# THE BEHAVIORAL ECONOMICS GUIDE 2020

Introduction by
**Colin Camerer**

Edited by
**Alain Samson**

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# INTRODUCTION

# Challenges for Behavioral Economics

# Cumulating and Distilling What We Know

## Colin Camerer

Behavioral economics and its application in important areas of practice is thriving, as this Guide and preceding annual Guides clearly show. In this essay, I would like to challenge all of us to continue to innovate around ongoing challenges. Two of these are the result of an embarrassment of riches, from having so much new evidence and new ideas. Those two challenges are how knowledge accumulation can work better, and how to reduce the "dimensionality" of all the different behavioral factors we perceive, to distill them to a smaller, more general set. The third challenge is that there are many ideas in psychology and adjacent social sciences which have not yet been incorporated into behavioral insights (in a way that fully respects ideas and methods of their "native" fields). I use design thinking and salience as illustrations of this challenge.

## Knowledge Accumulation

The goal of science is to accumulate knowledge, full stop. In my opinion, there is a lot of leakage in how we currently do this. The reproducibility "upgrade" (a term I prefer to "crisis") going on in many areas of science is an example of trying to minimize leakage. Solid accumulation depends on not getting led too far or frequently astray by false positives which do not reproduce. A good infrastructure for rapidly evaluating and cumulating results is of special use for "hurry-up" social science. For example, as I write this there are probably hundreds of social science studies being done about COVID-19. It is essentially impossible for all those scientists to know what the other scientists are doing. There will be duplication and poorly-designed studies. (It is often said in design that everyone wants cheap, fast, and good. But you can only have two.)

When studies are written and circulated in preprints, a lot of null effects won't be written up. Which studies will get the most attention? It will be a scrum of social media, presenting at seminars, slow and fast reviewing paces. The one thing that would *undoubtedly be most useful*—a giant dashboard summarizing weekly progress on each of those hundreds of studies—does not exist. This is a failure of good informatics.

Behavioral economics is accumulating knowledge about how different kinds of nudges influence behavior at a rapid pace. The challenge is that carefully assessing what an entire body of knowledge is telling us is actually quite difficult and is under-rewarded (by academic incentives). A lot of academic publishing, and similar career concerns within government or NGOs, depend on creativity and doing something new. This creates an incentive to exaggerate the novelty of one's contribution compared to what is known from past studies.

Doing a study in which you very carefully collect and code studies for meta-analysis shows little creativity and novelty because the idea is to look at everyone else's studies.  If you were trying to show your brilliance and originality, meta-analysis is the last thing you would do.

But think how valuable meta-analysis is! I'm working on a couple of these and will just mention one that is almost published, about "time budget" (CTB) experiments (Imai, Rutter, & Camerer, in press). The time budget paradigm presents subjects with a line that represents possible allocations of 100 tickets for money earned at time T or T+X, with stated conversion rates for tickets to money at the two times.  For example, suppose T=today and T+X=one week from now. If the conversion rates are $0.10 for today and $0.11 for one week from now, the budget reflects an implicit interest rate of 10% per week. CTB is basically an expansion of the typical "smaller sooner, larger later" (SS/LL) paradigm, in which two discrete amounts and dates are

compared. In CTB the ranges of "sooner" and "larger" are continuous. Present bias, for example, will be evident if people allocate a lot more tickets to the earlier time T when that time represents an immediate reward. Since this method was first used by Andreoni and Sprenger (2012), it became an immediate sensation.

Imai et al. (in press) meta-analyzed 48 studies using this method. Figure 1 shows a "funnel plot" of estimates of the present bias parameter ⬚. Publication bias can be detected from the lowest-power studies which have high standard errors and low precision. Imprecise studies should have both unusually low values (like the data points around PB=0.6) and very high values, in this case above 1. Those high-value studies are missing. More careful tests indicate publication bias, but only for studies that use "real effort" instead of money.
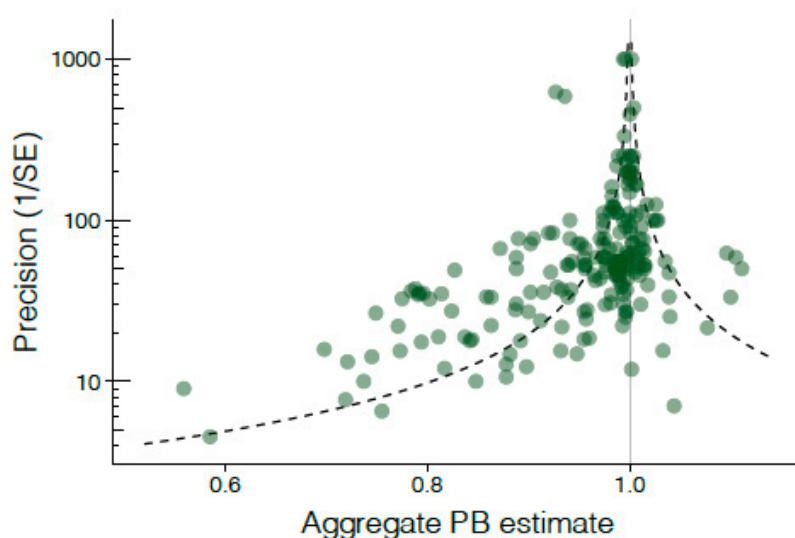


**Figure 1:** Funnel plot of estimates of present-bias parameter PB. The y-axis (precision; inverse standard error) is presented in log-scale. The dotted curves indicate the boundaries for rejection of the null hypothesis of no present bias (PB=1) at p<.05. *Source:* Unpublished artwork, Taisuke Imai.

There are many likely pressures that create publication bias. One is that a powerful profitable institution does not want bad news to get out (this may contribute to false positives in medical trials, for example). For academics, the typical pressures are more mