit, the relationship between Ukraine and Russia had been particularly tense since 2014, when the latter annexed Crimea and occupied parts of the Donbas, which has since been governed by Russian proxies). The Russian army attacked from several directions, from the north towards Kyiv, from the northeast towards Kharkiv, and from the east and south towards Mariupol, Zaporizhzhia, and Kherson. By April 6, however, due to their unsuccessful attempts to take Kyiv, the Russian military withdrew their forces from the northern part of Ukraine to redeploy them in Donbas and other occupied territories. In early fall 2022, Russia left Kharkiv oblast and, in November, the western side of the Dnipro river—and with it the city of Kherson. As they withdrew, Russian forces left behind a trail of evidence pointing to mass murders and indiscriminate civilian killings. Some of these cases have been documented by international reports (Office of the United Nations High Commissioner for Human Rights, 2023). Since then, intense fighting has occurred, particularly in the eastern and southern areas of Ukraine, with limited advances by Russian forces. Furthermore, rockets and drone attacks have targeted all areas of the country, temporarily leaving it without a stable supply of electricity.

According to the United Nations High Commissioner for Refugees (UNHCR), more than eight million people have fled the country, while almost five million were internally displaced as of February 15, 2023.[3] No official evacuation order was issued by the central authorities at the beginning of the war, possibly due to the fact that the invasion was mostly unexpected.[4] In fact, in our sample, when asked about it, 72% of the respondents said that they were not expecting a direct Russian attack. However, by the end of July 2022, the government had asked civilians to leave the eastern part of the country in an attempt to evacuate 200,000 people to safer places. Evacuees were given 2,000-3,000 hryvnia (about €50-€80, which is about a quarter of the average monthly wage in Ukraine) upon arrival and registered as internally displaced persons eligible for continued monthly payments. In many cases, those who refused to evacuate were required to sign a paper saying they understood the risks and would take responsibility for themselves and their dependents (Hyde, 2022). This has been a source of great debate among the Ukrainian population, especially when children are involved. For instance, proponents have argued that the children of individuals living close to the front lines should be taken away by social services if their parents refuse to evacuate. Oftentimes, the decision not to leave their homes means that these individuals need to be protected—at great risk to themselves and the volunteers who need to come to the rescue.

Understanding evacuation behavior in times of war is still relevant for the ongoing evacuations in the east of Ukraine. Furthermore, evacuations might become relevant again if Russia launches new attacks from the south or the north. In general, it is also important to understand this aspect for other ongoing and future armed conflicts, because while the war in Ukraine is currently the largest and most severe conflict, there are more than 50 further active armed conflicts in the world (Roser et al., 2022).

In this article, we discuss findings on evacuation behavior, including our own research conducted during the ongoing Russo-Ukrainian war. We start by reviewing the literature on evacuation behavior during wars. We then review the results of our study on evacuation behavior, based on a sample of about 2,000 Ukrainians from the eastern regions (the ones most affected by the war). This includes an overview of the results of an experiment, which asked subjects to evaluate different evacuation messages based on perceived effectiveness. Finally, we review the literature on evacuation behavior during natural disasters. In the concluding section, we briefly summarize to what extent the results from the natural disaster evacuation literature can be applied to war situations.

Evacuation Behavior During Wars

The evidence from earlier wars is either very limited or outdated. Some papers focus on World

3 The UNHCR's Ukraine refugee data can be found here: https://data.unhcr.org/en/situations/ukraine.

4 Residents of some cities report having received a message or having talked to volunteers asking them to leave for safer areas. Nonetheless, the initiative remained autonomous.

War II (Crosby, 2021; Welshman, 1998), whereas others look into more recent conflicts, such as the Second Lebanon War, but use a small sample and contact the potential respondents after more than one year since the events have passed (Gidron et al., 2010). Limited data available from Israel suggests that students exposed to rocket attacks experience the same level of recalled fear and anger regardless of whether they have evacuated or not (Shahrabani et al., 2012).

Given that evacuation behavior varies depending on individual characteristics, understanding the nature, timing, and determinants of evacuation decisions during wars is important in helping authorities become more effective in facilitating this action. A theoretical framework presented by Savage (2016) sheds light on how factors like uncertainty, type of war, risk perception, social norms, and behavioral biases can influence decision-making in extreme environments. Although the study lacks empirical findings, it offers valuable insights into how these components may shape behavior in war zones. The study argues that under significant uncertainty and time pressure, due to extreme situations, people are more prone to deviate from rational behavior and instead display present bias and status quo bias.[5] In this context, risk attitudes and perceptions are crucial factors in determining whether to leave a war zone. Panic may also arise, causing individuals to act impulsively and flee when it's not safe, or stay and wait for additional information before making a decision. Due to the high emotional intensity of the experience, it is challenging to get a complete picture of this decision-making process. Overall, this might help explain some of the behavior observed during the Russo-Ukrainian war and other armed conflicts.

Evidence From the War in Ukraine

To the best of our knowledge, the only scientific evidence concerning evacuation behavior during the Russo-Ukrainian war comes from our own research (Martinez et al., 2023). This evidence is based on a survey and a survey experiment conducted with approximately 2,000 respondents from the areas of Ukraine most affected by the conflict. At the time at which the survey was run, the sample contained both subjects who had evacuated (either abroad or within the country) and those who had not done so.

Determinants of Actual Evacuation Decisions

The non-experimental part of the survey contained a vast array of questions, including demo- graphics, family context, risk assessments, and items comparing behavior before and after the invasion began.

Those who took precautions for a possible evacuation before the war started were more likely to vacate their houses and relocate to a safer place. Such precautions (which we also call an "own" or "personal" evacuation plan) consisted of having a method of transportation available, an approximate route to take, and a possible place to stay in case of emergency. This can be seen in Figure 1, which shows the effect of having had a personal evacuation plan on the actual evacuation decision, jointly with the effect of individual risk perceptions (that is, if individuals considered a particular situation as threatening).

The revealed evacuation behavior also seems to be connected with the perception of some risks but is not fully explained by them. All respondents were presented with six possible scenarios and had to evaluate them for possible risks. For five situations, over 50% of the respondents marked them as risks. A possible occupation by the invading army was perceived as a risk by a mere 41% of respondents, and to a larger extent by those who had left. The perceptions of the risk of being killed or of a possible food shortage are clearly associated with higher probabilities of evacuating. At the same time, variation in the perception of a risk of illegal actions, such as being raped, robbed, or beaten, and variation in the perception of being buried under the rubble of one's own home, did not differ enough to explain variation in evacuation behavior. Interestingly, the risk of violent acts (including rape or being beaten) was perceived as relatively low (about 47% of females and 58% of males perceived this risk), whereas the risk of a collapsed house was the highest, both for those who had evacuated and those who stayed (about

5 The concept of status quo bias was first introduced by Samuelson and Zeckhauser (1988). It consists in the generalized preference to stick with one's own current situation, as opposed to changing the course of action even when it is beneficial to do so. Present bias refers to the tendency to give more weight to a payoff that is closer in time when considering a trade-off between two future moments, as described by O'Donoghue and Rabin (1999).

82%). The perception of the risk of losing utilities was stronger among those who had not evacuated. To conclude, even though a situation was perceived as risky, not all perceived risks had an equally large effect on the evacuation decision.

Going back to the positive effect of the pre-existing plan, we analyzed which characteristics are related to having a plan in the first place. The results are shown in Figure 2. Females were less likely to have a pre-existing evaluation plan compared to males, which is also related to the fact that females were less likely to expect the invasion in the first place (37% of males vs 22% of females). Owning a car or possessing sufficient disposable income makes it more likely to have a plan. Also, having dependent children in the household makes it more likely to take precautions for an evacuation (although not, or hardly, statistically significant), while being married or the level of education has no or very little effect. The availability of a plan is the main channel through which these characteristics are related to the actual evacuation decision.

Whether people made any preparations for a possible evacuation is related to their perceived likelihood that the war would happen in the first place. In turn, these expectations were related to religion (whether a subject is affiliated with the Russian Orthodox Church as opposed to the Ukrainian one), language spoken at home before the invasion (Russian or Ukrainian), gender, and age. For example, we observe that people who spoke Ukrainian before the war (and thus were in the minority in most regions in our analysis) perceived the scenarios as riskier than their Russian-speaking counterparts; additionally, they were more likely to leave their homes. However, this evidence from the regressions is relatively weak.

Only about 23% of our subjects reported having received an official evacuation message. Conditional on having a personal evacuation plan, having received an official evacuation order did not increase the likelihood of evacuation. The reason may be that these individuals already intended to leave, so it did not alter their evacuation decision. What the data tells us about the evacuation decision itself is that it is mostly taken together with relatives, and it is made very quickly (often on the same day or the day before the evacuation).

Experimental Analysis of Nudges With Text Messages

In the survey experiment, we analyzed the effectiveness of using different text-based alerts

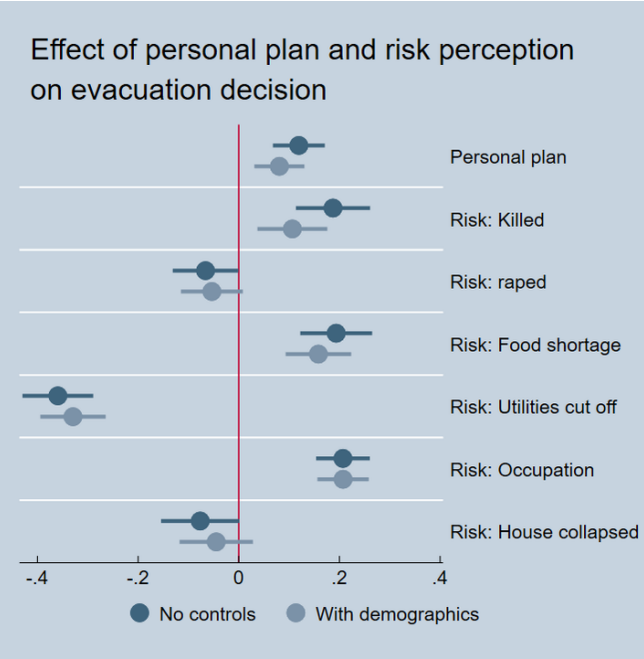

Figure 1: Determinants of the decision to evacuate. The coefficients shown are the average marginal effects calculated after probit regression analysis (with and without demographic control variables). *Source:* Martinez et al. (2023).

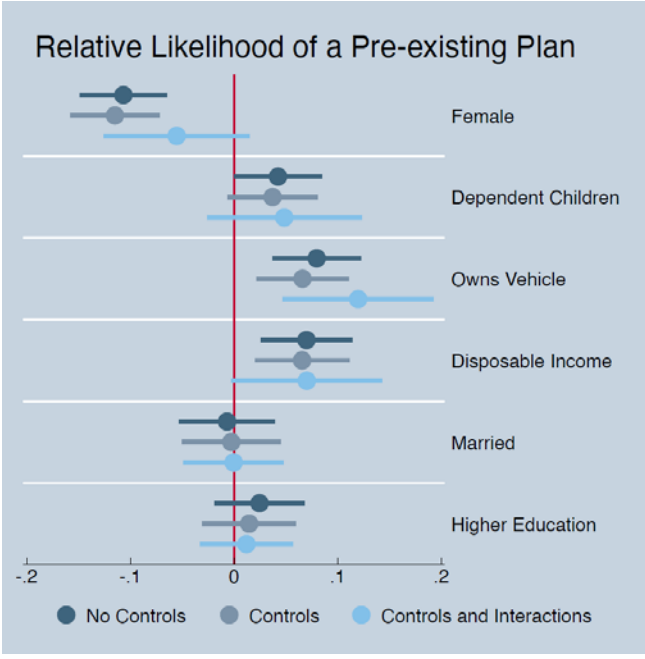

Figure 2: Determinants of having a personal pre-existing evacuation plan. *Source*: Martinez et al. (2023).

in prompting people to evacuate. We varied two treatment dimensions in a 2x2 between-subjects design. First, we varied the framing of the messages prompting evacuation. These framings consisted of a neutral control framing, framing focusing on the chance of saving one's life when leaving (Gain of Life), framing focusing on the dangers of dying when staying (Loss of Life), framing focusing on the deterioration in living conditions when staying (Deteriorating Conditions), and one focusing on the positive externalities when evacuating, as leaving improves the opportunities for Ukrainian soldiers to defend the territory (Military Effectiveness).

The second treatment dimension concerned whether the messages contained information about a government-organized evacuation plan (i.e., that this opportunity exists, when and where the buses leave, and the phone number to reserve a seat). This is motivated by previous evidence suggesting that evacuation plans increase intentions to evacuate by reducing uncertainty (Lazo et al., 2015). Figure 3 shows an evaluation of the effectiveness of the different messages received by the survey participants, on a scale ranging from 1 to 10. We can observe that the inclusion of information about the government-provided plan was the most critical factor affecting the effectiveness of the messages, while framing did not play an important role. The differential perception of the messages is mainly driven by women. A detailed description of the experiment (including additional and more detailed results) can be found in Martinez et al. (2023)

Evidence on Evacuation Behavior During Natural Disasters

In this section, we briefly review the existing evidence on evacuation behavior during natural disasters.[6] The literature on disaster studies dates back to the 1950s, initially as part of research funded by the U.S. military (Williams, 1954; Merton & Nisbet, 1976). This paper mainly relates to the strands of research examining the determinants of evacuation behavior and the effectiveness of related messages.

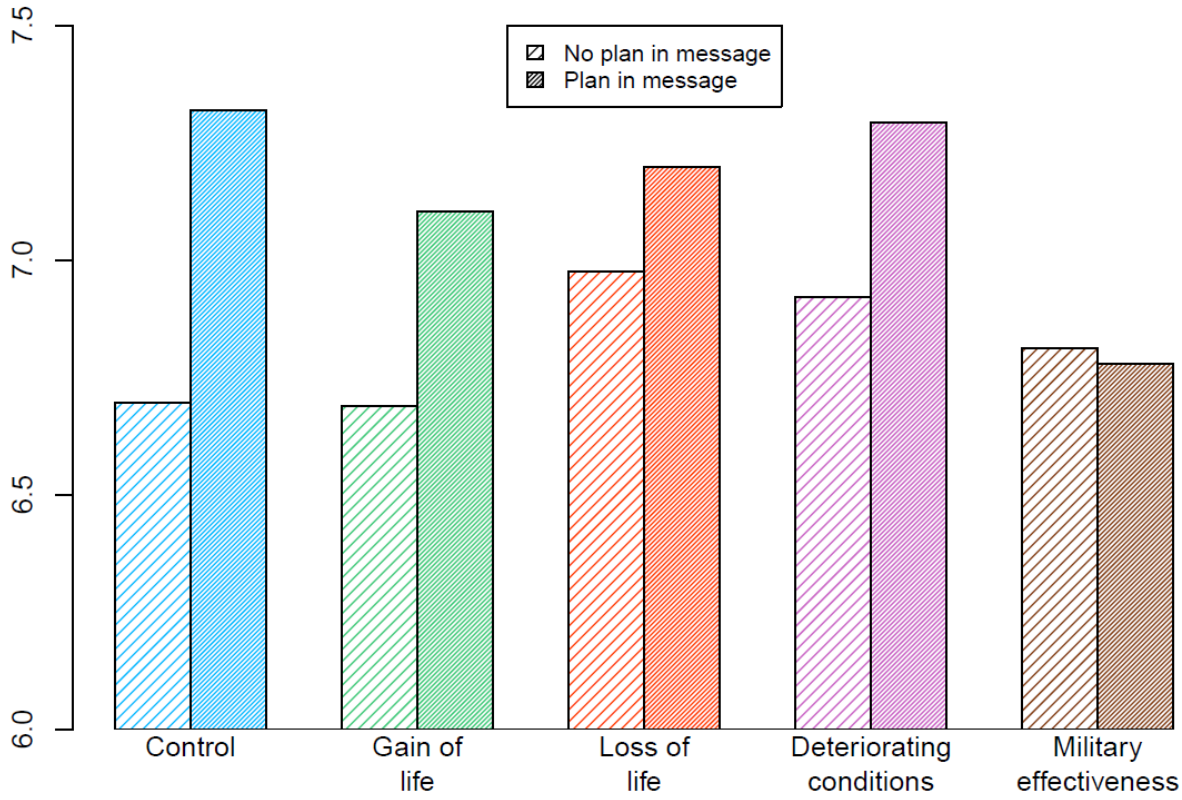

Figure 3: Mean evaluated effectiveness of evacuation messages. *Source*: Martinez et al. (2023).

6 There is currently no clear consensus as to what constitutes a disaster (Quarantelli,1998). However, it is common to classify disasters based on the agent responsible, either as the result of natural phenomena or human behavior (Brown & Goldin, 1973; Schorr, 1987).

Given the vast amount of literature on evacuation behavior, it would not be feasible to provide a comprehensive overview of everything published to date within such a limited space. Therefore, we decided to focus on a few key areas, such as why individuals choose to evacuate, or not, when advised to do so (Sorensen & Mileti, 1988). Many different dimensions have been identified, including the identity of the sender and the receiver of the evacuation message, as well as situational and social factors (for an overview see Sorensen, 2000). Other factors include previous experience of a disaster, the perception of the safety of the location, and their expectations about living conditions after leaving (Buylova et al., 2020; Arlikatti et al., 2006; Burnside et al., 2007; Heijmans, 2001).

Most of the data has been gathered by examining communities that evacuated from specific disasters (Hurricane Katrina, Hurricane Ivan, floods in Batangan, etc.), while some comes from collecting responses about future threats from subjects living in at-risk areas (coastal communities, volcanic areas, etc., e.g. Thiede & Brown, 2013; Charnkol & Tanaboriboon, 2006; Rød et al., 2012; Medina & Moraca, 2016; Fischer et al., 1995). When it comes to demographics, some consistent patterns emerge between studies. For instance, homeowners, pet-owners, and older individuals are less likely to evacuate; however, analyses of other characteristics, such as gender, income, and education, yield mixed results (for a literature review see Thompson et al., 2017). Subjective perceptions of risk are strongly correlated with evacuation behavior—sometimes even more strongly than official evacuation orders (R. M. Stein et al., 2010; Stein et al., 2013; Ricchetti-Masterson & Horney, 2013). Finally, it is important to consider the behavior of others, as individuals are more likely to leave if those around them evacuate the area, and vice versa (Udagawa et al., 2019; Urata & Hato, 2017).

The relationship between evacuation decisions and risk perception is complex. It is generally assumed that higher risk perception will lead to protective actions. However, studies suggest that this depends on many contextual factors (for an overview of the literature, see Wachinger et al., 2013). Instruments, such as emergency warnings, are most effective at prompting evacuation behavior when they are frequently repeated (Quarantelli, 1998), confirmatory in nature (Drabek & Stephenson III, 1971), and perceived by the public as credible (Perry et al., 1981). Previous literature has often focused on the best way to present information so that people can understand it correctly and assess the risk appropriately (Wu et al., 2015). For instance, by modifying graphics in hurricane forecasts or showing pictures of hurricane damage and measuring evacuation intentions as a result (Burnside et al., 2007; Ruginski et al., 2016; Meyer et al., 2013), Robinson and Khattak (2010) tested the effectiveness of different messages, with the aim of avoiding traffic jams on evacuation routes. The authors found that providing more detailed information about routes increased the probability of making a detour.

Given the psychological content related to warning messages, in recent years, a few attempts have been made to combine this literature with the one on nudges (Thaler & Sunstein, 2009) with the aim of creating more effective evacuation messages. For instance, Ohtake, Sakata, and Matsuo (2020) used nudge messages to encourage early evacuation and examined the results several months later to see how they translated into actual behavior. They determined that messages using social norms with a loss framework were the most effective relative to a control used by local authorities in increasing intentions to evacuate to a suitable site. Nonetheless, in the long term, the message that raised evacuation awareness and translated into higher stockpiling of food and water was the one using social norms with a gain framework. Mol, Botzen, Blasch, Kranzler, and Kunreuther (2021) relied on an online experiment to deliver social norms nudges, finding that they do not significantly affect flood preparedness in the context of a flood risk investment game. Relying on the idea that individuals with more recent disaster experience tend to be more prepared (Guo & Li, 2016; Grothmann & Reusswig, 2006), a very recent strand of the literature relies on virtual reality and serious gaming to make subjects experience natural disasters and learn the appropriate responses (e.g. Mol et al., 2022; Nowak et al., 2020; Li et al., 2017).

Implications for the War in Ukraine and Other Armed Conflicts

Most (but not all) findings from the natural disaster literature seem to carry over to the case of evacuation behavior during a war. In both cases, for instance, being female, owning a car, and having children increases the likelihood of evacuation. However, some findings do not seem to replicate.

In our research on evacuation messages, we did not observe any significant effects of the mere framing of messages. On the other hand, in line with previous evidence, we did find that providing an evacuation plan is crucial for effective nudges to prompt evacuation.

A key difference with the natural disaster literature consists in the greater importance of cultural or identity components, such as religion or language spoken at home in the Ukrainian context (similarly to ethnicity or race in other conflicts). This seems natural from the point of view that natural disasters do not distinguish possible victims along cultural or ethnic lines, while it might be very important for the parties involved in a war. These arguments seem to provide a promising line of future research.

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Behavioural Insights for Cyber Security: Nudging New Zealanders to Be Secure Online

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CERT NZ

Cyber security incidents in New Zealand have significantly increased since the COVID-19 lockdowns, and as a result people are losing their money, information and privacy. Many of these cyber security incidents can be prevented, or their impact reduced, when users put simple protective measures in place. Behavioural insights are a powerful tool to help uncover opportunities to prompt online security behaviours. CERT NZ (New Zealand's Computer Emergency Response Team) works to support businesses, organisations and individuals who are or may be affected by cyber security incidents. CERT NZ and TRA (The Research Agency) identified 18 different behavioural insights for cyber security actions, using the COM-B behaviour change framework. Moving from recommendations to implementation, this article shows how seven of those behavioural insights have been practically implemented in the New Zealand market. This provides a case study of how to take theory and recommendations into a real-world context.

The Challenge

Many New Zealanders view cyber security as something for the tech-minded, but the reality is everyday people are at its centre. New Zealanders are increasingly experiencing cyber security incidents, and as a result they are losing their money, information and privacy (CERT NZ, 2021).

The good news is many cyber security incidents can be prevented, or have less impact, when users put protective measures in place. There are opportunities to help individuals and organisations take action to protect themselves. Actions include seemingly simple changes like changing privacy settings on social media and using long, strong and unique passwords.

These changes may seem simple, but people don't always make them – despite positive intentions to follow through, the value-action gap (also commonly known as the behaviour-intention gap) is at play (Jenkins et al., 2021). There is no single reason for this issue. A number of barriers prevent people from taking action to improve their online security, such as people not believing cyber security threats are relevant to them or lacking awareness of how and why cyber security incidents happen. Some underestimate the possible impacts these incidents can have, or they are not aware of what steps they can take to protect themselves.

Behavioural insights can play a role in understanding and overcoming these barriers and unlocking opportunities to help people take action to better protect themselves online.

The Behaviours

A key part of applying behavioural insights is understanding what behaviours need to be influenced. In the case of online security, there are many actions people can take to protect themselves, from creating long and strong passwords through to regularly updating security software across all devices. Table 1 outlines the recommended online security behaviours within the scope of this behavioural review. Please note: this is not an exhaustive list of potential online security behaviours.

Behavioural Insights

Through multi-stage research of New Zealanders' current cyber security behaviours (CERT NZ, 2022a), and behavioural insights analysis using the COM-B behaviour change model (Michie et al., 2011), we identified 18 different behavioural insight interventions

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Table 1: CERT NZ's Cyber Security Behaviours for Everyday People to Be Secure Online

Challenge	Behaviour
Authentication	Using long and strong passwords
	Using different passwords for each online account
	Using two-factor authentication
	Using a password manager
Keeping systems up to date	Updating software, browsers and apps to the latest version
	Installing and running cyber security software or apps on devices
Sharing information	Not sharing personal information online with unknown people
	Setting social media accounts to 'friends' only
Double checking trusted sites and payments	Only making purchases from websites that use trusted and secure payment systems
	Verifying links in text messages and emails that are not from trusted and familiar sources, before responding or clicking
	Reading customer reviews and feedback online to check if a website is legitimate
Reporting	Reporting an online cyber threat, attack or crime
Other	Staying up to date with online security advice from official sources
	Changing default password settings on devices like routers

to help New Zealanders be secure online (CERT NZ, 2022b). These interventions are aligned to the key individual behaviours above (see Table 1); however, it is one thing to identify behavioural insight opportunities and another to implement them in the real world. The following is a practical look at how seven of the behavioural insights have been implemented in New Zealand by both CERT NZ and our partners.

Framing

Behavioural Insight

Our decisions and behaviours are influenced by the way information is framed. The same information can be perceived differently depending on what features are highlighted. A yoghurt that is framed as '90% fat-free' for instance, comes across very differently to one that is framed as '10% fat'. How something is said is therefore as important as what is said (Levin et al., 1998).

Application

We often talk about passwords, but reframing and referring to passphrases can help people set up stronger protection that is also easier to remember. Almost half the New Zealand population report using weak passwords, making it easy for attackers to get into their accounts (CERT NZ, 2022a). We developed the Big Password Energy campaign to make long, strong passwords feel easier to create by reframing

them as phrases or sentences made up of four or more words, e.g., BeastModeNowActivated (Figure 1). As a result of applying a new form of framing in this campaign, 12% of people who engaged with it reported that they had changed their passwords, and 46% thought about what random four word passphrase they could use (The Research Agency, 2022).

Chunking

Behavioural Insight

Chunking information reduces perceived effort and can make a task easier. Sorting information into meaningful groups, categories or 'chunks' can not only reduce the perceived effort, but also improve recall (Mathy & Feldman, 2012). For example, when thinking about packing for a holiday, chunking the packing list into meaningful groups – clothes, toiletries, devices and travel documents – can help people more easily remember all their items.

Application

Chunking information was applied during a Cyber Smart Week campaign. We identified the most important steps people can take to be more secure online and created a short and actionable list of

Figure 1: Examples of reframing passwords to passphrases in CERT NZ's 2022 campaign.

just four easy-to-follow actions (Figure 2). This is particularly important given that many people can feel overwhelmed by cyber security information and do not know where to start.

Availability Heuristic

Behavioural Insight

The availability heuristic is our tendency to act off information that easily comes to mind. This is strongly linked to the media, advertising and news people are exposed to (Pachur et al., 2012). News stories can prompt the availability bias; for example, households are more likely to prepare for a natural disaster after seeing widespread coverage of an earthquake, and people are more likely to acknowledge the risk of online threats and take action after hearing about a cyber attack – 25% of respondents said they are more likely to implement online security after hearing a cyber attack story (CERT NZ, 2022b). Therefore, the availability heuristic can be used to help prompt secure online behaviour by providing relevant advice directly after a significant online threat has headlined in the media or been experienced within an organisation.

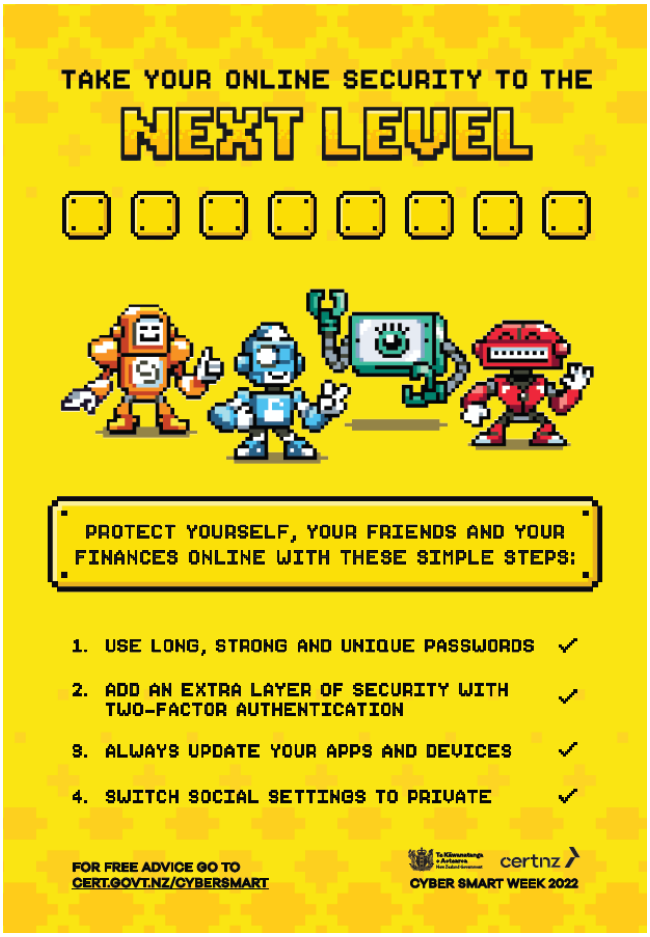

Figure 2: Example of CERT NZ chunking information into manageable steps.

Application

CERT NZ uses the likes of social media posts and incident response communications to leverage the availability heuristic and increase the impacts and uptake of actions by the audience. For instance, Figure 3 (Wara, 2023) and Figure 4 (Nichols, 2022) are examples of incident response communications provided by CERT NZ in major media articles connecting the dots between a major attack in the media headlines with key preventative behaviours. This nudge application has also been used to inform the Cyber Incident Response Framework that has been made publicly available for organisations (Figure 5; CERT NZ, 2023a). The framework outlines how to best communicate an incident and how to prompt people to take proactive actions to be more secure following an incident.

Authority Bias

Behavioural Insight

It's not just the message that matters, but also who it's from. Authority bias is our tendency to give greater weight to information provided by authority figures. Authority can come in the form of experts, people or organisations with a high social standing, and they can be indicated through symbols and signals of trust and authority, like trusted seals, ticks of approval or uniforms (Greer, 2003). In the New Zealand cyber security context, the most trusted providers of cyber security information have been identified as banks/financial institutions, government agencies, internet service providers, technology brands and workplaces (CERT NZ, 2022b).

Application

We make use of authority bias and deploy a partnership approach by working with other trusted providers to share messages and prompts about how to be secure online. This is particularly the case during Cyber Smart Week, when organisations are encouraged to spread the word about how people can be secure online. CERT NZ provides free content

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How to protect yourself from scammers

By Imogen Wara
Community journalist

Two Auckland women tell us their story on how they fell victim to investment scams via social media.

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How to protect yourself from scammers

How to protect yourself from scammers

The FMA stresses to be wary of social media posts and messages because these sources aren't substitutes for professional financial advice. If you find information online that you feel relates to your financial situation or interests, take the content to a financial adviser for their input.

CERT NZ recommends the following to protect yourself from scams:

- Use long, strong and unique passwords (don't use the same password for more than one account, and don't include any personal information).
- Use two-factor authentication to ensure another layer of security on top of your password.
- Do not share your personal information through social media, email or over the phone with people you don't know (set your privacy settings to 'private' or 'friends only').
- Be wary of unusual emails and text messages, don't click any unknown links, and don't follow instructions which ask you to act fast to seize the opportunity.
- Be wary of advice on schemes which advertise little risk and high reward. If something is too good to be true, it probably is.
- If someone you have met online asks for money or gives investment tips, consult with people you know and trust, and thoroughly investigate the investment opportunity.

Figure 3: Example of the availability heuristic in action, linking major cyber scam headlines in a Consumer NZ article to key preventative actions provided by CERT NZ.

Figure 4: Example of the availability heuristic in action, linking major cyber scam headlines in a New Zealand Herald article to key preventative actions provided by CERT NZ.

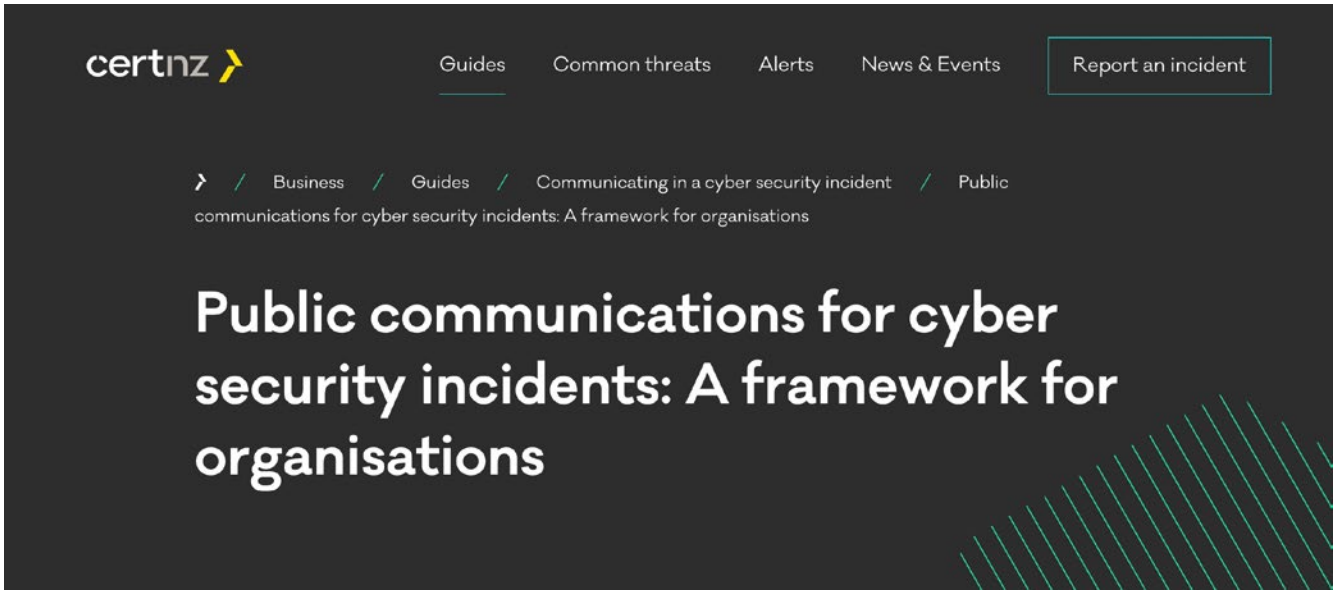

Figure 5: CERT NZ's Cyber Incident Response Framework.

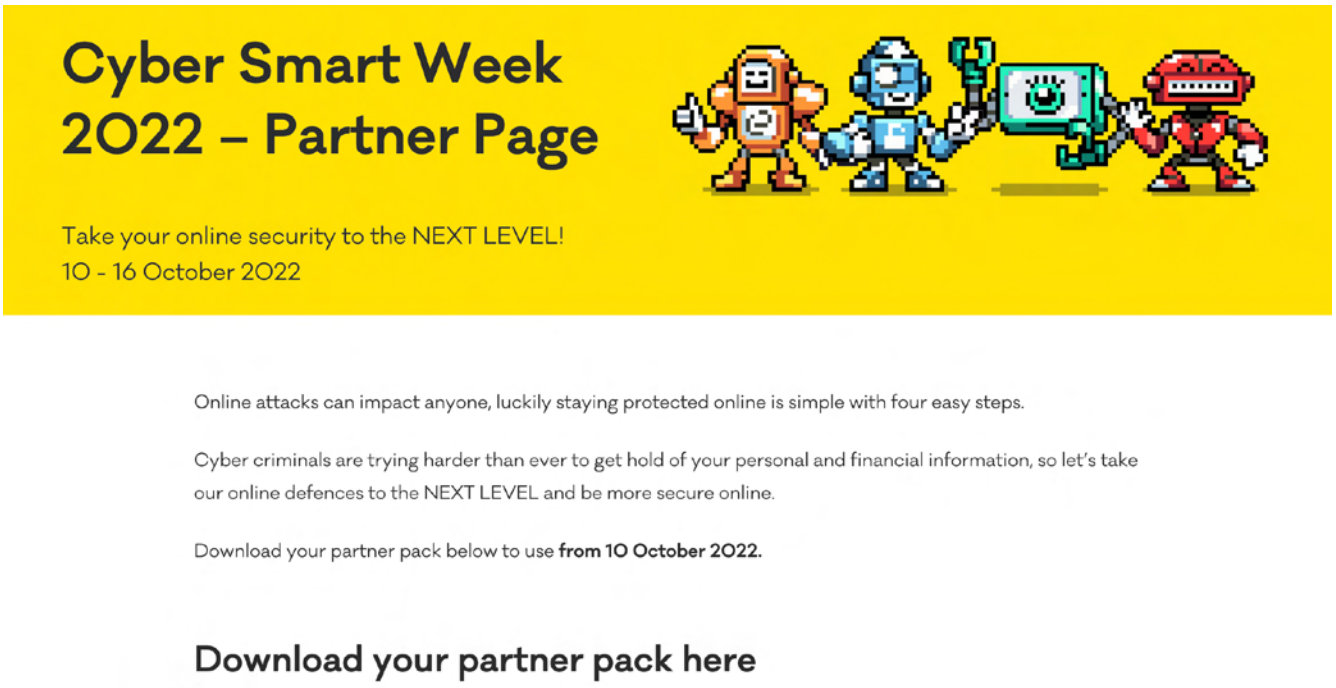

Figure 6: CERT NZ's Cyber Smart Week partner page offers shareable content for authority figures and organisations.

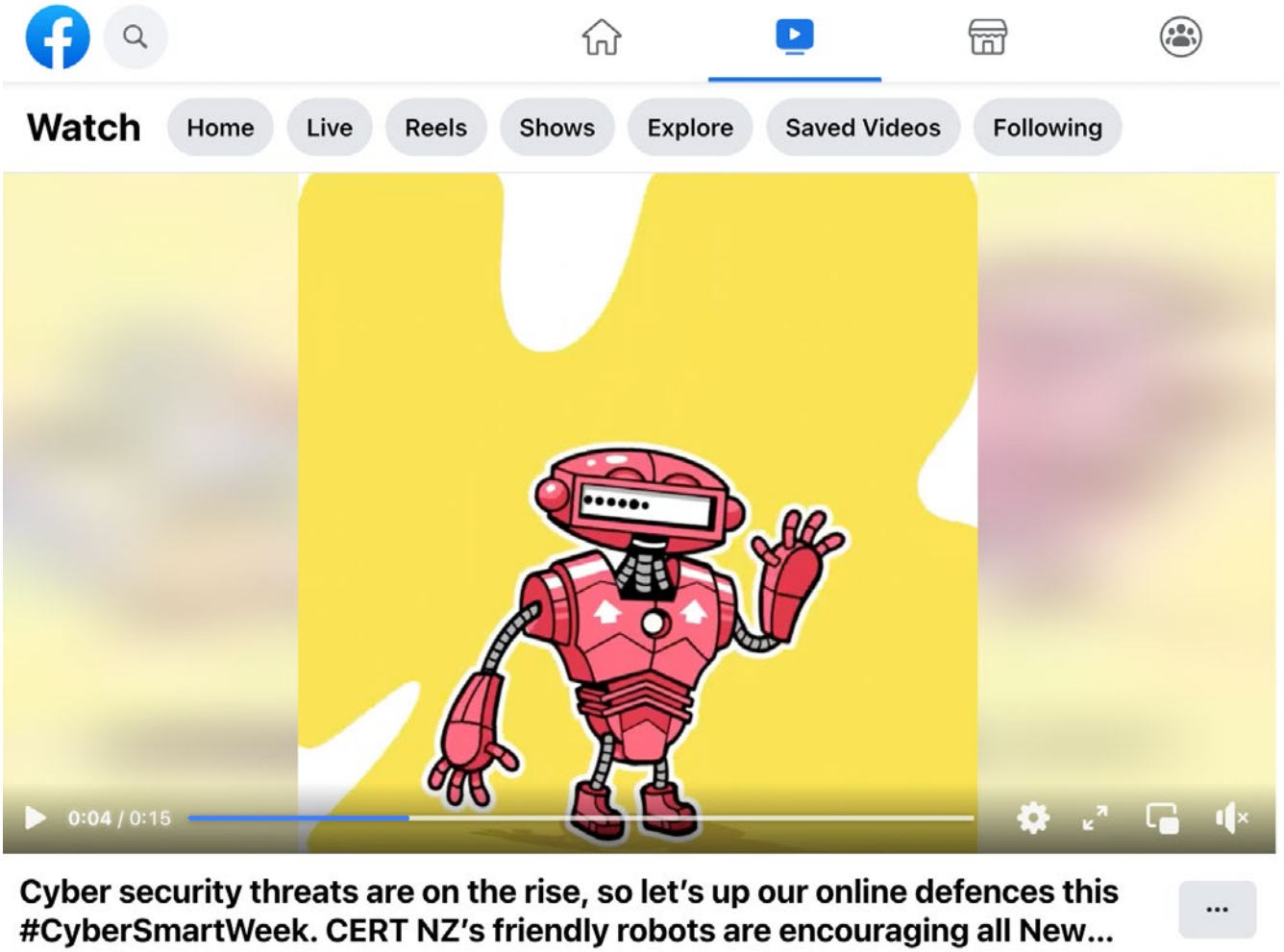

Figure 7: A major internet service provider in New Zealand, an authority organisation, shares CERT NZ's Cyber Smart Week content.

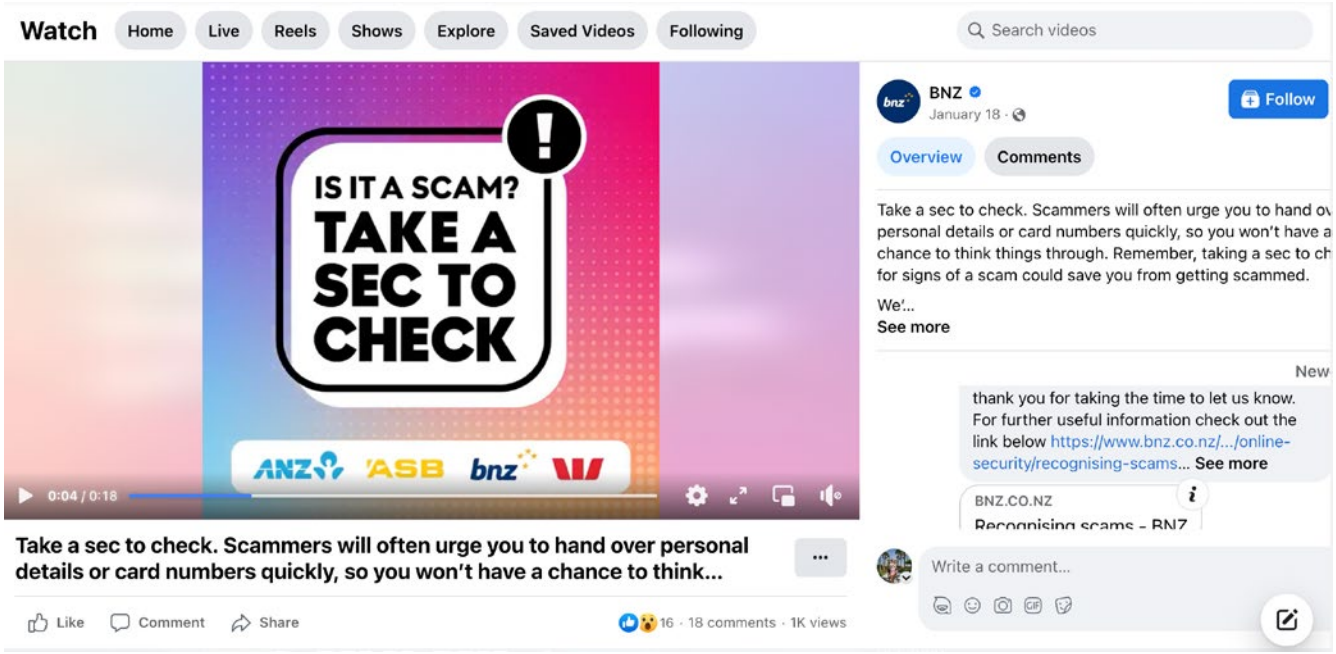

Figure 8: Four major banks, i.e., authority organisations, share how to protect yourself online.

and collateral for other authoritative sources to share (Figures 6 and 7; CERT NZ, 2023b) and works closely with financial institutions and internet service providers. For example, we support four of the major banks in New Zealand, alongside the New Zealand Banking Association, to release cyber security content that helps keep people secure online (Figure 8; New Zealand Banking Association, 2023). As a result, the key behavioural messages are spread further, to a broader audience, and shared by trusted messengers.

Priming

Behavioural Insight

People's behaviours and decision-making are affected by priming, namely exposure to certain stimuli, like imagery or certain types of words and language. For example, priming people through exposure to words like athletic, fit, lean and the concept of being active makes them more likely to take the stairs than the lift (Wryobeck & Chen, 2003).

Application

Cyber security is currently presented in the media as dark, shadowy and complex; and something for experts, IT specialists and large organisations to deal with. We started priming for a more human, everyday 'people like me' and empowering tone. We used more everyday imagery, language and tone to subconsciously motivate people into action in the Two Steps, Too Easy campaign (CERT NZ, 2023c) aimed at small business owners in New Zealand (Figure 9). This group is increasingly susceptible to unauthorised access which can lead to incidents like invoice scams. The messaging prompted them to take two simple steps: use strong passwords and turn on two-factor authentication. Steps which are proven to significantly reduce the risk of a cyber attack or scam. The photo-based campaign used images of a range of different small business owners to make it feel more human-focused than tech-focused. The campaign used everyday language rather than technical cyber security terms.

Social Norms and Normative Behaviours

Behavioural Insight

Our social context influences our behaviour, and we tend to follow social codes of conduct and stick to normative behaviours, or what's 'socially acceptable' among our peers, culture and wider society (Yamin et al., 2019). For example, in many cultures it's not considered socially acceptable to take your shoes off around strangers in a restaurant, but it is at home when around friends and family.

Figure 9: Examples from the Two Steps, Too Easy campaign that prime cyber security actions as being easy steps for everyday business owners through the use of images and language.

Application

Some audiences find hanging up or saying 'no' to a scam caller difficult, awkward and, in some instances, impolite. Arming people with socially acceptable ways to say 'no' to phone scam callers can help them end the call and avoid a possible incident, and it also helps normalise the behaviour of saying 'no'. In May 2022, we became aware of a spike in scam calls where attackers were pretending to be from a bank to try and trick recipients into sharing financial information, giving access to their bank accounts or allowing remote access to their devices or PCs. Normalising how to say 'no' to a scammer was used in messaging to help people feel comfortable to end the call and hang up (Figure 10).

Fresh Starts

Behavioural Insight

The fresh start effect refers to special occasions, or 'temporal landmarks', namely key moments where people are more likely to reflect and take action. For example, New Year's Eve is a well-known fresh start for resetting goals (Dai et al., 2014).

Application

There are key moments when implementing online security behaviours is more relevant to people, and these typically align to fresh starts. Our research identified the key fresh start moments where people are more likely to implement online security measures. In total, 63% of New Zealanders would typically implement cyber security behaviours when setting up a new device, 48% for a new financial service and 44% when signing up for a new website – all of which are 'fresh starts' and first-time actions (CERT NZ, 2022b). Internet service providers and financial service providers can provide relevant cyber security information and actions for people to take when they are setting up a new service or device. For instance, Spark (a New Zealand telecommunications and internet service provider) provides an informative pamphlet (Figure 11) to customers setting up a new phone that prompts them to use two-factor authentication, to not share personal details with strangers and other cyber security advice.

Figure 10: CERT NZ helped normalise how to say 'no' to a scam caller.

Figure 11: Spark (a New Zealand telecommunications and internet service provider) provides cyber security information to customers setting up a new phone, because setting up a new device is a key fresh start opportunity where people are more likely to be engaged with cyber security information and actions.

Conclusion

One important next step for applying behavioural insights to cyber security action is to continue to monitor, measure and learn. While some behavioural interventions may be successful in the short term, their effectiveness may diminish over time or fail to produce the desired outcomes altogether. By regularly monitoring and measuring the impact of these interventions, it becomes possible to adjust and improve them as needed. Additionally, as new threats and vulnerabilities emerge, it may be necessary to adapt behavioural interventions to address these new challenges. We have established an ongoing annual tracking system to measure the effectiveness of CERT NZ campaigns and to track the key cyber security behaviours over time in order to learn and adapt.

Another key consideration is the need to scale successful nudges. Organisations, such as CERT NZ, that have successfully implemented behavioural interventions may need to consider how to scale these interventions to reach more people or to adapt them for use in different contexts. One such approach is through our partnership strategy: the more trusted institutes and messengers that share behaviourally-informed messages, the more people exposed to and engaging with the content.

In addition to scaling successful interventions, there may also be an opportunity to trial different nudges with specific audiences. Behavioural interventions may not work equally well for all groups of people, and different interventions may be needed to address the unique challenges faced by different groups. This could involve using different messaging or framing for different groups, or targeting interventions based on demographic or behavioural characteristics. For example, an intervention that works well with young adults may not be as effective with older adults. By trialling different interventions with specific audiences, organisations can gain a better understanding of what works best – and for who. We have recently developed a cyber security segmentation tool that allows us to look at more specific audiences. These audiences have been broken into five segments based on demographics (age and life stage), digital and cyber security capability and confidence, and cyber security risk levels (motivation to engage in cyber security actions and exposure to cyber threats). These allow us to have a more specific

approach to each audience.

Finally, it's important to recognise that behavioural interventions are not a silver bullet solution to cyber security challenges. While nudges can be effective in changing behaviour, they are just one tool in a larger toolbox of cyber security strategies. Organisations looking to apply behavioural insights to help boost cyber defences should consider how these interventions fit into their broader cyber security strategy and complement other necessary areas such as cyber security awareness, training and technology.

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Digital Behavioural Interventions for Sustainable Mobility: A Review of Behaviour Change Techniques in Mobile Apps

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Salzburg Research

There is an urgent need for city administrations and other stakeholders to promote sustainable mobility choices, such as bicycling or public transport, to reduce the negative effects of individual car use. In order to promote sustainable mobility behaviour, digital behaviour change interventions using mobile apps have been suggested as a promising means in this regard. This paper presents a review of 26 urban mobility apps with a focus on the most commonly implemented behaviour change techniques. We conclude that the design of digital interventions could be improved by grounding them firmly in a model of behaviour change. We suggest applying the COM-B model and related behaviour change technique taxonomy in the field of mobility, and we provide examples of how interventions could be designed from this more holistic perspective.

Introduction

Shifting people's behaviour away from individual car use towards more sustainable mobility choices, such as walking, bicycling or using public transport, is understood as a way to decrease carbon emissions, since transport accounts for a quarter of global CO2 emissions, and without aggressive measures, emissions are expected to rise by 60% between 2015 and 2050 (World Bank Group, 2021). As part of such measures, it is important to address mobility behaviour in urban areas in order to achieve carbon goals regarding transport. Policymakers view it as essential to motivate people to make use of sustainable forms of mobility (e.g., walking, bicycling, public transport) instead of individual car use, because restrictive regulations are not always possible or desired. As this challenge relates to individual behaviour, interventions based on behavioural sciences such as psychology and behavioural economics have been proposed (Ewert, 2019). Considering the frequent use of smartphones in people's daily lives, digital interventions are seen as potentially effective means for motivating people to adopt sustainable urban mobility choices (Andersson et al., 2018; Sunio & Schmöcker, 2017).

Promoting Sustainable Urban Mobility With Digital Interventions

Behaviour change methods, such as the nudging of individuals (Thaler & Sunstein, 2008) and gamification approaches (Douglas & Brauer, 2021; Pajarito & Gould, 2017), have been discussed as potential interventions for motivating more sustainable behaviour in different application areas, and more recently in relation to green mobility. In this field, digital intervention methods can be easily implemented for use with smartphones before, during and after trips. Various methods have already been explored in studies, for example, travel feedback providing information on aspects of trips taken, such as different modes of mobility used, carbon emissions, calories burned while walking, etc. (Jariyasunant et al., 2015). Another focus has been personalised travel planning, for instance, suggesting taking the most environmentally-friendly mode of mobility (Anagnostopoulou et al., 2020; Jariyasunant et al., 2015). Some mobility apps also display information about one's carbon footprint resulting from different mobility choices (Shankari

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et al., 2015). Furthermore, apps with a combination of the aforementioned features have been developed (Jylhä et al., 2013), and additional functionalities such as goal-setting (Schrammel et al., 2015) or social and community aspects have been introduced (Luger-Bazinger & Hornung-Prähauser, 2021). This article provides an overview of behaviour change techniques that are being used to motivate sustainable urban mobility through digital, mobile app-based interventions. We argue that there is still much potential for such digital interventions by grounding them firmly in a model of behaviour change that will help with their design (Chng, 2021). Other fields such as health and medicine (e.g., diabetes management) have seen a greater effect when behaviour change techniques, designed from a model, are systematically implemented in interventions (Van Rhoon et al., 2020) – and the same approach could thus be followed for mobility behaviour

Review of Green Urban Mobility Apps

For an overview of implemented approaches to digital behaviour change in the field of mobility, we conducted a review of currently available urban mobility apps seeking to encourage sustainable mobility choices.

Search Process

A Google search was initially conducted to find apps for inclusion in the study. The following keywords were used: "sustainable mobility", "urban mobility", "smart urban mobility", "green mobility apps", "active mobility behaviour apps", "urban mobility playstore" and "urban mobility appstore". In addition, the "Similar apps" section of Google Playstore and the "You might also like" section of Apple Appstore were used to discover related apps on both platforms. If developers limited the availability of apps to certain countries, not including Austria, these apps could not be seen and accessed, and therefore they were not included in the review. The keywords used in finding the mobile apps were all in English. However, some apps in other languages were identified (e.g., ViaggiaRovereto in Italian, Mobilite.eco in French), and these were found using the "Similar apps" search in Google Playstore. 36 apps were initially found and included in the review list.

Selection Criteria

We limited the scope of the apps review to urban mobility apps with links to sustainable mobility behaviour. More specifically, the inclusion criteria were that the app had to:

- be for a city or urban area,
- promote sustainable urban mobility modes (e.g., walking, bicycling, public transport) instead of individual car use, and
- include at least one behaviour change technique.

We excluded public transportation and navigation apps that only offer real-time information on transportation schedules or traffic data, as well as mobility apps that mostly focus on personal health and fitness development (e.g., through step-counters). After applying the selection criteria, 26 of the initially found 36 apps were retained. At the time the search and selection was conducted (July to September 2022), 18 apps were available in both Google Playstore and Apple Appstore, five only in Playstore and three only in Appstore.

App Characteristics

Distribution

The 26 apps included in the review are present in at least 228 cities in 18 countries, and 23 apps are found in cities in one or more EU countries (see Table 1).

Categories

Eight apps have been created for city administrations, four as commercial apps for the general public, nine as corporate mobility apps aimed at employees of private companies and five apps have been developed and promoted by research projects.

Modes of Mobility Promoted

17 apps promote two or more sustainable mobility mode choices. Bicycling is the most popular, promoted in 22 apps, as a single transport mode or in combination with other modes, followed by walking, public transport and carpooling (see Table 2).

Table 1: Overview of Urban Mobility Apps

App Name	Category	Country	Mode of Mobility
bike to work	City admin.	Switzerland	Bicycling
Cycle Journey Planner	City admin.	Ireland	Bicycling
Ecomode	City admin.	France	Bicycling, Walking, Public Transport, Carpooling, E-scooter
Enschede Bikes	City admin.	Netherlands	Bicycling
Ridenjoy	City admin.	Singapore	Bicycling, Walking
Safe & the City	City admin.	UK, Germany	Walking, Public Transport
Stadtmacherei	City admin.	Austria	Bicycling
Wien zu Fuß	City admin.	Austria	Walking
BikeCitizens	Commercial	Austria, Germany	Bicycling
Cowlines	Commercial	US, Canada	Bicycling, Walking, Public Transport, Carpooling
MUV	Commercial	EU	Bicycling, Walking, Public Transport, Carpooling
My Safetipin	Commercial	India	Walking, Public Transport
Carployee	Corporate	Austria	Carpooling
Ciclogreen	Corporate	Spain	Bicycling, Walking, Public Transport, Running, Skating
commute	Corporate	Denmark	Bicycling, Walking, Public Transport, Carpooling
Commute Greener	Corporate	Sweden, US	Bicycling, Walking, Public Transport
Mobilite.eco	Corporate	France	Bicycling, Walking, Carpooling
Pave Commute	Corporate	Austria, Germany, Switzerland, Poland	Bicycling, Walking, Public Transport, Carpooling
Tern	Corporate	Australia	Bicycling, Walking
Trappers	Corporate	Netherlands	Bicycling
Ummadum	Corporate	Austria	Bicycling, Walking, Carpooling
Ferrara Play&Go	Research	Italy	Bicycling, Walking, Public Transport
GoEco!	Research	UK	Bicycling, Walking, Public Transport
TrafficO2	Research	Italy	Bicycling, Walking, Public Transport, Carpooling
Tripzoom	Research	Netherlands	Bicycling
ViaggiaRovereto	Research	Italy	Bicycling, Public Transport

Table 2: Number of Apps Promoting Each Mode of Transport

Mode of Mobility	Number of Apps
Carpooling	9
Public transport	13
Walking	17
Bicycling	22

Implemented Behaviour Change Techniques

In a first step, all app features seeking to influence behaviour were identified (e.g., whether a sustainability tracker was present). In the second step, the identified 23 features were clustered into five categories, selected and adapted for the mobility field from the Behaviour Change Technique Taxonomy (Michie et al. 2013), thereby representing the different behaviour change techniques implemented in the apps. The results are presented below according to the frequency of implemented techniques.

Feedback and Monitoring: Present in 22 (85%) of the urban mobility apps, features in this category include GPS-based mobility tracking and sustainability monitoring functions. These functions present results in terms of metrics, e.g., carbon footprint calculation for each trip taken, or the option for users to review their trips on a dashboard. A trip review is the top feature present in the urban mobility apps, allowing one to track and to be aware of their mobility choices as a self-monitoring tool (e.g., MUV, Trappers).

Rewards (gamification): Gamification approaches were implemented in 21 (81%) of the apps, either with social elements or monetary incentives.

- Social: These features include badges, leader boards, trophies, gamified points earned and other ways to display users' progress and enable comparisons with other members of an online community. Typically, such features are used to promote bicycling (e.g., Tripzoom app) or selecting from amongst mobility options those with a lower or no carbon footprint (e.g., GoEco! app).
- Monetary incentives: This form of rewards scheme (i.e., points earned can be redeemed for prizes, vouchers or cash) is typically part of a city or a company's sustainability programme to encourage app users to choose sustainable mobility options (e.g., Ciclogreen app).

Planning: Planning functionalities were present in 18 (69%) of the apps, consisting of all routing options to get to the user's destination, highlighting the "greenest" route or comparing between different transport modes (e.g., carpooling, public transport, bicycling). This approach is generally designed to support users in choosing the most sustainable journey option by revealing the consequences of different transport modes, such as CO2 emissions, travel time, etc. (e.g., ViaggiaRovereto, Cowlines).

Reminders and prompts: This is implemented in 16 (62%) of the apps through push notifications which remind and prompt users to keep choosing sustainable mobility options (e.g., Safe & the City, Pave Commute). Motivational reminders often focus on environmental, fitness or social aspects of choosing more sustainable modes of transport, and in fewer cases user community or safety aspects.

Knowledge and education about consequences: 14 (54%) of the apps aim to educate users about the environmental benefits of adopting sustainable mobility options as well as existing urban infrastructure for bicycling and walking (e.g., Stadtmacherei, Ferrara Play&Go).

Behaviour Change Models

Our review of urban mobility apps reveals that there have been various attempts at changing mobility behaviour through digital interventions. Approaches in the mobility field often share the same features, especially in sustainable mobility programmes offered by cities (e.g., providing information on carbon footprints of mobility choices, green routing options, incentives offered). A meta-analysis of various mobility behavioural interventions, not limited to digital options (Semenescu et al., 2020), found that these efforts can indeed reduce individual car use. However, the applied methods are not equally successful: the most effective interventions targeted social, cultural and moral norms, with a 32% decrease in the modal split share, i.e., the proportion of car trips to the total number of trips (Semenescu et al., 2020). Nonetheless, this approach has not – or has only indirectly – been applied by apps in our review (e.g., by providing information on impacts on the environment

or climate). Information on trips taken, such as CO2 emissions, produces a smaller effect, with a 14% decrease in the modal split share (Semenscu et al. 2020), but was included as a behavioural intervention method in over half of the apps. Only a weak effect on changing mobility behaviour can be achieved by solely providing information on more sustainable practices, which was also a prominent feature present in over half of the apps. Combining different interventions could boost effectiveness, but studies on interactions of various methods are still needed.

A major concern is that digital behavioural interventions which are not firmly rooted in theoretical models of behaviour change do not enable a real understanding of the barriers to or facilitators of behaviour. Successful interventions depend on grounding them in theoretical models of behaviour change (Arnott et al., 2014), and one study showed that there is a positive correlation between a theoretical foundation of interventions and their effectiveness (Webb et al., 2010). The lack of grounding of interventions in the mobility field in a valid scientific understanding of human behaviour has been criticised before (Andersson et al., 2018; Sunio & Schmöcker, 2017).

Transferring the COM-B Model Into the Field of Mobility

In order to influence mobility behaviour, suitable models of human behaviour, and the implementation of behaviour change strategies, can be transferred from other fields, among which the COM-B model (Michie et al., 2011) and the related taxonomy of behaviour change interventions (Michie et al., 2013) could serve as a comprehensive framework for the development of interventions. The COM-B model proposes that a specific behaviour 'will occur only when the person concerned has the capability and opportunity to engage in the behaviour and is more motivated to enact that behaviour than any other behaviour' (West & Michie, 2020, p. 1). To work with the COM-B model, one has to think about whether current behavioural barriers stem from capability, motivation or opportunity, thereby fostering a holistic perspective on changing mobility behaviour (see Table 3 for examples of barriers). Of course, not all barriers can be removed by behavioural interventions with smartphones apps (e.g., physical capability, infrastructure), but digital solutions can certainly help with many barriers, such as motivation, social opportunity or psychological capability.

Using the COM-B model in the face of a lack of theories in mobility behaviour change has previously been suggested (Arnott et al., 2014), albeit, to date, the model has not been widely adopted in the mobility field. For example, Arden et al. (2022) used it for a successful active mobility intervention based on participants' self-commitment to walk or cycle at least one of the local journeys they make each week instead of using their car.

We also applied the COM-B model for designing digital interventions for promoting active mobility (walking, bicycling) and using public transport in the form of push notifications to mobile app users (Luger-Bazinger et al., 2023). Building on the Behaviour Change Technique Taxonomy (Michie et al., 2013), and following the idea to offer behaviour change interventions that can be built into different apps (e.g., apps with a focus on mobility, fitness, health), we elaborated over 160 short texts that can be used as notifications. These are clustered into 15 groups and 46 behaviour change techniques of the taxonomy, expanding possible interventions to targeting social and cultural norms, reframing costs (i.e., monetary, time), emotional consequences and identity. Further, the notifications can be connected to relevant context data (e.g., weather, traffic, proximity to public transport) that determine the timing and content of the notifications – similar to the idea of just-in-time adaptive interventions (Nahum-Shani et al., 2018), for example recommending one packs a rain jacket for bicycling promotion in case of inclement weather. This situational context brings the additional element of opportunity into the digital interventions.

Conclusion

Interventions to encourage people to use sustainable modes of mobility are needed to address climate change, reduced quality of life in urban environments and other negative effects associated with carbon emissions, air pollution and traffic congestion. Building on the wide use of and possibilities offered by smartphones, there have been considerable efforts to change mobility behaviour through digital interventions. The review presented herein illustrates the most common behaviour

Table 3: Barriers to Changing Mobility Behaviour From Car Use to More Sustainable Alternatives

COM-B Element	Factors	Examples of Barriers
Capability	Physical	Not skilled to ride a bicycle A physical disability
	Psychological	Finding bus plans and connections too difficult to understand Not knowing where to safely store a bicycle
Opportunity	Physical	Rain or snowfall No reliable public transport available
	Social	Having small children or elderly family members to take care of Car use is prevalent among peers
Motivation	Reflective or automated	Negative opinions about public transport Not wanting to waste time on public transport or walking

change methods implemented in urban mobility apps. However, many interventions operate without any theoretical model of behaviour change and are limited in their approaches and insights because of this issue. To enhance digital behaviour change efforts in the mobility field, existing theory-based models could be applied that have proven their usefulness for grounding the implementation of behaviour change techniques. We suggest transferring the COM-B model and the related Behaviour Change Technique Taxonomy into the field of mobility in order to design behaviour change interventions for sustainable mobility behaviour. This approach could not only improve and broaden the design of digital interventions and potentially improve effectiveness, but it could also provide a holistic perspective on barriers and enablers in mobility behaviour.

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The Behavioral Economics of Sustainable Food Decisions: How to Nudge Climate-Friendly and Healthy Choices

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Nudges can enable people to make climate-friendly and sustainable food choices. Food influences climate gas emissions and the destruction of nature, but food providers and consumers can find it difficult to produce and consume more climate-friendly alternatives. We introduce the behavioral science of food decisions and discuss which nudges seem most effective in changing choices. Arguing that food nudges can be an effective climate solution for consumers, the food industry, and green investors, we suggest solutions for potential pitfalls and problems.

Why Food Nudges?

Unsustainable food production practices are a significant source of climate gases, and they destroy nature. Food providers have introduced ecological options, but consumers are either unaware or unwilling to spend money on them.

Food nudges can increase the probability of making environmentally friendly choices and offer a cost-effective and profitable tool in the green transition. The behavioral economics of food choices provides relevant knowledge for food providers, public officials, advisors, consultants, educators, and academic researchers alike.

How Food Is Important for People and the Planet

Food is connected with health and wellbeing, personal pleasure, a good family life and enjoyable social relationships, productive work and satisfactory employment, and culture and identity. However, poor diets cause obesity and rank among the top global health problems (Qiao et al., 2022); additionally, food choices are influenced by many different factors—and it is difficult to change them (Enriquez & Archila-Godinez, 2022).

There has been substantial growth in food production to feed the growing global population; however, according to estimates, it creates as much as 25–30% of all global greenhouse gas emissions (Masson-Delmotte et al., 2021; Smith & Gregory, 2013) and is associated with the unsustainable destruction of nature and many ecosystems, in order to make way for agriculture. Food technologies, such as fertilizers and pesticides, also result in pollution. In short, food is directly connected to the two biggest human and planetary challenges today: global warming and the loss of nature.

Why Food Problems Are Difficult to Fix, and How Nudges Are Useful

Food problems are difficult to fix because they require changes in food value chains, investor behaviors, public policies, and consumer purchases. Nudges can be part of the solution because they influence what consumers buy and can increase the sales of sustainable options.

Food value chains are commercial systems driven by investments, costs, profits, and losses. Firms focused on sustainable growth can find it difficult to fund the green transition because of low sustainable sales (Bernardes et al., 2018), but food nudges can convince consumers and thus enable profitable green growth and promote better scores on sustainability barometers.

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For sustainable investors in the food industry, it might be unclear how food firms actually promote greener choices. Food nudges can be measured and communicated to document how strongly food firms care for people and the planet, thereby making these firms more attractive to green investors.

Some national governments include climate gas emissions from food in their plans for achieving international climate commitments. Nudges can help move the public towards low emission foods.

To implement nudges as a sustainability strategy, we need to understand how they work.

How Nudges Can Influence Sustainable Food Choices

What Is a Food Nudge?

A nudge is a gentle push towards a better choice, so light that it can be easily avoided, but so effective that a significant number of people can be swayed slightly in a positive direction (Sunstein & Thaler, 2008).

Nudges involve objective changes in the external world and can form part of decision-making structures called a "decision architecture". Furthermore, nudges change what we see, in which order, and provide more information about options and their consequences. As most food choices are made in supermarkets and eateries, food nudges involve adjustments to these decision contexts. A new field of food research is online shopping.

Nudges are psychological influencing methods. People receive information about diets, health, and the ecology from media and marketing, but nudges are the specific stimuli that influence us in the actual moment of choice. Most people invest little mental effort in food choices and can therefore be influenced by what they see first, what looks most tasty, what there is a lot of, what is easy and convenient to eat, portion sizes, positive names, and attractive symbols and signs on products (Wansink, 2016).

How the Brain Decides

To apply the most effective nudges, it is useful to know how the brain makes a decision.

A well-known distinction is between the fast-thinking System 1 and slower analytic System 2 (Kahneman, 2003), and nudges work because they influence the intuitive choices of the former. Moreover, System 1 includes three main judgement steps (Kahneman, 2003), and recent research suggests that nudges can target each of them (Mertens et al., 2022).

Table 1 illustrates that System 1 includes three decision steps and suggests how each step can be influenced by food nudges.

The three decision steps are:

- Focus: People have selective attention and notice a limited number of options. Each option is matched with people's mental categories about food attributes such as taste, health, the environment, or others.
- Evaluation: People match what they see with reference points and expectations, and they judge if options seem positive or negative.
- Intentions: People match what they see with their goals and intentions, and they are more likely to choose those options that match their needs.

At each step of the processes, people's judgments can be influenced by three corresponding categories of nudges (Mertens et al., 2022):

- Type 1 Decision structure: Redesign the decision situation by changing the order of food options, number of alternatives, their size, availability, and convenience.
- Type 2 Decision information: Add signals and signs that suggest positive food attributes or add facts and information about food qualities.
- Type 3 Decision intentions: Add signs with information or reminders about positive intentions such as health or the environment, or benefits such as lower costs or emissions.

Several other nudge frameworks are available in the Appendix.

How to Nudge Food Choices

Science suggests that decision Systems 1 and 2 interact (Kahneman, 2011), whereby the mental maps stored in System 2 influence how System 1 interprets the decision context (Jones et al., 2011). Each decision step is influenced by the mental maps, and more personal information is added by the mind in the later steps (Kahneman, 2003).

Table 1: Decision Steps and Main Types of Nudges with Examples

System 1 Decision Steps	Main Categories of Nudges	Examples of Food Nudges
Step 1: Focus	Type 1: Decision structure (Alter the physical decision architecture and presentation of options)	Place the positive options first and closer, make them easier to see and choose Increase the number of attractive alternatives Provide default options Portion food products Make the options more convenient to choose and consume
Step 2: Evaluation	Type 2: Decision information (Add information about options)	Symbols and signs that trigger positive feelings Signs with information about food quality
Step 3: Intention	Type 3: Decision intentions (Suggest positive intentions or inform about the consequences of options)	Signs with reminders about what is positive to choose and benefits of the options Price labels or signs that signal financial benefits or additional costs

To nudge food choices, we need to consider two main factors: 1) consumers' beliefs about food, the climate, and sustainability and 2) the decision architecture of supermarkets and eateries. This notion is illustrated in Figure 1.

Viewed from left to right, Figure 1 illustrates how consumers' food choices are influenced by their mental maps, which help people interpret a situation and decide how to react. Food choices can be influenced by several different maps, and examples in this regard are taste, timing, convenience, price, health, the climate, and sustainability.

Viewed from right to left, we see how Type 1, 2, and 3 nudges can influence each step in how a consumer makes a decision. To exemplify how these nudges can be designed in food outlets, see Figure 2.

The left section in Figure 2 illustrates a supermarket. If it wished to nudge sustainable and healthy sales of fruits, vegetables, and fish, Type 1 nudges could include placing these categories first, adding more options and more appealing alternatives, adjusting the shelves so that the products would be easier to see and grab, and portioning the options to make them convenient to consume. Type 2 nudges would include adding signs to direct customers towards the categories and options, using messages that increase the taste and attractiveness of the products, or informing about product qualities and benefits. Type 3 nudges would include adding signs suggesting eating more of the healthy and sustainable fruits, vegetables, and fish—or reducing the price of these alternatives.

The right section in Figure 2 exemplifies the typical design of a buffet restaurant. If it wished to nudge the healthy and sustainable consumption of fish, vegetables, and fruit, the principal Type 1, 2, and 3 nudges would be similar to the supermarket ones. Type 1 nudges could involve the physical placing,

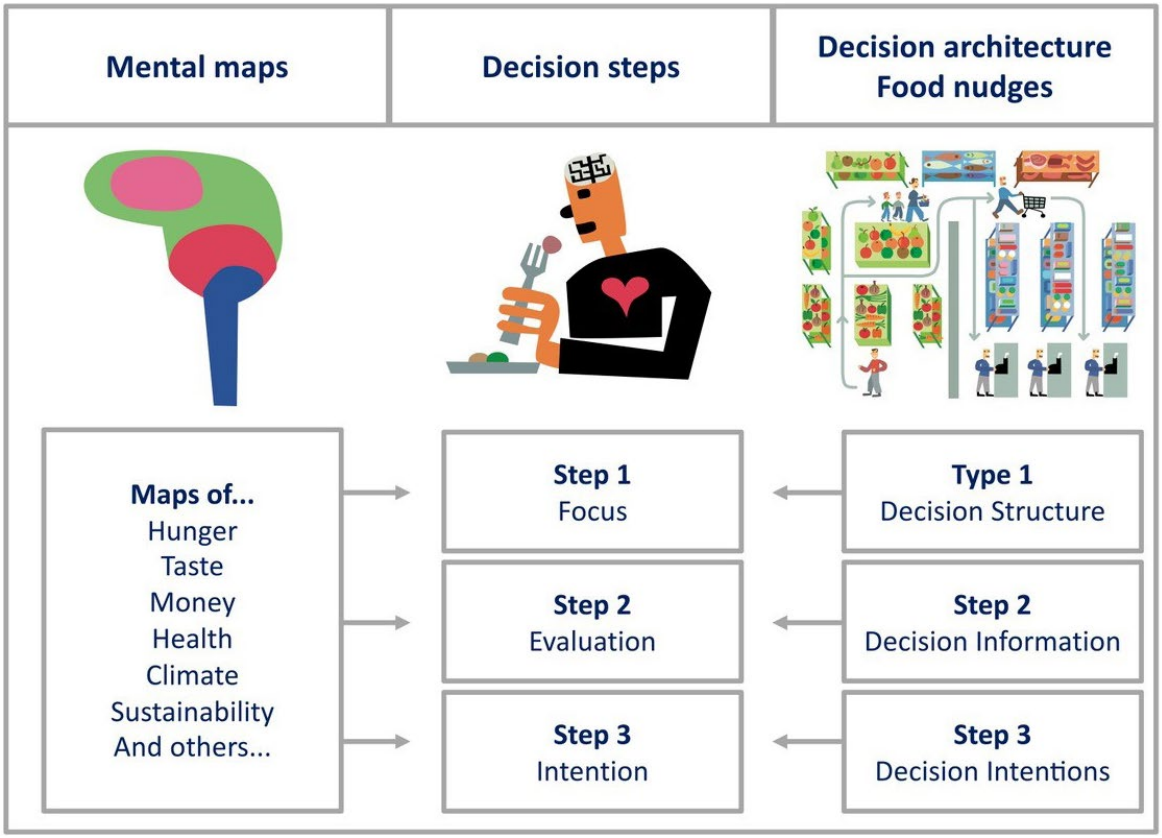

Figure 1: Components of consumers' food decision processes.

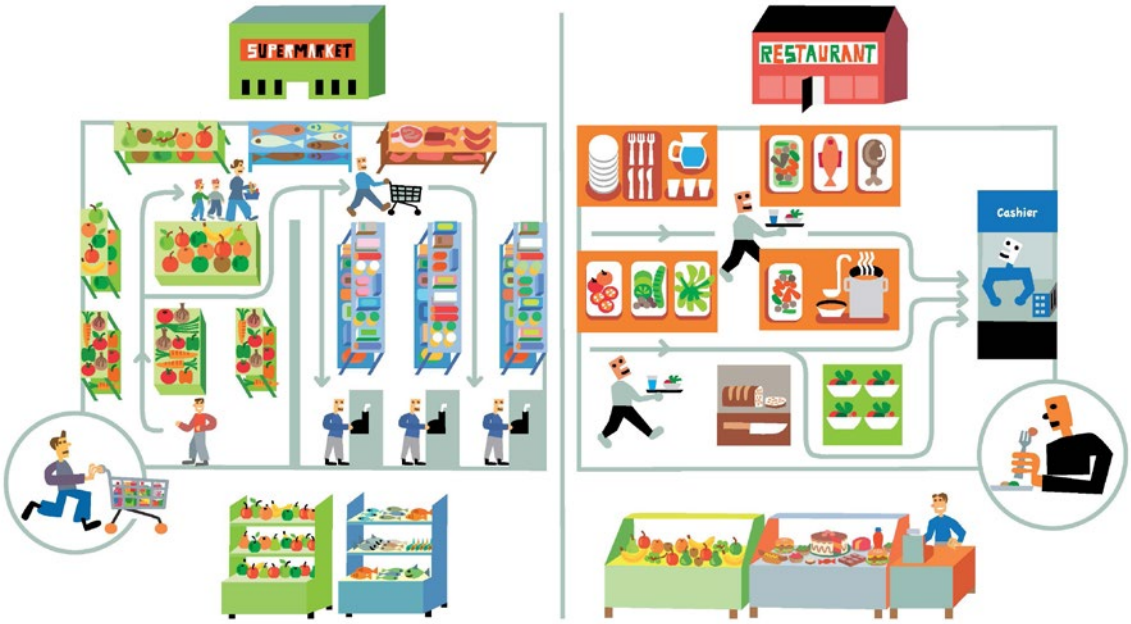

Figure 2: Illustration of supermarket and restaurant designs to exemplify nudges.

ordering, and portioning of these dishes to make them easier to see and take. Type 2 could mean adding signs to catch guests' attention and make the dishes seem tasty and positive, or adding information about health or climate benefits. Type 3 could be price reductions or signs suggesting eating more of these alternatives.

Consumer Beliefs About Climate-Friendly and Sustainable Foods

As consumers' mental maps influence each decision step, we need to understand what people believe about food, the climate, and sustainability. This is especially relevant for designing Type 2 and 3

nudges, which involve labels, signs, symbols, and factual information.

Many consumers know little about how food influences the planet's health: the impact of food on climate and sustainability is fresh news. Food choices are influenced by many different needs, but climate and sustainability may be lower priorities, thereby making it difficult to use them as arguments for choosing foods in a positive way.

Some consumers might even react negatively to climate messages because they are skeptical about the climate crisis. Climate change is a threat that produces negative perceptions, feelings, and reactions (Marshall, 2015; Stoknes, 2015),so climate communication might therefore be ignored, rejected, or denied.

Even among experts, such as food and climate specialists, policymakers, and food providers, there is disagreement about the definitions of climate and sustainability (Smith & Gregory, 2013). Sustainability is a multidimensional concept that includes social, environmental, economic, and governance factors, whereas the climate can be classified as an element of environmental sustainability focused on the climate gas emissions of carbon dioxide, methane, and nitrous oxide.

As there are unclear and differing beliefs about food and sustainability, it is more difficult to nudge through Type 2 and 3 nudges, as these rely on adding decision information and decision intentions. Consumers might ignore or reject such information because it does not resonate or is in conflict with their assumptions.

The Most Effective Food Nudge Tools

Scientists have different ways of determining how effective nudges work. One way is to design an experiment to investigate how nudge X influences food choice Y. Another way is to compare all nudge experiments and measure how consistent the results are, which is called a "review" or a "meta-analysis." Herein, we use the last approach to provide an overview of which nudges seem most effective.

We present four recent scientific reviews and compare the effectiveness of Type 1, 2, and 3 nudges. The first study compared food nudges with other domains, the second and third studies reviewed the impact of healthy nudges, and the last study transformed food health scores to climate scores, in order to estimate how sustainable food choices can be nudged. Most of what we know about food nudges comes from health studies, and we have therefore included two such reviews. In recent years, interest in food nudges for the climate and sustainability has increased, and we found two such reviews (Blackford, 2021; Vandenbroele et al., 2020)

Table 2 shows the results of all four reviews.

The most recent review (Mertens et al., 2022) compared nudge effectiveness in several choice domains and found that Type 1 nudges were more effective than Types 2 and 3. Further, food nudges were most effective with a high average impact (d=.72), compared with medium for the environment (d=.43) and prosocial behaviors (d=.44) but lowest for health (d=.34) and finance (d=.25). The impact of Type 1 nudges was also highest for food.

Study 2 on healthy choices (Cadario & Chandon, 2020) also found that Type 1 nudges were most effective, but the differences between nudge types were smaller than in study 1. The total impact of Type 1 nudges was medium (d=.35), Type 2 medium-low (d=.23), and Type 3 low (d=.09). The most effective nudge was portioning (d=.62) and the least effective evaluative signs (d=.15) and descriptive labels (d=.06). Type 2 sensory and feeling-oriented signs were more effective than evaluative messages.

Studies 3 and 4 (Karevold & Lekhal, 2017; Karevold & Soldis, 2023) were practice-oriented reviews designed to explain the most effective health and climate nudges for food providers. Both studies showed that Type 1 nudges in relation to placing (order, distance, availability) and portioning were more effective than Type 2 labels (symbols and descriptive signs) and Type 3 pricing (level, increase, and decrease). In study 4, we identified 27 review studies of healthy food nudges with nearly 300 unique empirical articles, and with the help of a climate scientist we transformed the foods' health scores to climate scores. Not surprisingly, we found that the same nudges can influence both the climate and health, whilst Type 1 nudges are most effective in influencing climate-friendly food choices.

However, two aspects of the healthy food studies make them difficult to directly transfer to climate nudges. First, the descriptive labels contain health facts and not climate facts. Second, the nudge studies aimed at reducing unhealthy foods with high amounts

Table 2: Relative Impact of Food Nudges

Nudge Types**	Study 1: Food, Environment, Health, Financial, Prosocial Nudges (Mertens et al., 2022)	Study 2: Healthy Food Nudges (Cadario & Chandon, 2020)	Study 3: Healthy Food Nudges (Karevold & Lekhal, 2017)	Study 4: Climate Food Nudges (Karevold & Soldis, 2023)
Type 1: Decision structure	Food impact: d=.86 Impact all domains*: Default: d=.62 Composition: d=.55 Effort: d=.43 Visibility: d=.36	Behavior nudges: d=.35 Convenience: d=.34 Portioning: d=.62 Visual: d=.11	Placing: 80% Distance: 100% Order: 79% Availability: 63% Portioning: 67%	Placing: 76% Distance: 82% Order: 70% Availability: 66% Portioning: 79%
Type 2: Decision information	Food impact: d=.52 Impact all domains*: Translation: d=.31 Social reference: d=.40	Affective cues: d=.23 Healthy cues: d=.27 Sensory cues: d=.22 Evaluative signs: d=.15	Labels: 53% Symbols: 61%	Labels: 62% Symbols: 61%
Type 3: Decision intentions	Food impact: d=.44 Impact all domains*: Reminders: d=.30 Commitment: d=.30	Descriptive labels: d=.06	Descriptive labels: 25% Price: 54% Price reduction: 63% Price increase: 67%	Descriptive labels: 47% Price: 80% Price reduction: 78% Price increase: 67%

Note: Table 2 shows the results of the four review studies. Studies 1 and 2 used quantitative review approaches for measuring nudge impacts. The d-score is a statistical measure of effect size. The rough rule of thumb is that 0.8 is a large effect, 0.5 a medium effect, and 0.2 a low effect. Studies 3 and 4 used a qualitative rapid review approach and counted the proportion of significant effects reported in the studies. A higher percentage means that a higher proportion of the nudge interventions provided significant changes in food choices. *The article does not cite specific impacts of subcategories of food nudges. The d-scores refer to the general impact of all nudges. ** We have organized the nudge categories in each study according to the three main nudge types. Our structure deviates somewhat from Mertens et al. (2022).

of salt, sugar, and fat are not possible to translate to climate footprints. Vegetables and fruit have positive climate scores so that more of these choices would have a positive environmental impact, but the climate scores for sugars, fat, and salt are difficult to determine. We therefore have limited empirical evidence indicating that it is possible to reduce the number of food choices with negative climate impacts. We can speculate, however, that nudges that reduce the number of unhealthy choices could also influence negative climate choices, but we would need to test these to learn how they actually work.

Discussion and Comparison of the Empirical Studies

The main impression from the four review studies is that Type 1 nudges seem more effective than Types 2 and 3. The differences in nudge effectiveness between Type 1 versus Type 2 and 3 nudges make sense when we consider how food choices are influenced by

primary human needs such as hunger, taste, pleasure, and convenience.

In terms of labels as a tool for adding decision information, it seems that symbols and messages that signal good taste and positive feelings are more effective than descriptive ones. For example, communicating that a product or dish is tasty and delicious could be more effective than informing about its climate gas emissions. Tests of price as an incentive for purchasing intentions show mixed results. Price seems to influence what people buy, but it is unclear if price reductions on positive options may be more effective than price increases on negative options.

All of the studies suggest that consumers are primarily nudged by attractive, tasty, and convenient choices, and secondly by added information and suggested intentions. As many consumers are unaware of how food affects the climate, and therefore might not respond to Type 2 and 3 nudges, the most effective climate strategy would be to focus on the attractiveness and availability of the most sustainable alternatives.

When we compare effect sizes across the four studies, we see that they vary, and the same type of interventions may influence choices differently. One explanation for this finding is that nudge impacts are vulnerable variations in nudge design and food choice contexts, which has implications for how food providers implement nudges as part of their sustainability strategies.

How to Nudge in Practice

We have practical experience with nudge interventions for health and sustainability in supermarkets and eateries. Our tests of which nudges work best match the studies cited above, in that Type 1 nudges are more effective than Types 2 and 3. Also, positive and tasty signs are more effective than adding facts about the food and its benefits.

We use the empirical studies as guidelines for inventing local nudges, and it is most effective to test nudges on a small scale before large-scale implementation, since smaller adaptations and adjustments can have a significant impact on total effectiveness, and local adjustments can enhance effectiveness.

There are different ways to test nudges, but the best method is to design experiments with measures before-after nudges or between sites with nudges-no nudges. We recommend measuring outcomes in terms of objective measures such as number of packages purchased or number of portions consumed. As nudges work subconsciously and below people's awareness, what consumers subjectively report might not match what they actually choose.

We also recommend linking nudges to an overall sustainability strategy and focusing on how they can improve the firm's climate score card. It is also a good idea to train managers and professionals in the basics of nudging so that they know why and what they are doing.

Potential Pitfalls and Problems

The next question is whether there are pitfalls or problems associated with food nudges. Do we risk any negative reactions?

Nudge sceptics are critical of the idea of nudging and often cite potential negative consequences (Bovens, 2009; Clavien, 2018). Their concerns stem from a variety of perspectives, ranging from philosophy and ethics to practical problems and backfire effects. There are several important considerations to be aware of in this regard.

One concern is that people might feel manipulated, as nudges influence subconscious System 1 choices and move them below their conscious awareness. As a result, if people become aware of the influence, they might resist or become angry. Another worry is that nudges can reduce people's feelings of freedom of choice and may limit what they can easily and conveniently choose.

Another critique is that nudges exploit vulnerable people, as they might be most easily influenced by nudges, due to potential limited decision capacity. As such, it appears unethical to abuse people's weaknesses to help them make better choices. Nudges may also backfire and produce unintended consequences.

Nudges can be problematic because they reduce people's responsibility in relation to solving problems and changing their lifestyle choices. However, they are an easy and convenient way out of a very difficult set of problems. In addition, longer-term solutions should correct foundational causes and not just superficially fix short-term through climate nudges. Furthermore, nudges may not lead to lasting change, as they work at the moment of choice and are effective through redesigning external decision architectures. When

people move into a different decision context, they might revert to unsustainable choices.

How can we deal with and manage these potential problems?

One solution is to be mentally conscious and ethically aware when we design and implement nudge interventions. To prevent feelings of manipulation, customers can be informed about how they are being nudged—and why. Studies have found that people have positive feelings about being nudged (Reisch et al., 2017). When we nudge, we let the whole range of options be open to choice, but we promote the healthiest and most sustainable ones so that we do not limit people's freedom. For those who dislike being told what to eat, nudges are a weaker form of influence than information, incentives, and regulations, all of which attempt to force people to act differently. For those who want to make positive climate choices but find it difficult to do so in their hectic lives, nudges can be perceived as a positive form of help. As all of us have limited capacity, but nudges make it easier to choose better. When we test nudges and adapt them to local conditions, we can measure if they backfire and produce unintended consequences.

Summary and Conclusions

Climate, sustainability, and health are major global problems, and the behavioral insights of food nudges can affect all three by influencing consumers to eat healthier, and in ways that are more sustainable and climate-friendly, thereby helping fund the green transition for food producers and providers. Nudges can be measured, reported, and communicated, and they can also be part of firms' sustainability strategies and reports. Investors can ask for objective facts about how food firms nudge customers and use this to determine how attractive these firms are for their green investment portfolio. The tools to achieve this aim are science-based and validated by empirical research. Nudges work quickly and can change climate choices instantly, whereas other influencing tools focused on changing consumers' mental maps require more time. By nudging food, we contribute to a healthier, more sustainable, and climate-friendly world.

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APPENDIX

Table 3: Overview of Nudge Frameworks

Framework	Nudges	Reference
3D	Decision structure, decision information, decision intentions	(Mertens et al., 2022)
P4	Placing, portions, prompts, price	(Karevold & Lekhal, 2017)
TIPPME	Cognitive, feeling, behavioral	(Hollands et al., 2017)
CAN	Convenient, attractive, normal	(Wansink, 2015)
EAST	Easy, attractive, social, timely	(Team, 2014)
MINDSPACE	Messenger, incentives, norms, defaults, salience, affect, prompts, proximity	(Dolan et al., 2010)
8P	Place, profile, portion, price, promotion, placing, prompts, proximity	(Kraak et al., 2017)
4P	Possibilities, process, persuasion, person	(Chance et al., 2014)

The Next Frontier of Personalization: Behavioral Science Customer Segmentation in Financial Services

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If data is as valuable as oil, the financial services industry sits on a treasure trove of liquid gold. The challenge is that many financial services firms continue to use inefficient and outdated approaches to using that data to engage customers. In this paper, we discuss the opportunity for firms to integrate behavioral science within existing segmentation models. This approach allows firms to not only better understand user behaviors and preferences, but also to learn underlying motivations that may not be apparent in traditional methods. Behavioral science-based segmentation empowers firms to effectively collect and refine data to generate more meaningful insights, leading to greater actionability and engagement. This is what true personalization is all about.

The Financial Services Customer Engagement Issue

The phrase "data is the new oil" became widely used in the early 2000s as people started to conduct more activities online. There are two main caveats with that notion. First, as data scientist Clive Humbly, who coined the phrase, pointed out: "Data is the new oil. It's valuable, but if unrefined it cannot really be used." Second, according to Piero Scaruffi, "the product of oil does not generate more oil [...] whereas the product of data [...] will generate more data" (Haupt, 2016).

The financial services industry has an incredible amount of data about its users, ranging from their spending habits to their investing prowess. Yet, the industry has often been associated with a lack of engagement and trust from consumers. The following are some reasons why the industry has faced this user-client engagement problem.

Complexity of products and services: Financial products and services, such as investments, insurance policies, and mortgages, often involve intricate terms, conditions and legal jargon. This complexity can be overwhelming for consumers. Purchase decisions that are perceived as highly complex may cause consumers to adopt simplification procedures to cope, such as choosing what they are familiar with or avoiding a choice altogether (Erasmus et al., 2014).

Lack of transparency: The financial services industry has been criticized for a lack of transparency regarding fees, charges, and terms. Hidden fees or complex pricing structures can erode trust and discourage users from actively engaging with financial institutions. In fact, the 2022 Edelman Trust Barometer revealed that the financial services industry's trust rating of 56% ranked second to last in comparison with leading sectors including technology (74%), education (69%), and healthcare (69%) (Daniel J. Edelman Holdings, 2022).

Limited personalization: Many financial institutions have struggled to provide personalized experiences to their clients. Generic offerings and a one-size-fits-all approach can make customers feel undervalued and less engaged with their financial service providers. For example, a common criticism of robo-advisory investment products is the lack of personalization in risk assessments and rebalancing. One major US-based robo-advice service, for instance, ignores individual requirements and inserts the investor into a one-size-fits-all rebalancing algorithm (Jung et al., 2019).

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Ineffective communication: Communication from financial institutions has often been impersonal, filled with technical jargon, and focused on selling products rather than understanding and addressing client needs. This can make it challenging for clients to connect with their financial service providers. In an ongoing shift in management approaches from a product-based strategy to a customer-based strategy, the goal of the customer-centric approach lies not in selling products but rather in creating value for the customer and, in the process, creating value for the firm (Shah et al., 2006).

Lack of digital transformation: Historically, the financial services industry has been slow to adopt digital technologies and embrace user-friendly interfaces. This has resulted in outdated systems, cumbersome processes, and a poor user experience, leading to disengagement from clients who prefer convenient and seamless digital interactions. In the banking industry, for instance, technology infrastructure often involves large transaction systems that have to work with distributed systems online. The problem is that the current infrastructure is not flexible enough to quickly integrate new technology or keep up with the fast-changing needs of businesses. (Cuesta et al., 2015).

These issues are further compounded as most firms end up using traditional segmentation as the primary driver of their customer engagement approach. They take a product-centric view and generally segment their clients by typical demographic variables such as age, gender, and level of financial assets. With this approach, the more human elements of clients – their experiences, emotions, decision styles, and behaviors – are often hidden from view.

Segmentation in Financial Services

The financial services industry is ripe for new approaches to segmentation to produce more meaningful engagement with current and prospective customers. Wealth managers have historically segmented customers by the level of financial assets owned. A commonly used definition of wealth tiers differentiates between seven segments ranging from Mass Market to Affluent to Ultra-High Net Worth (Cerulli Associates, 2022). In the United States, eighty-five percent of all households, approximately 109 million households, are in the Mass Market and Middle Market tiers. The ability of most financial services firms to profitably provide personalized service and value to these households with less than $500,000 in investable assets has been difficult to achieve and thus, most financial services offerings that do exist today for this segment are commoditized.

This commoditization is evident in robo-advisors, for example, which emerged as the industry's response to providing an affordable offering. They typically provide a range of pre-built investment portfolios based on a client's risk tolerance. The robo-advisor will also automatically rebalance the portfolio and, in some instances, give clients a rudimentary range of "what-if" scenarios, such as contributing more money or the potential tax implication of selling a portion of the portfolio. While robo-advisors provide a level of personalization by matching a client to an appropriate portfolio based on their risk tolerance, it is not enough to differentiate one robo-advisor from a competitor, whether it be from a product, services, or customer experience perspective.

From Behavioral Data to Behavioral Science-Based Segmentation

The accumulation of data in the digital age has boosted opportunities for behavioral segmentation, which is based on the way customers interact with products or services. Common approaches include usage and occasion segmentations (Kotler & Armstrong, 2003). For instance, in a retail experiment conducted by Yoseph and AlMalaily (2019), it was found behavior-based variables such as occasions (e.g., Christmas, "back to school") were more accurate (78%) than traditional variables such as age and gender (53%) in predicting user purchase behaviors. Advances in behavioral science and data science are making it possible to segment customers in ways that consider not only differences between people, but also differences across time and situations (Soman & Kwan, 2022).

New segmentation methodologies that also include behavioral and psychographic perspectives could offer an effective approach to mass personalization, thus allowing deeper client engagement with more ease. Indeed, understanding the range of behavioral traits and motivational factors of consumers and then tailoring offerings to match their revealed preferences has become a key driver toward engagement,

growth, and profitability. An analysis in 2020 showed investment in behavioral science and related capabilities growing by about 146% over the five years prior (EY, 2020).

Identifying and understanding the hidden traits and emotions that affect financial behavior and decision-making could potentially improve the conversion, engagement, and retention of consumers. We see this in other industries such as digital commerce, where firms are investing in personalized recommendation systems to convert "browsers into buyers," increase loyalty, and improve customer retention. One study associated personalized recommendations to online shoppers with a 29% increase in firm revenue (Basu, 2021).

New approaches to segmentation that are inspired by behavioral science tend to combine theories from different fields, including social psychology (e.g., how people approach goals), personality psychology (e.g., how open people are to new experiences), or behavioral economics (e.g., the extent to which people prefer immediate over delayed payoffs). Understanding customers behaviorally may involve concepts related to various heuristics and biases, such as confirmation bias (Nickerson, 1998), the availability heuristic (Schwarz et al., 1991) or overconfidence (Moore & Healy, 2008). These perspectives can be pulled together to construct a customer's psychological profile.

Profiling that draws on behavioral science insights can employ two main data sources: digital footprints and questionnaires. The first of these is based on user actions online, which can occur naturally or as part of an A/B test. The second kind of data is information elicited from respondents in a survey or experimental questioning format. Methodologically, behavioral preferences or traits can be measured in two different forms: stated and revealed (Hill et al., 2017). Stated preferences are based on people's responses to direct questions, such as their likes and dislikes of Option A or B. Revealed preferences are based on people's actual decisions, such as their purchase of Option A or B.

New kinds of segmentation can combine different kinds of data and elicitation methodologies to generate insights into a person's motivations, biases, and behavioral preferences, thus enabling firms to personalize their consumer engagement strategies. In the remainder of this article, we will use two examples from survey data to illustrate practical applications of behavioral science-based segmentation.

Example 1: Scaling Client Engagement Through Mass Personalization

The way consumers interact with brands and services has fundamentally changed in recent years. The expectation is for the product or service to be digitally native, available on demand anytime and anywhere, customizable to consumer needs, and highly personalized to their preferences. For instance, services such as over-the-top (OTT) streaming, the gig economy, and mobile applications all have moved away from being product centric to becoming client centric.

However, at most financial firms, product centricity continues to drive the approach to establishing relationships with consumers. Products (i.e., retirement products – IRAs, 401(k)s; or investment products – 529 accounts, Health Savings Accounts, brokerage accounts) and their features are the primary focus of marketing efforts to acquire customers. Conversely, with a client-centric approach to establishing relationships, it is life events and related emotions that serve as the primary drivers of engagement and efforts to provide service value (e.g., opening a 529 account after the birth of a child, investing in a Health Savings Account because of a family history of health concerns).

The financial services industry would benefit from becoming more personalized, holistic, and client-centric by selling to consumers based on personal needs and desires instead of product features (EY, 2023). Benartzi (2023) argues that when advice fully reflects the financial needs and complexities of the average employee (i.e., the typical American household and not just the wealthy), the holistic advice can be worth at least $4,384 per year, which translates to about 7.5% of their annual income. Given the impact and opportunity, we believe that artificial intelligence (AI)-driven financial health platforms will become "personal financial operating systems" and that consumer finance offerings will further evolve into subscription models by unbundling products and re-bundling personalized and holistic value propositions. (EY, 2019).

Some financial services firms have gained measurable benefits through incremental investments in

behavioral segmentation. For example, a robo-advisor app with more than 6,000 downloads a day experienced low user engagement, as less than 1% of users completed a transaction on the app within the first week of downloading it. We identified three key reasons why this was the case with most apps:

- Many apps don't make the users feel understood, resulting in a significant empathy gap.
- The users feel burdened by choice overload and regret aversion and ultimately disengage.
- App users often feel they are being pushed or guided to certain products, which can create a level of distrust when the motive is not clear.

To resolve this, we devised an intervention to drive user engagement through a psychological assessment that measured behaviorally relevant dimensions.

In our work, we generally consider a behavioral dimension or concept to be potentially impactful if it meets the following criteria:

- Importance – It is relevant for the problem or objective at hand.
- Measurability – It can be quantified on an individual level (e.g., in a survey-style assessment).
- Actionability – It has real-life implications and identifiable behavioral targets.

Based on these criteria, our client engagement intervention selected three dimensions that influence individuals' approach to investing in the context of the app:

- Attitudes toward money – power-prestige vs. utility-value (Yamauchi & Templer, 1982).
- Orientation toward achieving goals – promotion vs. prevention focus (Higgins, 1998).
- Decision-making style – maximizing vs. "satisficing" (Kapteyn et al., 1979).

Our intervention could be viewed through the lens of a conceptual framework that we call our "3A Behavioral Approach". The approach identifies awareness, analysis, and action as the key steps to drive engagement.

1. Awareness: We helped users understand how their psychological makeup influences their approach to money and investing. This aimed to reduce the empathy gap. Not only did the app now understand the user better, but the user also understood themselves better.
2. Analysis: We focused on how these factors influence users' risk appetite and, hence, impact their investment behaviors. Highlighting gaps between their perceptions vs. reality was designed to produce constructive dissonance and set the base for actionability.
3. Action: We presented different segments with products that matched both their behavioral preferences and their financial requirements, thus shortening the trust cycle and increasing active engagement. Over the first four months after the intervention went live the completion rate for the behavioral assessment was 91%, and it increased the first-week transaction rate from below 1% to over 3%.

While most financial firms can now deliver personalized messaging based on the "what" (current savings rate, company match, targeted retirement age, etc.), this case illustrates that the real value for personalization at scale is in understanding "the why" by uncovering behavioral profiles that are not readily apparent.

Example 2: Segmenting Global Wealth Management Customers

One of the dimensions measured in the previously discussed intervention was decision-making style. This was based on work by the Nobel prize-winning social scientist Herbert Simon, who showed that people tend to make decisions by either Maximizing or Satisficing ("satisfying" + "sufficing") (Simon, 1955). Maximizers exhaustively examine every available option before carefully choosing the choice with the highest utility. Satisficers tend to make decisions by choosing the first option that is "good enough" to meet their basic criteria.

In the recently released EY 2023 Global Wealth Management Report, we measured these two decision-making styles from secondary survey data asking wealth management clients about their preferences for consuming information with their financial advisors. According to our data for the US, 58% of wealth management clients are Maximizers, while 42% are Satisficers. The two segments were found to have significant differences in how they perceive complexity, in their propensities to switch providers, and in their preferences for engagement.

Some sample findings for the US include:

- Maximizers are 2x more likely to switch providers than Satisficers (42% vs. 21%).

- Maximizers are more than 3x more likely to prefer monthly advice (32%) on their financial plans than Satisficers (10%).
- Maximizers (16%) exhibit 4x greater likelihood to seek a new provider when faced with overload than Satisficers (4%).
- Maximizers are more than 2x as likely to value sustainable investments (12.8% vs. 4.7%).
- Maximizers are more than 2x as likely to value access to customized investment research (16.4% vs. 7.30%).

Based on our analysis, a Maximizer would also examine the quality of service and investment performance above all else when deciding to establish a relationship with a provider, whereas a Satisficer may decide based on firm reputation and competitive fees. In addition, we found that Maximizers are more likely to prefer in-person communication and Satisficers more likely to prefer DIY digital tools.

Applying an added segmentation layer such as decision-making style to transactional data helps recognize that individuals with similar observable data patterns may have different underlying motivations. Based on that recognition, we can come up with a hypothesis about the appeal of different product offers to different segments (Maximizers vs. Satisficers) to be tested in an experiment. With this information, sales efforts can be tailored to meet the

Table 1: Practical Implications of a Decision-Making Style Segmentation

	Individual A	Individual B
Observed data patterns	High credit card usage Frequent buy-now, pay-later usage Higher spending over savings activity	High credit card usage Frequent buy-now, pay-later usage Higher spending over savings activity
Behaviors and traits	*Maximizer:* exhaustively examines every available option before carefully choosing the highest utility choice	*Satisficer:* makes decisions by choosing the first option that is "good enough" to meet their basic criteria
Potential reasons for the observed data patterns	Spending to maintain brand loyalty status Spending to secure a point multiplier Investing in an entrepreneurial venture	Spending in the moment for lifestyle and convenience Spending for experiential purchases
Implications	Individual A may be a strong candidate for complex products that provide high utility (e.g., line of credit, investment opportunity, financial planning)	Individual B may be a strong candidate for streamlined services carried by brand reputation (e.g., digital advice/ automated investments offering, credit card rewards offer, perks or loyalty circles that offer exclusive experiences)

decision styles of prospects. This may include targeted marketing collateral and articulation of services provided (e.g., detailed analysis and information for Maximizers; fees, industry awards/reputation, and accolades for Satisficers). Consider the hypothetical example in Table 1.

Once the prospect becomes a client, knowing their decision-making style will allow advisors to cater to a client's needs. Does your Maximizer want a personal phone call going over the details with shared screens to view the analysis? Does your Satisficer want one-click scheduling with the analysis attached to an email to follow up when it suffices for them?

While financial firms can ask customers directly about their decision-making styles, they might also be able to infer decision styles by observing the digital footprint of their customers. For example, attributes such as time spent on a particular screen, the number and type of hyperlinks clicked, the number of times a screen has been visited, etc., may readily reveal a prospect or current client as a Maximizer. This would be subject to rigorous testing of both the link between psychographic and behavioral profile and between the behavioral profile and transactional data.

As firms continue to invest in ways to improve acquisition, engagement, and retention, adding a behavioral segmentation layer, such as the above Maximizer vs. Satisficer example, will increasingly drive new methods of personalization in the industry.

Conclusion: The New Frontier of the Behavioral Economy

If data is the new oil, behavior is the refined by-product that can fuel mass personalization to drive client engagement and business growth.

We are now on a new frontier of the behavioral economy (i.e., the aggregate of resources invested in applying a behavioral sciences approach toward a product or service offering), having refined and generated enough data with incredible implications for the ability to measure, understand, and shape both behavior and underlying motivational factors.

The financial services industry is facing a significant challenge with client engagement. Despite the range of products and services available, the overall experience is often disjointed and does not reflect a deep understanding of customers' needs and preferences. This disconnect is exacerbated by traditional segmentation approaches, which group consumers based on transactional and demographic data rather than their underlying behaviors and motivations.

Segmentation based on behavioral science can offer a possible solution to this problem. By analyzing customer behavior and identifying distinct profiles or behavioral archetypes, financial services firms can develop a more consumer-centric approach to engagement. This enables them to not only view consumers through a new lens but also generate valuable insights from the behavioral data they already possess.

With this behavioral science segmentation approach, financial services firms can better understand their customers' needs and preferences and create tailored experiences that meet those needs. This can bridge the gap between firms and consumers, creating a new level of engagement that spans all customer touch points from acquisition and onboarding to retention.

Incorporating new kinds of segmentation into the financial services industry can create a more personalized experience and intervention points that empowers customers to make informed decisions and feel more connected to the firms that serve them. This can lead to increased trust and loyalty, as well as better outcomes for consumers and financial services firms. In an industry where differentiation is key, behavioral segmentation can help firms stand out and drive growth, ultimately creating a more customer-centric and successful industry as a whole.

The views reflected in this article are the views of the authors and do not necessarily reflect the views of the global EY organization or its member firms.

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Nudging Toward Good Health: Leveraging Behavioural Science in the Shared-Value Insurance Model

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Discovery Vitality

The global epidemic of lifestyle-related, non-communicable diseases (NCDs), such as diabetes, heart disease and cancer, is fuelling increases in healthcare demand and costs. Although healthcare funders have undertaken cost-containment measures in response, these fail to address NCD prevention. Global financial services company Discovery has adopted a shared-value health and life insurance model through its Vitality programme, which provides members with comprehensive health promotion and disease prevention services. In this shared-value model, Discovery no longer simply responds to risks but seeks, instead, to anticipate, mitigate and prevent them. The result is a shared benefit whereby clients enjoy a healthier life and financial rewards, Discovery reduces claims costs and society sees a healthier and more productive workforce. In this paper, we discuss how Vitality draws on principles from behavioural economics while leveraging the latest digital technology advances to change behaviour and improve members' health.

Introduction

Globally, healthcare is facing a crisis. The problem is due not only to ever-increasing healthcare needs and costs, but also as a result of healthcare systems being out-of-sync with the changing landscape of diseases. Over the last several decades, the world has experienced extraordinary economic and social changes, particularly the increasingly sedentary nature of work and leisure, a steep decrease in physical activity, excessive intake of nutrient-poor and calorie-dense foods, persistently high levels of smoking and excessive alcohol use (World Health Organization, 2022).

These changes have, in turn, fuelled a global rise in lifestyle-related, non-communicable chronic diseases (NCDs) such as diabetes, hypertension, heart disease, stroke, chronic lung diseases and cancers. Today, NCDs account for 74% of global mortality (World Health Organization, 2022) and, as such, pose one of the 21st century's greatest health and economic challenges (Bloom et al., 2012). Moreover, people with chronic diseases are disproportionately at risk of severe disease and death related to certain acute infections, such as Covid-19 (Khunti et al., 2023; Gasmi et al., 2021).

Curbing the rise of NCDs through individual behaviour change faces multiple challenges. NCDs, for the most part, develop insidiously, and although exposure to risk factors for these conditions may happen at an early age, illnesses can take decades to manifest. From a behavioural perspective, the "symptom-free" nature of the early phases of many NCDs often results in a lack of urgency in changing behaviours to reduce risks.

Moreover, certain well-studied biases, such as status quo bias and present bias preferences (Loewenstein et al., 2007; Lowenstein et al., 2013), may prevent individuals from taking actions to reduce their risk of disease.

The explosion in NCDs has been accompanied by a burgeoning demand for healthcare and a massive growth in related costs, driven partly by the increasing costs of new drugs and technologies (Bloom et al., 2012).

Faced with escalating chronic disease expenditure, healthcare funders such as public and private

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insurers have adopted measures like managed care and differential benefit designs to contain spiralling costs. While some measures have been effective in restraining annual increases, they have not always been acceptable to patients or providers. Moreover, the best cost containment strategies fail to address the fundamental problem of NCD prevention.

In this respect, Discovery Limited – a South African-founded global financial services company – incorporated a comprehensive health promotion programme called "Discovery Vitality" ("Vitality") for clients of Discovery Health and Discovery Life plans. The Vitality programme seeks to improve the health of insured members and prevent or delay avoidable lifestyle-related diseases. Discovery Vitality's insurance model represents a distinct form of insurance based on shared value (Porter & Kramer, 2011; Porter et al., 2014), as shown in Figure 1, and it is offered in the United Kingdom as Vitality Health and Vitality Life. Vitality has also evolved globally through partnerships that embed it within some of the leading insurers across 40 markets and covering more than 40 million lives.

A Brief Description of the South African Vitality Programme

Since its inception in 1997, South Africa's Vitality programme has grown progressively, incorporating interventions to improve physical activity and encourage healthy eating, weight loss, mental health interventions, vaccinations, preventive screening and smoking cessation.

A Tiered, Status-Based Programme

Vitality members who engage in health-promoting activities (such as exercising) or preventive activities (recommended screenings, including cholesterol checks and mammograms) are awarded points that contribute to a status (Blue, Bronze, Silver, Gold and Diamond). A tiered-status programme is based on goal-gradient theory, which suggests that motivation increases as individuals build on the success of achieving smaller goals and engage more vigorously in goal-directed behaviours the closer they come to achieving their goal (Heath et al., 1999) – in the case of Vitality members, a higher status.

The Intentional, Purpose-Driven Use of Incentives and Rewards

A distinctive feature of the Vitality programme is its extensive use of incentives and rewards to positively influence behaviour in an enabling, non-punitive way. Vitality incentives can be characterised as *enabling incentives* and *contingent rewards*.

The specific aim of enabling incentives is to lower the financial barriers to engaging with health-promoting interventions, thereby widening access. For instance, the Vitality *Gym Benefit* offers a discount of

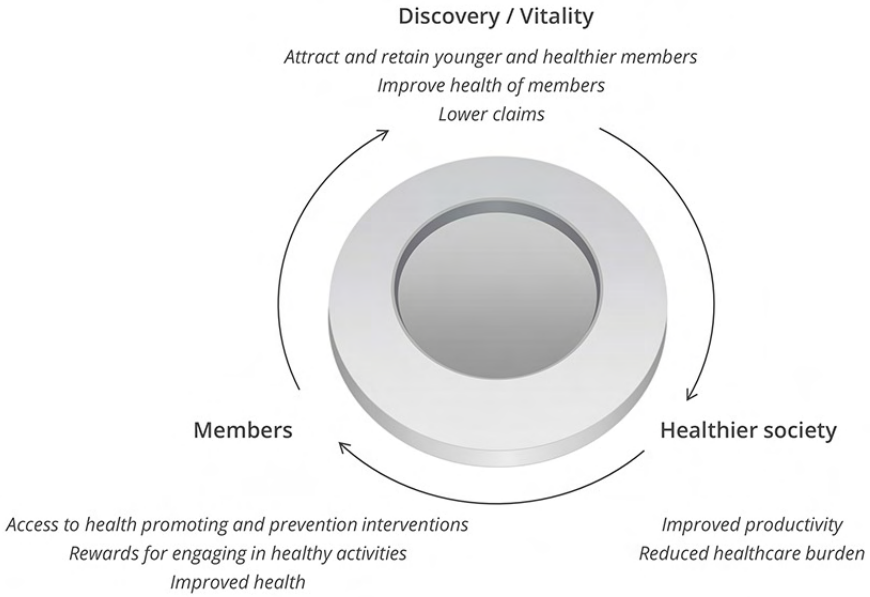


Figure 1: Potential benefits of the Discovery Vitality shared-value insurance model.

up to 75% on memberships with several major South African gym chains and thus lowers the financial and motivational barriers to joining a gym.

Vitality's *HealthyFood* benefit offers up to 25% cashback on a range of healthy food purchases at two national supermarket chains. Healthy food items (minimally processed whole foods that are low in added sugars and salt and free from trans fats) such as fruits, vegetables, legumes and lean meats, are labelled with a "V" on supermarket shelves, making it easier for members to make healthier choices.

Concurrently, Vitality uses contingent rewards to reinforce and sustain engagement with health-promoting or preventive interventions. As previously mentioned, members accumulate points for healthy behaviours over the calendar year, earning a status based on their points total. Higher status allows members to claim better discounts on local and international flights, whilst they also receive potentially significant financial incentives on their Discovery Life policies. To drive consistent change in physical activity behaviour, members are challenged to achieve a personalised weekly exercise goal in the *Vitality Active Rewards (VAR – see below)* programme. The achievement of this weekly goal is rewarded with a medium of exchange called *Discovery Miles*, which can be monetised or used to purchase a range of discounted goods and services. Vitality rewards based on weekly engagement aim to provide immediate gratification, while increasing rewards based on status – offered on a continuous basis – are aimed at reinforcing behaviour change towards the long-term goal of improved health.

Separating financial instruments into "enabling incentives" and "contingent rewards" is in keeping with evidence showing that factors that lead people to initiate behaviour change may be different from those that prompt them to maintain those changes in behaviour (Sheeran et al., 2022).

Getting People More Active

A key objective of the Vitality programme is to improve physical activity amongst members. There is overwhelming evidence of the detrimental effects of physical inactivity and, conversely, the benefits of physical activity in preventing or delaying the onset of a range of diseases, such as hypertension, coronary artery disease and many cancers (Lee et al., 2012).

Vitality Active Rewards (VAR) and Other Structured Fitness Interventions

Individual physical activity is captured on smart devices such as cell phones and wearable fitness devices that record steps and workout data, which is then sent to a platform within the Discovery app called *Vitality Active Rewards* (VAR). In addition to the gym membership incentives described above, the digital VAR platform is supported by a range of

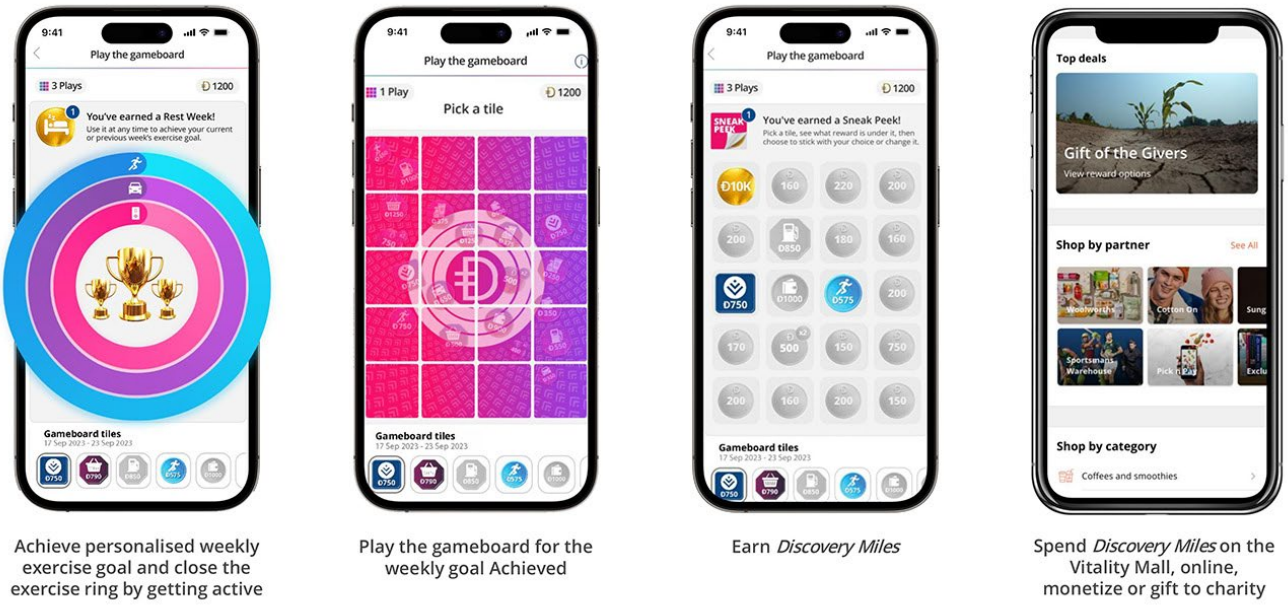


Figure 2: Steps in the Vitality Active Rewards smartphone platform.

tangible fitness interventions such as membership of a running and cycling club called *Team Vitality*, linkages to local fun runs and walks and discounts of up to 75% on fitness wearables, including heartrate monitors. Participants also have the potential to earn a free Apple Watch under the Apple Watch Benefit (AWB), as discussed below.

The VAR platform has several technological and behavioural features that are designed to facilitate engagement in physical activity (see Figure 2).

Easy Accessibility on a Smartphone App

Once set up, the VAR platform syncs with fitness apps on the Android and iOS systems and seamlessly captures step count and heart rate data recorded by wearables. Gym attendance data is submitted electronically to Vitality through a system-integrated process, and so members can access real-time or same-day updates of their recorded physical activity on the VAR platform. There is research evidence (Laranjo et al., 2021) that lower effort and attention required by people to record and monitor their behaviours contributes to higher engagement.

Personalised Goal-Setting and Monitoring

Members starting out on the VAR benefit are set achievable weekly fitness goals based on age, self-reported cardiovascular risk and current levels of activity. The exercise goal is expressed in Vitality points, and the VAR goal is automatically adjusted based on whether previous goals were met. The greater one's level of physical activity, the quicker and higher the adjusted goal. The overall intention is to get members to engage progressively and sustainably in more physical activity with the aim of reaching the recommended target of at least 150 minutes of moderate to vigorous physical activity a week (Bull et al., 2020). Progress towards achieving the goal is visually represented by a ring, which progressively closes as the member accumulates Vitality points.

A wide body of literature shows that goal-setting is an effective and a necessary component of successful interventions to change physical activity behaviour (Epton et al., 2017). Behaviour is said to be enhanced when an individual receives feedback regarding progress towards the goal (Locke & Latham, 2002). There is also considerable evidence that personalising goals, including via smartphone applications, is effective in increasing overall physical activity (Larnajo et al., 2021; Yardley et al., 2016).

Leveraging the "Fresh Start Effect"

The "fresh start effect" describes the tendency to put behind past failures and start afresh with a new goal (Dai et al., 2014). Individuals usually set various goals at temporal markers, such as the beginning of the year, on birthdays, the start of spring, etc.

Vitality leverages the fresh start effect in several different ways i.e., the VAR goal resets weekly, while Apple Watch benefit (AWB) goals restart at the beginning of every month (see AWB below) and, finally, the Vitality status resets at the start of every year.

Wearable Devices

The incorporation of wearable technology in VAR has allowed for the effortless recording of physical activity data. Most wearables measure steps, heart rate and the speed and duration of exercise, thereby enabling the accurate measurement of the "dose" of exercise and steps from daily activities. Research shows that wearables also facilitate behavioural change, provide direct feedback on physical activity to the wearer and can be effectively used to increase physical activity levels among adults (Larsen et al., 2022).

The Apple Watch Benefit (AWB) and Loss Aversion

The AWB is available to members who have registered on the VAR programme and are clients of the Discovery Bank. The purchase of the watch is funded upfront by Vitality, minus a nominal activation fee, and members are required to repay the purchase price in 24 monthly instalments. The instalment amount depends on the member's physical activity goal achievement: those who achieve all their monthly goals are exempt from any repayment, while members who achieve none, pay the full month's repayment costs. Vitality's research shows that VAR members on the AWB achieve three additional days of activity a month compared to VAR members not on the benefit (see later, Figure 8), which may be attributed to loss aversion, which describes a powerful behavioural trait whereby people assign a greater value to loss than to gain, even if the monetary value of the gain and loss is identical (Kahneman et al., 1991). The AWB may induce people to sustain higher levels of

physical activity to avoid the potential loss of paying the monthly instalment and losing out on a free Apple Watch.

Gamification

Health apps increasingly use elements of games within a non-gaming context to increase user engagement and sustain ongoing app use. A recently published systematic review and meta-analysis found that gamifying interventions are effective ways of changing physical activity behaviour (Mazeas et al., 2022).

The VAR platform uses gamification by allowing members who achieve their weekly activity goal to "play" the VAR gameboard. As part of this process, players select a tile on the board to reveal Discovery Miles, as illustrated in Figure 2, which, as described above, can be spent at a range of online or in-store shopping partners, monetised or donated to select charities.

Improved Behaviour and Improved Health Outcomes

The Impact of Physical Activity on Chronic Diseases, Covid-19 Outcomes, Mental Health and Healthcare Costs

Discovery analysis (Figure 3) shows the effect of a change from not being physically active on the programme – in the one-year baseline period, to doing "low", "medium" and "high" levels of activity in the three-year observation period – on the risk of diagnosis of hypertension and type 2 diabetes. "Low-" level activity was classified as earning 1-200 Vitality physical activity points per week, "medium" as >200-400 points and "high" as more than 400 points. Four hundred Vitality points a week translates into activities such as 10,000 steps four times a week or four gym visits a week, or two moderate-intensity (70 -80% of maximum heartrate) workouts a week. The study includes approximately 600,000 members with a Discovery Health and a Vitality policy between 2013 and 2019. The analysis was adjusted for age, Vitality status, socio-economic status and a member's state of health as measured by total health claims. The analysis used a causal design framework to simulate a synthetic randomised control trial. A change in behaviour from no activity on the programme to sustaining a high activity level for 3 years is associated with a 57% lower risk of the onset of type 2 diabetes and a 20% lower risk of the onset of hypertension compared to members who remained unengaged.

Not only does being physically active reduce morbidity related to chronic disease, but higher levels of physical activity amongst Vitality members were also associated with significantly lower risks of severe COVID-19 disease and death, as shown in Figure 4 (Steenkamp et al., 2022). After accounting for demographic factors and other risk factors, patients in the high physical activity engagement band compared to those with low physical activity engagement had a 34% lower risk of admission to hospital, a 41% lower risk of admission to ICU, a 45% lower risk of requiring ventilation and a 42% lower risk of death, compared with those with low levels of activity.

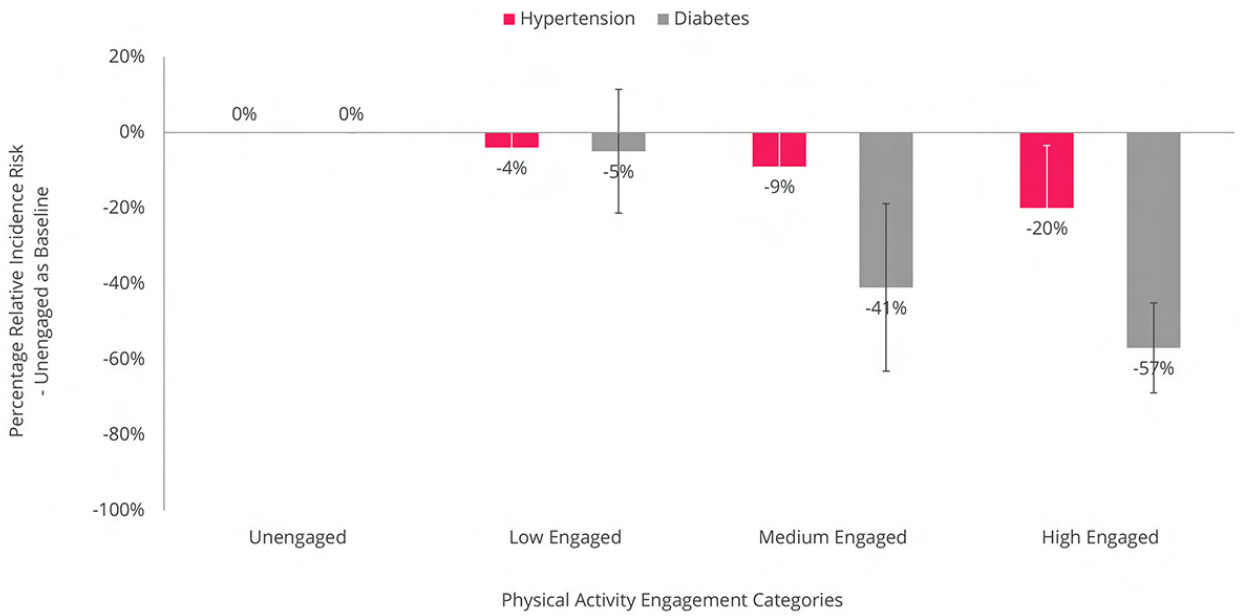
In addition, physical activity is associated with a significantly lower risk of being diagnosed with depression amongst female Vitality members (Motilal et al., 2022).

A longitudinal retrospective study (Patel et al., 2011), in a cohort of Vitality members, found that over a five-year period, the percentage of active members utilising the gym increased from 27% – at the time of enrolment in the study – to 33%, five years later. The proportion of members classified as "inactive" changed from 76% to 68% from years 1 to 5, while the proportion of members classified as having "high activity" increased from 10% to 13%.

As shown in Figure 5, remaining "highly active" or increasing physical activity was associated with significantly lower hospital costs compared to those individuals who remained unengaged.

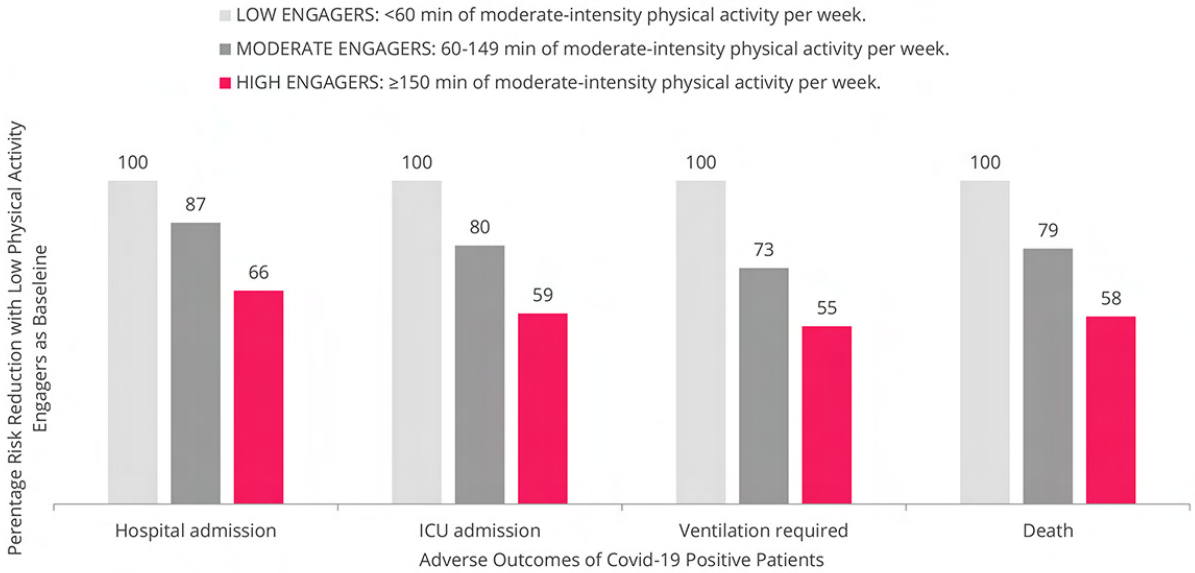
The Impact of a Cash Rebate on Purchases of Healthier Food in the HealthyFood Benefit (HF)

As mentioned earlier, the HF benefit offers a cash rebate of up to 25% on purchases of healthy foods (on activation of the benefit, members are eligible for a monthly 10% cash rebate, and by completing an online health risk assessment and an in-person health screening, they can increase their monthly cashback amount to 25%). Published research (Figure 6) (Sturm et al., 2013) shows that a rebate of 10% and 25% is associated with an increase in the ratio of healthy to total food expenditure by 6.0% and 9.3%, respectively.



Discovery Data

Figure 3: Percentage difference in the incidence of hypertension and type 2 diabetes by physical activity engagement level.

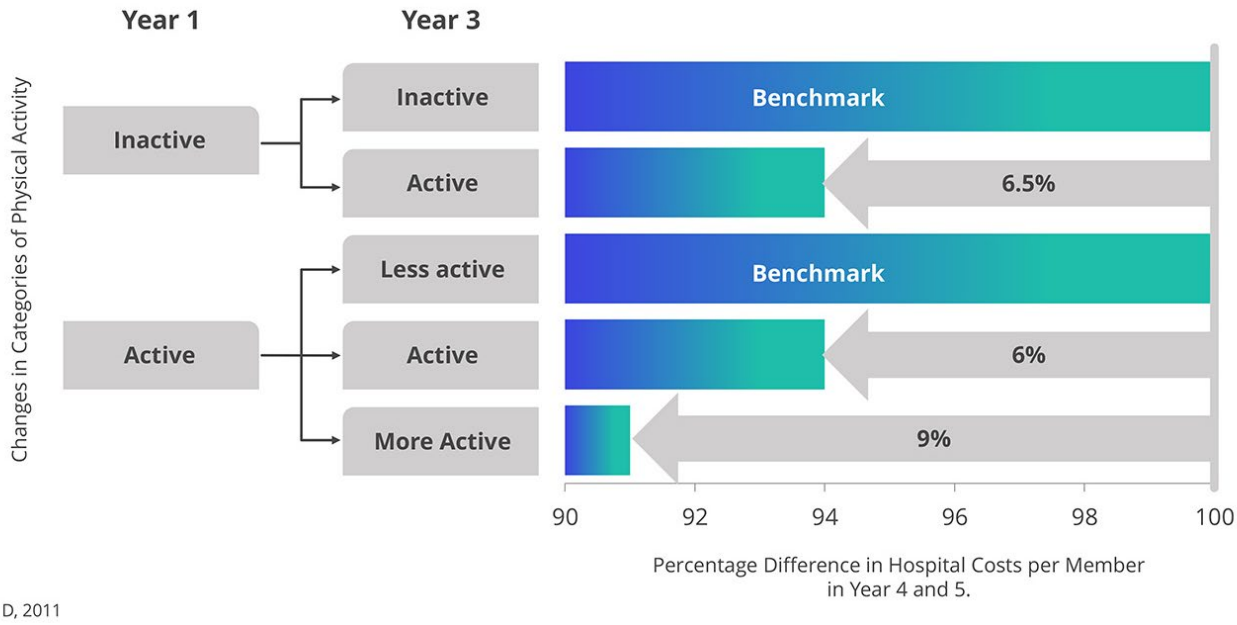


Steenkamp et al,. 2022

Figure 4: Percentage risk reduction in severe outcome in patients with Covid-19 assocated with increasing physical activity.

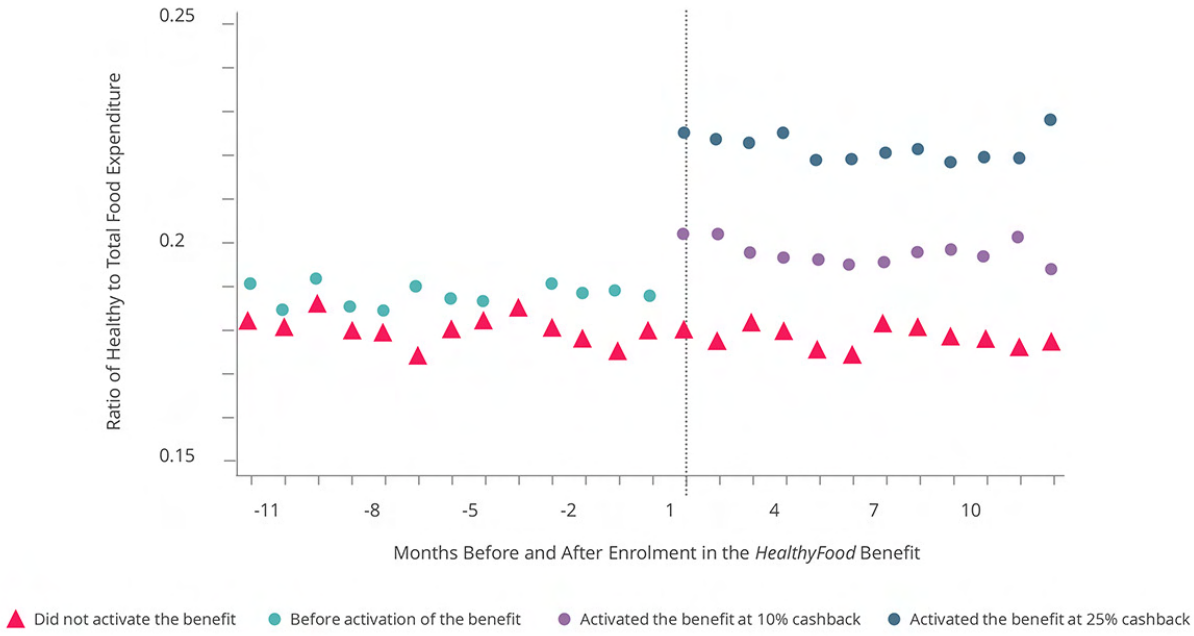
Using Behavioural Messaging to Nudge People with Diabetes to Join the Healthy Food (HF) Benefit

Purchasing healthier food is a first step to eating healthily amongst people with type 2 diabetes. Gopalan et al. (2016) compared the effectiveness of various diabetes-specific messages to increase enrolment in the HF benefit amongst members with the condition. Eligible members were randomised to one of five study arms: (1) control arm (no message), (2) a message that simply explained the advantages of joining the HF benefit , (3) a message written from



Patel D, 2011

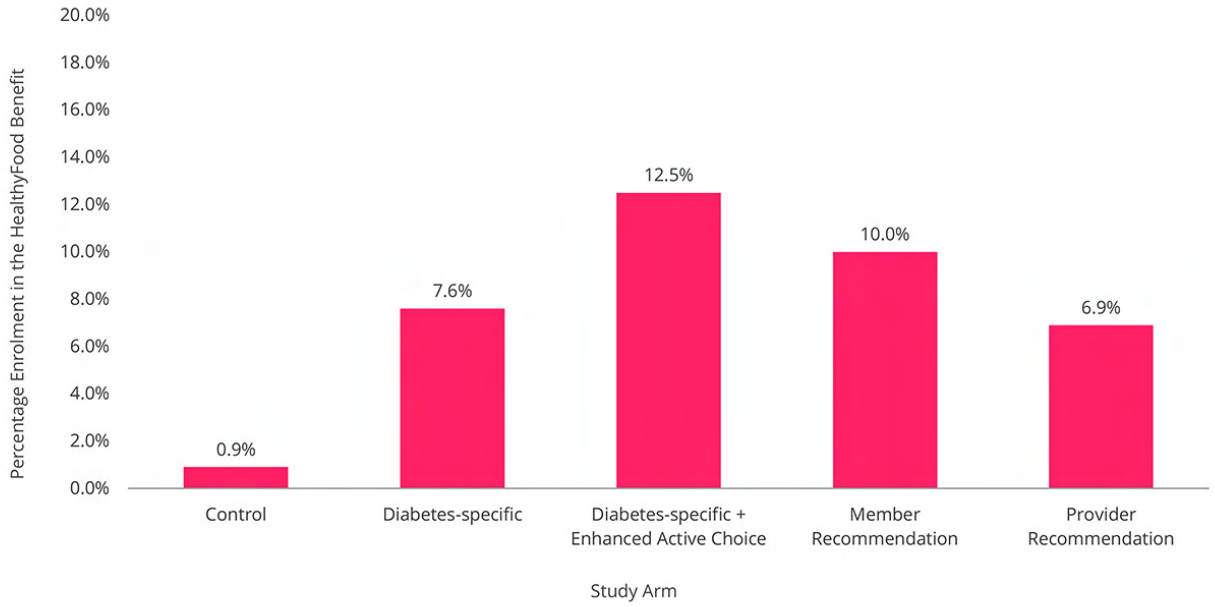
Figure 5: Percentage differences in the cost of hospital admissions in years 4 and 5 based on changes in levels of engagement in fitness-related activities in years 1 to 3.



Sturm et al., 2013

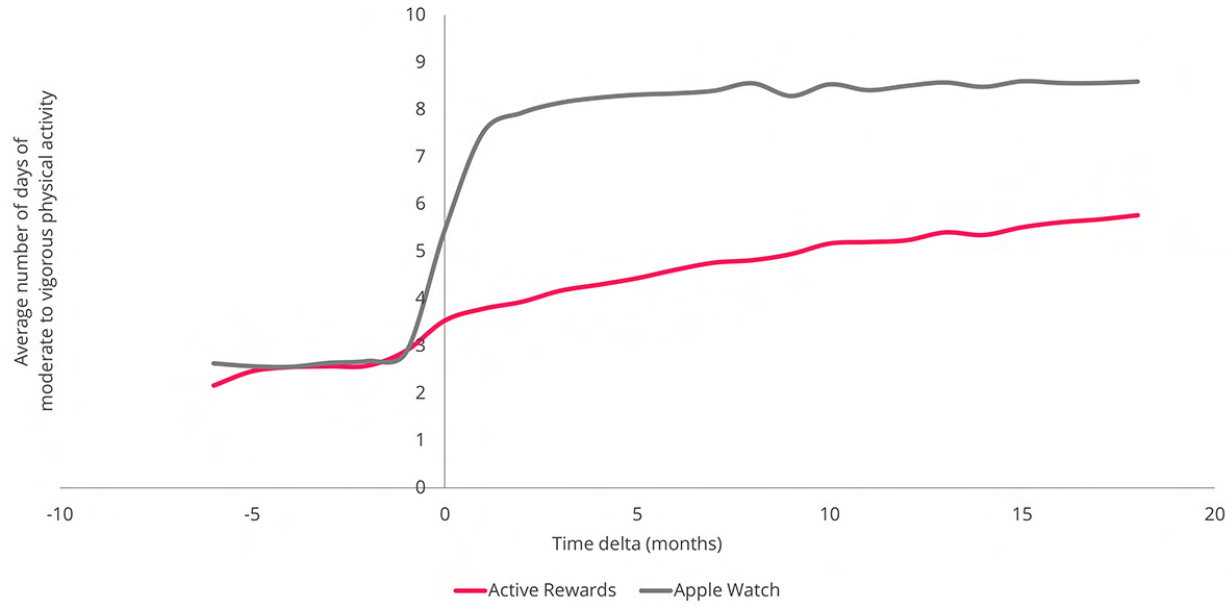
Figure 6: Increase in the ratio of healthy to total food expenditure before and after enrolment in the HealthyFood benefit.

the perspective of a Vitality member with diabetes, (4) a message with a recommendation from a physician (5) a diabetes-specific message from arm 2 together with an "enhanced active choice" message in which members were asked to make an immediate, "active" choice ("Yes I want join" or "No I don't"). The choice was further enhanced by highlighting the benefit of enrolling and the possible losses of not doing so. Figure 7 shows enrolment rates across the arms. All interventions elicited significantly higher enrolment than the control, and the "enhanced active choice" arm revealed the largest difference compared with



Gopalan et al., 2016.

Figure 7: Enrolment in the HealthyFood programme via various behavioural messages.



Discovery Data

Figure 8: Comparison of moderate to vigorous physical activity workout days a month between Vitality Active Rewards members, with and without the Apple Watch Benefit.

the control (12.6% vs 0.9%, p<0.0001).

Impact of Vitality on Preventive Screenings

Research done with RAND (Mehrotra et al., 2014) found that the odds ratio for receiving a preventive screening test (such as glucose, cholesterol, HIV test) ranged from 1.34 to 3.47 across the eight preventive services associated with joining the Vitality programme. The estimated increase in the receipt of a preventive test varied from 3% to 9% in a year.

Apple Watch Benefit Drives Sustained Additional Engagement

Figure 8 (Discovery analysis) compares physical activity behaviour between people on the Apple Watch Benefit (AWB) to people on Vitality Active Rewards (VAR) without the Apple Watch. The study, which employed a difference-in-difference analysis, includes observations from November 2015 to February 2020. Members on the AWB were rebased from the date of the AWB benefit activation, while those on VAR, but without the AWB, were rebased from the date on which they started to track activity on the VAR platform. The graph shows that over an 18-month period, people with an Apple Watch did an average of 3 days a month more moderate to vigorous physical activity (≥ 70% of max heart rate) workout days than those on VAR but without the Apple Watch. Hafner et al. (2018) too recorded a significant increase in physical activity amongst Vitality members with an Apple Watch.

Vitality Savings for the Discovery Health Medical Scheme (DHMS)

Vitality enables the DHMS to attract and retain healthier lives compared to competitors (described as the "age selection effect"). These people also exercise more, when considering their age, compared to non-Discovery members (described as the "engagement selection effect"). Finally, Vitality encourages members to increase engagement in healthy behaviour (described as the "behaviour change effect"), all of which results in savings for Discovery Health, as claims are lower for younger members – members that are more active as well as those that increase their level of engagement with health-promoting activities from the level observed at the outset. The actuarially determined proportion of savings attributable to the Vitality programme over 2019 to 2021 is shown in Table 1 below. These savings build over time and grow as Vitality engagement continues.

Conclusion

The Discovery Vitality shared-value model is a shift away from the staid model of insurance, which funds care for illness, disability and death, to a model that purposefully also funds programmes that allow members to enhance their own and their family's health and wellbeing. In South Africa, the programme has grown organically to incorporate a range of health-enhancing and preventive interventions. Discovery embraces an iterative process of analysing data linking health and life insurance claims to lifestyle data to assess the effectiveness of interventions. The Discovery Vitality model is continually enhanced by testing and incorporating interventions drawn from the latest developments in digital technology, public health and behavioural economics.

Table 1: Summary of Savings (in South African Rands) to the Discovery Health Medical Scheme Attributable to Vitality

	2019 Savings		2020 Savings		2021 Savings	
	PLPM	Rand Millions	PLPM	Rand Millions	PLPM	Rand Millions
Age Selection Effect	18.11	608	12.85	426	11.24	373
Engagement Selection Effect	12.42	417	7.32	243	9.58	318
Behaviour Change Effect	19.96	669	21.00	697	21.88	726
Total Vitality Saving	50.49	1,694	41.17	1,366	42.70	1,416

Note: PLPM is Per Life Per Month. All values are quoted in South African Rands.

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South African Traders Show a Sunny COVID-19 Disposition (Effect)

PAUL NIXON[1] AND EVAN GILBERT

Momentum Investments

The decision to sell a stock can be influenced by whether that decision is framed as either a gain or a loss. This can influence investor trading behaviour in two ways: first, investors may hang on to losing positions for too long (loss aversion), and second, they may trade winning positions too frequently (regret aversion). Together, these two behaviours form one of the most widely studied biases in investment behaviour, namely, the disposition effect (DE). This paper examines the presence and size of the DE for a large group of South African traders on the Momentum Securities trading platform, before and during the COVID pandemic, which provides a natural experiment to examine differences in trading behaviour driven by crisis events. The segmentation approach adopted in this paper (age and gender) offers novel insights that will allow stock brokerages to nudge the most severely affected clients to secure better investment outcomes.

Introduction

It was Benjamin Franklin who suggested that one's happiness depends more on their inward disposition of mind than on outward circumstances. The term "disposition" itself can be used to describe someone's inherent qualities of mind (a tendency to have a pleasant or "sunny" outlook) as well as the way something is arranged in relation to *other* things (relative to a point of reference), which creates perspective. An architectural plan shows the disposition of rooms, for example, from a particular perspective. Both descriptions help us understand one of the most widely documented behavioural biases, the disposition effect (DE), which refers to the general inclination of investors to sell off winning assets too hastily and hold on to losing ones for too long. First demonstrated for investors by Odean (1998), the DE has been shown to hold for households, businesses (financial and otherwise), government, and even not-for-profit investors (Grinblatt & Keloharju, 2001).

From a behavioural finance perspective, in 1985, economist Hersh Shefrin and behavioural economist Meir Statman would identify a similar change in preferences, depending on the investor's perspective. The change in perspective in this case depends on the *reference point*—a term credited by Daniel Kahneman to fellow psychologist Harry Helson in his 1964 paper on adaptation-level theory.

As shown in Figure 1, we tend to experience an unequal amount of dissatisfaction when wealth decreases by, say, $50 when compared to the same satisfaction when our wealth increases by the same amount ($50). Said differently, finding two $50 notes on the street and losing one on the way home is not the same feeling as finding one $50 note on the street. Our net change in wealth is the same (+$50), but we don't feel the same after these two experiences because losses hurt more than the happiness created by the gain. Tversky and Kahneman (1979) termed this effect "Prospect Theory" (PT) and demonstrated it by offering participants choices or prospects that were framed as gains or losses, observing their change in preferences accordingly. Participants would generally accept a greater degree of risk to avoid painful prospective losses but were comfortable to avoid risk and accept a certain smaller gain.

For the purposes of this paper, it is not necessary to venture into a specification of the asymmetric value function in Figure 1, since the DE simplifies this to an extent by referring only to differences in behaviours on either side of the reference point. As we shall explain, it assumes that each frame (the relative gain

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or loss) subjects the investor to a separate al bias that leads to different types of behaviours in each zone or area. The DE thus makes a simple causal claim: there will be differences in behaviour around the reference point, and these will lead to non-rational behaviour in the wealth-maximising sense. It is also likely that this will be affected by external conditions.

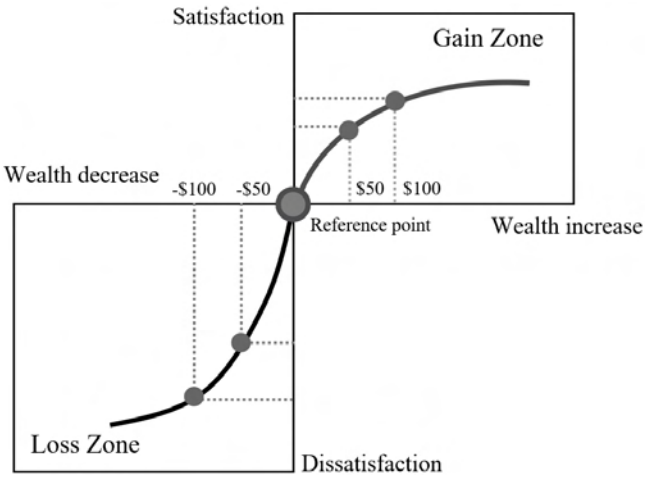

Figure 1: Change in perceived value in investment gains versus losses. Source: Adapted from Van Raaij (2016).

From a psychological stress point of view, recent times have pushed people—and indeed investors—to their limits. Tei and Fujino (2022) propose that the same social ties that have served the survival and continued thriving of our species caused significant psychological distress during the COVID-19 pandemic. Fears of being rejected (excluded from unvaccinated groups), infecting others (and indeed loved ones), and the breaking of social ties from forced lockdowns are just a few examples of how anxiety was amplified. From an investment perspective, we would expect the same anxiety in a financial context (Qin et. al., 2019)[2] to amplify biases such as the DE.

This paper empirically examines the changes in behaviour of execution-only traders[3], before and during the COVID-19 pandemic, on the Momentum Securities platform in South Africa. It reveals novel, statistically significant differences in the DE by age group as well as by gender in the pre- and post-COVID periods. These findings strongly support the link between anxiety and the DE, which has implications for financial advice and other forms of engagement with clients in an effort to help them from shooting themselves in the foot—financially at least—as they try to make themselves feel less anxious.

Possible Causes of the Disposition Effect (DE)

Measuring the DE is conditional on the specification of the reference point. As this is a subjective phenomenon, any measurement thereof is open to criticism, but from an investment perspective the initial purchase price is an obvious starting point, as it provides an objective basis against which to assess gains/losses and could credibly reflect the core reasons for the investor's emotions around their decision to buy at that price. Building on this base, we can see that as the market price fluctuates, the investor will drift between so-called "paper losses" (current market price < purchase price) and "paper gains" (current market price > purchase price). Relevant biases that may affect the decision to realise these (sell the stock) at any specific point in time include the following.

The aversion to losses: Selling a losing share will turn a paper loss into a real one. If traders are loss-averse, then they are unlikely to realise this loss—there is always the temptation to wait a bit longer in the hope they turn into winners (Shah & Malik, 2021). The expectation is that they will hold on to "losers" for longer than they should.

The aversion to regrets: Selling out of a profitable position turns a paper gain into a real one and makes the trader feel good. Waiting for a larger profit can mean that a (currently) winning position could turn into a losing one (Shah and Malik, 2021). This tendency encourages the selling of winners too quickly, as the trader fears the regret of the winning position reversing into a (painful) loss.

Baker and Nofsinger (2002) highlight two additional supporting concepts.

Mental accounting: Thaler (1985) introduces the concept of mental accounting whereby individuals have separate psychological accounts for investments in different contexts, such as retirement versus cash windfalls. Shefrin and Statman (1985) propose that when buying a stock, the trader opens a new mental account and considers value in relation to the purchase

2 Qin et. al. (2019) found that stock market exposure in turbulent times increased anxiety in investors with stock market exposure.

3 The term "trader" in this context refers to execution-only stock traders, i.e., individuals trading stocks without any professional advice. The conclusions of this research therefore only apply to this type of investor.

price or reference point.

Cognitive dissonance: It is also necessary to consider that factors other than simply *realisation utility*[4] may be at play. It is plausible that we don't want to sell a stock because doing so means admitting we were wrong, and this may be at odds with our self-image (the savvy trader). The value of avoiding this psychological cost may be meaningful, even if the financial costs are clear.

DE of Execution-Only Traders on the Momentum Securities Platform

To examine the potential DE of South African execution-only traders, transactional data was obtained for a pre-COVID (1st January 2016 – 31st December 2019) period and COVID-period (January 1st 2020 to October 1st 2021) respectively. Execution-only traders are individuals trading via their own account (i.e., their accounts are not managed in any way).

The trader's DE is calculated in the same way as the seminal paper by Odean (1998), who predicted that investors would realise more gains, relative to the number of gains that were available at the time, and fewer losses, realised relative to the number of losses available, again at that point in time. Following his methodology, a timeline of trading activity was then established for each trader. Each time a trade was executed (realised), the trader's portfolio was placed under the microscope to ascertain:

1. The number of stock positions sold for a gain (1)
2. The number of positions sold for a loss (2)
3. The number of open positions (i.e., not sold) showing a gain [*a paper gain*] (3)
4. The number of open positions (i.e., not sold) showing a loss [*a paper loss*] (4)

These gains and losses were all judged against the original purchase prices, using the closing prices on the day.

Tallying the realised gains (1) plus the paper gains (3) presents the total count of gains available for realisation at that point in time. Similarly, summing (2) and (4) gives the total count of losses available for realisation. These may be expressed as ratios:

$$\textit{Proportion of gains realised (PGR)} = \frac{\textit{(Realised gains)}}{\textit{(Realised gains+Paper gains)}}$$

$$\textit{Proportion of losses realised (PLR)} = \frac{\textit{(Realised losses)}}{\textit{(Realised losses+Paper losses)}}$$

$$\textit{Disposition Ratio} = \frac{PGR}{PLR}$$

A Disposition Ratio of >1 would indicate the proclivity of investors to realise more gains than losses, hence the existence of the DE. Note that for brevity the average of the ratio for the two periods is reported. Monthly results are also available.

Data and Preliminary Results

It was decided to segment the population according to age and gender, as these demographic variables were readily available in the dataset[5]. Table 1 not only shows each population group and the average Disposition Ratio (DR) over the time period, but it also separates the pre-COVID and COVID periods with a vertical line. The investor count (n), assets held on the trading platform by this group, and the average DE for the group are shown in the final column. Table 2 shows the difference in the DE from the pre-COVID to the COVID period, respectively.

Statistical Significance Testing Methodology

The following groups were compared with each other to ascertain any statistically significant effects of the COVID-19 pandemic in the DR, using the methodology summarised in Figure 2.

The Student's t-test was employed to test whether there was a difference in the means of the two particular groups (between the pre-COVID and COVID periods in this case). An important assumption for the Student's t-test, however, is that the variances of the two groups should be equal, so in order to ascertain this point, a Levene's Test was conducted. A Welch's two-sample t-test was used where differences in variances were found.

4 The benefit from selling assets and realizing a gain.

5 There were no explicit hypotheses on the differences between age and gender groupings at the onset. These variables were exploratory.

Table 1: Disposition Ratio Across All Groups

	2016	2017	2018	2019	2020	2021	n	Assets %	Average
All Traders	1.14	1.10	1.15	1.28	2.68	1.78	7474	100%	1.47
Males	1.21	1.10	1.18	1.28	3.14	1.93	2765	63%	1.64
Females	0.99	1.08	1.12	1.37	1.96	1.37	4709	37%	1.32
Gen Z (0 – 21)	2.14	1.39	1.20	1.22	1.73	2.41	450	2.18%	1.53
Millennials (22 – 37)	1.14	0.99	0.93	1.54	1.83	1.77	1292	7.03%	1.28
Gen X (38 – 53)	1.17	1.32	1.41	1.44	3.92	2.36	2344	27.35%	1.92
Boomers I (54 – 63)*	1.46	1.20	1.26	1.31	1.67	1.32	1918	33.16%	1.37
Boomers II (64 – 72)**	1.05	0.82	0.89	1.04	1.57	1.38	1470	30.29%	1.04

* It was decided to split the overall Boomers group into two subgroups with clear behavioral differences.
** Clients over the age of 72 were not included in this analysis, as their trade frequency is very low.

Table 2: Average Distribution Ratios for the Pre-COVID and COVID Periods

	Pre-COVID DR	COVID DR	% Increase
All traders	1.17	2.23	91%
Males	1.19	2.54	113%
Females	1.14	1.67	46%
Gen Z	1.49	2.07	39%
Millennials	1.15	1.80	57%
Gen X	1.33	3.14	136%
Boomers I	1.31	1.50	15%
Boomers II	0.95	1.48	56%

The tables and figures that follow set out the results of the various statistical significance tests. A specific example of the entire population is first given in detail to illustrate the testing process followed herein. A box and whisker plot of the DR results for the two periods is illustrated in Figure 3, which clearly highlights the differences in the behaviour at an aggregate level for these two periods. The results for the other groups are reported in Table 4.

Discussion and Key Findings

The key findings from the sections 5 and 6 of this paper are as follows:

- From 2018 to 2021, there existed a statistically significant DE (a DR of > 1) across all traders at a 95% confidence interval in each year [6].
- There is a 95% certainty the DR is significantly greater during COVID for the entire sample.
- Both males and females show a statistically significantly greater DR during COVID.

6 These tests are not shown here but are available from the corresponding author on request.

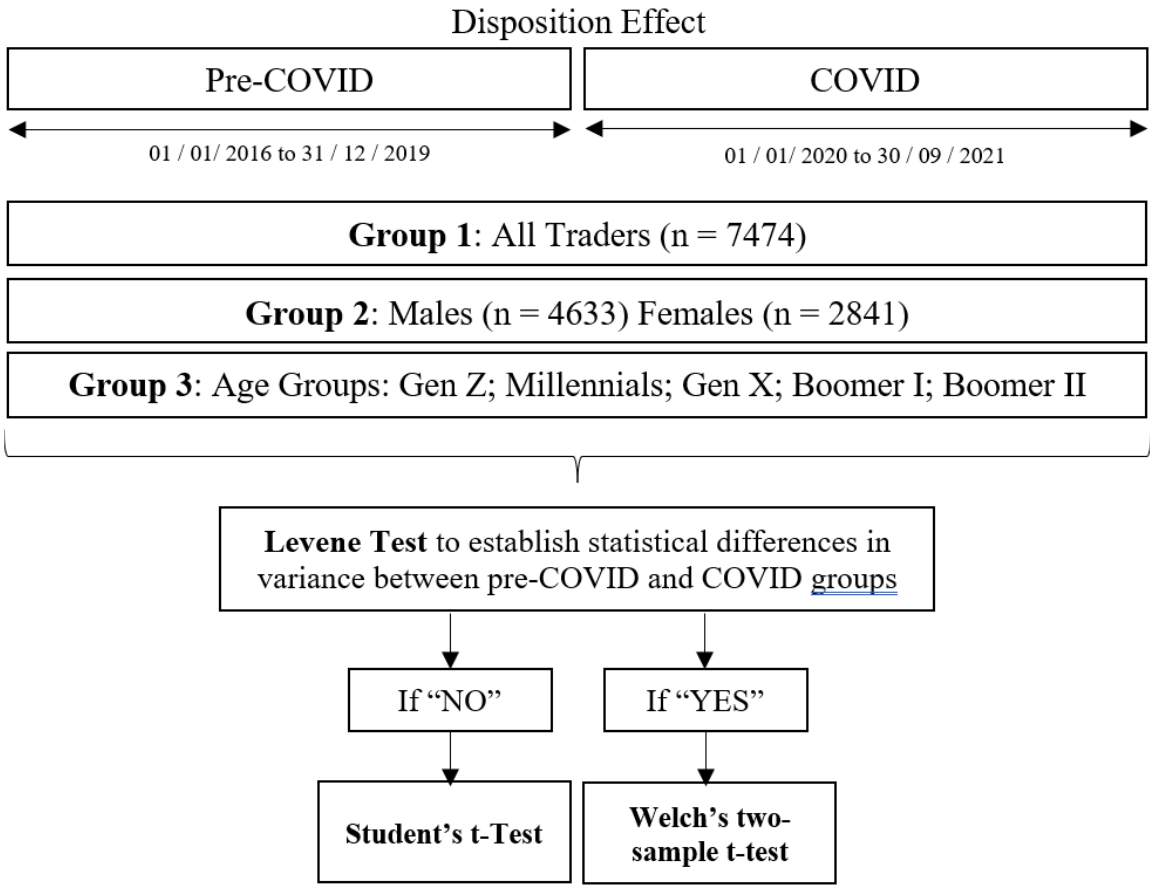

Figure 2: Statistical significance and testing process.

Table 3: Testing for the Effect of COVID on the DRs for All Traders

Statistical Test	Hypotheses	Test Results	Outcome
Levene's test	H0: Groups have equal variances. H1: Groups have different variances.	p=.000	Reject H0 and use Welch's t-test
Welch's t-test	H0: There is no difference in means. H1: The difference in means is greater than 0.	p=.000 t(20.425) = 5.473 Lower bound (one-tailed test) = 0.789 Sample estimate (COVID) = 1.167	Accept H1: Overall traders DRs were higher during the COVID-19 period. There is a 95% chance that the DE was greater during COVID.

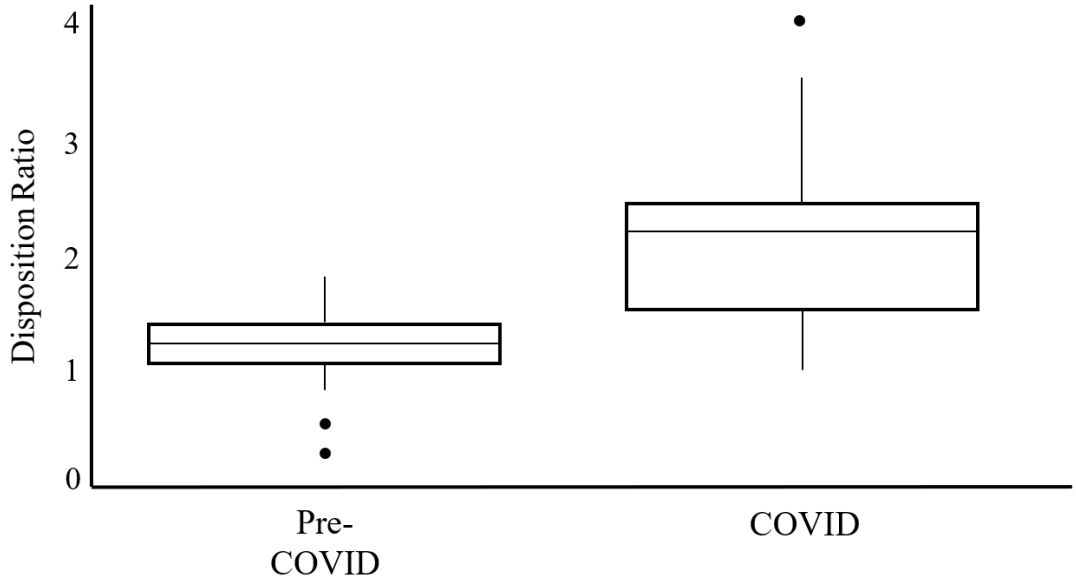

Figure 3: Box and whiskers plot of overall traders' DRs pre-COVID vs COVID.

Table 4: Testing for Differences in DR Pre-COVID vs COVID—Remaining Groups

Group	Levene's Test P-Value	Welch/Student T-Test P-Value	Conclusion: 95% Certain That:
Males	0.000	0.000	DR was higher during COVID
Females	0.007	0.000	
Gen Z	0.370	0.098	No differences in DR during COVID
Millennials	0.818	0.000	DR was higher during COVID
Gen X	0.004	0.000	DR was higher during COVID
Boomer I	0.212	0.034	No differences in DR during COVID
Boomer II	0.000	0.000	DR was higher during COVID

- Although this is not reported above, females have a lower variance in DR as well as a lower DR on average.
- The Gen Z group (0 – 21) are the smallest proportion of the population but have the highest DE *prior* to the pandemic (in normal market conditions). This is consistent with Steves (2022), who cites Gen Z as the most risk-averse generation.
- Gen Xers have an extremely high DE during COVID of 3.92, indicating that ≈ 80% of trades take place in the gain zone or ≈ 20% in the loss zone.
- Gen Xers comprise 31% of the studied population and 27% of the invested assets studied. They are therefore the obvious target for the intervention

studies discussed in the conclusion.

- The Millennial, Gen X, and Boomer II groups all show statistically significant increases in DE during COVID and therefore are more prone to elevated loss and regret aversion.

The evidence suggests that emotions and anxiety are related to the size of the overall DE (in both males and females) and in the Millennial, Gen Xer, and Boomer II groups[7]. This diversity in age group behaviour suggests that there may be specific age-related conditional factors that affect this behaviour.

Conclusion and Recommendations

This study confirms the existence of the DE for this population of investors over the period studied and indicates that the size of the effect was significantly positively affected by the COVID environment. Furthermore, it provides insights into the segmentation of the trader population, clearly revealing preferences that are statistically significant in respect of gender differences and (some) age groupings, both before[8] and during the COVID period[9]. The presence of age-related differences in the specific responses suggests that there are additional potential factors at play, which should be explored further.

These insights will allow trading securities platforms to begin focusing their nudging strategies on segments where they are most needed. This paper determines how Gen Xers—and particularly male Gen Xers—need the most help in trying to minimise their DE[10]. Trading and securities platforms can nudge this cohort to use advanced trading strategies such as stop-losses to create a predefined floor on investment losses, thereby forcing the trader to execute a trade and not allowing losses to run. Richards et. al. (2017) show that this strategy is effective in minimising the DE in the zone of losses as well as gains.

Having the psychological assurance that losses are somewhat limited appears to give traders the confidence to hold on to their winners for longer (trade less). More innovative social trading strategies are emerging as well, as demonstrated by Jin and Zhu (2021), who posited that having trades open to public view appears to curb the DE. Moreover, many stockbroking offerings in South Africa offer the services of a professional portfolio manager to buy and sell stocks on behalf of the investor, and in this regard Shapira and Venezia (2001) show that employing such services also reduces the DE.

These are many possibilities to explore in relation to helping (South African) investors to better outcomes and the important role that stockbroking firms could play in achieving this by understanding their customers' disposition effect. Further research is also underway in understanding the probability distributions of investor trading behaviour around the reference point, as well as different calculations of this reference point, to understand better any causal relationships. Age-related differences also suggest the presence of other important explanatory factors.

THE AUTHORS

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Evan Gilbert completed his PhD at the University of Cambridge in 2000 and then worked for a major international strategy consultancy (the Monitor

7 While anxiety is not specifically studied as a variable published research suggests that market turbulence is linked to anxiety (Qin, 2019).

8 These tests are available from the corresponding author.

9 Further research is also recommended in respect of comparing the period of market turbulence that COVID presented with the 2008 Global Financial Crisis for example where the turbulence was longer to examine the effects on the DE (if any).

10 Further research is needed in respect of age and gender differences as well psychological differences such as personality traits that may contribute to a better understanding of differences in the samples.

Group) for two years, followed by an eight-year period in the world of academia. He taught corporate finance on the MBA programme at UCT's Graduate School of Business and Financial Economics at the Department of Economics at Stellenbosch University. Since 2010, he has worked in the investment management industry. He joined Momentum Investments' Outcome-Based Solutions team in 2015 as a senior portfolio manager. He is also an Extraordinary Professor in the Department of Business Management at Stellenbosch University and teaches at the Henley Business School.

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Applying Behavioral Economics to Improve the Experience of Debtors and to Promote Timely Payments in the Realm of Debt Collection

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Neovantas

Debt can occur to anyone, yet it is still a widely taboo topic. Despite being a complex process affected by multiple biases, there are few behavioral economics resources that help individuals with excessive debt to improve their situation. This paper highlights how behavioral economics can be leveraged to help debtors and should be used when designing interventions for debt collection to make processes better for both agencies and debtors. We do this by first explaining the importance of behavioral insights in creating more specific and personalized debtor segments, and secondly describing five behavioral principles that could be applied to improve the debt collection process according to what is most effective for each segment. These principles were implemented in communications with one debtor segment in a Spanish bank to facilitate the payment process by encouraging digital payment, resulting in a 55.2% increase in debt payments through digital channels.

Behavioral Introduction to Debt Collection

Many behavioral economics resources, nudges, and programs aim to help individuals make good financial decisions and secure their financial future, such as saving and pension plans like Save More Tomorrow (Thaler & Benartzi, 2004). However, there are much fewer resources for those individuals who incur excessive debts and struggle to pay them back.

This discrepancy is important to acknowledge, because debt can occur to anyone, often as a result of an individual's situation changing over time (e.g. losing a job) (Furniss, 2016), and while it is preferable to help individuals avoid excessive debt in the first place, those who are indebted also need support to prevent their situation from worsening.

This paper will focus precisely on what can be done to support individuals in this circumstance by using behavioral economics to understand them better and help them prevent distressing outcomes. Specifically in Spain, where this research was conducted, these consequences can be quite serious, starting from a judicial claim and additional interest for late payments through entering a national delinquency list if the debt persists (BBVA, 2016; Fernández, 2022).

Aside from these consequences, research has proven that owing excessively has a negative effect on psychological and physical health (Ong et al., 2019; Sweet et al., 2013), thereby aggravating what is already a stressful experience (Ryu & Fan, 2023). In fact, as a taboo topic, debt experiences are rarely shared among friends and family members (Talker Research, 2022), and this combination of isolation and stress creates a highly vulnerable situation for debtors.

Upon analyzing the situation through a behavioral lens, it becomes evident that managing debt is part of a web of complex and often irrational behaviors, starting with the factors that affect an individual's decision to take out a loan to those that affect the decision to pay it back (Chu et al., 2017). This phenomenon can affect everyone, even those who have the capacity to pay off their debt.

A great example in this regard can be seen through a key behavioral economics concept: the

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intention-action gap. Despite individuals knowing what behaviors are better for them, such as eating healthily, exercising, and saving for the future, many do not act according to these intentions (Douneva, 2022). This same gap can be seen among debtors who know that paying off their debts in a timely fashion is better for them but still end up missing their payments. This example illustrates one way in which behavioral economics helps us understand a debtor's behaviors and constraints, and additional behavioral concepts can provide further insights as to how debt collection could be approached. In fact, Dan Ariely successfully counteracted this intention-action gap in debt collection in an experiment where automated calls with planning prompts nudged individuals to commit to a specific date on which they would pay off their debt, thus reducing their credit card delinquency and increasing the speed at which they resolved the situation (Ariely et al., 2018). Similarly, the Commonwealth Bank of Australia implemented behavioral principles that reduced individuals' credit card debt by 12.18% by inviting them to pay off specific items or purchase categories, such as a coffee or a utility bill, rather than just asking them to pay off their debt (Donnelly et al., 2020).

Aside from the intention-action gap, many individuals might not know how to manage their debts. An experiment with consumers carrying multiple debts showed that they often paid off smaller amounts first despite having larger balances with higher interest rates (Amar et al., 2011). The results revealed that only 3% of the individuals allocated money to pay off their higher-interest debts as a priority; therefore, additional support could be provided to help debtors achieve optimal payment strategies (Amar et al., 2011). Indeed, an intervention program by the Poverty Action Lab found that there was a strong demand for behaviorally motivated debt reduction support (e.g. goal-setting tools with incremental loan payments) (Zinman, 2010).

Given the delicate situation these debtors find themselves in, it is the responsibility of debt collection agencies to help them manage their debt in the best way possible, to avoid drawing additional interest. There are a wide variety of organizations that aim to help individuals in this situation; however, if they are not using behavioral economics to reinforce their initiatives, their attempts can sometimes face unexpected results or even backfire (Hershfield & Roese, 2015; Wang & Keys, 2014).

Overall, behavioral economics can help agencies improve different debt collection initiatives, nudging debtors towards better payment strategies according to their needs. Having introduced this foundational information, this paper will continue to explore the tools required to understand debtors and properly segment them according to their behavior, as well as how to design effective and behaviorally reinforced communications.

Theoretical Framework

We consider two main points when applying behavioral economics to improve debt collection across various projects:

1. *Use of a behavioral lens to analyze consumer data and generate behavioral insights* to understand what initiatives would result in the most effective debt collection method according to the customer's behavioral profile.
2. *Application of behavioral principles* to shape how these initiatives are rolled out and communicated to facilitate the process and help the debtors in each segment as much as possible.

Behavioral Insights

The first step in understanding debtors' behavior is to look at behavioral data, i.e. data derived from customer interactions with an organization (Indicative Team, n.d.), for instance using speech and text analytics. This data is used to generate behavioral insights, which are key conclusions of human behavior based on empirical evidence and information regarding "how people perceive things, how they decide, and how they behave" (European Commission, 2021, para. 1).

These insights are highly valuable for organizations but are rarely harnessed to their full potential. Concretely, they can be used to create behavioral archetypes to segment debtors beyond traditional risk-based classifications. Moreover, behavioral segmentation analyzes "psychological insights and advanced analytics to build a closer profile of customers within the same risk segment" (Baer, 2018, para. 2), thereby allowing for more accurate and efficient collections.

From our experience in the world of debt collection, one way of creating these archetypes is by incorporating traditional data, such as the capacity to pay, alongside behavioral insights, such as willingness to pay (Table 1). Moreover, plotting these variables along two axes allows for a clear visualization of the different profiles created for the debtors in each segment (Figure 1).

Table 1: Examples of Data Analyzed to Measure Capacity and Willingness to Pay

Capacity to Pay	Willingness to Pay
Total amount of debt	How long the individual took to react/respond to their debt
Length of time (in days) of the debt being owed	Verbalizing willingness to pay via a call
Number of unpaid bills	Asking for or accepting an installment payment plan
The client already belongs to a delinquency list or is a recurrent debtor	Making a promise to pay at the end of the month after receiving a paycheck
	Visiting the payment page of the debt collection agency

Figure 1: Behavioral segmentation matrix with debtor archetypes.

This sort of behavioral segmentation is also supported by academic studies. For instance, research conducted on a German debt collection agency created 16 different debtor archetypes based on data relating to debtor's willingness to pay, capacity to pay, financial organization, and rational behavior, finding that different debtor segments have different communication strategies which are most successful at eliciting reactions and payments (Ghaffari et al., 2021). Additional research found that encouraging repayment through different behavioral nudges and communications reduced late payments for some specific client segments but not others (Barboni et al., 2022). These experiments reveal the importance of behavioral segmentation in order to know what initiatives to implement for each debtor.

Behavioral Principles

Once a behavioral segmentation is completed, the next step is to understand how to apply the different behavioral principles and initiatives to each segment.

We first define and provide application examples for five key behavioral principles we have used when designing debt collection communications (SMS, letters, and emails). Then, we briefly explain, based on our experience, how these principles can be applied in different ways according to what is most effective for each segment mentioned above (Figure 1). It is important to remember that these principles can be applied in multiple ways depending on the objective of the initiative, such as nudging debtors to pay, guiding them toward personalized payment strategies, and/or facilitating the payment process.

1. Make it Easy

This concept is the first one found in the EAST Framework developed by the Behavioral Insights Team. It asserts that the more complex an action seems and the more effort it requires, the less likely people are to carry out said behavior (BIT, 2014).

While this is not a bias in itself, it is a key behavioral principle that drives individuals' behavior and is closely connected to the System 1 vs System 2 Theory popularized by Kahneman, given that making something easier to process taps into the fast, automatic part of the brain, thus making it less effortful to accomplish (Kahneman, 2011).

Applying this principle to debt management is vital because, as mentioned above, it is a particularly vulnerable moment for debtors which adds to their mental load and thus may make it harder for them to process the situation or information received.

Let's take a look at some applications of this principle we carried out:

- Including a QR code in a debt collection letter to allow the individual to quickly and easily access a digital payment platform on their phone
- Incorporating a clear and visual "Call to Action" in emails that effortlessly guides the attention and behavior of readers
- Simplifying messages by highlighting key information in sections (e.g. 1. Why is the collection agency contacting you? 2. What is the problem? 3. What are the solutions?)

2. Reciprocity Principle

While this principle was popularized by Robert Cialdini in his book *Influence: The Psychology of Persuasion*, research reveals reciprocity could have been present even in ancient Rome (gift-giving, exchanging goods, etc.) (The Decision Lab, n.d). It explains the human tendency to return favors and positive actions with equally positive behaviors (or punish negative actions) (Buric, n.d.).

Connecting it to debt collection, when clients receive a positive action, favor, or personalized communication in which an effort is tangibly evident, they will be more likely to engage with it. Therefore, when the agency tries to understand their client's needs and interests and highlights their effort and personalized attention to said client, they may feel this "commitment" to respond and take action, thus increasing the trust and sympathy between both parties.

We have applied it in debt collection in the following ways:

- Hand-writing letters sent to debtors, showing increased dedication and effort
- Personalizing communications with the agent's name, last name, and position
- Incorporating expressions that highlight the effort incurred by the agent (e.g. "after personally reviewing your file...")

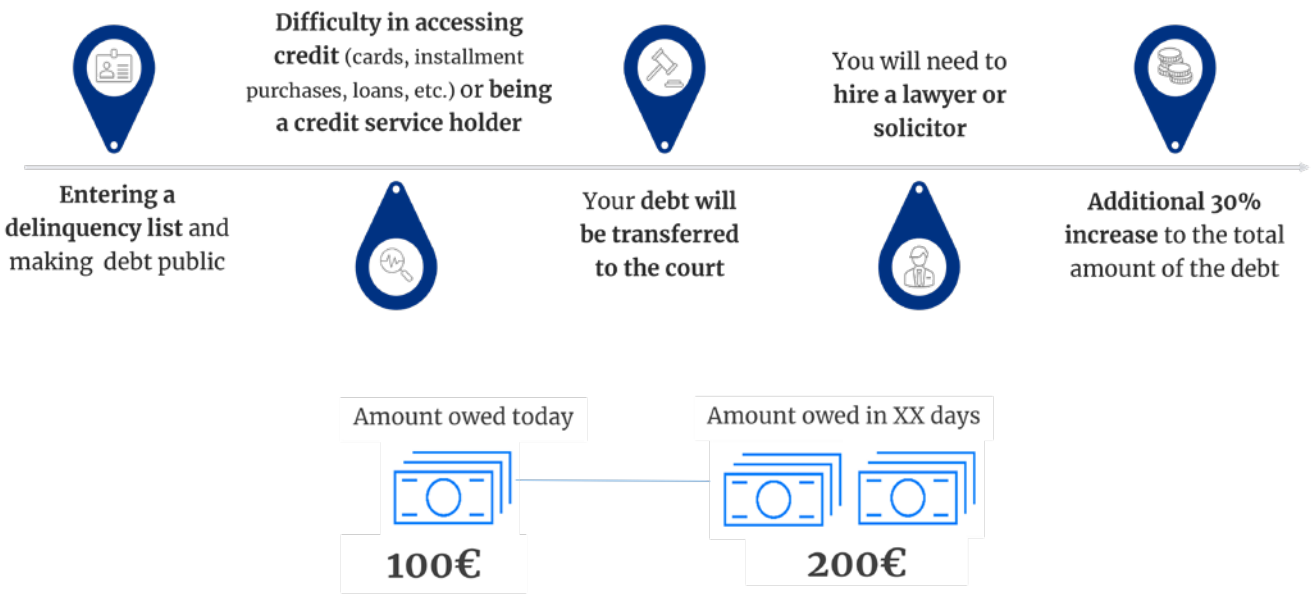

Figure 2: Visual design incorporating present bias.

3. Present Bias

Present bias states that, when allowed to choose between a smaller reward now and a larger reward in the future, humans tend to select the immediate benefit because they focus more on the present situation when making decisions (O'Donoghue & Rabin, 1999).

This bias is closely related to the intention-action gap, and it can be counteracted in debt collection communications by making tangible the negative consequences of not solving the debt, and thus making those future consequences salient in the "present" moment.

We have leveraged the present bias in debt collection by:

- Incorporating life cycles to tangibly highlight the "present" moment the debtor is in and any future consequences (e.g. increased interest rates, court visits, etc.), as illustrated in Figure 2
- Including a summary table to emphasize the current amount of the debt owed and the increased amount due the following month if they don't pay on time

4. Ambiguity Aversion

This behavioral principle explains how individuals tend to avoid uncertain or volatile situations when the consequences or outcomes are unknown (Ellsberg, 1961).

This is a key element in debt collection because if a client is uncertain about the consequences (legal or associated costs) or the process to follow to manage their debt, they will be more likely to avoid the situation rather than contact the agency. Therefore, we seek to offer the client the greatest possible security and confidence to move forward with the management of their debt, anticipating and solving any doubts they may have.

To avoid this bias, we have developed the following suggestions:

- Including specific payment deadlines and debt amounts
- Incorporating how the debtor can communicate with the agency (phone, address, customer service hours, etc.)
- Providing tips to increase security when moving forward (e.g. "If possible, avoid using a public computer to access your bank account")

5. Reactance Theory

Reactance refers to a negative reaction that arises unconsciously when an individual feels that they are being questioned or intensely pressured to do/accept something, especially when their freedom of choice is being threatened or restricted (Miron & Brehm, 2006).

In the world of debt collection, it is essential to focus on how to convey messages to debtors to prevent them from perceiving them as excessive or too pressuring. There is a fine line between tangibly stating the economic and legal consequences of not paying a debt and the client perceiving said messages as threats.

Figure 3: Behavioral principles by segmentation matrix.

These are some examples we applied to prevent reactance:

- Using approachable language at the beginning of the process and, little by little, increasing the seriousness and strictness of the tone in communications
- Avoiding making assumptions that invade the client's privacy or restrict their freedom of choice regarding the debt payment, as it may be perceived as an attack on their ego/self-esteem

Given the five behavioral principles we defined, Figure 3 briefly summarizes which principles could be best applied to each segment. It is essential to remember that all the biases mentioned above could be applied, albeit in different ways, to each segment.

Experimental Application

The previous examples of applied behavioral principles encourage debtors to pay off their debt through various communications (primarily through digital channels such as emails and SMS). In fact, research shows that many consumers prefer automated digital communications over calls from debt collectors, given that digital channels often facilitate and reduce the awkwardness often tied to these situations (Yang, 2021). Nevertheless, in Spain, the degree of digital debt payments is negligible, at almost 0%, because most debts are managed through agencies, contact centers, and in-person interactions.

Therefore, the following experiment stems from a project in which we implemented these behavioral principles across digital communications in order to boost online payments. This experiment focused particularly on only one segment, as it was a pilot to test and measure the initial impact of behavioral interventions before scaling it up to other segments.

Objective and Context

The main objective of this A/B experiment was to increase the number of debt payments made through digital channels among the Self-cure segment (see Figure 1) of a Spanish bank, using communications that incorporated the principles exemplified above.

We hypothesized that the application of the previously identified behavioral principles would nudge these Self-cure debtors to pay off their debt completely using a digital payment channel. The use of digital channels was encouraged because they

Figure 4: Example of a treatment group email incorporating behavioral principles.

are both a cheaper method for organizations and a faster and easier way for clients to pay off their debt. Moreover, if the client did not pay off the debt, the amount would be automatically deducted from their account (given that they had enough funds), which would be an unpleasant and often frustrating experience for them. Thus, by encouraging payment through a digital channel, the debtor could choose how and when would be best for them to pay, reinforcing their autonomy over the situation and improving their experience.

Methodology

Over 150,000 debt cases were analyzed to create a segmentation model with distinct archetypes using both willingness and capacity to pay. Of those, only individuals with medium to high capacity and willingness to pay, young debts (maximum 30 days), and debts related to overdrafts, mortgage loans, and card debt up to 3,000€ were selected for the experiment for two main reasons: cost limitations and easier implementation, as they were more accessible.

Of the total 18,000 cases fitting this profile, approximately 12,000 of them were selected for a sample and randomly divided into a treatment group (6,016) and control group (5,984), based on whether their client number was even or odd, after ensuring that both samples had equivalent characteristics.

The control group received the usual communications and management practices originally used by the bank. The treatment group received communications that had been modified using different behavioral

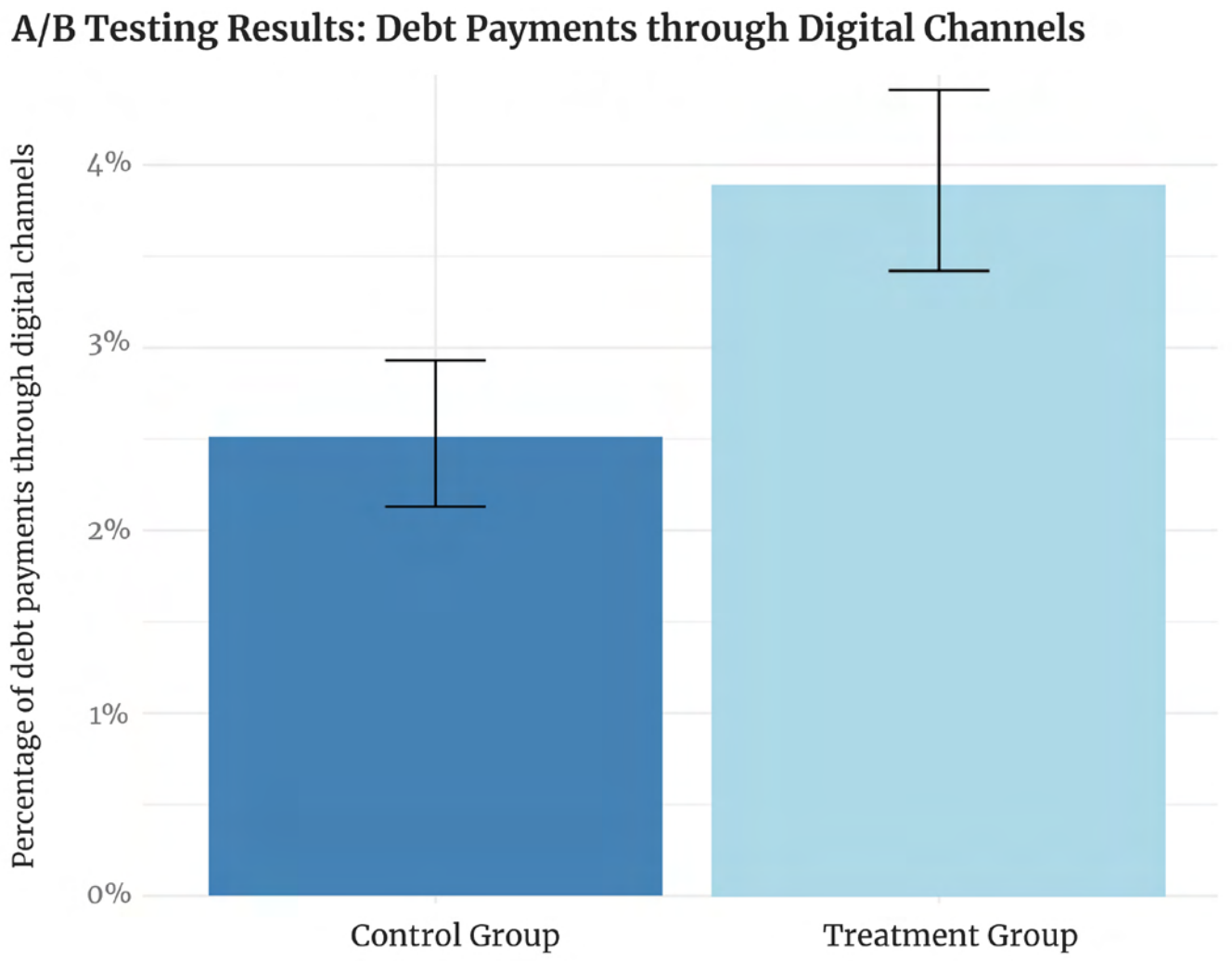

Figure 5: Experiment results displayed in bar graph.

principles (Figure 4), such as those exemplified above.

Results

A month after launching the intervention, the results of the experiment found that the treatment group had a 55.2% increase in debt payments through digital channels compared to the control group (Figure 5).

These results were statistically significant ($p<.001$), indicating that the experiment was tested in a large enough sample to confidently support the hypothesis that behavioral principles can be successfully used to nudge the Self-cure segment of debtors into using digital channels to pay their debts.

Ethical Considerations, Limitations, and Further Research

Ethical considerations were followed for this experiment, specifically maintaining the privacy and anonymity of all debtors, applying behavioral principles without using any manipulation tactics, and maintaining freedom of choice (e.g. selecting different payment methods).

Despite having a very large sample size and following all ethical considerations, the experiment had a few limitations. First, due to bank restrictions, it was not possible to test separately the effect of individual behavioral principles in the different communications, and therefore, there was no way to analyze which principles were the most or least effective in increasing digital payments. Moreover, the scope of the experiment was limited to a specific target segment that the bank wanted to focus on due to cost limitations and easier implementation.

Further research should be undertaken to explore effective behavioral strategies among other segments of debtors, primarily those with lower willingness or capacity to pay, as well as later stages of debt or larger debts that must be paid over time. In these investigations, we encourage the analysis

of additional behavioral principles which can be implemented throughout the process, such as the framing effect, salience bias, blemishing effect, and loss aversion, as well as new applications across different communications.

Conclusions

Managing debt is a complicated matter, and despite being a process in which objective information seems to be the main driver, this research further illustrates how analyzing the situation through a behavioral lens can improve the process for all stakeholders involved (debtors, banks, and organizations collecting debts). The use of behavioral insights enables organizations to personalize different initiatives based on what would be most appropriate for each debtor archetype, ensuring that interventions are more targeted, relevant, and effective. Additionally, behavioral principles can be implemented to overcome the intention-action gap and facilitate the payment process for each initiative in a way that helps improve the financial well-being of debtors while also aiding organizations to achieve their business objectives. The experiment above highlights the importance of combining behavioral concepts with traditional data to achieve this success. Overall, this behavioral perspective leads to a greater understanding of the underlying behavioral drivers of debt repayment and can be leveraged to support and benefit both debtors and organizations involved in the debt collection process, thus reinforcing its relevance for all stakeholders and unveiling the taboo element of the subject to encourage further exploration.

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Applying Behavioural Science Techniques to Improve Employee and Client Outcomes: A Case Study on Deceased Estates Administration in South Africa

ADAM GOTTLICH[1] AND AKIRA PANDAY

Standard Bank Group

Due to spikes in the South African death rate during the COVID-19 pandemic, various industries that facilitate the administration of deceased estates came under an immense amount of pressure, which led to clients experiencing a slow and unsatisfactory administration process. In this paper, we reveal the cognitive and behavioural bottlenecks that contributed to client dissatisfaction in an estates business – particularly from a client-facing communications perspective. Applying techniques such as linguistic concreteness, cognitive empathy, simplification and the picture superiority effect to client-facing communications enabled both clients and employees to partake in a more seamless estates administration process. The new communications contributed to a more manageable working environment, satisfied clients and happier employees. Our findings demonstrate that by eliminating uncertainty and the curse of knowledge from client interactions, and making it easier for staff to provide feedback, positive gains are experienced by both clients and staff alike.

Introduction

When a person passes away, all their assets are placed in an estate, known as a 'deceased estate'. These assets include immovable property (houses), movable property (vehicles, furniture, valuables) and cash in the bank. The person or business that is responsible for administering a deceased estate is known as an 'executor' (Standard Trust Limited, a leading business in estate administration, based in South Africa). Administering a deceased estate is extremely complex because each one is unique and therefore may not be administered in the same way as those that came before it. Additionally, the administration process is intricate and lengthy (usually finalised between 6 and 18 months), and it relies on various external dependencies to ensure that the estate is wound-up with care and due diligence (Madjarevic, 2020). Most importantly, estates businesses interact with highly emotional clients who expect a compassionate and proficient experience from start to finish.

In 2021, South Africa saw an approximate 34% rise in deaths due to the COVID-19 pandemic (Stats SA, 2021), which had a significant impact on various industries that assist in winding up deceased estates. During this time, Standard Trust Limited (STL) experienced a great deal of pressure to provide their clients with a seamless and efficient experience and to ensure that their estates officers (EOs) were able to effectively manage the vast influx of files.

The steep rise in the South African death rate created large backlogs of estates that executors, and various external dependencies such as the South African Revenue Services, were required to tend to. This in turn caused many delays in the administration process and, inevitably, led to many impatient and frustrated clients. The Standard Bank Behavioural Science Team were asked to intervene in order to improve the client experience.

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Research Phase

A thorough research process into the estates business was conducted in order to better understand the problem areas and how they could potentially be addressed using behavioural science. Due to the complex nature of the business, the first step was to map out the entire client journey, as illustrated in Figure 1. The journey consists of 16 milestones which take place over the course of a number of months. We sought to understand the timelines between the milestones as well as the interactions that take place between EOs and clients, as well as any other external dependencies that come into play. We supplemented this journey map with business data around the drivers of complaints and queries and conducted qualitative interviews with EOs, clients and the management team.

Finally, we conducted a behavioural audit on all communications sent to clients. We found that there were two discrete types of communications in the journey: systematic communications that were automatically sent to clients upon reaching a certain milestone, and ad-hoc emails sent by officers to clients at various points of the journey.

After synthesising all the research, we identified a number of bottlenecks that we believed were leading to a poor client experience. First, EOs were completely inundated with a huge amount of cases to work through and a significant number of clients to whom they needed to attend. This led to negative outcomes in client interactions, delays in updates and poorly worded communications being sent to clients that lacked empathy. In terms of what the Behavioural Science Team could control and assist with, we decided that client-facing communication (both systematic and ad-hoc) required intervention to remedy the client experience. The main bottlenecks we identified can be found in Table 1 below.

The identification of the above bottlenecks made clear the intervention pathway and expected results. We hypothesised that by re-writing communications in a simplified, understandable and empathetic manner, and by making timelines more salient, we would see a decrease in complaints (H1) and a reduction in queries (H2). We also hypothesised that by providing EOs with the necessary tools to address negative client interactions, we would see a reduction in negative client sentiment (H3) and a resultant increase in staff happiness at work (H4).

Solution Design and Implementation Phase

Our intervention first focused on redesigning nine system-generated emails that were filled with jargon, ambiguous expectation management and too much

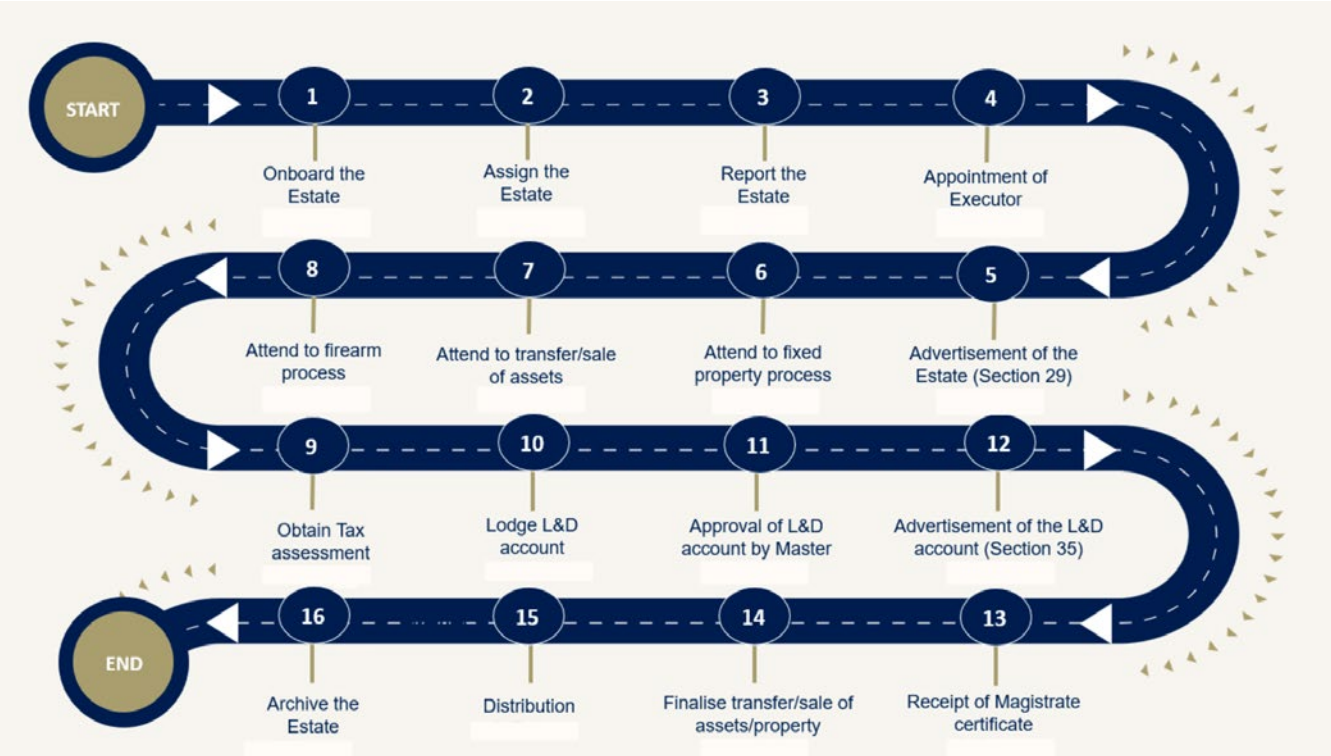

Figure 1: Estates administration process flow.

Table 1: Description of the Bottlenecks Identified During the Research Phase

Bottleneck	Description
The curse of knowledge	Both the systematic and ad-hoc communications demonstrated examples of the manifestation of the curse of knowledge whereby information asymmetry was present (Camerer et al., 1989). Communications were being sent out on the assumption that clients knew more about the estates administration process than was actually the case. This journey is an infrequent experience for the client and not common knowledge for most. This flawed assumption led to the use of jargon and steps in the administration process not being explained fully or in terms that were simple to understand. Clients expressed feeling frustrated, overwhelmed and confused when receiving these communications.
Negativity bias	Our interviews with EOs revealed that negativity bias was manifesting through avoidant behaviours. This bias refers to the tendency of people to experience negative events or information more intensely than positive ones – even when the positive and negative aspects are of the same magnitude (Rozin & Royzman, 2001). As a result of negativity bias, EOs would avoid tending to complaints and queries from clients, which only made said clients more frustrated. This cycle negatively affected the officer-client relationship. Our research revealed that one of the reasons behind this avoidance was due to EOs having low levels of perceived self-efficacy when it came to dealing with negative client interactions. Increasing levels of perceived self-efficacy (the ability to which we believe we can do something) is an effective way to overcome the intention-action behavioural gap (Sniehotter et al., 2005).
Lack of empathy	Estates staff – due to time and cognitive limitations experienced during this time – were often unable to prioritise incorporating empathy and compassion into their communications with clients, the latter of whom complained about the brevity and callousness perceived in the communications they received from estates staff. Research suggests that empathy is a vital component of client experience, especially when it comes to frontline employee interactions (Lywood et al., 2009; Riess, 2017).
Poor expectation management and uncertainty	Post the COVID-19 pandemic, turnaround times were longer and working conditions more pressurised. However, something that did not change was the existing system and officer-generated communications, which meant that clients received information that was only relevant in a pre-COVID world. Their expectations – around turnaround times in particular – were not adequately managed, which contributed to a poor overall experience. Clients needed to be provided with feedback that was accurate and realistic, as it would lead to increasing feelings of confidence (Sheth & Mittal, 1996) as well as reduce the negativity associated with uncertainty (Morriss, 2022).

information leading to cognitive overload.

When re-writing these emails, we focused on a few core behavioural science techniques that would better shape the client experience. First, we leveraged linguistic concreteness to systematically reduce uncertainty experienced by clients.

Linguistic Concreteness

Linguistic concreteness refers to how people perceive concretely phrased statements to have true intentions and abstract statements to have false intentions (Calderon, 2022). When client service agents used more concrete language, clients were

Figure 2: Explainer communication to clients to overcome the curse of knowledge.

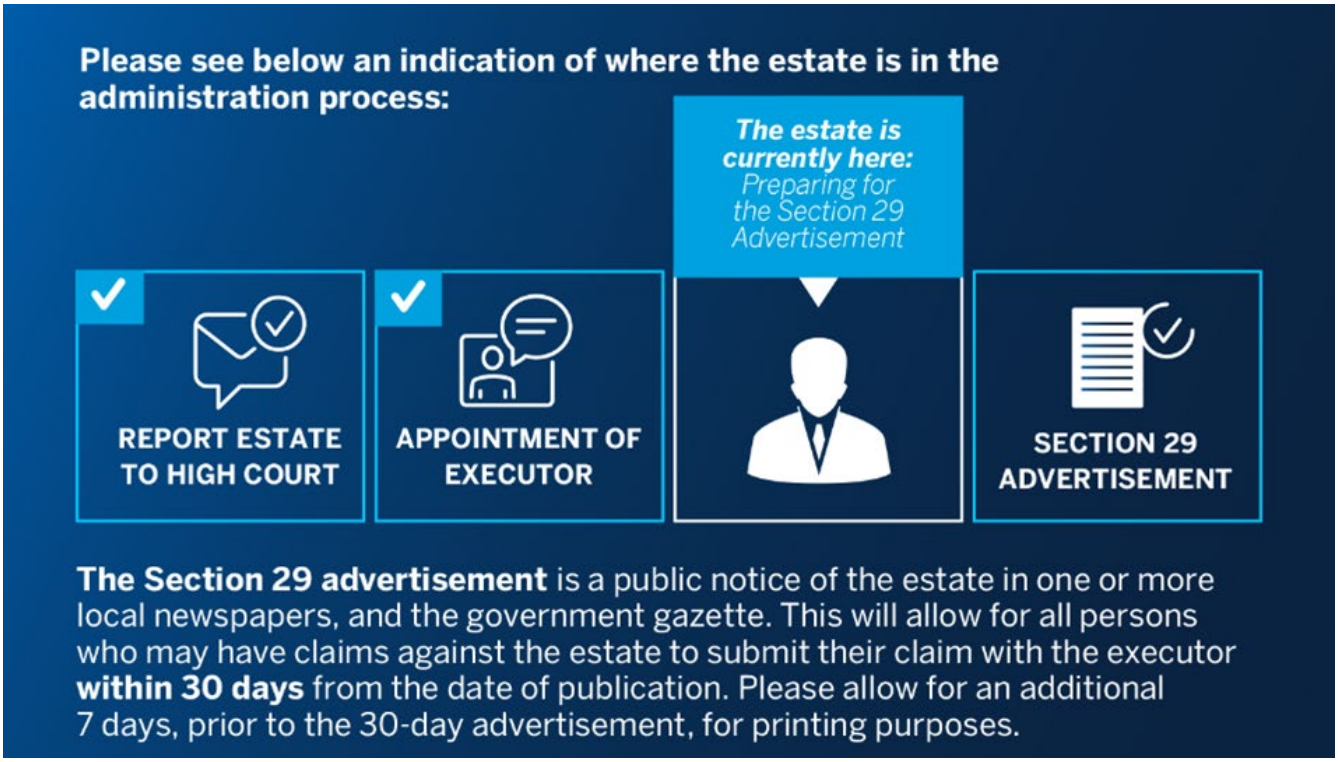

Figure 3: Example of using iconography to make content easier to process.

more satisfied with the experience and rated agents as more helpful (Berger, 2023). In our research, it became clear that 'lack of feedback' was a significant driver of repeat queries and complaints. Reviewing the collateral, we found that clients experienced uncertainty because EO actions and timelines were phrased too abstractly. For example, feedback was often framed as to be expected 'soon' or 'shortly', that an estate would be at a milestone for a 'few days or weeks' and estates were often described as being 'prioritised'. This framing was ambiguous and led clients to follow up repeatedly, as 'soon' sets no anchor for expectation and thus relies on the client's interpretation. To correct this, we made a few changes.

First, all promises of feedback were framed concretely. For example, '*The Section 29 advertisement is a public notice of the estate in one or more local newspapers and the government gazette. This will allow for all persons who may have claims against the estate to submit their claim with the executor within 30 days from the date of publication. Please allow for an additional 7 days, prior to the 30-day advertisement, for printing purposes.*'

Second, when talking about prioritising estates, we made the actions taken far more concrete so as to reassure clients that activity was taking place in the background. For example, '*During this stage, an assigned officer follows up with and visits, the High Court on a weekly basis to ensure that your estate is prioritised.*'

Simplification, Picture Superiority and Saliency

The next bottleneck we sought to overcome was the curse of knowledge, whereby the information and understanding that clients had around the estates administration process was overestimated. The letters that clients received were usually lacking in contextual information and were cognitively taxing due to their length and formatting.

We approached this issue by removing all jargon and acronyms and took the time time to explain each milestone in the administration journey in terms of what was needed and why it was being done. We did this by creating a brochure that outlined the entire client journey. We made use of chunking (Thalman et al., 2019) to make the content more digestible and memorable and used saliency (Underwood & Foulsham, 2006) to make the content visually distinct. Each milestone was explained, and we created a complexity rating scale to provide more context on each milestone with timelines communicated as well. Within each milestone, we leveraged the picture superiority effect (Defeteyer et al., 2009) by using pictures and infographics to make content easier to understand and recall.

Cognitive Empathy

Our research revealed that clients who complained felt as if they were treated in a callous manner, void of empathy. Our engagements with the EOs showed us that they were certainly capable of being empathetic but were placed under sever cognitive strain due to their workload. Research has demonstrated that humans have a limited number of cognitive resources at any given time, and allocating resources to one task or activity limits the resource availability for other tasks (Plass et al., 2010). Thus, it is reasonable to posit that cognitive empathy, which involves making the effort to have more complete and accurate knowledge about the contents of another person's mind and their feelings (Hodges & Myers, 2007), will suffer as a result of cognitive overload.

To remedy this problem, we embedded empathy into all communications, as it was not present in any bar the very first communication that clients received. For example, '*Thank you for reaching out to me and, most importantly, thank you for your patience during this process. I understand that this is a trying time, but I hope that you can take comfort in knowing that facilitating the administration process of the <Estate late> estate is my top priority*'. We ensured that taking the client's perspective was part of every communication, be it system-generated or ad-hoc.

Perceived Self-Efficacy

EOs spent a significant amount of time providing feedback and updates to clients via email. However, they also demonstrated avoidant behaviours when needing to respond to dissatisfied clients. These emails were also a source of client frustration and, as a result, we decided to create five different email templates based on the five most common queries and emails EOs were addressing and sending to clients.

In order to maximise usage and reduce friction, we saved these templates as Microsoft Outlook signatures (see Figures 4 and 5), which meant that EOs were able to access them swiftly and with only minor changes

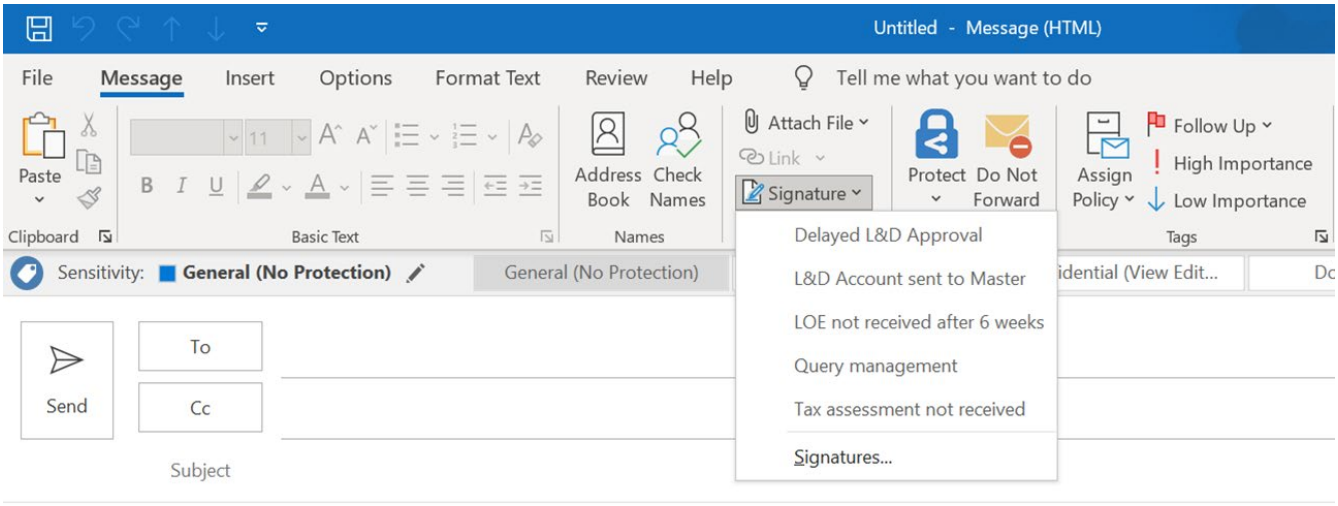

Figure 4: Outlook email signature templates summary.

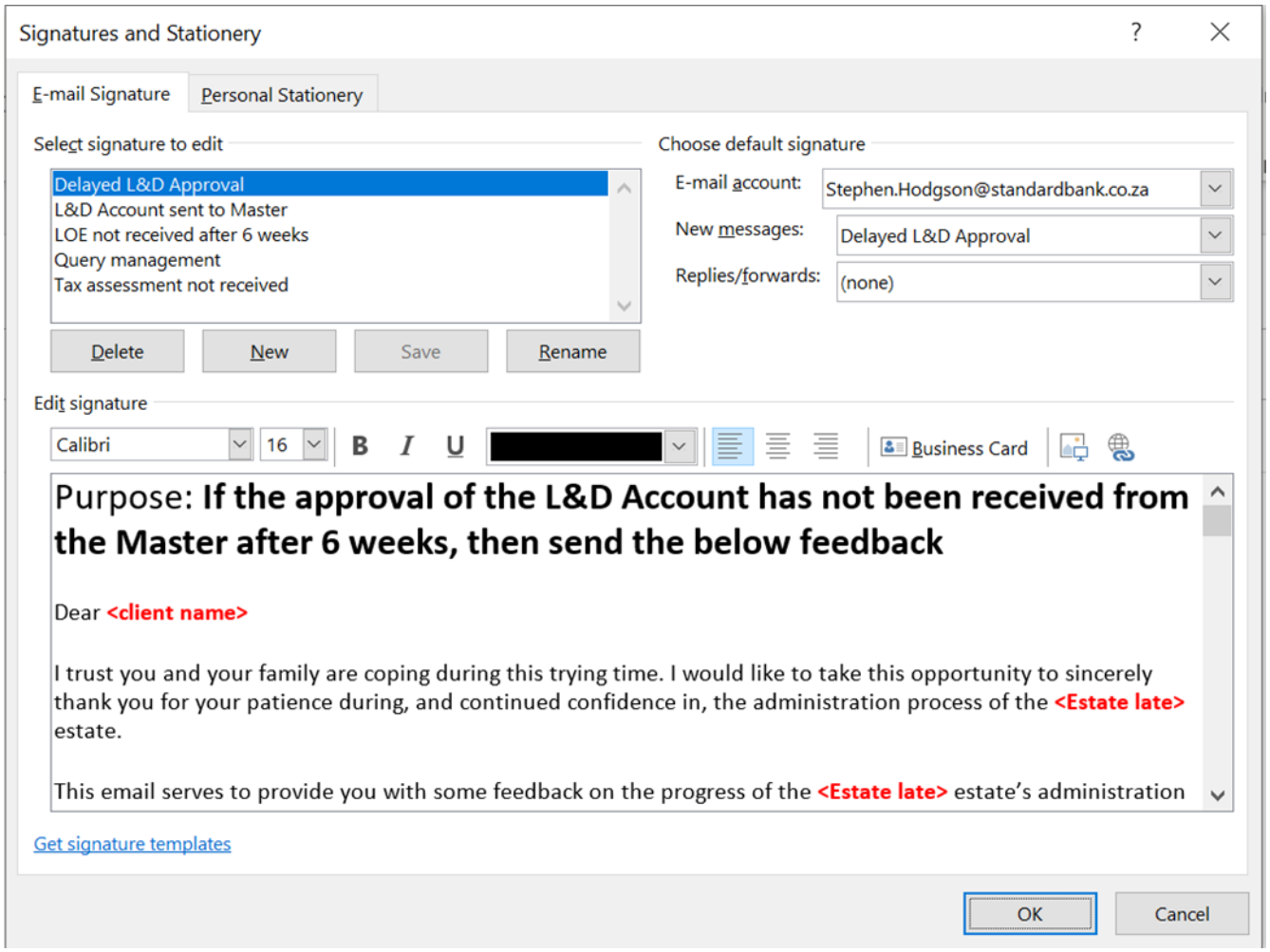

Figure 5: Example of an email signature template.

send a behaviourally informed communication to a client. We outlined the purpose of each template clearly to the EOs and created 'if-then' rules about when they were appropriate to distribute. Studies have shown that 'if-then' rules have been effective in encouraging people to follow through with their intentions (Gollwitzer, 2018), and we believed that the EOs would benefit from the same approach. Additionally, these templates served to close the intention-action behavioural gap (Sniehotter et al., 2005) by providing EOs with the necessary tools to deal with interactions they had previously avoided, thus raising their level of perceived self-efficacy when it came to providing clients with feedback.

Estates officers from around South Africa were trained either virtually or in-person on the new system-generated communications and the email signature templates.

Results

After three months post-implementation, we assessed the numbers of complaints and queries that were received both before and after the intervention and also ran a survey that was sent out to EOs (N=30) to capture their experience, on an individual level, of the new communications strategy.

First, H1 and H2 were both supported, in that we saw an overall reduction in queries and complaints. Two general mailboxes (Complaints and Queries) were monitored during the intervention period to observe the impact of what we had implemented. The monthly averages of both queries and complaints, three months prior to the roll out of the intervention, were used as historic measures for comparison against the mailboxes' monthly averages, three months post-intervention. Queries decreased by 12% and complaints decreased by 35% during the intervention period, meaning that our revised communication strategy was successful in its intention. On an individual level, EOs reported that the email templates were successful in reducing the amount of queries and complaints they received by 33% and 43%, respectively. Thus, H1 and H2 were supported.

Survey results revealed that negative client sentiment dropped significantly post-intervention. After receiving the system-generated emails, EOs reported a decrease in negative sentiment of 45% and positive sentiments expressed by clients increased by 84%. Additionally, negative sentiment expressed by clients following EOs sending ad-hoc email communication dropped by 69% during the intervention period. This significant reduction in negative client sentiment meant that H3 was supported.

Finally, self-reported happiness at work pre- vs post-intervention increased by 16%. Amongst those EOs who used the email templates the most, their happiness at work levels increased by 45% post-intervention. Staff reported that less negative interactions with clients as well as positive expressions of gratitude played a large role in this increase, thus supporting H4.

Discussion

This implementation showed that clients partaking in a complex financial experience require a more interactive and delicate approach from a communications perspective. Our research indicated that the client experience contained elements of the curse of knowledge, uncertainty and a lack of empathy. The nine system-generated emails that we re-designed focused on overcoming these bottlenecks. Linguistic concreteness (Calderon, 2022) was effective in terms of reducing the uncertainty that had become part and parcel of the experience. By reframing the content to become more definitive in terms of the time each administrative milestone took, as well as making the actions that the EOs undertook to process the estate, were effective in reducing uncertainty and improving the client experience. Uncertainty is a negatively valanced emotional state that can erode the client experience (Sweeny & Cavanaugh, 2012), so solving it through making abstract statements more concrete is an effective way of transforming client experiences.

Additionally, the curse of knowledge (Camerer et al., 1989) was overcome through an intentional application of simple language that eliminated jargon. In communications, we took the time to explain why each milestone was necessary and what was being done during the course of each administrative step. This approach was appreciated by clients and manifested in both the reduction of negative sentiment as well as the increase in positive client sentiment after receiving these emails. The curse of knowledge is likely to manifest in environments that are extremely complex, such as estates administration. Therefore,

it is imperative to sense check that clients actually understand what you are doing and why it is being done; otherwise, it can be no surprise that repeat queries and complaints will follow as a result of misunderstandings.

Finally, the ad-hoc communications were designed due to the fact that EOs were spending a significant amount of time per day replying to client queries. The email templates led to EOs saving up to 5 hours per day replying to client queries – a 45% decrease compared to pre-intervention levels. The 'if-then' rules we created for EOs to distribute these email templates were well-received and aligned with research demonstrating that this strategy it is an effective tool to encourage people to follow through with their intentions (Gollwitzer, 2019). Our research found that EOs were cognitively overloaded, and thus replying to clients with comprehensive updates that were empathetic became a challenge. Embedding empathy into all communications was critical, as the estates administration journey is a highly emotional time for clients off the back of losing a loved one. Ensuring empathetic language was used throughout on both system-generated and ad-hoc emails guaranteed that the reliance on empathy did not solely fall on the shoulders of the EOs.

The email templates were simple, easy to use and held clear utility for the EOs, as they saved them significant time in responding to clients – all of which led to high rates of adoption. This approach demonstrated that providing people with tools that increase their levels of perceived self-efficacy is one way of closing the intention-action behavioural gap (Sniehotter et al., 2005) and also resulted in EOs demonstrating fewer avoidant behaviours (Rozin & Royzman, 2001), as they were now able to deal with a negative client interaction. Previously, negative client interactions were avoided, which then led to a high rate of complaints as a downstream consequence.

Our 14 behaviourally-informed emails led to core business improvements during the intervention period. Namely, queries and complaints significantly decreased compared to pre-intervention levels, and the new approach also had a positive impact on staff experience and wellbeing. No other changes occurred during the business at this time that could have resulted in the reduction in complaints and queries, meaning that we can evaluate the results with a high degree of certainty.

In terms of next steps, we are scaling our approach to all other parts of the business. Additionally, we are in the process of automating certain communications to further reduce the burden on EOs. Specifically, we have identified stages in the journey that take a long time to process and, as a result, a fair amount of time passes without system-driven feedback to clients. By automating updates that reassure clients their estate is being processed, we can further reduce the aversive nature of uncertainty in client experiences.

THE AUTHORS

Adam Gottlich leads the Standard Bank Behavioural Science Team and has been part of the Standard Bank Group since 2017. Having started the team as a single practitioner, Adam has subsequently developed it to be able to apply behavioural science across South Africa, a number of other countries in Africa as well as Standard Bank's international business sector. Adam has a Master of Science degree in Economic and Consumer Psychology from Leiden University in the Netherlands.

Akira Panday is a manager within the Standard Bank Behavioural Science Team, which she re-joined in 2022. During her time in this role, she has applied behavioural science to various strategic use cases across the business in a national capacity. These use cases encompass projects within the realms of insurance, investments, marketing, client experience, human capital and various strategic partnerships in telemedicine and an affiliated financial institution. Akira has a Bachelor of Arts degree with an Honour's major in Psychology from the University of Johannesburg.

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Journey Optimisation: The Road Not Taken

HENRY STOTT, BENNY CHEUNG, JERRY LUUKKONEN[1] AND ALICE PEARCE

Dectech

The global economy has been digitising exponentially for over 20 years, with online purchases already representing 30% of UK sales. However, there is still tremendous scope for digital customer journey optimisation. Price optimisation is often not the answer to increasing sales you might think – you can only capture about two-thirds of a price increase because people trade down, and this reduces customer satisfaction and thus sales conversion. In this report we explore various other strategies for optimising customers' online journeys. Using an immersive randomised controlled trial approach to measure these strategies, we find that many small tweaks can be far more effective in increasing average order value by up to 23%.

Executive Summary

In a digitising economy, this report explores various approaches to optimising customers' online journeys and measures, using an immersive randomised controlled trial, the scale of those benefits. The main research takeaways are:

- *Relentless digitisation*: The global economy has been digitising exponentially for over 20 years, albeit differentially across countries and product categories. In 13 years, the majority of US retail sales will be online. In the UK, online sales already account for 30% of total sales.
- *Conversion dispersion:* There is tremendous scope for journey optimisation. In our case study, real-world acquisition journey conversion rates vary from 21% to 64%.
- *Price rises backfire:* Increasing prices will not necessarily increase revenue as much as expected, because people react by switching to cheaper products. Furthermore, price increases reduce customer satisfaction and, thereby, sales conversion and shareholder value. There are better strategies.
- *Cross-sell carefully:* You can increase average order value by selling add-ons. How you bundle these add-ons into packages is important: you shouldn't clutter up the online journey with too many decisions on the same page.
- *Choices are malleable:* There are many ways to manage how often a given option is chosen. This includes altering the defaults, re-ordering lists and flagging the most popular options. Each effect can move choice in the order of ±10%.
- *Friction is expensive:* Counterintuitive layouts, extra clicks and weird journey flows greatly reduce customer satisfaction. Minimising each source of friction is equivalent to a 10% price cut. Simplified journeys are therefore extremely valuable.
- *One in five ideas are good:* This study is typical. We tested 25 scenarios, and many had no effect or actually backfired. Only five ideas had a material impact on performance. Which ideas will work in a given context is not clear until you test.

Based on these findings, we make five main recommendations. In this case study, adopting these recommendations led to a 23% increase in average order value coupled with a rise in customer satisfaction equivalent to an 11% price cut.

Two Decades of Digitisation

Do we really need to establish the importance of digital customer journey optimisation (the optimisation of every aspect of an online purchase journey with the goal of increasing sales and customer satisfaction)? Possibly not. But it's still intriguing to start by taking a step back and reviewing the progress of digitisation in commerce, which has been consistent and unrelenting. Figure 1 shows

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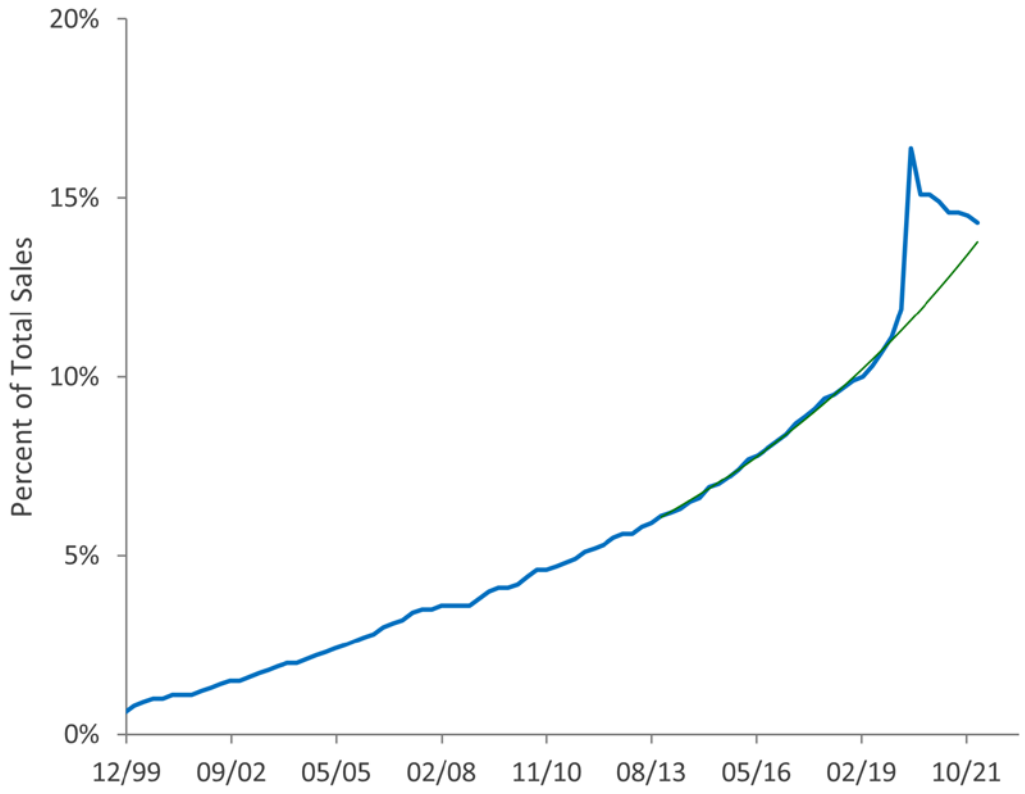

Figure 1: United States online retail sales (United States Census Bureau, 2022).

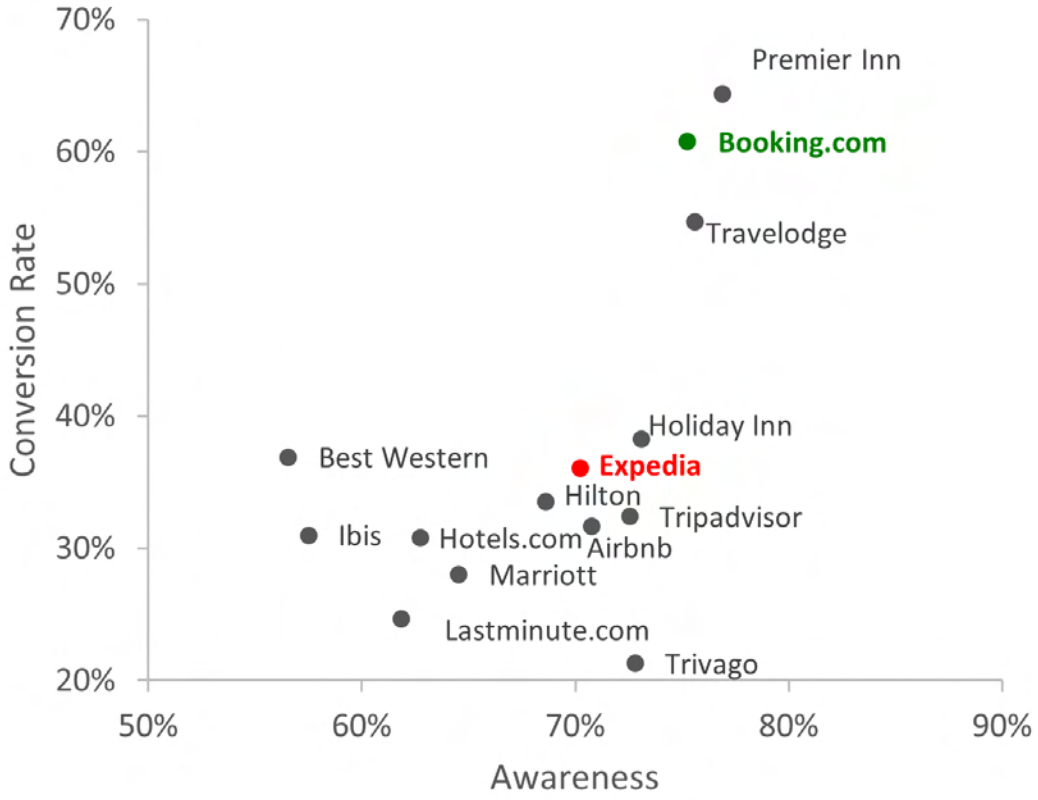

Figure 2: Hospitality sector performance.

how, from a niche activity 20 years ago, online sales currently account for 14% of American retail, having spiked during the pandemic and now returned to its pre-pandemic trajectory. Played forwards, this trend sees the majority of US sales online by 2035.

Naturally, these adoption rates vary greatly by geography and product category. Across Europe, Italy lags behind at 9% whereas the UK leads with 30% of sales already online. If you're running a UK retailer, you've got about 5 years until online dominates. Likewise, fashion has a higher percentage of online sales than grocery, albeit these are still $10.8Bn and $27.4Bn markets, respectively. It's perhaps unexpected, but Ocado, at $3.0Bn sales, only has a 10% share of the online grocery market.

Figure 2 shows a correlation between awareness (prompted) and conversion rate (defined as reported usage over the past year divided by awareness). This relationship – that well known firms tend to be better at converting awareness into sales – isn't inevitable. There are various potential reasons for this. For example, it could be reverse causation (you're more aware of hotels you've used) or a third cause correlation (you're more aware of, and more likely to use, larger hotel chains). Moreover, these findings align with the theory of double jeopardy law, an empirical law in marketing, which postulates that brands with smaller market shares are found to have fewer and less loyal buyers (Sharp, 2010).

Inevitably some companies have adapted faster than others to the market restructuring and the associated flood of new entrants. We're going to use hospitality as a case study in this report because it exemplifies that narrative. As Figure 2 shows, existing providers Travelodge and Premier Inn are doing well, being both well-known and widely used: Marriott and Best Western not so much. New entrants, Booking.com and Expedia, have rapidly increased their market share.

Figure 2 also demonstrates how seemingly similar businesses can deliver vastly different Conversion Rates. The performance rewards from overall journey optimisation can be massive. Expedia and Booking.com were both founded in 1996 and offer broadly comparable services. They have since achieved similar levels of brand awareness, and yet Booking.com's ability to convert that awareness into sales is roughly double that of Expedia.

Over the years, the financial impact on investors of this divergence has been profound. In 2022, Booking.

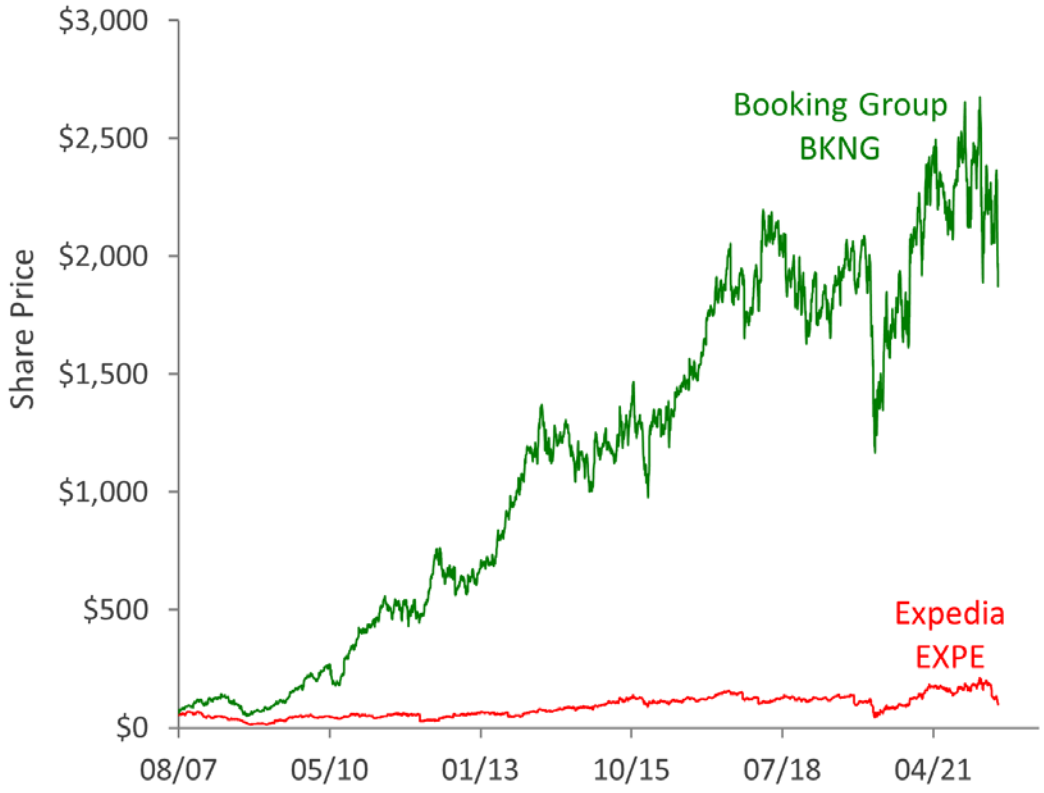

Figure 3: Shareholder return (Bloomberg, 2022a, 2022b).

com's turnover was $17.4Bn and Expedia's $11.7Bn. If Expedia matched Booking.com's conversion rate, sales would grow by $8.0Bn. Figure 3 tracks the associated impact on shareholder returns. Fifteen years ago, both stocks traded at about $50, but today, one is worth $100 and the other $2,000.

In this brief we use a behavioural experiment to explain how relatively modest changes to a provider's product offering and acquisition journey design can account for this entire outperformance. To be clear, however, our claim is not that Booking.com has specifically outperformed Expedia due to differences in journey design but rather that journey design can be highly impactful in general.

Behavioural Experiment

The behavioural experiment underpinning this report is detailed in the Appendix. In summary, we created an online acquisition task where paid participants selected a hotel room, choosing between five types, reviewed some add-ons, such as paying for late check-out, and then told us how they felt about their choices and the sales process. As a randomised controlled trial, different participants experienced different journeys and propositions to see how these affected their behaviours and reactions. As detailed below, we had four primary hypotheses relating to how the features in our experiment would influence both choices and customer satisfaction.

Prior research on hotel room demand has found that although it can be relatively inelastic in the short run, customers do nonetheless switch to other providers in reaction to higher prices, particularly in the long run (Corgel et al., 2012). In our experiment, participants were not given the option of not selecting a room or selecting from a competitor, so we expected them to trade down to cheaper rooms instead. Specifically, we had the following hypothesis:

> *H1. As the pricing level increases, people will choose cheaper hotel rooms, take fewer add-ons and have reduced customer satisfaction.*

How add-ons are displayed, whether bundled or sold separately, may also affect customer choices and customer satisfaction. Prospect theory suggests that separating benefits while combining losses will result in higher utility for an individual (Johnson et al., 1993; Tversky & Kahneman, 1992), which in turn can lead to bundles being perceived more favourably than goods sold separately (Johnson et al., 1999). Based on this we hypothesised the following:

> *H2. Bundling add-ons will result in higher revenue and higher customer satisfaction than selling them separately.*

Foregrounding a room through various means such as the primacy effect (Murphy et al., 2006), showing it as a default option (Steffen et al., 2019) or displaying it as a bestseller (Carare, 2012), may increase the likelihood it is chosen. We therefore hypothesised the following:

> *H3. Foregrounded (whether through primacy, being displayed as the default, being shown on the first screen or being shown as a bestseller) hotel rooms will be more likely to be chosen.*

Finally, utilitarian website features, such as accessibility, providing the ability to search effectively for information, and providing comprehensive product information, have been shown to help create customer loyalty in hotel bookings through promoting positive emotions (Bilgihan & Bujisic, 2015). Similarly, convenience and perceived ease of use have been found to positively affect the customer loyalty of mobile booking users (Ozturk et al., 2016). We therefore also hypothesise the following:

> *H4. Factors reducing journey friction, such as showing rooms in ascending price order, asking for personal details after the basket and auto-sending to the next page after choosing a room, will increase customer satisfaction.*

Pricing and Bundling

The first feature we varied was price. Figure 4 shows what happens when you parallel shift all five rooms. As prices increase, people trade-down to cheaper rooms and spend less on add-ons. Consequently, average order value (AOV) increases, but by less than the underlying price rise. Applying +20% to the £114 AOV base case gets you to £137. However, the trading-down means you only realise two-thirds of that gain at £129.

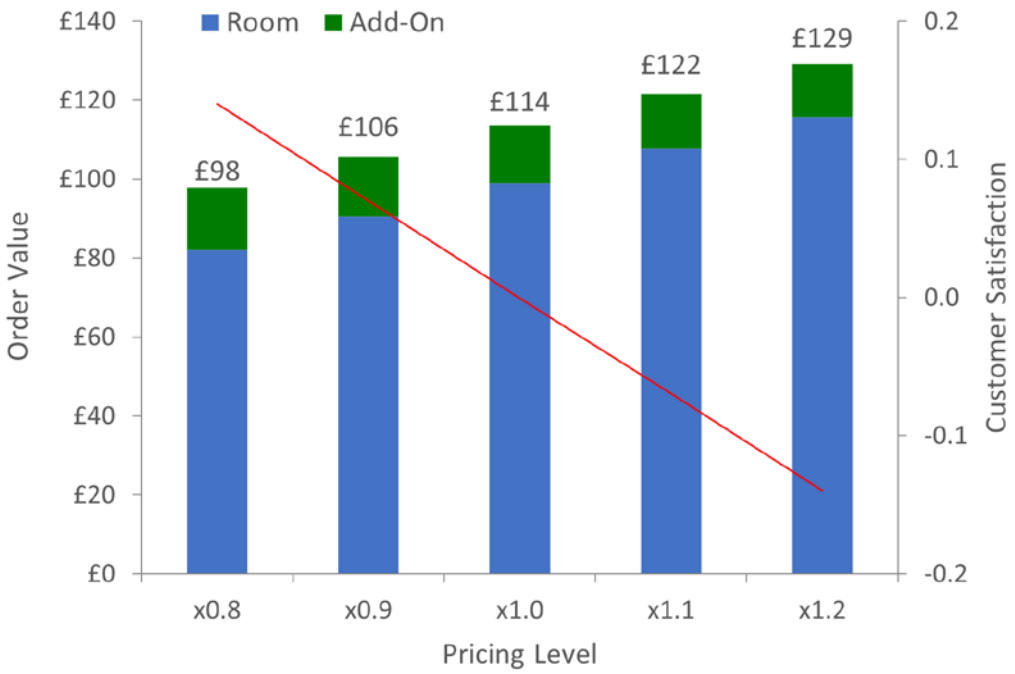

Figure 4: Price elasticity.

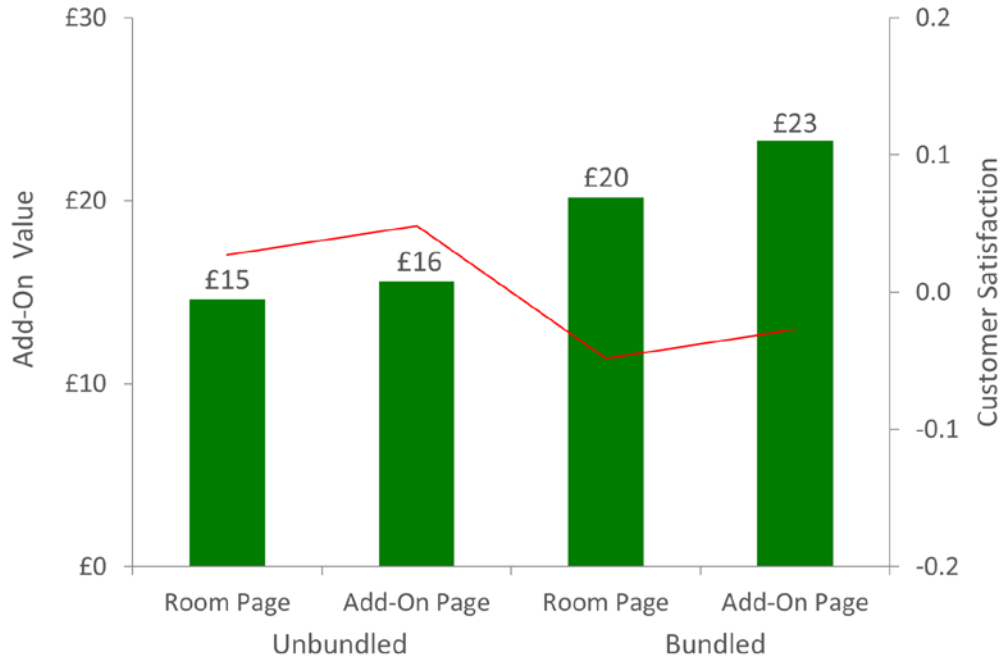

Figure 5: Cross-selling add-ons.

Nevertheless, these price changes also influence customer satisfaction (a normally distributed principal component based on several image statements) – and thereby the likelihood of converting a sale. And this is the problem with price optimisation. The most measurable variables, like AOV or sales, always go up when you raise prices. Meanwhile, there is a long and increasingly hard to measure list of collateral damage, eventually reversing the predicted benefits and rendering the strategy ill-advised. Price elasticity is a siren song.

One solution is to replace brute force price increases with more customer-friendly elective premium options offered with a minimal amount of additional journey friction. Give me more choices but keep it simple. For example, the experiment included

conditions where we tried to cross-sell people four add-ons offered individually whilst others saw them grouped into two bundles (e.g., breakfast and late check-out were combined into a "Rise and Shine" package).

The results of these cross-sales conditions are shown in Figure 5. In these bundle conditions, customers spent more money. However, like the price rise conditions, this knocked customer satisfaction by almost the same amount, in contradiction to what we expected. People don't like being coerced into spending an extra £7 and, in this case, they preferred the more granular choice. How many add-ons? Which add-ons? How do we group them? These decisions will all affect AOV and customer satisfaction and will need testing.

Finally, it's interesting to note that customer satisfaction levels and spend were always higher when add-ons had their own page and weren't cluttering up the room choice page. When cross-selling, don't spanner people with two choices at once. The value of journey fluency is something we return to later.

Foregrounding

Customers just want an easy life, but clearly some products require greater engagement than others. People are more invested in booking a hotel room than renewing car insurance, but no one wants to read complicated instructions, plough through repetitive information or wander around some "hall of mirrors" website. Basically, following the school of "I'd write you a shorter letter if I had more time" customers want to feel that they've made an informed choice with minimal cognitive effort.

This simplicity preference can be seen in people's propensity to pick the first and last items from a list. This well-documented serial position effect (e.g. Murphy et al., 2006) is evident in Figure 6, which shows the position choice frequencies in our experiment, isolating for other factors such as underlying room popularity. This effect can be used for good or evil. The first item can be the most suitable or the highest margin product. This decision is between you and the god of intangible brand value.

There are, of course, other ways to foreground or sideline a product, and Figure 7 shows some examples. First, in the baseline condition, people had to click on a room to reveal its detailed description. However, when we made the details of the first room open by default, its selection rose by 10%. Second, when we put the last two rooms on a second screen, their selection dropped by 9% on average, all without any change to the product or its pricing.

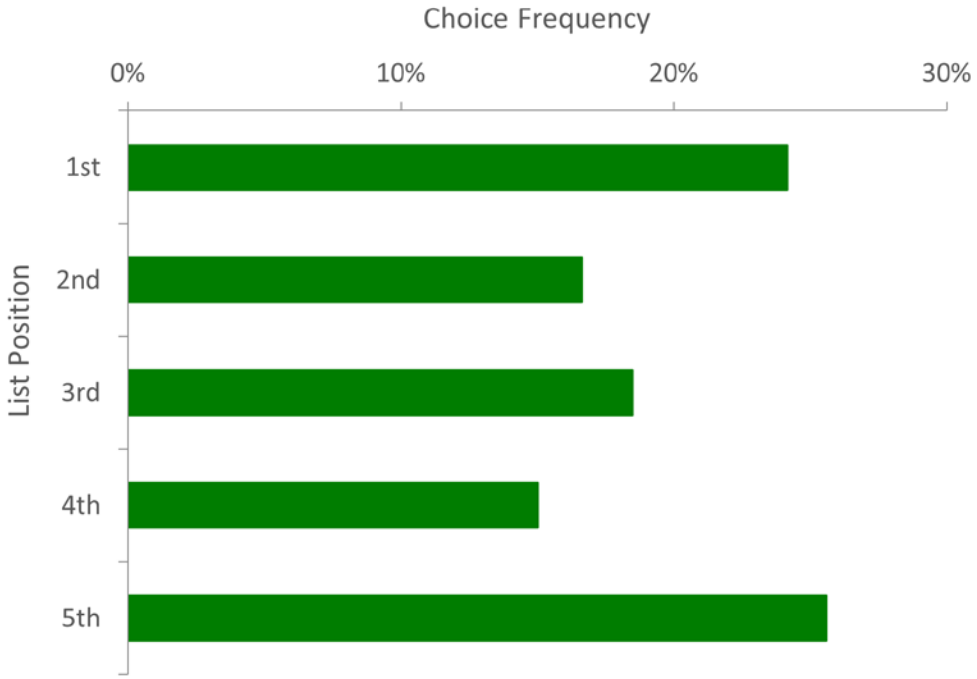

Figure 6: Primacy and recency.

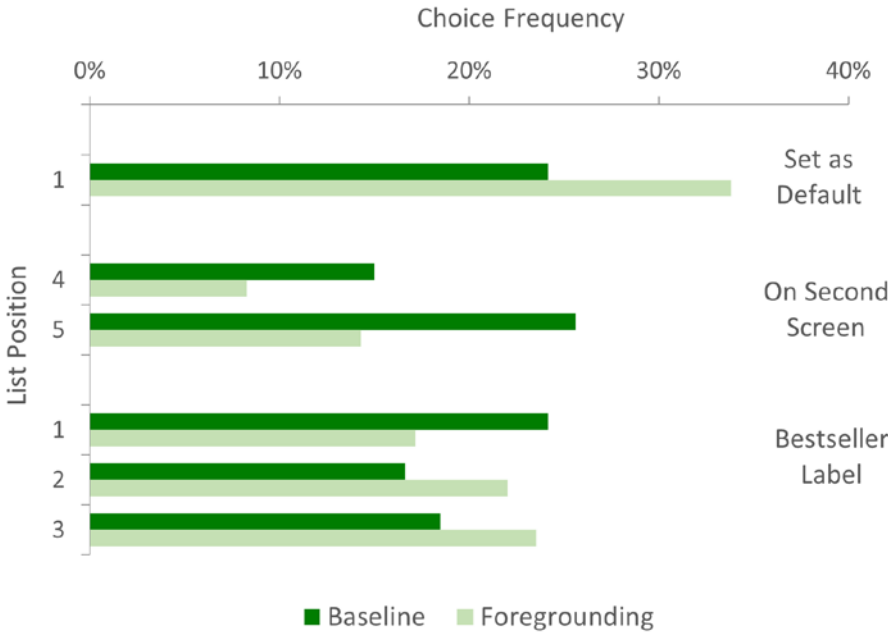

Figure 7: Foregrounding strategies.

Figure 8: Finding the frictionless journey.

Third, we put a "Bestseller" label on one of the first three rooms. This increased selection by about 5% for the second and third rooms but *decreased* selection by 7% for the first, particularly when it was the Grand Suite. If the second or third room is labelled "Bestseller," then it probably *is* the bestseller. But labelling the first room in this way seems like too much of a coincidence: there's a good chance I'm being messed around, and few things are more off-putting to a consumer than a lack of authenticity.

Table 1: Journey Optimisation

	Room	Add-Ons	Total	Customer Satisfaction
Baseline	£101	£15	£116	0.00
Three rooms visible	£110	£16	£126	-0.03
Grand suite is default	£113	£16	£129	-0.04
Auto-send advance	£115	£16	£131	0.02
Detail after basket	£115	£16	£131	0.13
Bundled with own page	£117	£25	£142	0.07

Usability and Optimisation

As noted earlier, when we tested add-ons on their own page or on the room page, it was important to minimise journey friction. So, finally, we explored the impact of making small, structural changes to the journey itself. As shown in Figure 8, whilst none of these conditions changed people's purchase behaviour, and thereby AOV, they did alter customer satisfaction and, consequently, their purchase likelihood and brand perceptions.

For example, reducing clicks by auto-sending to the next page once a room is selected, rather than having to hit "Continue", makes people happier. This customer satisfaction improvement is equivalent to cutting room prices by 8%. Likewise, not putting check-out details in a weird place, such as earlier in the journey, is equivalent to a 16% price cut. Conversely, whatever room ordering you use, including a random room list, there is no effect. We expected people to prefer ascending. We were wrong. You need to test.

Your reward for testing is to identify operative effects that raise customer satisfaction. The remarkable financial impact of optimising an acquisition journey with such small adjustments is shown in Table 1.

The baseline condition has five rooms visible, no default, with unbundled add-ons on the same page, a "Continue" button and personal details collected before the final basket check-out page. Plenty of sites follow this policy. Then you make five fairly innocuous design adjustments and AOV climbs by 23% to £142 whilst, at the same time, customer satisfaction increases by the equivalent of an 11% price cut – all without a single price optimisation algorithm in sight.

Across the 380 studies we've run on 2m participants over the past 20 years, this is a very common outcome. Clients often have 20-30 good ideas but don't know what will work best. Immersive randomised controlled trials then reveal that about 20 of them, or four out of five, have either no effect or marginally backfire. The remaining 20% are good ideas that raise performance by around 5-10%. Prior research on digital journey optimisation has also supported the need for testing multiple, systematically varied versions of a website design, as even small changes can produce substantial effects on customer satisfaction and conversion rates (e.g. Gofman et al., 2009).

To keep outperforming competitors, therefore, the only thing required is to keep picking the right five things from 25 options. No grand strategic vision is needed, just a sustained commitment to incremental improvement based on accurate evidence.

Recommendations

Using a randomised controlled trial, we immersed paid participants in a hotel room booking experiment. Exploring the impact of eight levers, we identified five adjustments that optimise the acquisition journey. The optimised journey simultaneously increases AOV by 23% and customer satisfaction by the equivalent of an 11% price cut. Based on these findings:

- *Beware price optimisation:* There is a permanent temptation to raise prices and hit shorter-term sales targets at the expense of longer-term

enterprise value. Unless there is a clear-cut result, look for other, more creative, ways to raise sales.

- *De-couple choice and complexity:* Find innovative ways to give people more choice without them having to make more choices. For example, you can bundle wisely by combining features people tend to co-purchase. Likewise, don't spanner sales by trying to sell too many things at once. You can always cross-sell later.
- *Provide authentic advice:* Save people time and effort by exploring different methods of signposting them towards the most suitable options. Methods include how you select the default option, flagging bestsellers and so on. Providing this advice in good faith will build trust and longer-term enterprise value.
- *Minimise journey friction:* In the spirit of the "Three Clicks Rule", you need to make the journey as simple and frictionless as possible. This can include editing down text, streamlining data entry, designing intuitive interfaces and sticking to standard schemas wherever possible. Think Google search pages circa 2002.
- *Don't guess, test. Accurately:* You can intuit journey design ideas by interviewing people, but you can't evaluate those ideas without larger-scale fieldwork. The more ideas you test and the more accurate your tests, the better your outcome. A/B testing a few conditions or small sample wireframing is simply not enough.

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APPENDIX: METHODOLOGY

Sampling

The primary research undertaken for this report was conducted online from 25th November 2021 to 2nd December 2021 with a nationally representative sample of 1,548 UK consumers aged 18 and over.

Behaviourlab

Behaviourlab, our bespoke online test platform, uses a randomised controlled trial to address key commercial questions more accurately and definitively. The method follows modern academic standards of eliciting consumer preferences and behaviours.

This research involved putting participants through a realistic simulation of a hotel booking website (see Figure 9 for an example). Each participant was asked to book a room from the following five options: Standard Double, Double with Garden View, King, King with Sea View and Grande Suite with Terrace. Participants were also offered the opportunity to choose from the following upgrade

Table 2: Summary of Levers Tested

Lever	Element 1	Element 2	Element 3	Element 4	Element 5
Room ordering	Ascending	Descending	Random		
Bestseller	None	Bestseller (1st)	Bestseller (2nd)	Bestseller (3rd)	
Price level	80%	90%	100%	110%	120%
Upgrade options	Bundled *(Room Page)*	Bundled *(Add-on Page)*	Unbundled *(Room Page)*	Unbundled *(Add-on Page)*	
Default plan	No Default	Default			
Page progression	Auto-send *(Plan Selection)*	Continue Button *(Scroll & Click)*			
Visible options	3 Options	All Options			
Page ordering	Personal Details Before Rooms	Personal Details After Rooms	Personal Details After Basket		

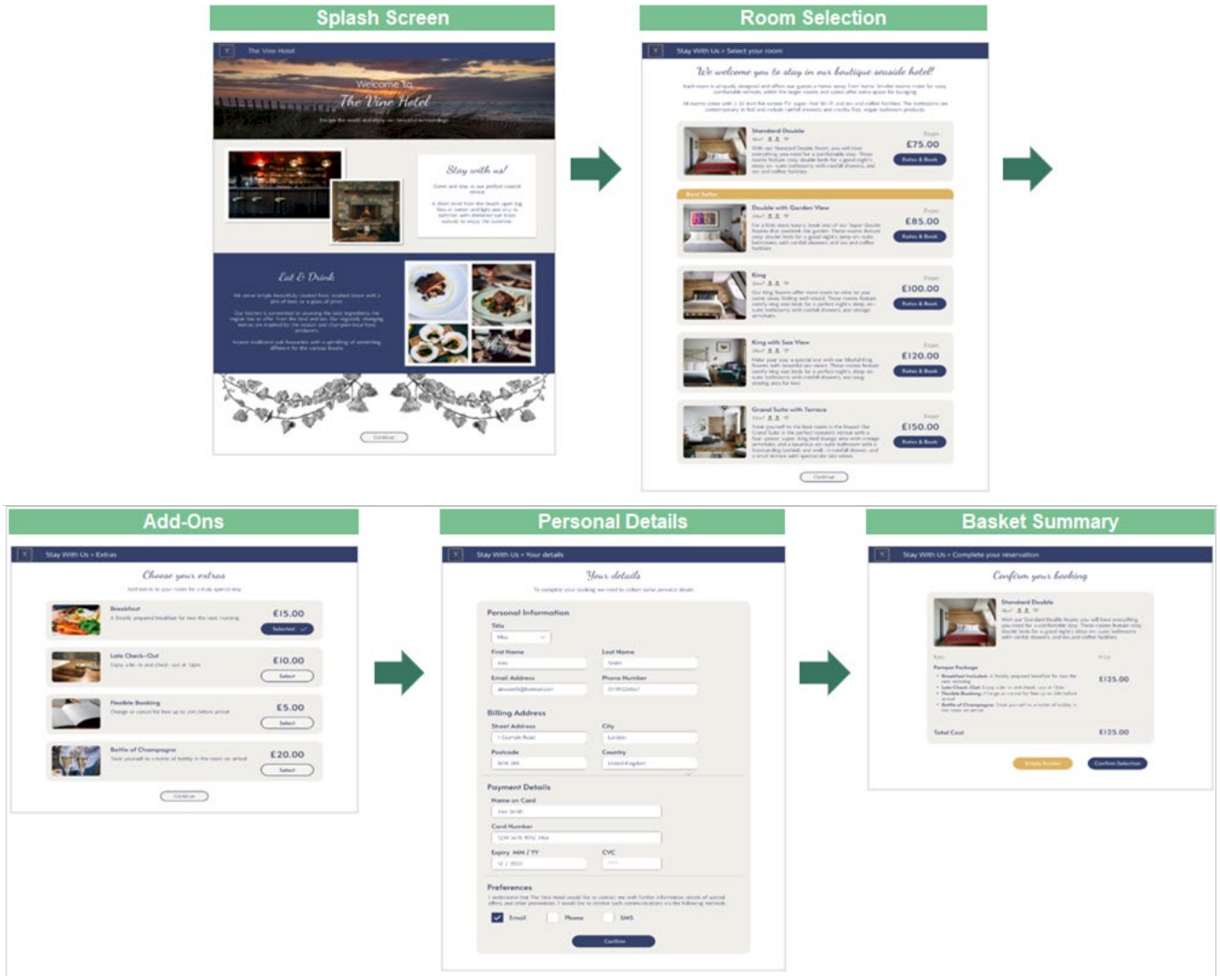

Figure 9: Example hotel booking journey.

options: breakfast, late check-out, flexible booking and a bottle of champagne. To proceed, participants had to choose a room but were not forced to choose any of the upgrades.

We explored the impact of a number of different levers that might influence a consumer's likelihood to purchase a room and extras, as well as impact perceptions of the hotel and booking website. These levers (summarised in Table 2) included pricing, upgrade bundling, whether a room was displayed as a bestseller, the ordering of the pages and so on. Each of the elements was chosen randomly for each respondent such that any of the 5,760 possible combinations could be experienced.

After completing the hotel booking journey, participants were required to indicate their likelihood to purchase the hotel package they chose and rate the hotel and booking website against a number of different perception statements. The analysis involved statistically modelling whether the different levers increased purchase likelihood of rooms and upgrade options, and whether they increased positive perceptions of the hotel and booking website.

Modelling

For the experiment data, ordinal logistic regression was used to model purchase likelihood, and multivariate multinomial logistic regression was used to model the room choices. The purpose of modelling is in part to control for the impact of other information (such as a consumer's age) and thereby isolate and estimate the impact of different benefits on the probability of purchase. Modelling also allows us to identify statistically significant effects and avoid reporting insights that are actually only noise in the data. The set of controlling variables included:

- Age.

- Gender.
- Marital status.
- Household size.
- Employment status.
- Personal income.
- Education level.
- UK region the respondent currently lives in.
- Average number of hotel stays per year (from 2019 to 2022).
- Number of hotel booking platforms used.
- Typical spend on a hotel room.
- Whether the respondent mostly books hotels online (over the phone as the comparison group).
- Whether the respondent mostly books hotels in-person (over the phone as the comparison group).

Limitations

Although we controlled for a large number of factors, there may have been some we did not include that could have influenced behaviour in the experiment. Beyond controlling for these factors, we also did not explore their effects, as our focus was on examining the effect of changes to the hotel application journey. Finally, although we provide recommendations regarding how digital customer journeys may be optimised, we have not provided a formal framework for how the factors to adjust should be chosen. This remains something for future research to delve into in more detail.

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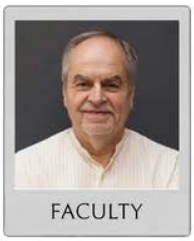

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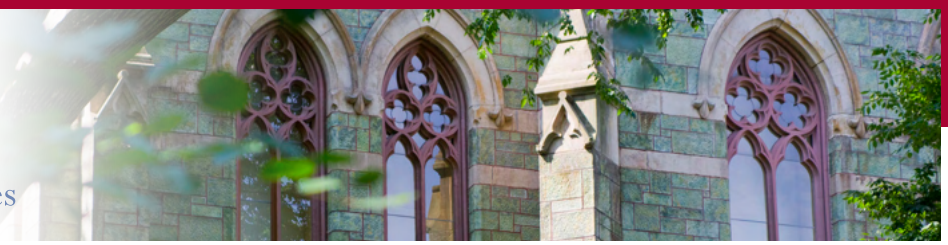

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Cristina Bicchieri

Founding Director, Master of Behavioral and Decision Sciences

S.J. Patterson Harvie Professor of Social Thought and Comparative Ethics, Departments of Philosophy and Psychology

Director, Center for Social Norms and Behavioral Dynamics

"Wherever there is a human group there are social norms."

-Cristina Bicchieri

Cristina Bicchieri is a world authority on social norms and has consulted with UNICEF, the World Bank, the Gates Foundation, the United Kingdom's Department for International Development, and many other organizations. She is the founder of the Master of Behavioral and Decision Sciences program, the Penn Social Norms Group (PENN SoNG), and the Behavioral Ethics Lab. She is also the Director of the Center for Social Norms and Behavioral Dynamics, a newly formed research center at Penn that aims to support positive behaviors on a global scale.

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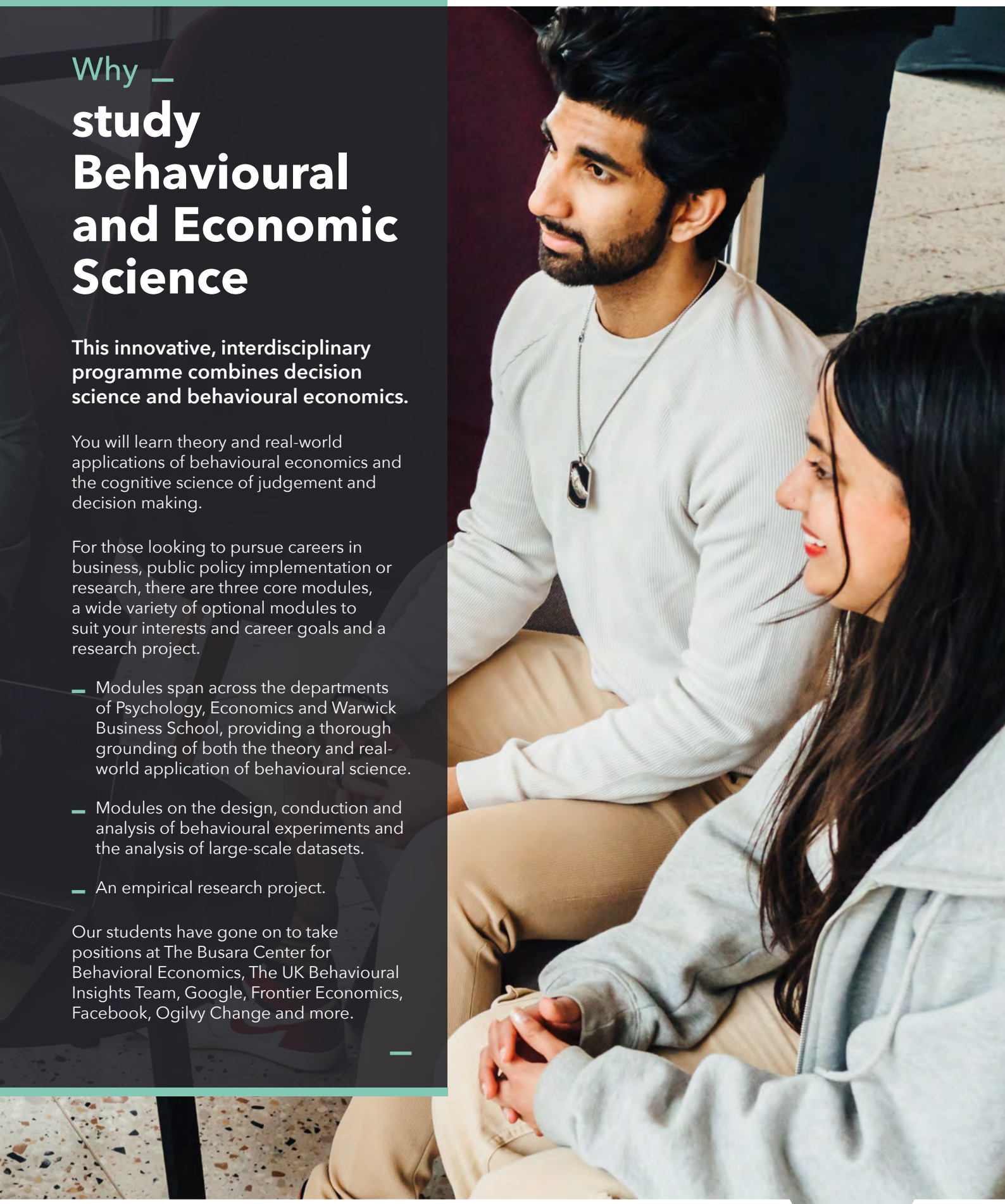

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BEHAVIOURAL SCIENCE MSc

Designed for aspiring Behavioural Scientists

The MSc in Behavioural Science is a unique new programme co-run by the Adam Smith Business School and the School of Psychology & Neuroscience. It focuses on the study of decision-making blending research and methods from multiple domains.

The programme aims to shape tomorrow's Behavioural Scientists through an interdisciplinary approach – drawing on knowledge, research, and methods from the fields of Economics, Management, Finance, Psychology and Neuroscience.

Adam Smith Business School's MSc Behavioural Science pairs theoretical knowledge with quantitative methods, empirical designs, qualitative applications, and market-driven research questions.

Find out more or apply online at:
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BEHAVIOURAL SCIENCE MSc

What makes the Adam Smith Business School MSc Behavioural Science different?

- The MSc Behavioural Science distinguishes itself by its interdisciplinary approach to understanding decision-making, combining knowledge and methods from different fields
- The programme is distinct in that you choose from one of two tracks (science and business and economics) with a joint foundation path, allowing you to tailor your learning to your specific interests and career goals
- Benefit from special laboratory facilities for studying human behaviour and conducting behavioural research
- Industry projects will allow you to apply your skills to real-world scenarios.

Our modules:

- Health neuroscience
- Psychology of climate change
- From visual awareness to free will
- Experimental design and methods for behavioural science
- Managing diversity in organisations
- Management science for business decision-making
- Perception and visual cognition
- Behavioural economics and personal finance

Programme Structure

The MSc Behavioural Science starts in September 2023 and extends over 12-months full-time. Students must complete 180 credits in total, comprising 120 credits of taught courses and 60 credits for the independent piece of work.

The programme features two tracks: a **science track** and a b**usiness and economics track**.

Students on the science track must complete at least 60 credits of courses offered by the School of Psychology & Neuroscience.

Students on the business and economics track must complete at least 60 credits of courses offered by the Adam Smith Business School.

Is the Behavioural Science MSc for you?
Find out more and apply today at:
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University of Glasgow

BEHAVIOURAL SCIENCE MSc

Potential career paths

- The science track will equip you with strong neuro-scientific skills, expertise, and horizons in Behavioural Science. The programme will improve scientific understanding of human behaviour and decision-making from different research fields. You have a good chance of gaining a PhD or a research position within the private or public sector.
- The business and economics track will prepare you for working in or conducting research in different sectors. The programme will develop relevant knowledge and competencies in the realm of decision science and how to apply innovative insights in behavioural science in real-world environments. You have a good chance of finding work in both public policy settings and private business.

Intrigued by decision-sciences?
Enrol in the new Behavioural Science MSc
at the Adam Smith Business School:
glasgow.ac.uk/postgraduate/taught/behavioural-science

WORLD CHANGERS WELCOME

Department of
Psychological and Behavioural Science

EXECUTIVE MSc BEHAVIOURAL SCIENCE

UNCOVER THE SCIENCE BEHIND BEHAVIOUR

An increasing number of organisations now engage with the idea of applying behavioural insights to their organisational challenges.

The Executive MSc Behavioural Science, based in LSE's Department of Psychological and Behavioural Science, is taught by experts at the forefront of international research in behavioural science.

Our programme provides rigorous training for professionals who are seeking to expand their knowledge in this emerging and exciting field. Many of our alumni are now prominent behavioural science leaders and experts in a range of organisations around the world.

CONTACT US

pbs.emsc@lse.ac.uk

For more information, please visit **lse.ac.uk/EMScBehaviouralScience**

LSE Department of Psychological and Behavioural Science

EXECUTIVE MSc BEHAVIOURAL SCIENCE

A UNIQUE AND DYNAMIC PROGRAMME FOR PROFESSIONALS

LSE's Executive MSc Behavioural Science is taught by specialists at the forefront of international research in behavioural science. Our programme provides the opportunity for full-time professionals working in any sector to obtain a graduate qualification in behavioural science, allowing you to pursue new and expanded opportunities within this emerging and exciting field.

The programme starts in September each year with teaching being delivered during three two-week intensive teaching blocks at the LSE campus in London. You are not required to be in attendance on campus outside of these weeks and can therefore continue to live and work outside of London and the UK. Between teaching sessions you work independently on various assignments. After the final teaching session you complete a dissertation on a topic of your choice with support from your supervisor.

The programme includes unique and innovative modules such as:

- Behavioural Science and Policy
- Behavioural Decision Science
- Research Methods for Behavioural Science
- Frontiers in Behavioural Science Methods
- Policy Appraisal and Ethics
- Behavioural Science in an Age of New Technology
- Corporate Behaviour and Decision Making
- Organisational Culture

Please note that while this information is correct at the time of publication, the School may on occasion need to change, suspend or withdraw a course.

OUR STUDENTS

Our students come from a wide range of academic and professional backgrounds from all over the world, but one thing binds them together: a passion for behavioural science and a desire to better understand how principles from behavioural science can be applied in their professional (and personal) lives.

CONTACT US

pbs.emsc@lse.ac.uk

For more information, please visit **lse.ac.uk/EMScBehaviouralScience**

Department of
Psychological and Behavioural Science

WHAT OUR ALUMNI HAVE TO SAY ABOUT THE PROGRAMME

LSE's Executive MSc Behavioural Science is second to none in providing a complete insight into contemporary behavioural science debate and methodology, delivered by world-class experts.

Ana, 2021 graduate

The EMSc was a rigorous, but perfectly balanced, compliment to my work obligations.

Joshua, 2019 graduate

The Executive MSc Behavioural Science has equipped me with tools to address some of the most pressing challenges with strong behavioural roots in the MENA region and the Global South.

Nabil, 2020 graduate

The network built during the EMSc is unmatched by any past professional or educational experience I've had, through faculty support, alumni connections, and lifelong professional and personal relationships.

Madeline, 2019 graduate

CONTACT US

pbs.emsc@lse.ac.uk

For more information, please visit **lse.ac.uk/EMScBehaviouralScience**

TheChicagoSchool®

Explore the mind of the consumer through The Chicago School's Behavioral Economics programs.

With foundations in advanced psychology, the Behavioral Economics programs at The Chicago School provide students with two pathways to building skills in understanding and influencing consumer behavior: the Certificate in Behavioral Economics, a customizable and abbreviated credential situated within the Behavioral Economics program, and the M.A. in Behavioral Economics, a traditional full master's degree with elective options.

Our M.A. in Behavioral Economics and Certificate in Behavioral Economics programs blend elements of consumer, social, and cognitive psychology to provide a psychological perspective to consumer behavior.

Those who earn their degree or certificate are prepared to deliver professional services, perform research, excel as leaders and policy advisers, and serve diverse populations in business, marketing, and politics with sensitivity and inclusion.

About The Chicago School

The Chicago School of Professional Psychology is a nonprofit, accredited institution with more than 5,700 students at campuses across the country (Chicago, Dallas, Southern California, Washington, D.C., and online). The Chicago School has been an innovator in the field of psychology and related behavioral sciences since 1979. The Chicago School offers more than 30 degree programs and several opportunities for international experiences.

Program features

Dedicated, engaged faculty who are highly experienced professionals and leaders in their respective fields.

A student-faculty partnership model that encourages collaborative work between students and instructors, enhancing professional, academic, and community engagement.

Integrated learning that balances classroom instruction and "real work" research and application.

A curriculum that values exposure to a variety of strategies for understanding and researching diverse human experience and behaviors.

M.A. in Behavioral Economics

The online M.A. Behavioral Economics non-licensure program is designed for working adults interested in psychological perspectives of human decision-making, risk assessment, and consumer behavior. This program provides students an alternative to the traditional MBA by offering a curriculum with a foundation in advanced psychology that addresses broader business applications to decision-making, negotiation, marketing, and consumer behavior.

The M.A. in Behavioral Economics utilizes a competency-based model grounded in consumer, social, cognitive and consulting psychology, as well as political science and infuses multicultural perspectives from diverse market audiences.The curriculum is interdisciplinary in approach and integrates theories of consumer decision-making, consulting, and financial literacy, including coursework in choice architecture, neuromarketing, and persuasive messaging to generate a richer understanding of human behavior.

Graduates are prepared to deliver professional services, perform research, excel as leaders and policy advisers, and to sensitively and inclusively serve diverse populations in business, marketing, and politics.

What Distinguishes This Program?

- The online Behavioral Economics M.A. program provides students with an alternative to the traditional MBA by combining social psychological theory with a practical application toward decision-making and consumer behavior within the context of a psychology degree.

- The program is distinct from those of competing institutions both in its flexible online delivery model and its curriculum, which blends elements of consumer, social, and cognitive psychology while providing a psychological perspective to behavioral economics.

- Upon successful completion of the online M.A. in Behavioral Economics program, students who meet admissions requirements will be prepared to enter The Chicago School's Business Psychology Ph.D. program, allowing them to pursue additional postgraduate and career opportunities.

Career Possibilities

Graduates can consider careers in the following fields:

- **Consulting**
- **Public service**
- **Marketing**
- **Public relations**
- **Health care**
- **Higher education**
- **Human resources**
- **Nonprofit**
- **Government**

M.A. Student Experience

The M.A. in Behavioral Economics program is designed to support interaction and learning among students and faculty by incorporating cohort membership, small groupings, a blended delivery system, active learning, and pedagogical "best practices" within the design.

Cohort model: Students in the Behavioral Economics M.A. program move through a sequence of courses collectively. The common goal of starting and completing the program together encourages students to work collectively, which promotes the development of personal relationships and the building of a professional network. Cohort membership enables students to support and learn from other students.

Small groupings: The program strategically allows for arrangement of students in small groups for online learning that is advantageous for active learning. As approximations, online courses have fewer than 20 students.

Diverse delivery system: This program utilizes both synchronous and asynchronous instructional modalities to provide students an accommodative learning environment that encourages interaction among students and faculty, supports active learning, and respects diverse talents and ways of learning. Asynchronous learning includes the use of online forums, as well as audio and video recordings. Synchronous learning includes the use of live chat sessions and virtual meetings.

Student services: Online students have access to a range of students support services including: access to Library Services, professional skill development through Career Services, opportunities to study abroad, the chance to present original research at the Graduate Research Forum, and engagement opportunities through student groups and societies.

Certificate in Behavioral Economics

Also available is our Certificate in Behavioral Economics. This program requires fewer credit hours than the M.A. yet also blends behavioral economics and business psychology to provide a unique alternative to a traditional MBA. Curriculum begins with an introduction to the fundamentals of behavioral economics. Students then choose two electives that suit their professional goals.

Total program credits: 9-10 credit hours

Length of program: 3 terms

Delivery format: online

M.A. Program Specifications

The M.A. in Behavioral Economics is a non-licensure 40 credit hour program. The program includes:

- **18 credit hours of core course work**
- **16 credit hours of research course work**
- **6 credit hours of elective course work**

The program culminates in an Applied Research Project in which students will apply behavioral economics concepts to an approved topic. Students will complete classwork over the course of their studies that will guide them through the process of writing the Applied Research Project. A faculty member will approve and supervise the project through these courses.

Postgraduate Programs

(Taught in English)

University	School/Department	Program
United States		
Brown University	School of Public Health	Master of Public Health (Health Behavior concentration)
	Department of Economics	PhD in Economics
California Institute of Technology (Caltech)	Division of the Humanities and Social Science	PhD in Social and Decision Neuroscience
Carnegie Mellon University	Department of Social and Decision Sciences	PhD in Social and Decision Sciences
	Tepper School of Business	PhD in Behavioral Economics (see also Dynamic Decision Making Laboratory) (see also Center for Behavioral and Decision Research)
Chapman University	Economic Science Institute	MS in Behavioral and Computational Economics
The Chicago School of Professional Psychology		Masters in Behavioral Economics **See pp. 160-162**
Claremont Graduate University	School of Social Science, Policy, and Evaluation	PhD in Economics (see also Center for Neuroeconomics Studies)
Columbia University	Columbia Business School	MBA, MS, and PhD in Business (see also Center for Decision Sciences)
	Department of Economics	MA and PhD in Economics (see also Cognitive and Behavioral Economics Initiative) (see also Cognition & Decision Lab)
Cornell University	Charles H. Dyson School of Applied Economics and Management	PhD in Applied Economics and Management Master of Professional Studies (MPS) in Applied Behavioral Economics and Individual Choice (see also Lab for Experimental Economics & Decision Research)
Duke University	The Fuqua School of Business	MBA and PhD in Business Administration (Marketing or Decision Sciences track)

Evidentia University		Master of Science in Behavioral Economics **See pp. 146 - 147**
Franklin University	College of Arts, Sciences & Technology	Master's in Business Psychology
Georgia State University	Andrew Young School of Policy Studies	PhD in Economics MA in Economics (see also Experimental Economics Center)
Harvard University	Department of Economics School of Public Health	PhD in Economics MS and PhD in Social and Behavioral Sciences
Johns Hopkins University	Johns Hopkins Bloomberg School of Public Health	PhD in Social and Behavioral Sciences
Massachusetts Institute of Technology	Department of Brain and Cognitive Sciences MIT Sloan School of Management	PhD in Brain and Cognitive Sciences Masters in Management, Analytics, Applied Economics (see also MIT Sloan Neuroeconomics Laboratory)
New York University	Graduate School of Arts & Science	MAs and PhDs in Economics, Politics and Psychology (see also Center for Experimental Social Science) (see also Institute for the Study of Decision Making)
Ohio State University	Department of Psychology	PhD in Psychology (Decision Psychology) (see also Decision Sciences Collaborative)
Stanford University	Department of Economics	PhD in Economics (Behavioral & Experimental specialization) (see also Institute for Economic Policy Research)
Texas A&M University	Department of Economics	PhD in Economics (see also Economic Research Laboratory)
University of Arizona	Eller College of Management	PhD in Economics (see also Institute for Behavioral Economics)
University of California, Berkeley	Haas School of Business Department of Psychology Department of Economics	PhDs in Marketing, Psychology and Economics (see also Initiative for Behavioral Economics & Finance) (see also Berkeley Decision Science Research Group)

University of California, Los Angeles	Anderson School of Management	PhD Behavioral Decision Making
University of California, San Diego	Rady School of Management	MBA and PhD in Management (see also Atkinson Behavioral Research Lab)
University of California, Santa Barbara	College of Letters & Science	PhD in Economics (see also Experimental and Behavioral Economics Laboratory)
University of Chicago	Booth School of Business	MBA PhD in Behavioral Science (see also Center for Decision Research)
University of Kansas	College of Liberal Arts and Sciences	MA in Applied Behavioral Science PhD in Behavioral Psychology (see also KU Applied Behavioral Economics Laboratory)
University of Maryland	College of Behavioral & Social Sciences	PhD in Social, Decision, and Organizational Sciences
University of Oregon	College of Arts and Science Lundquist College of Business	MA and PhD in Psychology PhD in Economics PhD in Marketing (see also Institute of Cognitive and Decision Sciences)
University of Pennsylvania	School of Arts & Sciences	Master of Behavioral and Decision Sciences (see also Behavioral Ethics Lab) (see also Social Norms Group) **See pp. 148 - 150**
University of Pittsburgh	Katz Graduate School of Business Dietrich School of Arts & Sciences	PhD in Marketing PhD in Economics
University of Southern California	Dana and David Dornsife College of Letters, Arts, and Sciences	PhD in Economics (see also Los Angeles Behavioral Economics Laboratory)
University of Wisconsin	School of Human Ecology	MS and PhD in Human Ecology: Consumer Behavior and Family Economics (see also Behavioral Research Insights Through Experiments Lab)

Washington University in St. Louis	School of Arts and Sciences	PhD in Behavior, Brain and Cognition (see also Behavioral Economics Laboratory)
Yale University	Yale School of Management	Doctoral Programs in Financial Economics, Marketing, and Organizations and Management (See also Yale-Ipsos Consumer Marketing & Behavioral Economics Think Tank)

United Kingdom

City University London	Interdisciplinary School of Arts and Social Sciences	MSc in Behavioural Economics PhDs in Economics and Psychology (see also Decision Making and Behavioural Economics Research Group)
Durham University	Department of Psychology Durham Business School	MSc in Behavioural Science MSc in Experimental Economics
Kingston University	Faculty of Arts and Social Sciences	MSc in Behavioural Decision Science
Lancaster University	Management School	PhD Behavioural and Experimental Economics
London School of Economics and Political Science	Department of Psychological and Behavioural Science	MSc in Behavioural Science Executive MSc in Behavioural Science **See pp. 157 - 159**
	Departments of Management, Social Policy, Economics and Psychological and Behavioural Science	PhDs in Management (Marketing), Social Policy, Economics and Psychological and Behavioural Science (see also LSE Behavioural Lab for Teaching and Research)
Queen Mary University of London	School of Economics and Finance	MSc in Behavioural Finance
University College London	Division of Psychology and Language Sciences Division of Psychology and Language Sciences School of Management and the Behavioural Insights Team	Executive Programme in Behavioural Science MSc in Cognitive and Decision Sciences MSc in Behaviour Change PhD in Experimental Psychology PhDs in Management with Behavioural Science and Policy
University of Bath		MSc Applied Psychology and Economic Behaviour

University of Cambridge	Judge Business School	MBA, Executive MBA and PhDs in Business Economics, Marketing, etc.
	Faculty of Economics	PhD in Economics (see also Cambridge Experimental and Behavioural Economics Group)
University of East Anglia	Department of Economics	MSc in Behavioural and Experimental Economics MSc in Behavioural Science PhD in Economics (see also Behavioural Economics Group) (see also Centre for Behavioural and Experimental Social Science)
University of Essex	Department of Economics	MSc in Behavioural Economics
University of Glasgow	Adam Smith Business School and the School of Psychology & Neuroscience	MSc in Behavioural Science **See pp. 154 - 156**
University of Leeds	Leeds University Business School	MSc in Business Analytics and Decision Sciences (see also Centre for Decision Research)
University of Nottingham	School of Economics	MSc in Behavioural Economics PhD in Economics (see also Centre for Decision Research and Experimental Economics)
University of Oxford	Department of Economics	DPhil in Economics (see also Behavioural Economics Research Group) (see also Nuffield Centre for Experimental Social Sciences)
University of Portsmouth	Faculty of Business and Law	PhD in Behavioural Economics
University of Reading	Henley Business School	MSc Behavioural Finance
	Graduate Institute of International Development, Agriculture and Economics	MSc in Consumer Behaviour
University of Stirling	Stirling Management School and Behavioural Science Centre	MSc in Behavioural Science for Management (see also Behavioural Science Centre)

University of Warwick	Interdisciplinary	MSc in Behavioural and Economic Science **See pp. 151- 153**
	Department of Psychology	PhD in Psychology (see also Behavioural Science Group)
	Department of Psychology & Department of Computer Science	MSc Behavioural and Data Science

The Netherlands

Erasmus University Rotterdam	Erasmus School of Economics	Master in Economics and Business (Behavioural Economics specialization) PhD in Applied Economics (Behavioural Economics group)
Leiden University	Institute of Psychology	Master in Psychology (Economic and Consumer Psychology specialization)
Maastricht University	School of Business and Economics	Master in Human Decision Science
Radboud University Nijmegen	Department of Social Science	Master in Behavioural Science Master in Economics (Economics, Behaviour and Policy specialization)
Tilburg University	Department of Social Psychology School of Social and Behavioral Sciences Tilburg University Graduate Schools	Master in Social Psychology (Economic Psychology track) Research Master in Social and Behavioral Sciences Research Master and PhDs in Economics, Business (Marketing track) and Social & Behavioural Sciences (see also Tilburg Institute for Behavioural Economics Research)
Tinbergen Institute		Research Masters in Economics
University of Amsterdam (Amsterdam Business School / School of Economics)	School of Economics	MSc in Economics (Behavioural Economics and Game Theory track) PhD in Economics (Behavioural Economics research priority area)
University of Groningen	Faculty of Behavioural and Social Sciences	Research Master in Behavioural and Social Sciences
Utrecht University	Graduate School of Social and Behavioural Sciences	PhD in Social and Behavioural Sciences (see also Behaviour in Social Context)
Wageningen University & Research		MSc in Statistical Science for the Life and Behavioural Sciences

Germany

Applied University at Hamm-Lippstadt		Intercultural Business Psychology Masters (Economic Psychology concentration)
Friedrich-Schiller University Jena	Jena Graduate School	PhD in Human Behaviour in Social and Economic Change
Leuphana University Lüneburg		PhD in Behavioural Economics and Social Transformation
Ludwig-Maximilians University Munich	Munich Graduate School of Economics	PhD in Economics (see also Munich Experimental Laboratory for Economic and Social Sciences)
TH Köln		MA in Behavioral Ethics, Economics and Psychology
University of Bonn	Bonn Graduate School of Economics	PhD in Economics (see also Center for Economics and Neuroscience) (see also Bonn Laboratory for Experimental Economics)
University of Kassel		MSc in Economic Behaviour and Governance
University of Konstanz	Graduate School of Decision Sciences	PhDs at the Graduate School of Decision Sciences (interdisciplinary)

Other Countries

Australia

Monash University	School of Business, Monash University Malaysia.	PhDs in Business and Economics (see also Monash Laboratory for Experimental Economics) (see also Monash Business Behavioural Laboratory)
RMIT University		Master of Business (Behavioural Economics specialization) PhD in Economics, Finance & Marketing (Behavioural Economics specialization) (see also Behavioural Business Lab)
University of Melbourne	School of Psychological Sciences	Master of Applied Psychology

University of Queensland	School of Economics	Master and PhD in Economics (see also Risk and Sustainable Management Group)
University of Technology Sydney (UTS)	UTS Business School	PhD in Economics (Behavioural or Experimental Economics research field) (See also UTS Behavioural Laboratory)

Austria

Sigmund Freud University	Faculty of Business, Economics, and Statistics	Master in Psychology (Business & Economic Psychology specialization)
University of Vienna	Faculty of Business, Economics, and Statistics	PhD in Economics MSc in Economics (see also Vienna Center for Experimental Economics)
Vienna University of Economics and Business	Institute for Cognition and Behavior	Master in Cognition and Behavior

Canada

University of British Columbia	UBC Sauder School of Business	PhD in Marketing and Behavioural Science
University of Saskatchewan	Interdisciplinary	PhD in Applied Economics (Research area in Behavioural and Experimental Economics) (See also Experimental Decision Laboratory)
University of Toronto	Rotman School of Management	MBAs and PhDs in Marketing and Business Economics (see also Behavioural Economics in Action)

Cyprus

University of Cyprus	Department of Economics and Department of Psychology	MSc in Behavioural Economics

Denmark

University of Copenhagen	Department of Economics	MSc and PhD in Economics (See also Centre for Experimental Economics)

Finland

Oulu University in Finland	Business School	Master's program in Economics

France

Burgundy School of Business		MSc in Data Science and Organizational Behavior
Paris School of Economics	School of Economics	Masters and PhDs in Economics (see also Parisian Experimental Economics Laboratory)
Toulouse School of Economics		PhD in Economics (Behavioral and Experimental Economics specialization)

Italy

Bocconi University in Milan		Bocconi Experimental Laboratory for the Social Sciences
Catholic University of the Sacred Heart, Milan	PhD School in Economics and Finance	PhD Economics and Finance
University of Chieti-Pescara	School of Advanced Studies	PhD in Business and Behavioural Sciences Master in Behavioral Economics & Neuromarketing
University of Trento	Department of Economics and Management	Master in Behavioural and Applied Economics
	Doctoral School of Sciences	PhD in Economics and Management (Behavioural Economics)

Norway

Norwegian School of Economics		PhD in Business and Management Science (see also the Choice Lab)

Portugal

Universidade Catolica Portuguesa		Master in Psychology in Business and Economics
IDC Herzliya	Raphael Recanati International School	MA Behavioral Economics

Romania

University of Bucharest	Faculty of Business and Administration & Faculty of Psychology	Master in Behavioural Economics

Russia

National Research University Higher School of Economics		Master in Applied Social Psychology

Singapore

National University of Singapore	NUS Business School	MBA and PhDs in Management, Decision Sciences and Economics (see also Centre for Behavioural Economics)

South Africa

University of Cape Town	School of Economics	Masters and PhD in Economics (see also Research Unit in Behavioural Economics and Neuroeconomics)

Spain

UDIMA University		Master in Behavioral Economics
University of Barcelona	Faculty of Psychology	Master's in Research in Behaviour and Cognition
University of Navarra	IESE Business School	PhD in Management (see also: IESE Behavioral Lab)

Sweden

Stockholm School of Economics	Department of Economics	PhD in Economics (specialization in Behavioral and Experimental Economics)
University of Gothenburg	School of Business, Economics, and Law	PhD in Economics (Behavioural Economics concentration) (see also Behavioural and Experimental Economics Group)

Switzerland

Conférence Universitaire de Suisse Occidentale		PhD in Behavioral Economics and Experimental Research
University of Basel		PhD in Society and Choice
University of Geneva	School of Economics and Management	PhD in Behavioral Economics and Experimental Research
University of Zurich (Zurich Graduate School of Economics)	Department of Economics	Master in Economics (minor in Behavioral Economics) PhD in Economics and Neuroeconomics (see also Laboratory for Experimental and Behavioral Economics)

Behavioral Science Concepts*

A

Action bias

Some core ideas in behavioral economics focus on people's propensity to do nothing, as evident in **default bias** and **status quo bias**. Inaction may be due to a number of factors, including **inertia** or anticipated **regret**. However, sometimes people have an impulse to act in order to gain a sense of control over a situation and eliminate a problem. This has been termed the action bias (Patt & Zeckhauser, 2000). For example, a person may opt for a medical treatment rather than a no-treatment alternative, even though clinical trials have not supported the treatment's effectiveness.

Action bias is particularly likely to occur if we do something for others or others expect us to act (see **social norm**), as illustrated by the tendency for soccer goal keepers to jump to left or right on penalty kicks, even though statistically they would be better off if they just stayed in the middle of the goal (Bar-Eli et al., 2007). Action bias may also be more likely among **overconfident** individuals or if a person has experienced prior negative outcomes (Zeelenberg et al., 2002), where subsequent inaction would be a failure to do something to improve the situation.

Affect heuristic

The affect heuristic represents a reliance on good or bad feelings experienced in relation to a stimulus. Affect-based evaluations are quick, automatic, and rooted in experiential thought that is activated prior to reflective judgments (see **dual-system theory**) (Slovic et al., 2002). For example, experiential judgments are evident when people are influenced by risks framed in terms of counts (e.g. "of every 100 patients similar to Mr. Jones, 10 are estimated to commit an act of violence") more than an abstract but equivalent probability frame (e.g. "Patients similar to Mr. Jones are estimated to have a 10% chance of committing an act of violence to others") (Slovic et al., 2000).

Affect-based judgments are more pronounced when people do not have the resources or time to reflect. For example, instead of considering risks and benefits independently, individuals with a negative attitude towards nuclear power may consider its benefits as low and risks as high under conditions of time pressure. This leads to a more negative risk-benefit correlation than would be evident without time pressure (Finucane et al., 2000).

The affect heuristic has been used as a possible explanation for a range of consumer judgments, including product innovations (King & Slovic, 2014), brand image (e.g. Ravaja et al., 2015), and product pricing (e.g. the **zero price effect**; see Samson & Voyer, 2012). It is considered another general purpose heuristic similar to **availability heuristic** and **representativeness heuristic** in the sense that affect serves as an orienting mechanism akin to similarity and memorability (Kahneman & Frederick, 2002).

Altruism

According to neoclassical economics, rational beings do whatever they need to in order to maximize their own wealth. However, when people make sacrifices to benefit others without expecting a personal reward, they are thought to behave altruistically (Rushton, 1984). Common applications of this pro-social behavior include volunteering, philanthropy, and helping others in emergencies (Piliavin & Charng, 1990).

Altruism is evident in a number of research findings, such as **dictator games**. In this game, one participant proposes how to split a reward between himself and another random participant. While some proposers (dictators) keep the entire reward for themselves, many will also voluntarily share some portion of the reward (Fehr & Schmidt, 1999).

While altruism focuses on sacrifices made to benefit others, similar concepts explore making sacrifices to ensure **fairness** (see **inequity aversion** and **social preferences**).

* **Acknowledgements:** The editor would like to thank Andreas Haberl, Chelsea Hulse, and Roger Miles for their contributions to this encyclopedia.

Ambiguity (uncertainty) aversion

Ambiguity aversion, or uncertainty aversion, is the tendency to favor the known over the unknown, including known risks over unknown risks. For example, when choosing between two bets, we are more likely to choose the bet for which we know the odds, even if the odds are poor, than the one for which we don't know the odds.

This aversion has gained attention through the Ellsberg Paradox (Ellsberg, 1961). Suppose there are two bags each with a mixture of 100 red and black balls. A decision-maker is asked to draw a ball from one of two bags with the chance to win $100 if red is drawn. In one bag, the decision-maker knows that exactly half of the pieces are red and half are black. The color mixture of pieces in the second bag is unknown. Due to ambiguity aversion, decision-makers would favor drawing from the bag with the known mixture than the one with the unknown mixture (Ellsberg, 1961). This occurs despite the fact that people would, on average, bet on red or black equally if they were presented with just one bag containing either the known 50-50 mixture or a bag with the unknown mixture.

Ambiguity aversion has also been documented in real-life situations. For example, it leads people to avoid participating in the stock market, which has unknown risks (Easley & O'Hara, 2009), and to avoid certain medical treatments when the risks are less known (Berger, et al., 2013).

Anchoring (heuristic)

Anchoring is a particular form of **priming** effect whereby initial exposure to a number serves as a reference point and influences subsequent judgments. The process usually occurs without our awareness (Tversky & Kahneman, 1974) and has been researched in many contexts, including probability estimates, legal judgments, forecasting and purchasing decisions (Furnham & Boo, 2011).

One experiment asked participants to write down the last three digits of their phone number multiplied by one thousand (e.g. 678 = 678,000). Results showed that people's subsequent estimate of house prices were significantly influenced by the arbitrary anchor, even though they were given a 10 minute presentation on facts and figures from the housing market at the beginning of the study. In practice, anchoring effects are often less arbitrary, as evident the price of the first house shown to us by a real estate agent may serve as an anchor and influence perceptions of houses subsequently presented to us (as relatively cheap or expensive). Anchoring effects have also been shown in the consumer packaged goods category, whereby not only explicit slogans to buy more (e.g. "Buy 18 Snickers bars for your freezer"), but also purchase quantity limits (e.g. "limit of 12 per person") or 'expansion anchors' (e.g. "101 uses!") can increase purchase quantities (Wansink et al., 1998).

Asymmetrically dominated choice

See **Decoy effect**

Availability heuristic

Availability is a heuristic whereby people make judgments about the likelihood of an event based on how easily an example, instance, or case comes to mind. For example, investors may judge the quality of an investment based on information that was recently in the news, ignoring other relevant facts (Tversky & Kahneman, 1974). In the domain of health, it has been shown that drug advertising recall affects the perceived prevalence of illnesses (An, 2008), while physicians' recent experience of a condition increases the likelihood of subsequently diagnosing the condition (Poses & Anthony, 1991). In consumer research, availability can play a role in various estimates, such as store prices (Ofir et al., 2008) or product failure (Folkes, 1988). The availability of information in memory also underlies the **representativeness heuristic**.

B

Behavioral economics

The field of behavioral economics studies and describes economic decision-making. According to its theories, actual human behavior is less rational, stable, and selfish than traditional normative theory suggests (see also *homo economicus*), due to **bounded rationality**, limited **self-control**, and **social preferences**.

Bias

See **Cognitive bias**

Bounded rationality

Bounded rationality is a concept proposed by Herbert Simon that challenges the notion of human rationality as implied by the concept of *homo economicus*. Rationality is bounded because there are limits to our thinking capacity, available information, and time (Simon, 1982). Bounded rationality is a core assumption of the "natural assessments" view of **heuristics** and **dual-system models** of thinking (Gilovich et al., 2002), and it is one of the psychological foundations of behavioral economics. (See also **satisficing** and **fast and frugal**.)

(Economic) Bubble

Economic (or asset) bubbles form when prices are driven much higher than their intrinsic value (see also **efficient market hypothesis**). Well-known examples of bubbles include the US Dot-com stock market bubble of the late 1990s and housing bubble of the mid-2000s. According to Robert Shiller (2015), who warned of both of these events, speculative bubbles are fueled by contagious investor enthusiasm (see also **herd behavior**) and stories that justify price increases. Doubts about the real value of investment are overpowered by strong emotions, such as envy and excitement.

Other biases that promote bubbles include **overconfidence**, **anchoring**, and **representativeness**, which lead investors to interpret increasing prices as a trend that will continue, causing them to chase the market (Fisher, 2014). Economic bubbles are usually followed a sudden and sharp decrease in prices, also known as a crash.

C

Certainty/possibility effects

Changes in the probability of gains or losses do not affect people's subjective evaluations in linear terms (see also **prospect theory** and **"Zero price effect"**) (Tversky & Kahneman, 1981). For example, a move from a 50% to a 60% chance of winning a prize has a smaller emotional impact than a move from a 95% chance to a 100% chance (certainty). Conversely, the move from a 0% chance to a 5% possibility of winning a prize is more attractive than a change from 5% to 10%. People over-weight small probabilities, which explains the attractiveness of gambling. Research suggests that problem gamblers' probability perception of losing is not distorted and that their **loss aversion** is not significantly different from other people. However, they are much more risk-taking and strongly overweight small to medium probabilities of winning (Ring et al., 2018).

Choice architecture

This term coined by Thaler and Sunstein (2008) refers to the practice of influencing choice by "organizing the context in which people make decisions" (Thaler et al., 2013, p. 428; see also **nudge**). A frequently mentioned example is how food is displayed in cafeterias, where offering healthy food at the beginning of the line or at eye level can contribute to healthier choices. Choice architecture includes many other behavioral tools that affect de-

cisions, such as **defaults**, **framing**, or **decoy** options.

Choice overload

Also referred to as 'overchoice', the phenomenon of choice overload occurs as a result of too many choices being available to consumers. Overchoice has been associated with unhappiness (Schwartz, 2004), **decision fatigue**, going with the **default** option, as well as choice deferral—avoiding making a decision altogether, such as not buying a product (Iyengar & Lepper, 2000). Many different factors may contribute to perceived choice overload, including the number of options and attributes, time constraints, decision accountability, alignability and complementarity of options, consumers' preference uncertainty, among other factors (Chernev et al., 2015).

Choice overload can be counteracted by simplifying choice attributes or the number of available options (Johnson et al., 2012). However, some studies on consumer products suggest that, paradoxically, greater choice should be offered in product domains in which people tend to feel ignorant (e.g. wine), whereas less choice should be provided in domains in which people tend to feel knowledgeable (e.g. soft drinks) (Hadar & Sood, 2014).

Chunking

When the same information is presented in a different form that is easier to process, our ability to receive and remember it is greater. People often reorganize, regroup or compress information to aid in its understanding or recall. The resulting subgroups are 'chunks', which can be defined as a set of information or items that are treated collectively as a single unit (Mathy & Feldman, 2012). Chunking may be done through strategic reorganization based on familiarity, prior knowledge, proximity or other means to structure the information at hand. For example, a phone number may be split up into three subgroups of area code, prefix and number or one might recognize a meaningful date in it, and so can organize it more easily into different chunks.

In relation to the ideal amount of chunks, Miller (1956) found that humans best recall seven plus or minus two units when processing information. More recently, various studies have shown that chunking is, in fact, most effective when four to six chunks are created (Mathy & Feldman, 2012). Although this seems to be a 'magic number', it is also possible to learn to increase the size of those chunks over time (Sullivan, 2009).

In behavioral science, chunking has also been used to refer to breaking up processes or tasks into more manageable pieces (see for example Eşanu, 2019, on chunking in UX design or Wijland & Hansen, 2016, on mobile nudging in the banking sector).

Cognitive bias

A cognitive bias (e.g. Ariely, 2008) is a systematic (non-random) error in thinking, in the sense that a judgment deviates from what would be considered desirable from the perspective of accepted norms or correct in terms of formal logic. The application of **heuristics** is often associated with cognitive biases. Some biases, such as those arising from **availability** or **representativeness**, are 'cold' in the sense that they do not reflect a person's motivation and are instead the result of errors in information processing. Other cognitive biases, especially those that have a self-serving function (e.g. **overconfidence**), are more motivated. Finally, there are also biases that can be motivated or unmotivated, such as **confirmation bias** (Nickerson, 1998).

As the study of heuristics and biases is a core element of behavioral economics, the psychologist Gerd Gigerenzer has cautioned against the trap of a "bias bias" – the tendency to see biases even when there are none (Gigerenzer, 2018).

Cognitive dissonance

Cognitive dissonance, an important concept in social psychology (Festinger, 1957), refers to the uncomfortable tension that can exist between two simultaneous and conflicting ideas or feelings—often as a person realizes that s/he has engaged in a behavior inconsistent with the type of person s/he would like to be, or be seen publicly to be. According to the theory, people are motivated to reduce this tension by changing their attitudes, beliefs, or actions. For example, smokers may rationalize their behavior by holding 'self-exempting beliefs', such as "The medical evidence that smoking causes cancer is not convincing" or "Many people who smoke all their lives live to a ripe old age, so smoking is not all that bad for you" (Chapman et al., 1993).

Arousing dissonance can be used to achieve behavioral change; one study (Dickerson et al., 1992), for instance, made people mindful of their wasteful water consumption and then made them urge others (publicly **commit**) to take shorter showers. Subjects in this 'hypocrisy condition' subsequently took significantly shorter showers than those who were only reminded that they had wasted water or merely made the public commitment.

Commitment

Commitments (see also **precommitment**) are often used as a tool to counteract people's lack of willpower and to achieve behavior change, such as in the areas of dieting or saving. The greater the cost of breaking a commitment, the more effective it is (Dolan et al., 2010). From the perspective of social psychology, individuals are motivated to maintain a consistent and positive self-image (Cialdini, 2008), and they are likely to keep commitments to avoid reputational damage (if done publicly) and/or **cognitive dissonance** (Festinger, 1957). A field experiment in a hotel, for example, found 25% greater towel reuse among guests who made a commitment to reuse towels at check-in and wore a "Friend of the Earth" lapel pin to signal their commitment during their stay (Baca-Motes et al., 2012). The behavior change technique of 'goal setting' is related to making commitments (Strecher et al., 1995), while **reciprocity** involves an implicit commitment.

Confirmation bias

Confirmation bias (Wason, 1960) occurs when people seek out or evaluate information in a way that fits with their existing thinking and preconceptions. The domain of science, where theories should advance based on both falsifying and supporting evidence, has not been immune to bias, which is often associated with people processing hypotheses in ways that end up confirming them (Oswald & Grosjean, 2004). Similarly, a consumer who likes a particular brand and researches a new purchase may be motivated to seek out customer reviews on the internet that favor that brand. Confirmation bias has also been related to unmotivated processes, including primacy effects and **anchoring**, evident in a reliance on information that is encountered early in a process (Nickerson, 1998).

Control premium

In behavioral economics, the control premium refers to people's willingness to forego potential rewards in order to control (avoid delegation) of their own payoffs. In an experiment, participants were asked to choose whether to bet on another person or themselves answering a quiz question correctly. Although individuals' maximizing their rewards would bet on themselves in 56% of the decisions (based on their beliefs), they actually bet on themselves 65% of the time, suggesting an aggregate control premium of almost 10%. The average study participant was willing to sacrifice between 8 and 15% of expected earnings to retain control (Owens et al., 2014). (See also **overconfidence**.)

Curse of knowledge

Economists commonly assume that having more information allows us to make better decisions. However, the information asymmetry that exists when one economic agent has more information than another can also have negative effects for the better-informed agent. This is known as the curse of knowledge (Camerer et al., 1989), which occurs because better-informed agents are unable to ignore their own knowledge.

The curse of knowledge can manifest itself in many domains of economic life, such as setting prices or estimating productivity. With respect to the latter, one study found that experts consistently underestimate the amount of time required by novices to perform a task (Hinds, 1999).

A fun way to show the curse of knowledge in action is through a musical game in which participants are either the "tapper" or a "listener." In the game, the tapper selects a simple, well-known song, such a "Happy Birthday," and taps out the rhythm on a table. The listeners then try to guess the song. In an early experiment, tappers expected the listeners to correctly guess the song 50% of the time, yet, in reality, listeners were only correct 2.5% of the time (Newton, 1990).

D

Decision fatigue

There are psychological costs to making decisions. Since choosing can be difficult and requires effort, just like any other activity, long sessions of decision making can lead to poor choices. Similar to other activities that consume resources required for executive functions, decision fatigue is reflected in self-regulation, such as a diminished ability to exercise self-control (Vohs et al., 2008). (See also **choice overload** and **ego depletion**.)

Decision staging

When people make complex or long decisions, such as buying a car, they tend to explore their options successively. This involves deciding what information to focus on, as well as choices between attributes and alternatives. For example, when people narrow down their options, they often tend to screen alternatives on the basis of a subset of attributes, and then they compare alternatives. **Choice architects** may not only break down complex decisions into multiple stages, to make the process easier, but they can also work with an understanding of sequential decision making by facilitating certain comparisons at different stages of the choice process (Johnson et al., 2012).

Decoy effect

Choices often occur relative to what is on offer rather than based on absolute **preferences**. The decoy effect is technically known as an 'asymmetrically dominated choice' and occurs when people's preference for one option over another changes as a result of adding a third (similar but less attractive) option. For example, people are more likely to choose an elegant pen over $6 in cash if there is a third option in the form of a less elegant pen (Bateman et al., 2008). While this effect has been extensively studied in relation to consumer products, it has also been found in employee selection (e.g. Slaughter et al., 2006), apartment choices (Simonson, 1989), or as a nudge to increase cancer screening (Stoffel et al., 2019).

Default (option)

Default options are pre-set courses of action that take effect if nothing is specified by the decision maker (Thaler & Sunstein, 2008), and setting defaults is an effective **nudge** when there is **inertia** or uncertainty in decision making (Samson, 2014). Since defaults do not require any effort by the decision maker, defaults can be a simple but powerful tool when there is inaction (Samson & Ramani, 2018). When choices are difficult, defaults may also be perceived as a recommended course of action (McKenzie et al., 2006). Requiring people to opt out if they do not wish to donate their organs, for example, has been associated with higher donation rates (Johnson & Goldstein, 2003). Similarly, making contributions to retirement savings accounts has become automatic in some countries, such as the United Kingdom and the United States.

Delusion of competence (Dunning-Kruger effect)

This is the case whereby, either socially or pathologically, a person lacks reflexive acknowledgement that they are not equipped to make a decision or to act appropriately in relation to the demands of a situation. Kruger and Dunning (1999) observed a divergence between perceived and actual competence which explains a range of unsound decision-making. The effect explains why, among other real-world difficulties, management boards decide to promote products whose working they don't understand, and why talent show contestants are unaware of their inability to sing, until ejected by the judges. (The prevalence of this bias has made the producers of certain talent shows very wealthy.)

Dictator game

The dictator game is an experimental game (see **behavioral game theory**) designed to elicit **altruistic** aspects of behavior. In the **ultimatum game**, a proposing player is endowed with a sum of money and asked to split it with another (responding) player. The responder may either accept the proposer's offer or reject it, in which case neither of the players

will receive anything. Since expressed preferences in the ultimatum game may be due to factors other than altruism (e.g. fear of envy), the dictator game is played without the responder being able to decide whether to accept the offer or not (Camerer, 2003). As a result, it only involves one actual player and is not strictly a game. Whether or not these games really better measure altruism, or something else, forms part of an interesting debate (e.g. Bardsley, 2008) (See also **trust game**.)

Discounting

See **Time discounting**

Disposition effect

The disposition effect refers to investors' reluctance to sell assets that have lost value and greater likelihood of selling assets that have made gains (Shefrin & Statman, 1985). This phenomenon can be explained by **prospect theory** (**loss aversion**), **regret avoidance** and **mental accounting**.

Diversification bias

People seek more variety when they choose multiple items for future consumption simultaneously than when they make choices sequentially, i.e. on an 'in the moment' basis. Diversification is non-optimal when people overestimate their need for diversity (Read & Loewenstein, 1995). In other words, sequential choices lead to greater experienced **utility**. For example, before going on vacation I may upload classical, rock and pop music to my MP3 player, but on the actual trip I may mostly end up listening to my favorite rock music. When people make simultaneous choices among things that can be classified as virtues (e.g. high-brow movies or healthy deserts) or vices (e.g. low-brow movies or hedonic deserts), their diversification strategy usually involves a greater selection of virtues (Read et al., 1999). (See also **projection bias**.)

Dual-self model

In economics, dual-self models deal with the inconsistency between the patient long-run self and myopic short-run self. With respect to savings behavior, Thaler and Shefrin (1981) introduced the concepts of the farsighted planner and myopic doer. At any point in time, there is a conflict between those selves with two sets of **preferences**. The approach helps economic theorists overcome the paradox created by self-control in standard views of **utility**. The more recent dual-self model of impulse control (Fudenberg & Levine, 2006) explains findings from the areas of time discounting, risk aversion, and self-control (see also **intertemporal choice**). More practically-oriented research on savings behavior has attempted to make people feel more connected to their future selves, making them appreciate that they are the future recipients of current savings. In an experiment, participants who were exposed to their future (as opposed to present) self in the form of an age-progressed avatar in virtual reality environments allocated twice as much money to a retirement account (Hershfield et al., 2011).

Dual-system theory

Dual-system models of the human mind contrast automatic, fast, and non-conscious (System 1) with controlled, slow, and conscious (System 2) thinking (see Strack & Deutsch, 2015, for an extensive review). Many **heuristics** and **cognitive biases** studied by behavioral economists are the result of intuitions, impressions, or automatic thoughts generated by System 1 (Kahneman, 2011). Factors that make System 1's processes more dominant in decision making include cognitive busyness, distraction, time pressure, and positive mood, while System 2's processes tend to be enhanced when the decision involves an important object, has heightened personal relevance, and when the decision maker is held accountable by others (Samson & Voyer, 2012; Samson & Voyer, 2014).

E

Efficient market hypothesis

According to the efficient market hypothesis, the price (market value) of a security reflects its true worth (intrinsic value). In a market with perfectly rational agents, "prices are right". Findings in behavioral finance, by contrast, suggests that asset prices also reflect the trading behavior of individuals who are not fully rational (Barberis & Thaler, 2003), leading to anomalies such as asset **bubbles**.

Ego depletion

Ego depletion is a concept emanating from self-regulation (or self-control) theory in psychology. According to the theory, willpower operates like a muscle that can be exercised or exerted. Studies have found that tasks requiring self-control can weaken this muscle, leading to ego depletion and a subsequently diminished ability to exercise self-control. In the lab, ego depletion has been induced in many different ways, such as having to suppress emotions or thoughts, or having to make a range of difficult decisions. The resulting ego depletion leads people to make less restrained decisions; consumers, for example, may be more likely to choose candy over 'healthy' granola bars (Baumeister et al., 2008). Some studies now suggest that the evidence for this resource depletion model of self-control has been overestimated (e.g. Hagger & Chatzisarantis, 2016).

Elimination-by-aspects

Decision makers have a variety of **heuristics** at their disposal when they make choices. One of these effort-reducing heuristics is referred to as 'elimination-by-aspects'. When it is applied, decision makers gradually reduce the number of alternatives in a choice set, starting with the aspect that they see as most significant. One cue is evaluated at a time until fewer and fewer alternatives remain in the set of available options (Tversky, 1972). For example, a traveler may first compare a selection of hotels at a target destination on the basis of classification, eliminating all hotels with fewer than three stars. The person may then reduce the choice set further by walking distance from the beach, followed by guest reviews, etc., until only one option remains.

(Hot-cold) Empathy gap

It is difficult for humans to predict how they will behave in the future. A hot-cold empathy gap occurs when people underestimate the influence of visceral states (e.g. being angry, in pain, or hungry) on their behavior or preferences (Loewenstein, 2005). In medical decision making, for example, a hot-to-cold empathy gap may lead to undesirable treatment choices when cancer patients are asked to choose between treatment options right after being told about their diagnosis.

In a study on the reverse, a cold-to-hot empathy gap, smokers were assigned to different experimental conditions (Sayette et al., 2008). Some smokers in a hot (craving) state were asked to make predictions about a high-craving state in a second session. Others made the same prediction while they were in a cold state. In contrast to those in the hot group, smokers in the cold group underpredicted how much they would value smoking during the second session. This empathy gap can explain poor decisions among smokers attempting to quit that place them in high-risk situations (e.g. socializing over a drink) and why people underestimate their risk of becoming addicted in the first place.

Endowment effect

This bias occurs when we overvalue a good that we own, regardless of its objective market value (Kahneman et al., 1991). It is evident when people become relatively reluctant to part with a good they own for its cash equivalent, or if the amount that people are **willing to pay** for the good is lower than what they are **willing to accept** when selling the good. Put more simply, people place a greater value on things once they have established ownership. This is especially true for goods that wouldn't normally be bought or sold on the market, usually items with symbolic, experiential, or emotional significance. Endowment effect research has been conducted with goods ranging from coffee mugs (Kahneman et al., 1990)

to sports cards (List, 2011). While researchers have proposed different reasons for the effect, it may be best explained by psychological factors related to loss aversion (Ericson & Fuster, 2014).

Extrapolation bias

See Representativeness heuristic

F

Fairness

In behavioral science, fairness refers to our social preference for equitable outcomes. This can present itself as inequity aversion, people's tendency to dislike unequal payoffs in their own or someone else's favor. This tendency has been documented through experimental games, such as the ultimatum, dictator, and trust games (Fehr & Schmidt, 1999).

A large part of fairness research in economics has focused on prices and wages. With respect to prices, for example, consumers are generally less accepting of price increases as result of a short term growth in demand than rise in costs (Kahneman et al., 1986). With respect to wages, employers often agree to pay more than the minimum the employees would accept in the hope that this fairness will be reciprocated (e.g. Jolls, 2002). On the flip side, perceived unfairness, such as excessive CEO compensation, has been behaviorally associated with reduced work morale among employees (Cornelissen et al., 2011).

Fast and frugal

Fast and frugal decision-making refers to the application of ecologically rational heuristics, such as the Recognition heuristic, which are rooted in the psychological capacities that we have evolved as human animals (e.g. memory and perceptual systems). They are 'fast and frugal' because they are effective under conditions of bounded rationality—when knowledge, time, and computational power are limited (Goldstein & Gigerenzer, 2002).

Fear of missing out

Social media has enabled us to connect and interact with others, but the number of options offered to us through these channels is far greater than what we can realistically take up, due to limited time and practical constraints. The popular concept of FoMO, or Fear of Missing Out, refers to "a pervasive apprehension that others might be having rewarding experiences from which one is absent" (Przybylski et al., 2013). People suffering from FoMO have a strong desire to stay continually informed about what others are doing (see also scarcity heuristic, regret aversion, and loss aversion).

Framing effect

Choices can be presented in a way that highlights the positive or negative aspects of the same decision, leading to changes in their relative attractiveness. This technique was part of Tversky and Kahneman's development of prospect theory, which framed gambles in terms of losses or gains (Kahneman & Tversky, 1979a). Different types of framing approaches have been identified, including risky choice framing (e.g. the risk of losing 10 out of 100 lives vs. the opportunity to save 90 out of 100 lives), attribute framing (e.g. beef that is described as 95% lean vs. 5% fat), and goal framing (e.g. motivating people by offering a $5 reward vs. imposing a $5 penalty) (Levin et al., 1998).

The concept of framing also has a long history in political communication, where it refers to the informational emphasis a communicator chooses to place in a particular message. In this domain, research has considered how framing affects public opinions of political candidates, policies, or broader issues (Busby et al., 2018).

G

Gambler's fallacy

The term 'gambler's fallacy' refers to the mistaken belief held by some people that independent events are interrelated; for example, a roulette or lottery player may choose not to bet on a number that came up in the previous round. Even though people are usually aware that successive draws of numbers are unrelated, their gut feeling may tell them otherwise (Rogers, 1998).

(Behavioral) Game theory

Game theory is a mathematical approach to modeling behavior by analyzing the strategic decisions made by interacting players (Nash, 1950). In standard experimental economics, the theory assumes *homo economicus* – a self-interested, rational maximizer. Behavioral game theory extends standard (analytical) game theory by taking into account how players feel about the payoffs other players receive, limits in strategic thinking, the influence of context, as well as the effects of learning (Camerer, 2003). Games are usually about cooperation or **fairness**. Well-known examples include the **ultimatum game**, **dictator game** and **trust game**.

H

Habit

Habit is an automatic and rigid pattern of behavior in specific situations, which is usually acquired through repetition and develops through associative learning (see also System 1 in **dual-system theory**), when actions become paired repeatedly with a context or an event (Dolan et al., 2010). 'Habit loops' involve a cue that triggers an action, the actual behavior, and a reward. For example, habitual drinkers may come home after work (the cue), drink a beer (the behavior), and feel relaxed (the reward) (Duhigg, 2012). Behaviors may initially serve to attain a particular goal, but once the action is automatic and habitual, the goal loses its importance. For example, popcorn may habitually be eaten in the cinema despite the fact that it is stale (Wood & Neal, 2009). Habits can also be associated with **status quo bias**.

Halo effect

This concept has been developed in social psychology and refers to the finding that a global evaluation of a person sometimes influences people's perception of that person's other unrelated attributes. For example, a friendly person may be considered to have a nice physical appearance, whereas a cold person may be evaluated as less appealing (Nisbett & Wilson, 1977). Halo effects have also been applied in other domains of psychology. For example, a study on the 'health halo' found that consumers tend to choose drinks, side dishes and desserts with higher calorific content at fast-food restaurants that claim to be healthy (e.g. Subway) compared to others (e.g. McDonald's) (Chandon & Wansink, 2007).

Hedonic adaptation

People get used to changes in life experiences, a process which is referred to as 'hedonic adaptation' or the 'hedonic treadmill'. Just as the happiness that comes with the ownership of a new gadget or salary raise will wane over time, even the negative effect of life events such as bereavement or disability on subjective wellbeing tends to level off, to some extent (Frederick & Loewenstein, 1999). When this happens, people return to a relatively stable baseline of happiness. It has been suggested that the repetition of smaller positive experiences ('hedonic boosts'), such as exercise or religious practices, has a more lasting effect on our wellbeing than major life events (Mochon et al., 2008).

Herd behavior

This effect is evident when people do what others are doing instead of using their own information or making independent decisions. The idea of herding has a long history in philosophy and crowd psychology. It is particularly relevant in the domain of finance, where it has been discussed in relation to the collective irrationality of investors, including stock market **bubbles** (Banerjee, 1992). In other areas of decision-making, such as politics, science, and popular culture, herd behavior is sometimes referred to as 'information cascades' (Bikhchandi et al., 1992). Herding behavior can be increased by various factors, such as fear (e.g. Economou et al., 2018), uncertainty (e.g. Lin, 2018), or a shared identity of decision makers (e.g. Berger et al., 2018).

Heuristic

Heuristics are commonly defined as cognitive shortcuts or rules of thumb that simplify decisions, especially under conditions of uncertainty. They represent a process of substituting a difficult question with an easier one (Kahneman, 2003). Heuristics can also lead to **cognitive biases**. There are disagreements regarding heuristics with respect to bias and rationality. In the **fast and frugal** view, the application of heuristics (e.g. the recognition heuristic) is an "ecologically rational" strategy that makes best use of the limited information available to individuals (Goldstein & Gigerenzer, 2002).

There are generally different classes of heuristics, depending on their scope. Some heuristics, such as **affect**, **"Availability heuristic"**and **representativeness** have a general purpose character; others developed in social and consumer psychology are more domain-specific, examples of which include brand name, price, and **scarcity** heuristics (Shah & Oppenheimer, 2008).

Hindsight bias

This bias, also referred to as the 'knew-it-all-along effect', is a frequently encountered judgment bias that is partly rooted in **availability** and **representativeness** heuristics. It happens when being given new information changes our recollection from an original thought to something different (Mazzoni & Vannucci, 2007). This bias can lead to distorted judgments about the probability of an event's occurrence, because the outcome of an event is perceived as if it had been predictable. It may also lead to distorted memory for judgments of factual knowledge. Hindsight bias can be a problem in legal decision-making. In medical malpractice suits, for example, jurors' hindsight bias tends to increase with the severity of the outcome (e.g. injury or death) (Harley, 2007).

Homo economicus

The term *homo economicus*, or 'economic man', denotes a view of humans in the social sciences, particularly economics, as self-interested agents who seek optimal, utility-maximizing outcomes. Behavioral economists and most psychologists, sociologists, and anthropologists are critical of the concept. People are not always self-interested (see **social preferences**), nor are they mainly concerned about maximizing benefits and minimizing costs. We often make decisions under uncertainty with insufficient knowledge, feedback, and processing capability (**bounded rationality**); we sometimes lack **self-control**; and our preferences change, often in response to changes in decision contexts.

Honesty

Honesty is an important part of our everyday life. In both business and our private lives, relationships are made and broken based on our **trust** in the other party's honesty and **reciprocity**.

A 2016 study investigated honesty, beliefs about honesty and economic growth in 15 countries and revealed large cross-national differences. Results showed that average honesty was positively associated with GDP per capita, suggesting a relationship between honesty and economic development. However, expectations about countries' levels of honesty were not correlated with reality (the actual honesty in reporting the results of a coin flip experiment), but rather driven by **cognitive biases** (Hugh-Jones, 2016).

People typically value honesty, tend to have strong beliefs in their morality and want to maintain this aspect of their self-concept (Mazar et al., 2008). Self-interest may conflict with people's honesty as an internalized **social norm**, but the resulting **cognitive dissonance** can be overcome by engaging in self-deception, creating moral "wiggle room"

that enables people to act in a self-serving manner. When moral reminders are used, however, this self-deception can be reduced, as demonstrated in laboratory experiments conducted by Mazar and colleagues (2008). It is not surprising, then, that a lack of social norms is a general driver of dishonest behavior, along with high benefits and low costs of external deception, a lack of self-awareness, as well as self-deception (Mazar & Ariely, 2006).

Honesty must also be understood in the context of group membership. Employees of a large international bank, for example, behaved honestly on average in an experiment's control condition, but when their professional identity as bankers was rendered salient, a significant proportion of them became dishonest. This suggests that the prevailing business culture in the banking industry weakens and undermines the honesty norm (Cohn et al., 2014) (see also **identity economics**).

Hot and cold states

See **Empathy gap**

Hyperbolic discounting

See **Time discounting**

I

Identity economics

Identity economics describes the idea that we make economic choices based on monetary **incentives** and our identity. A person's sense of self or identity affects economic outcomes. This was outlined in Akerlof and Kranton's (2000) seminal paper which expanded the standard utility function to include pecuniary payoffs and identity economics in a simple **game-theoretic** model of behavior, further integrating psychology and sociology into economic thinking.

When economic (or other extrinsic) incentives are ineffective in organizations, identity may be the answer: A worker's self-image as jobholder and her ideal as to how his job should be done, can be a major incentive in itself (Akerlof & Kranton, 2005). Organizational identification was found to be directly related to employee performance and even indirectly related with customer evaluations and store performance in a study on 306 retail stores, for example (Lichtenstein et al., 2010). Also, when employees were encouraged to create their own job titles such that they better reflected the unique value they bring to the job, identification increased, and emotional exhaustion was reduced (Grant et al., 2014). In some cases, identity can also have negative implications. Bankers whose professional identity was made salient, for example, displayed more dishonest behavior (see **honesty**).

IKEA effect

While the **endowment effect** suggests that mere ownership of a product increases its value to individuals, the IKEA effect is evident when invested labor leads to inflated product valuation (Norton et al., 2012). For example, experiments show that the monetary value assigned to the amateur creations of self-made goods is on a par with the value assigned to expert creations. Both experienced and novice do-it-yourselfers are susceptible to the IKEA effect. Research also demonstrates that the effect is not simply due to the amount of time spent on the creations, as dismantling a previously built product will make the effect disappear.

The IKEA effect is particularly relevant today, given the shift from mass production to increasing customization and co-production of value. The effect has a range of possible explanations, such as positive feelings (including feelings of competence) that come with the successful completion of a task, a focus on the product's positive attributes, and the relationship between effort and liking (Norton et al., 2012), a link between our creations and our self-concept (Marsh et al., 2018), as well as a psychological sense of ownership (Sarstedt et al., 2017. The effort heuristic is another concept that proposes a link between perceived effort and valuation (Kruger et al., 2004).

Incentives

An incentive is something that motivates an individual to perform an action. It is therefore essential to the study of any economic activity. Incentives, whether they are intrinsic or extrinsic (traditional), can be effective in encouraging behavior change, such as ceasing to smoke, doing more exercise, complying with tax laws or increasing public good contributions. Traditional incentives can effectively encourage behavior change, as they can help to both create desirable and break undesirable **habits**. Providing upfront incentives can help the problem of **present bias** – people's focus on immediate gratification. Finally, incentives can help people overcome barriers to behavior change (Gneezy et al., 2019).

Traditionally, the importance of intrinsic incentives was underestimated, and the focus was put on monetary ones. Monetary incentives may backfire and reduce the performance of agents or their compliance with rules (see also **over-justification effect**), especially when motives such as the desire to **reciprocate** or the desire to avoid social disapproval (see **social norms**) are neglected. These intrinsic motives often help to understand changes in behavior (Fehr & Falk, 2002).

In the context of prosocial behavior, extrinsic incentives may spoil the reputational value of good deeds, as people may be perceived to have performed the task for the incentives rather than for themselves (Bénabou & Tirole, 2006). Similarly, performance incentives offered by an informed principal (manager, teacher or parent) can adversely impact an agent's (worker, student or child) perception of a task or of his own abilities, serving as only weak reinforcers in the short run and negative reinforcers in the long run (Bénabou & Tirole, 2003). (For an interesting summary of when extrinsic incentives work and when they don't in nonemployment contexts, see Gneezy et al., 2011).

Inequity aversion

Human resistance to "unfair" outcomes is known as 'inequity aversion', which occurs when people prefer **fairness** and resist inequalities (Fehr & Schmidt, 1999). In some instances, inequity aversion is disadvantageous, as people are willing to forego a gain in order to prevent another person from receiving a superior reward. Inequity aversion has been studied through **experimental games**, particularly **dictator**, **ultimatum**, and **trust games**. The concept has been applied in various domains, including business and marketing, such as research on customer responses to exclusive price promotions (Barone & Tirthankar, 2010) and "pay what you want" pricing (e.g. Regner, 2015).

Inertia

In behavioral economics, inertia is the endurance of a stable state associated with inaction and the concept of **status quo bias** (Madrian & Shea 2001). Behavioral **nudges** can either work *with* people's decision inertia (e.g. by setting **defaults**) or *against* it (e.g. by giving warnings) (Jung, 2019). In social psychology the term is sometimes also used in relation to persistence in (or **commitments** to) attitudes and relationships.

Information avoidance

Information avoidance in behavioral economics (Golman et al., 2017) refers to situations in which people choose not to obtain knowledge that is freely available. Active information avoidance includes physical avoidance, inattention, the biased interpretation of information (see also **confirmation bias**) and even some forms of forgetting. In behavioral finance, for example, research has shown that investors are less likely to check their portfolio online when the stock market is down than when it is up, which has been termed the ostrich effect (Karlsson et al., 2009). More serious cases of avoidance happen when people fail to return to clinics to get medical test results, for instance (Sullivan et al., 2004).

While information avoidance is sometimes strategic, it usually has immediate hedonic benefits for people if it prevents the negative (usually psychological) consequences of knowing the information. It usually carries negative utility in the long term, because it deprives people of potentially useful information for decision making and feedback for future behavior. Furthermore, information avoidance can contribute to a polarization of political opinions and media bias.

Intertemporal choice

Intertemporal choice is a field of research concerned with the relative value people assign to payoffs at different points in time. It generally finds that people are biased towards the present (see present bias) and tend to discount the future (see time discounting and dual-self model).

L

Less-is-better effect

When objects are evaluated separately rather than jointly, decision makers focus less on attributes that are important and are influenced more by attributes that are easy to evaluate. The less-is-better effect suggests a preference reversal when objects are considered together instead of separately. One study presented participants with two dinner set options. Option A included 40 pieces, nine of which were broken. Option B included 24 pieces, all of which were intact. Option A was superior, as it included 31 intact pieces, but when evaluated separately, individuals were willing to pay a higher price for set B. In a joint evaluation of both options, on the other hand, Option A resulted in higher willingness to pay (Hsee, 1998).

Licensing effect

Also known as 'self-licensing' or 'moral licensing', the licensing effect is evident when people allow themselves to do something bad (e.g. immoral) after doing something good (e.g. moral) first (Merritt et al., 2010). The effect of licencing has been studied for different behavioral outcomes, including donations, cooperation, racial discrimination, and cheating (Blanken et al., 2015). Well-publicized research in Canada asked participants to shop either in a green or a conventional online store. In one experiment, people who shopped in a green store shared less money in a dictator game. Another experiment allowed participants to lie (about their performance on a task) and cheat (take more money out of an envelope than they actually earned) and showed more dishonesty among green shoppers (Mazar & Zhong, 2010).

Loss aversion

Loss aversion is an important concept associated with prospect theory and is encapsulated in the expression "losses loom larger than gains" (Kahneman & Tversky, 1979a). It is thought that the pain of losing is psychologically about twice as powerful as the pleasure of gaining. People are more willing to take risks (or behave dishonestly, e.g. Schindler & Pfattheicher, 2016) to avoid a loss than to make a gain. Loss aversion has been used to explain the endowment effect and sunk cost fallacy, and it may also play a role in the status quo bias.

The basic principle of loss aversion can explain why penalty frames are sometimes more effective than reward frames in motivating people (Gächter et al., 2009) and has been applied in behavior change strategies. The website Stickk, for example, allows people to publicly commit to a positive behavior change (e.g. give up junk food), which may be coupled with the fear of loss—a cash penalty in the case of non-compliance. (See also myopic loss aversion and regret aversion.)

People's cultural background may influence the extent to which they are averse to losses (e.g. Wang et al., 2017).

Some researchers have questioned the robustness or even existence of loss aversion (Gal & Rucker, 2018). Other academics have shown that loss aversion has its moderators, but that "reports of its death are greatly exaggerated" (Mrkva et al., 2020).

M

Mental accounting

Mental accounting is a concept associated with the work of Richard Thaler (see Thaler, 2015, for a summary). According to Thaler, people think of value in relative rather than absolute terms. For example, they derive pleasure not just from an object's value, but also the quality of the deal—its transaction **utility** (Thaler, 1985). In addition, humans often fail to fully consider opportunity costs (tradeoffs) and are susceptible to the **sunk cost fallacy**.

Why are people willing to spend more when they pay with a credit card than cash (Prelec & Simester, 2001)? Why would more individuals spend $10 on a theater ticket if they had just lost a $10 bill than if they had to replace a lost ticket worth $10 (Kahneman & Tversky, 1984)? Why are people more likely to spend a small inheritance and invest a large one (Thaler, 1985)?

According to the theory of mental accounting, people treat money differently, depending on factors such as the money's origin and intended use, rather than thinking of it in terms of the "bottom line" as in formal accounting (Thaler, 1999). An important term underlying the theory is fungibility, the fact that all money is interchangable and has no labels. In mental accounting, people treat assets as less fungible than they really are. Even seasoned investors are susceptible to this bias when they view recent gains as disposable "house money" (Thaler & Johnson, 1990) that can be used in high-risk investments. In doing so, they make decisions on each mental account separately, losing out the big picture of the portfolio. (See also **partitioning** and **pain of paying** for ideas related to mental accounting.)

Consumers' tendency to work with mental accounts is reflected in various domains of applied behavioral science, especially in the financial services industry. Examples include banks offering multiple accounts with savings goal labels, which make mental accounting more explicit, as well as third-party services that provide consumers with aggregate financial information across different financial institutions (Zhang & Sussman, 2018).

Mindless eating

Various cues non-consciously affect the amount and quality of people's consumption of food. Cues often serve as benchmarks in the environment, and they may include serving containers, packaging, people, labels, and atmospheric factors. They suggest to the consumer what and how much is normal, appropriate, typical, or reasonable to consume. Perceptual biases contribute to a distorted sense of consumption; for example, people underestimate calories in larger servings and tend to serve themselves more when using larger utensils, plates, or bowls (Wansink et al., 2009).

Brian Wansink, the most prominent academic in behavioral food science, has faced allegations of scientific misconduct and several article retractions (Ducharme, 2018).

Money illusion

The term 'money illusion' has been coined by Irving Fisher (1928) and refers to people's tendency to think of monetary values in nominal rather than real terms. This usually occurs when we neglect to consider money's decrease in purchasing power as a result of inflation. Investors, for example, may focus on more salient nominal returns rather than real returns that also account for inflation (Shafir et al., 1997).

Myopic loss aversion

Myopic **loss aversion** occurs when investors take a view of their investments that is strongly focused on the short term, leading them to react too negatively to recent losses, which may be at the expense of long-term benefits (Thaler et al., 1997). This phenomenon is influenced by narrow framing, which is the result of investors considering specific investments (e.g. an individual stock or a trade) without taking into account the bigger picture (e.g. a portfolio as a whole or a sequence of trades over time) (Kahneman & Lovallo, 1993). A large-scale field experiment has shown that individuals who receive information about investment performance too frequently tend to underinvest in riskier assets,

losing out on the potential for better long-term gains (Larson et al., 2016).

N

Naive allocation

Decision researchers have found that people prefer to spread limited resources evenly across a set of possibilities (see also **1/N heuristic**). This can be referred to as 'naive allocation'. For example, consumers may invest equal amounts of money across different investment options regardless of their quality. Similarly, the **diversification bias** shows that consumers like to spread out consumption choices across a variety of goods. Research suggests that **choice architects** can work with these tendencies due to decision makers' partition dependence. For instance, by separating healthy food menu options into different menu categories (e.g. 'fruits', 'vegetables') and combining unhealthy options into one single menu category (e.g. 'candies and cookies'), one can steer consumers toward choosing more healthy options and fewer unhealthy options (Johnson et al., 2012).

Nudge

According to Thaler and Sunstein (2008, p. 6), a nudge is

> 'any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic **incentives**. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting the fruit at eye level counts as a nudge. Banning junk food does not.'

Perhaps the most frequently mentioned nudge is the setting of **defaults**, which are pre-set courses of action that take effect if nothing is specified by the decision-maker. This type of nudge, which works with a human tendency for inaction, appears to be particularly successful, as people may stick with a choice for many years (Gill, 2018).

On a cost-adjusted basis, the effectiveness of nudges is often greater than that of traditional approaches (Benartzi et al., 2017). There is a growing body of research on the effectiveness of different kinds of nudges (Mertens et al., 2022), suggesting that nudges have at least a small effect on behavior (DellaVigna & Linos, 2022). However, some academics have argued that correcting for the presence of publication bias may eliminate the published effectiveness of nudges entirely (Maier et al., 2022).

Questions about the theoretical and practical value of nudging have been explored (Kosters & Van der Heijden, 2015) with respect to their ability to produce lasting behavior change (Frey & Rogers, 2014), as well as their assumptions of irrationality and lack of agency (Gigerenzer, 2015). There may also be limits to nudging due to non-cognitive constraints and population differences, such as a lack of financial resources if nudges are designed to increase savings (Loibl et al., 2016). Limits in the application of nudges speak to the value of experimentation in order to test behavioral interventions prior to their implementation.

As a complementary approach that addresses the shortcomings of nudges, Hertwig and Grüne-Yanoff (2017) propose the concept of boosts, a decision-making aid that fosters people's competence to make informed choices. (See also **choice architecture**.)

1/N (heuristic)

1/N is a trade-off heuristic, one that assigns equal weights to all cues or alternatives (Gigerenzer & Gaissmaier, 2011). Under the 1/N rule, resources are allocated equally to each of N alternatives. For example, in the (one-shot) **ultimatum game**, participants most frequently split their money equally. Similarly, people often hedge their money in investments by allocating equal amounts to different options. 1/N is a form of **naive allocation** of resources.

O

Optimism bias

People tend to overestimate the probability of positive events and underestimate the probability of negative events happening to them in the future (Sharot, 2011). For example, we may underestimate our risk of getting cancer and overestimate our future success on the job market. A number of factors can explain unrealistic optimism, including perceived control and being in a good mood (Helweg-Larsen & Shepperd, 2001). (See also **overconfidence**.)

Ostrich effect

See **Information avoidance**

Overconfidence (effect)

The overconfidence effect is observed when people's subjective confidence in their own ability is greater than their objective (actual) performance. It is frequently measured by having experimental participants answer general knowledge test questions. They are then asked to rate how confident they are in their answers on a scale. Overconfidence is measured by calculating the score for a person's average confidence rating relative to the actual proportion of questions answered correctly.

A big range of issues have been attributed to overconfidence more generally, including the high rates of entrepreneurs who enter a market despite the low chances of success (Moore & Healy, 2008). Among investors, overconfidence has been associated with excessive risk-taking (e.g. Hirshleifer & Luo, 2001), concentrated portfolios (e.g. Odean, 1998) and overtrading (e.g. Grinblatt & Keloharju, 2009). The **planning fallacy** is another example of overconfidence, where people underestimate the length of time it will take them to complete a task, often ignoring past experience (Buehler et al., 1994). (See also **optimism bias**.)

Over-justification effect

This effect occurs when a person's intrinsic interest in a previously unrewarded activity decreases after they engage in that activity as a means to achieving an extrinsic goal (e.g. financial reward) (Deci et al., 1999). As a result, the number of hours worked by volunteers, for instance, may be negatively affected by small financial rewards (Frey & Goette, 1999) (see also **incentives**).

P

Pain of paying

People don't like to spend money. We experience pain of paying (Zellermayer, 1996), because we are **loss averse**. The pain of paying plays an important role in consumer self-regulation to keep spending in check (Prelec & Loewenstein, 1998). This pain is thought to be reduced in credit card purchases, because plastic is less tangible than cash, the depletion of resources (money) is less visible, and payment is deferred. Different personality types experience different levels of pain of paying, which can affect spending decisions. Tightwads, for instance, experience more of this pain than spendthrifts. As a result, tightwads are particularly sensitive to marketing contexts that make spending less painful (Rick, 2018). (See also **mental accounting**.)

Partition dependence

See **Naive allocation**

Partitioning

The rate of consumption can be decreased by physically partitioning resources into smaller units, for example cookies wrapped individually or money divided into several envelopes. When a resource is divided into smaller units (e.g. several

packs of chips), consumers encounter additional decision points—a psychological hurdle encouraging them to stop and think. In addition to the cost incurred when resources are used, opening a partitioned pool of resources incurs a psychological transgression cost, such as feelings of guilt (Cheema & Soman, 2008). Related research has found that separate mental payment accounts (i.e. envelopes with money) can disrupt a shopping momentum effect that may occur after an initial purchase (Dhar et al., 2007). (For related ideas, see also **mental accounting**).

Peak-end rule

According to the peak-end rule, our memory of past experience (pleasant or unpleasant) does not correspond to an average level of positive or negative feelings, but to the most extreme point and the end of the episode (Kahneman, 2000b). The rule developed from the finding that evaluations of a past episode seem to be determined by a weighted average of 'snapshots' of an experience, such as moments in a film, thus neglecting its actual duration (Fredrickson & Kahneman, 1993), as well research showing that people would prefer to repeat a painful experience if it is followed by a slightly less painful one (Kahneman et al., 1993). In terms of memories, remembered **utility** is more important than total utility (Kahneman, 2000a). People's memories of prototypical moments are related to the judgments made when people apply a **representativeness heuristic** (Kahneman, 2000b).

Planning fallacy

Originally proposed by Kahneman and Tversky (1979b), the planning fallacy is the tendency for individuals or teams to underestimate the time and resources it will take to complete a project. This error occurs when forecasters overestimate their ability and underestimate the possible risk associated with a project. Without proper training teams of individuals can exacerbate this phenomena causing projects to be based on the team's confidence rather than statistical projections.

One way to combat the planning fallacy is to use a method termed Reference Class Forecasting (Flyvbjerg et al., 2005; Kahneman & Tversky, 1979b). This method begins by creating a benchmark using data on similar projects. Then estimates are built based on variances from the benchmark, depending on variables related to the project at hand. For example, a construction company might estimate that building a house will take five weeks instead of the average reference class time of six weeks, because the team at hand is larger and more skilled than previous project teams. (See also **optimism bias**, **overconfidence**.)

Possibility effect

See **Certainty/possibility effects**

Precommitment

Humans need a continuous and consistent self-image (Cialdini, 2008). In an effort to align future behavior, being consistent is best achieved by making a **commitment**. Thus, precommitting to a goal is one of the most frequently applied behavioral devices to achieve positive change. Committing to a specific future action (e.g. staying healthy by going to the gym) at a particular time (e.g. at 7am on Mondays, Wednesdays and Fridays) tends to better motivate action while also reducing **procrastination** (Sunstein, 2014).

The 'Save More Tomorrow' program, aimed at helping employees save more money (Thaler & Benartzi, 2004), illustrates precommitment alongside other ideas from behavioral economics. The program also avoids the perception of **loss** that would be felt with a reduction in disposable income, because consumers commit to saving future increases in income. People's **inertia** makes it more likely that they will stick with the program, because they have to opt out to leave.

Preference

In economics, preferences are evident in theoretically optimal choices or real (behavioral) choices when people decide between alternatives. Preferences also imply an ordering of different options in terms of expected levels of happiness, gratification, **utility**, etc. (Arrow, 1958). Measurement of preferences may rely on **willingness to pay (WTP)** and **willingness to accept (WTA)**. Preferences are sometimes elicited in survey research, which may be associated with a range of problems, such as the hypothetical bias, when stated preferences are

different from those expressed in actual choices, or response effects, when subjects return the answer that they perceive the researcher 'expects'. Armin Falk and colleagues have developed cross-culturally valid survey questions that are good predictors of preferences in behavioral experiments. These include questions about risk taking (see **prospect theory**), **social preferences** (e.g. about **reciprocity**) and **time discounting** (Falk et al., 2012).

Preference reversal

Preference reversal (Lichtenstein & Slovic, 1973) refers to a change in the relative frequency by which one option is favored over another in behavioral experiments, as may be evident in the **Less-is-better effect** or **ratio bias**, for example, or **framing effects** more generally. The preferred ordering of a pair of choices is often found to depend on how the choice is presented; this effect contradicts the predictions of rational choice theory. (See also **transitive/intransitive preferences**.)

Present bias

The present bias refers to the tendency of people to give stronger weight to payoffs that are closer to the present time when considering trade-offs between two future moments (O'Donoghue & Rabin, 1999). For example, a present-biased person might prefer to receive ten dollars today over receiving fifteen dollars tomorrow, but wouldn't mind waiting an extra day if the choice were for the same amounts one year from today versus one year and one day from today (see **time discounting**). The concept of present bias is often used more generally to describe impatience or immediate gratification in decision-making.

Primacy effect

See **Serial-position effect**

(Conceptual) Priming

Conceptual priming is a technique and process applied in psychology that engages people in a task or exposes them to stimuli. The prime consists of meanings (e.g. words) that activate associated memories (schema, stereotypes, attitudes, etc.). This process may then influence people's performance on a subsequent task (Tulving et al., 1982). For example, one study primed consumers with words representing either 'prestige' US retail brands (Tiffany, Neiman Marcus, and Nordstrom) or 'thrift' brands (Wal-Mart, Kmart, and Dollar Store). In an ostensibly unrelated task, participants primed with prestige names then gave higher preference ratings to prestige as opposed to thrift product options (Chartrand et al., 2008). Conceptual priming is different from processes that do not rely on activating meanings, such as perceptual priming (priming similar forms), the mere exposure effect (repeated exposure increases liking), affective priming (subliminal exposure to stimuli evokes positive or negative emotions) (Murphy & Zajonc, 1993), or the perception-behavior link (e.g. mimicry) (Chartrand & Bargh, 1999).

The technique of conceptual priming has become a promising approach in the field of economics, particularly in the study of the economic effects of social identity (see **identity economics**) and **social norms** (Cohn & Maréchal, 2016).

(Myopic) Procrastination

People often put off decisions, which may be due to **self-control** problems (leading to **present bias**), **inertia**, or the complexity of decision-making (see **choice overload**). Various **nudge** tools, such as **pre-commitment**, can be used to help individuals overcome procrastination. Choice architects can also help by providing a limited time window for action (see **scarcity heuristic**) or a focus on **satisficing** (Johnson et al., 2012).

Projection bias

In behavioral economics, projection bias refers to people's assumption that their own tastes or **preferences** will remain the same over time (Loewenstein et al., 2003). Both transient preferences in the short-term (e.g. due to hunger or weather conditions) and long-term changes in tastes can lead to this bias. For example, people may overestimate the positive impact of a career promotion due to an under-appreciation of **(hedonic) adaptation**, put above-optimal variety in their planning for future consumption (see **diversification bias**), or underestimate the future selling price of an item by not taking into account the **endowment effect**. Consumers' under-appreciation of **habit** formation (associated

with higher consumption levels over time) may lead to projection bias in planning for the future, such as retirement savings.

Projection bias also affects choices in other settings, such as medical decisions (Loewenstein, 2005), gym attendance (Acland & Levy, 2015), catalog orders (Conlin et al., 2007), as well as car and housing markets (Busse et al., 2012).

Prospect theory

Prospect theory is a behavioral model that shows how people decide between alternatives that involve risk and uncertainty (e.g. % likelihood of gains or losses). It demonstrates that people think in terms of expected utility relative to a reference point (e.g. current wealth) rather than absolute outcomes. Prospect theory was developed by framing risky choices and indicates that people are loss-averse; since individuals dislike losses more than equivalent gains, they are more willing to take risks to avoid a loss. Due to the biased weighting of probabilities (see certainty/possibility effects) and loss aversion, the theory leads to the following pattern in relation to risk (Kahneman & Tversky, 1979a; Kahneman, 2011).

Prospect theory has been applied in diverse economic settings, such as consumption choice, labor supply, and insurance (Barberis, 2013).

	GAINS	LOSSES
HIGH PROBABILITY	95% chance to win $10,000	95% chance to lose $10,000
(Certainty Effect)	Fear of disappointment	Hope to avoid loss
	RISK-AVERSE	RISK-SEEKING
LOW PROBABILITY	5% chance to win $10,000	5% chance to lose $10,000
(Possibility Effect)	Hope of large gain	Fear of large loss
	RISK-SEEKING	RISK-AVERSE

Figure 1. Prospect Theory Quadrant

R

Ratio bias

We find it harder to deal with proportions or ratios than with absolute numbers. For example, when asked to evaluate two movie rental plans with a contracted scale (e.g. 7 and 9 new movies per week for Plans A and B, respectively) as opposed to an equivalent offering with an expanded scale (364 and 468 movies per year, respectively), consumers favor the better plan (Plan B) more in the scale expansion than contraction condition (Burson et al., 2009). This is because our experiential system—unlike the rational system—encodes information as concrete representations, and absolute numbers are more concrete than ratios or percentages (Kirkpatrick & Epstein, 1992). (See also framing, dual-system theory, affect heuristic.)

Reciprocity

Reciprocity is a social norm that involves in-kind exchanges between people—responding to another's action with another equivalent action. It is usually positive (e.g. returning a favor), but it can

also be negative (e.g. punishing a negative action) (Fehr & Gächter, 2000). Reciprocity is of interest to behavioral economists because it does not involve an economic exchange, and it has been studied by means of experimental games (see **behavioral game theory**). Organizations often apply reciprocity norms in practice. Charities take advantage of reciprocity if they include small gifts in solicitation letters (e.g. Falk, 2007), while hospitals may ask former patients for donations (e.g. Chuan et al., 2018).

Reciprocity is also used as a social influence tool in the form of 'reciprocal concessions', an approach also known as the 'door-in-the-face' technique. It occurs when a person makes an initial large request (e.g. to buy an expensive product), followed up by a smaller request (e.g. a less expensive option), if the initial request is denied by the responder. The responder then feels obligated to 'return the favor' by agreeing to the conceded request (Cialdini et al., 1975).

Recency effect

See **Serial-position effect**

Recognition heuristic

While a core heuristic in the *heuristics and biases* tradition of Tversky and Kahneman is **availability**, a conceptually similar heuristic proposed in Gigerenzer's *fast and frugal* tradition is recognition. In the fast and frugal view, the application of heuristics is an "ecologically rational" strategy that makes best use of the limited information available to individuals (Goldstein & Gigerenzer, 2002). Recognition is an easily accessible cue that simplifies decision-making and indicates that sometimes less knowledge can lead to more accurate inferences. In one experiment, participants had to judge which one of two cities had the greater population size. Results showed that the vast majority of choices were based on recognition of the city name. What's more, the study indicated a less-is-more effect, whereby people's guesses are more accurate in a domain of which they have little knowledge than one about which they know a lot. American participants did better on German cities, while German participants had higher scores on American cities (Goldstein & Gigerenzer, 2002). (See also **satisficing**.)

Reference dependence

Reference dependence is one of the fundamental principles of prospect theory and behavioral economics more generally. In **prospect theory** (Kahneman & Tversky, 1979a), people evaluate outcomes relative to a reference point, and then classify gains and losses (see also **loss aversion**, **endowment effect**). Reference dependence can apply to any decision involving risk and uncertainty. Online privacy research, for example, has shown that identical privacy notices do not always result in the same levels of disclosure (Adjerid et al., 2013). Consumers evaluate privacy notices relative to the status quo—their current level of protection. When privacy notices are preceded by notices that are less protective, people disclose more compared to those who have experienced no change in privacy protection. The converse is the case if preceding privacy notices are more protective.

Regret aversion

When people fear that their decision will turn out to be wrong in hindsight, they exhibit regret aversion. Regret-averse people may fear the consequences of both errors of omission (e.g. not buying the right investment property) and commission (e.g. buying the wrong investment property) (Seiler et al., 2008). The effect of anticipated regret is particularly well-studied in the domain of health, such as people's decisions about medical treatments. A meta-analysis in this area suggests that anticipated regret is a better predictor of intentions and behavior than other kinds of anticipated negative emotions and evaluations of risk (Brewer et al., 2016). (See also **loss aversion**, **status quo bias**, **sunk cost fallacy**, **fear of missing out**, **information avoidance**, and **action bias**.)

Regulatory focus theory

The psychological theory of regulatory focus (Florack et al., 2013; Higgins, 1998) holds that human motivation is rooted in the approach of pleasure and the avoidance of pain and differentiates a promotion focus from a prevention focus. The former involves the pursuit of goals that are achievement-

or advancement-related, characterized by eagerness, whereas the latter focuses on security and protection, characterized by vigilance. For example, a person can become healthy by either engaging in physical activity and eating organic food, or refraining from bad habits such as smoking or eating junk food. Prevention and promotion orientations are a matter of both enduring dispositions and situational factors.

According to *regulatory fit* theory, messages and frames that are presented as gains are more influential under a promotion focus, whereas those presented as losses carry more weight in a prevention focus. For example, research by Lee and Aaker (2004) found that 'gain frames' in advertising ("Get energized") lead to more favorable attitudes when the body of the advertising message is written in promotional terms (e.g. emphasizing the energy benefits of drinking grape juice), whilst 'loss frames' ("Don't miss out on getting energized!") have a more favorable effect when the main body of the ad focuses on prevention (e.g. stressing the cancer reduction benefits of drinking grape juice).

Representativeness heuristic

Representativeness is one of the major general purpose heuristics, along with availability"Availability heuristic"and affect. It is used when we judge the probability that an object or event A belongs to class B by looking at the degree to which A resembles B. When we do this, we neglect information about the general probability of B occurring (its base rate) (Kahneman & Tversky, 1972). Consider the following problem:

Bob is an opera fan who enjoys touring art museums when on holiday. Growing up, he enjoyed playing chess with family members and friends. Which situation is more likely?

A. Bob plays trumpet for a major symphony orchestra
B. Bob is a farmer

A large proportion of people will choose A in the above problem, because Bob's description matches the stereotype we may hold about classical musicians rather than farmers. In reality, the likelihood of B being true is far greater, because farmers make up a much larger proportion of the population.

Representativeness-based evaluations are a common cognitive shortcut across contexts. For example, a consumer may infer a relatively high product quality from a store (generic) brand if its packaging is designed to resemble a national brand (Kardes et al., 2004). Representativeness is also at work if people think that a very cold winter is indicative of the absence of global warming (Schubert & Stadelmann, 2015) or when gamblers prefer lottery tickets with random-looking number sequences (e.g. 7, 16, 23, ...) over those with patterned sequences (e.g. 10, 20, 30, ...) (Krawczyk & Rachubik, 2019). In finance, investors may prefer to buy a stock that had abnormally high recent returns (the extrapolation bias) or misattribute a company's positive characteristics (e .g. high quality goods) as an indicator of a good investment (Chen et al., 2007).

Risk-as-feelings

'Consequentialist' perspectives of decision-making under risk or uncertainty (risky-choice theories, see e.g. prospect theory) tend to either focus on cognitive factors alone or consider emotions as an anticipated outcome of a decision.

The risk-as-feelings hypothesis (Loewenstein et al., 2001), on the other hand, also includes emotions as an anticipatory factor, namely feelings at the moment of decision-making.

In contrast to theories such as the affect heuristic, where feelings play an informational role helping people to decide between alternatives, risk-as-feelings can account for cases where choices (e.g. refusal to fly due to a severe anxiety about air travel) diverge from what individuals would objectively consider the best course of action.

S

Satisficing

According to Herbert Simon, people tend to make decisions by satisficing (a combination of sufficing and satisfying) rather than optimizing (Simon, 1956); decisions are often simply 'good enough' in light of the costs and constraints involved. As a **heuristic**, satisficing individuals will choose options that meet their most basic decision criteria. A focus on satisficing can be used by **choice architects** when decision makers are prone to procrastination (Johnson et al., 2012).

Scarcity (heuristic)

When an object or resource is less readily available (e.g. due to limited quantity or time), we tend to perceive it as more valuable (Cialdini, 2008). Scarcity appeals are often used in marketing to induce purchases. Marketing messages with limited quantity appeals are thought to be more effective than limited time appeals, because they create a sense of competition among consumers (Aggarwal et al., 2011). An experiment (Lee & Seidle, 2012) that used wristwatch advertisements as stimuli exposed participants to one of two different product descriptions "Exclusive limited edition. Hurry, limited stocks" or "New edition. Many items in stock". They then had to indicate how much they would be willing to pay for the product. The average consumer was willing to pay an additional 50% if the watch was advertised as scarce.

Scarcity can be used as an effective strategy by **choice architects** to get people who put off decisions (myopic procrastinators) to act (Johnson et al., 2012).

Scarcity (psychology of)

People have a "mental bandwidth," or brainpower, made up of attention, cognition, and **self-control** (Mullainathan & Sharif, 2013), which consists of finite resources that may become reduced or **depleted**. The scarcity mindset entails a feeling of not having enough of something. According to Mullainathan and Sharif, anyone can experience cognitive scarcity, but it is particularly pronounced for people living in poverty. On the positive side, this may induce limited focus that can be used productively. The downside is 'tunneling', which inhibits the cognitive power needed to solve problems, reason, or retain information. Reduced bandwidth also impairs executive control, compromising people's ability to plan and increasing impulsiveness whereby the focus becomes immediate—put food on the table, find shelter, or pay the utility bill (See also **present bias**).

The financial and life worries associated with poverty, and the difficult tradeoffs low-income individuals must make on a regular basis, all reduce their cognitive capacity. Limits on self-control or planning may lead some individuals to sacrifice future rewards in favor of short-term needs. **Procrastination** over important tasks is also more likely, as is avoidance of expressing negative emotions.

Self-control

Self-control, in psychology, is a cognitive process that serves to restrain certain behaviors and emotions vis-a-vis temptations and impulses. This aspect of self-regulation allows individuals to achieve goals (Diamond, 2013). (See also **intertemporal choice**, **present bias**, **dual-self model**, **dual-system theory**, **ego depletion**, and **decision fatigue**.)

Serial-position effect

The serial-position effect refers to the finding that items (e.g. word, picture or action) that are located either at the beginning (primacy effect) or end (recency effect) of a list are more easily remembered (Ebbinghaus, 1913). These effects have also been extensively studied in social psychology. Research on persuasion, for example, has found primacy effects to be stronger when the issue in a message is relevant or familiar to individuals, and recency effect more likely to occur when the issue is less relevant or familiar to them (Haugtvedt & Wegener, 1994; Lana, 1961).

The serial-position effect should not be confused

with more general order effects, which refers to context effects produced by the order of items, such as questions in a research instrument. (See also anchoring and peak-end rule.)

Sludge

The two defining characteristics of a sludge (Thaler, 2018) are "friction and bad intentions" (Goldhill, 2019). While Richard Thaler strongly advocates nudging for good by making desirable behavior easier, a sludge does the opposite: It makes a process more difficult in order to arrive at an outcome that is not in the best interest of the sludged. Examples of sludges include product rebates that require difficult procedures, subscription cancellations that can only be done with a phone call, and complicated or long government student aid application forms.

Even when a sludge is associated with a beneficial behavior (as in student aid, voter registrations or driver's licenses, for example), costs can be excessive. These costs may be a difficulty in acquiring information, unnecessary amounts of time spent, or psychological detriments, such as frustration (Sunstein, 2020).

Social norm

Social norms signal appropriate behavior and are classed as behavioral expectations or rules within a group of people (Dolan et al., 2010). Social norms of exchange, such as **reciprocity**, are different from market exchange norms (Ariely, 2008). Normative feedback (e.g. how one's energy consumption level compares to the regional average) is often used in behavior change programs (Allcott, 2011) and has been particularly effective to prompt pro-environmental behavior (Farrow et al., 2017). This feedback can either be descriptive, representing what most people do for the purpose of comparison (e.g. "The majority of guests in this room reuse their towels"; Goldstein et al., 2008), or injunctive, communicating approved or disapproved behavior (e.g. "Please don't…."; Cialdini et al., 2006). The latter is often more effective when an undesirable behavior is more prevalent than desirable behavior (Cialdini, 2008).

Social preferences

Social preferences (e.g. Fehr & Fischbacher, 2002) are one type of **preference** investigated in behavioral economics and relate to the concepts of **reciprocity**, **altruism**, **inequity aversion**, and **fairness**.

Social proof

The influence exerted by others on our behavior can be expressed as being either normative or informational. Normative influence implies conformity in order to be accepted or liked (Aronson et al., 2005), while informational influence occurs in ambiguous situations where we are uncertain about how to behave and look to others for information or cues. Social proof is an informational influence (or descriptive norm) and can lead to **herd behavior**. It is also sometimes referred to as a **heuristic**. Research suggests that receiving information about how others behave (social proof) leads to greater compliance among people from collectivist cultures, whereas information on the individual's past behavior (consistency/**commitment**) is associated with greater compliance for people from individualist cultures (Cialdini et al., 1999).

Status quo bias

Status quo bias is evident when people prefer things to stay the same by doing nothing (see also **inertia**) or by sticking with a decision made previously (Samuelson & Zeckhauser, 1988). This may happen even when only small transition costs are involved and the importance of the decision is great.

Field data from university health plan enrolments, for example, show a large disparity in health plan choices between new and existing enrollees. One particular plan with significantly more favorable premiums and deductibles had a growing market share among new employees, but a significantly lower share among older enrollees. This suggests that a lack of switching could not be explained by unchanging **preferences**.

Samuelson and Zeckhauser note that status quo bias is consistent with **loss aversion**, and that it could be psychologically explained by previously made **commitments**, **sunk cost thinking**, **cognitive dissonance**, a need to feel in control and **regret avoidance**. The latter is based on Kahneman and

Tversky's observation that people feel greater regret for bad outcomes that result from new actions taken than for bad consequences that are the consequence of inaction (Kahneman & Tversky, 1982).

While status quo bias is frequently considered to be irrational, sticking to choices that worked in the past is often a safe and less difficult decision due to informational and cognitive limitations (see **bounded rationality**). For example, status quo bias is more likely when there is **choice overload** (Dean et al., 2017) or high uncertainty and deliberation costs (Nebel, 2015).

The status quo bias has been studied in a range of fields, including Business and Economics, Information Systems, Psychology and Medicine, Politics and Law, as well as Energy and Sustainability (Godefroid et al., 2022).

Sunk cost fallacy

Individuals commit the sunk cost fallacy when they continue a behavior or endeavor as a result of previously invested resources (time, money or effort) (Arkes & Blumer, 1985). This fallacy, which is related to **loss aversion** and **status quo bias**, can also be viewed as bias resulting from an ongoing **commitment**.

For example, individuals sometimes order too much food and then over-eat just to "get their money's worth". Similarly, a person may have a $20 ticket to a concert and then drive for hours through a blizzard, just because s/he feels that s/he has to attend due to having made the initial investment. If the costs outweigh the benefits, the extra costs incurred (inconvenience, time or even money) are held in a different **mental account** than the one associated with the ticket transaction (Thaler, 1999).

Research suggests that rats, mice and humans are all sensitive to sunk costs after they have made the decision to pursue a reward (Sweis et al., 2018) and that a capacity for cognitive reflection can reduce sunk cost behavior (Ronayne et al., 2021).

System 1/2

See **Dual-system theory**

T

Take-the-best (heuristic)

Take-the-best is a simple decision-making shortcut that people may apply when choosing between alternatives. It is a one-reason decision rule, a type of **heuristic** where judgments are based on a single "good" reason only, ignoring other cues (Gigerenzer & Gaissmaier, 2011). Using the take-the-best heuristic, a decision maker will base the choice on one attribute that is perceived to discriminate most effectively between the options (Gigerenzer & Goldstein, 1996). Airport customs officers, for example, may determine whether a passenger is selected for a search by choosing the best of various cues, such as airport of origin, nationality, or amount of luggage (Pachur & Marinello, 2013). One study investigated voters' perceptions of how US presidential candidates would handle the single issue that voters regarded as most important, such as the state of the economy or foreign policy. A model based on this issue (as a take-the-best attribute used by potential voters) correctly chose the winner of the popular vote in 97% of all predictions (Graefe & Armstrong, 2012).

Take-the-first (heuristic)

Take-the-first is a fluency **heuristic**. Fluency-based decision-making strategies occur when different alternatives are recognized, but the one that is recognized faster is given higher value with respect to a criterion (Gigerenzer & Gaissmaier, 2011). In the case of take-the-first, decision-makers simply choose the first alternative that comes to mind (Johnson & Raab, 2003). Similar to other **fast and frugal** approaches, this strategy is most suitable in situations that present limitations to people's ability to analyze information carefully. When experienced handball players were asked to decide between taking a shot or passing the ball in video sequences, the first option that came to mind tended to be superior to later options or a condition

under which when they had more time to analyze the situation.

Time (temporal) discounting

Time discounting research investigates differences in the relative valuation placed on rewards (usually money or goods) at different points in time by comparing its valuation at an earlier date with one for a later date (Frederick et al., 2002). Evidence shows that present rewards are weighted more heavily than future ones. Once rewards are very distant in time, they cease to be valuable. Delay discounting can be explained by impulsivity and a tendency for immediate gratification (see **self-control**), and it is particularly evident for addictions such as nicotine (Bickel et al., 1999).

Hyperbolic discounting theory suggests that discounting is not time-consistent; it is neither linear nor occurs at a constant rate. It is usually studied by asking people questions such as "Would you rather receive £100 today or £120 a month from today?" or "Would you rather receive £100 a year from today or £120 a year and one month from today?" Results show that people are happier to wait an extra month for a larger reward when it is in the distant future. In hyperbolic discounting, values placed on rewards decrease very rapidly for small delay periods and then fall more slowly for longer delays (Laibson, 1997). (See also **present bias**.)

Research has shown different ways to reduce discounting, such as **primed** future focus (Sheffer et al., 2016), mental simulation of future experiences (e.g. Stein et al., 2016), and interactions with visual representations of one's future self (Hershfield et al., 2011).

Transitive/intransitive preferences

Preference transitivity is a hallmark of rational choice theory. It holds that if, out of a set of options, A is preferred to B and B to C, then A must also be preferred to C (e.g. von Neumann & Morgenstern, 1947),. Intransitive preferences (i.e. C is preferred to A) violate the transitivity assumption and are sometimes used to indicate **System 1 vs 2** decision-making (Gallo et al., 2016). (See also **preference reversal** and **decoy effect**.)

Trust

Trust pervades human societies. It is indispensable in friendships, love, family, organizations and politics. Interpersonal trust is a mental construct with implications for social functioning and economic behavior as studied by **trust games**, for example.

Although neoclassical economic theory suggests that trust in strangers is irrational, trust and trustworthiness can be widely observed across societies. In fact, **reciprocity** exists as a basic element of human relationships and behavior, and this is accounted for in the trust extended to an anonymous counterpart (Berg et al., 1995). The nature of trusting behavior is a multi-faceted part of psychology, investigated in terms of underlying dispositions, intergroup processes, and cognitive expectations (Evans & Krueger, 2009). Behavioral and biological evidence indicates that trusting is not simply a special case of risk-taking, but based rather on important forms of **social preferences**, such as betrayal aversion (Fehr, 2010).

Both trust and trustworthiness increase when individuals are closer socially, but the latter declines when partners come from different social groups, such as nationality or race. Furthermore, high status individuals are found to be able to elicit more trustworthiness in others (Glaeser et al., 2000). For example, CEOs are considerably more trusting and exhibit more trustworthiness than students. Trust seems to reinforce trustworthy behavior. In a behavioral experiment, trustworthiness was highest when the threat to punish was available but not used, and lowest when the threat to punish was actually used. Paradoxically, however, most CEOs and students used the punishment threat; although CEOs made use of it significantly less (Fehr & List, 2004).

Trust game

Similar to the **dictator game**, this game asks participants to split money between themselves and someone else. However, the trust game first asks Player A to determine an initial endowment of zero or a higher value (e.g. $5). The money is then multiplied (e.g. tripled to $15) by the experimenter and given to Player B, who is then asked to return an amount of zero or a higher value back to Player

A. The game is about **reciprocity** and **trust**, because Player A must decide how much of the endowment to give to Player B in the hope of receiving at least the same amount in return. In the original experiment (Berg et al., 1995), 30 out of 32 first players sent money, and 11 of these 30 decisions resulted in a payback that was greater than the initial amount sent. This finding confounds the prediction offered by standard economic assumptions (see *homo economicus*) that there would be no trust. However, as with other games, critics have raised questions about what the trust game actually measures (Brülhart & Usunier, 2012). (See also **ultimatum game**.)

U

Ultimatum game

The ultimatum game is an early example of research that uncovered violations of standard assumptions of rationality (see *homo economicus*). In the experiment, one player (the proposer/allocator) is endowed with a sum of money and asked to split it between him/herself and an anonymous player (the responder/recipient). The recipient may either accept the allocator's proposal or reject it, in which case neither of the players will receive anything. From a traditional game-theoretic perspective, the allocator should only offer a token amount and the recipient should accept it. However, results showed that most allocators offered more than just a token payment, and many went as far as offering an equal split. Some offers were declined by recipients, suggesting that they were willing to make a sacrifice when they felt that the offer was unfair (see also **inequity aversion** and **fairness**) (Guth et al., 1982). (See also **dictator game** and **trust game**.)

Utility

In economics, utility (e.g. Stigler, 1950) refers to the benefits (satisfaction or happiness) consumers derive from a good, and it can be measured based on individuals' choices between alternatives or **preferences** evident in their **willingness to pay or accept**. Behavioral economists have questioned past assumptions that utility is always maximized, and they have worked with both traditional and new utility measures.

- Expected utility (Bernoulli, 1954 [1738]) has been used in economics as well as game and decision theory, including prospect theory, and is based on choices with uncertain outcomes.
- Discounted utility is a form of utility used in the intertemporal choice domain of behavioral economics (Berns et al., 2007).
- Experience(d) utility (Kahneman et al., 1997) relates to actual (hedonic) experiences associated with an outcome (in contrast to choice-based decision utility), which is associated with theories on forecasting errors like the diversification bias.
- Remembered utility (Kahneman et al., 1997) suggests that people's choices are also based on their memories of past events or experiences and is invoked in the peak-end rule.
- Instant utility and forecasted utility have been used in the area of intertemporal choice, such as research on the empathy gap, showing that forecasted utility is biased in the direction of instant utility (Camerer & Loewenstein, 2004).
- Procedural utility is relevant if people value not only outcomes, but also the processes that lead to these outcomes (Frey, Benz, & Stutzer, 2004).
- Social utility has been proposed in relation to game theory, where players not only always act self-interestedly, but also show concerns about the perceived intentions of other players and fairness (Camerer, 1997).
- Transaction utility accounts for perceived merit or quality of a deal, rather than just the value of a good or service relative to its price captured by acquisition utility (Thaler, 1985).

W

Willingness to pay (WTP) / willingness to accept (WTA)

In economics, willingness to accept (WTA) and willingness to pay (WTP) are measures of preference that do not rely on actual choices between alternative options. Instead, they ask individuals to specify monetary amounts. WTA is a measure of the minimum financial compensation that a person would need in order to part with a good or to put up with something undesirable (such as pollution or crime). Willingness to pay (WTP) is the opposite—the maximum amount of money someone is willing to pay for a good or to avoid something undesirable. According to standard economic intuition, WTP should be relatively stable across decision contexts and WTA should be very close to WTP for a given good.

Behavioral economics, however, has shown that WTP and WTA may be context-dependent. For example, Thaler (1985) found evidence that people presented with a hypothetical scenario of lying on a beach and craving a beer would be willing to pay significantly more for a beer purchased at a resort hotel as opposed to a rundown grocery store (see also transaction **utility** and **mental accounting**). In addition, sometimes the average WTA for a good exceeds its WTP, which may be indicative of an **endowment effect**, i.e. people value something more if they already own it. Research has also shown that the farther a good is from being an ordinary private (market) good, the more likely it is that WTA exceeds WTP. The WTA-to-WTP ratio is particularly high for health/safety and public/non-market goods (Horowitz & McConnel, 2002).

Winner's curse

The winner's curse describes the phenomenon that the winning bid of an auction tends to exceed the true (and uncertain to the bidders) value of the commodity, resulting, in effect, in the winner overpaying. Emotion, **cognitive biases** and incomplete information seem to account for this behavior, which can, in extremis, lead to **bubbles** in the stock or real estate markets.

In his seminal paper, "Anomalies: The Winner's Curse", Richard Thaler (1988) stated that if he were to auction of a jar of coins amongst his students, (1) the average bid would be significantly less than the actual value of the coins (bidders are risk averse) and (2) the winning bid would exceed the value of the jar (even if it might be overpriced). This is not consistent with the idea of all bidders being rational. In theory, if perfect information were available to everyone and all participants were completely rational in their decision-making and skilled at valuation, no overpayments should occur. However, the winner's curse, a robust and persistent deviation from theoretical predictions established in experimental economics, reflects **bounded rationality** quite well, since people have difficulty in performing contingent reasoning on future events (Charness & Levin, 2009) (see **intertemporal choice**). Not surprisingly, in an experimental demonstration of the winner's curse, the degree of uncertainty concerning the value of the commodity and the number of competing bidders were identified as the two factors that affect the incidence and magnitude of this curse (Bazerman & Samuelson, 1983).

In an attempt to overcome the winner's curse, an experiment has identified two factors that account for its persistence: a variability in the environment, which leads to ambiguous feedback (i.e. choices and outcomes being only partially correlated), and the tendency of decision makers to learn adaptively. Therefore, reducing the variance in the feedback (such that choices and outcomes are correlated), performance can be significantly improved (Bereby-Meyer & Grosskopf, 2008).

Z

Zero price effect

The zero price effect suggests that traditional cost-benefits models cannot account for the psychological effect of getting something for free. A linear model assumes that changes in cost are the same at all price levels and benefits stay the same. As a result, a decrease in price will make a good equally more or less attractive at all price points. The zero price model, on the other hand, suggests that there will be an increase in a good's intrinsic value when the price is reduced to zero (Shampanier et al., 2007). Free goods have extra pulling power, as a reduction in price from $1 to zero is more powerful than a reduction from $2 to $1. This is particularly true for hedonic products—things that give us pleasure or enjoyment (e.g. Hossain & Saini, 2015). A core psychological explanation for the zero price effect has been the **affect heuristic**, whereby options that have no downside (no cost) trigger a more positive affective response.

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APPENDIX

Author Profiles

Sheena Iyengar (Introduction)

Sheena Iyengar is the S. T. Lee Professor of Business at Columbia Business School, where she has taught since 1998. A graduate of both Wharton and Stanford, she is one of the world's experts on choice and innovation. Famously known for her "Jam Study," which transformed the way we think about products offered in the marketplace and how we curate them for customers, you may recognize her from one of her TED Talks, which have collectively been viewed nearly seven million times.

In 2010, her book *The Art of Choosing* received the Financial Times and Goldman Sachs Business Book of the Year award and was also ranked #3 on Amazon.com. Her second book, *Think Bigger: How to Innovate*, released in April 2023 has been hailed by The New York Times and Financial Times as a must read for business leaders and was ranked by Thinkers50 as one of 2023's Best New Management Books.

At Columbia Business School, Dr. Iyengar leads the innovation program and teaches "Think Bigger," a hands-on course where MBA students learn to think outside the box so they can solve big problems and come up with their best ideas. An award-winning educator, she earned the Columbia Business School Dean's Award for Outstanding Core Teaching and was named one of the World's Best B-School Professors by Poets and Quants. She is a 2002 recipient of the Presidential Early Career Award and was ranked as a top 50 global management thinker by Thinkers50. The Asian American Business Development Center ranked her as one of 2022's Outstanding 50 Asian Americans in Business. She also regularly appears (2019, 2021) on the Thinkers50 list of the Most Influential Business Thinkers. In 2012, she was recognized by Poets and Quants as one of the Best Business School Professors for her work merging academia with practice. In 2002, she was the only social scientist to receive the Presidential Early Career Award for Scientists and Engineers from the Office of the President.

Iyengar has given talks to over 200 companies and has spoken at Davos. She is regularly referenced in top tier media such as The Wall Street Journal, the Financial Times, The New Yorker, The Economist, Bloomberg Businessweek, CNBC, CNN, BBC, and NPR.

Iyengar holds a dual degree from the University of Pennsylvania, with a BS in Economics from the Wharton School and a BA in psychology from the College of Arts and Sciences. She received her PhD from Stanford University.

In her personal life, as a blind woman, Iyengar intuitively used Think Bigger to find her calling and strives to inspire others to do the same.

William Duggan (Introduction)

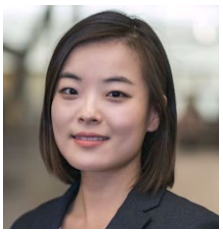
William Duggan is the author of four books on innovation: *Strategic Intuition: The Creative Spark in Human Achievement (2007)*; *Creative Strategy: A Guide for Innovation (2012)*; *The Seventh Sense: How Flashes of Insight Change Your Life (2015)*; and *The Art of Ideas (2020)*. In 2007 the journal Strategy+Business named *Strategic Intuition* "Best Strategy Book of the Year." He has BA, MA and PhD degrees from Columbia University, and twenty years of experience as a strategy advisor and consultant.

Professor Duggan teaches innovation in three venues at Columbia Business School: MBA and Executive MBA courses, and Executive Education sessions. In 2014 he won the Dean's Award for Teaching Excellence. He has given talks and workshops on innovation to thousands of executives from companies in countries around the world.

Dilip Soman (Guest Editorial)

Dilip Soman holds a Canada Research Chair in Behavioural Science and Economics and serves as the Director for the Behavioural Economics in Action research centre (BEAR) at the University of Toronto. He holds degrees in Engineering (BE, Bombay), man¬agement (PGDM, Indian Institute of Management) and Behavioral Science (PhD, University of Chicago), and he also serves as director of the Behaviourally Informed Organizations initiative (BI-Org: https://www.biorgpartnership.com/). He is the author of *The Last Mile* (University of Toronto Press, 2015), co-author of *Managing Customer Value: One Step at a Time* (World Scientific, 2022), and co-editor of *The Behaviorally Informed Organization* (UTP, 2021) and *Behavioral Science in the Wild* (UTP, 2022). He is interested in the adoption of behavioral science and its applications to wellbeing and policy.

Bing Feng (Guest Editorial)



Bing Feng is currently a manager in the Behavioural Finance team at TD wealth, one of Canada's large financial institutions. Previously, she worked as the associate director of the Behavioural Economics in Action at Rotman (BEAR) research centre, and project manager of the BI-Org partnership. Her work focuses on helping organizations embed and harness behavioral insights in their everyday processes, and she has contributed articles on these topics to Behavioral Scientist and to the BEAR report series. Bing holds an MBA degree from the Rotman School, University of Toronto, and a BA in Economics from Western University.

Jingqi Yu (Guest Editorial)

Jingqi Yu is a postdoctoral researcher at BEAR, University of Toronto, and is heavily involved in the BI-Org initiative. Her work focuses on two areas: 1) solving present-day behavioral challenges through a science-based approach and 2) identifying and developing new ideas that help shape the way leaders approach behavioral change. Jingqi holds a dual PhD in Psychology and Cognitive Sciences from Indiana University.

Alain Samson (Editor)

Alain Samson is the editor of the Behavioral Economics Guide, founder of BehavioralEconomics.com and Chief Science Officer at Syntoniq. In the past, he has worked as a consultant, researcher and scientific advisor. His experience spans multiple sectors, including finance, consumer goods, media, higher education, energy and government.

Alain studied at UC Berkeley, the University of Michigan and the London School of Economics, where he obtained a PhD in Social Psychology. His scholarly interests have been eclectic, including culture and cognition, social perception, consumer psychology and behavioral economics. He has published articles in scholarly journals in the fields of management, consumer behavior and economic psychology. He is the author of Consumed, a *Psychology Today* online popular science column about behavioral science.

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Contributing Organizations

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American University Kyiv, Institute for Behavioral Studies

The Institute for Behavioral Studies (IBS) is a research unit at American University Kyiv, which aims to provide evidence-based insights on human behavior to support policymakers and businesses in making targeted and efficient decisions. To accomplish this, IBS applies academic principles and toolkits of behavioral economics to solve urgent issues. IBS is the only research institution in Ukraine that follows this approach.

IBS's current and planned primary projects revolve around the investigation of human behavior and the development of nudges to influence behavior in socially acceptable ways. These projects are specifically focused on addressing pressing issues related to the ongoing war in Ukraine. The Institute conducts research to understand the factors driving evacuation behavior during wartime and investigates social norms of mental health to enhance its social acceptability. Additionally, IBS has planned a longitudinal study of Ukrainian refugees in various countries and internally displaced persons.

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Salzburg Research

Salzburg Research is an innovation-driven research and technology organization in Austria, conducting applied research in the field of information and communication technologies, with a focus on motion data intelligence in smart cities & regions, as well as health and sports markets.

The strength of Salzburg Research lies in the interdisciplinary combination of expertise in technology, data-science, socio economics and psychology. The innovation research group focuses on user research and technology acceptance of solutions enabled by the Internet of Behaviour, which uses data gathered from objects in the physical world, connected within the internet, in order to understand and drive human behaviour. The innovation research group conducts studies on behavioural change, nudging, motivational techniques, and gamification approaches and examines the design, effect and impact of data-based and digital behavioural interventions in mobility and health contexts.

www.salzburgresearch.at

SixthFactor Consulting

As a recognized leader in market research, SixthFactor Consulting believes in providing our clients with Predictability, Clarity, and Profitability. Striking a balance between industry experience and innovation, we cater to a global clientele through a rich blend of traditional and avant-garde approaches. Our special emphasis on Behavioural Economics, supplemented by our region's pioneering Neuro lab, facilitates a profound understanding of consumer choices.

Harnessing the power of ethnographic research and artificial intelligence, we decode the intricacies of consumer behavior and cultural nuances. This helps us in generating insights that are deeply rooted in the contexts of Middle East, Africa, India, and SouthEast Asia cultures. Our highly experienced team works hand-in-hand with executive leadership to offer more than just data – we provide actionable, tailored business strategies designed for maximum impact.

Choose SixthFactor Consulting for a comprehensive, data-driven exploration of your market landscape, leveraging unique cultural understanding and cutting-edge AI technologies to transform insights into successful, profitable strategies.

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Standard Bank

Standard Bank Group is Africa's largest financial institution that offers banking and financial services to individuals, businesses, institutions and corporations in Africa and abroad. Africa is our home, and our belief in the possibilities of this continent motivates us to drive her growth.

We believe that dreams matter in driving growth and that we must always find new ways of making them possible. That is why we are evolving from being a traditional bank to a digitally-enabled services organisation that delivers smart solutions and innovations. We do this by putting people at the centre of what we do – because their dreams reflect the possibility of this great continent.

Our vision is to be the leading financial services organisation in, for and across Africa, delivering exceptional client experiences and superior value. As we move to become a services organisation, we are building ecosystems of trusted partner organisations – a shift that will see us become an advisor and enabler of sustainable growth.

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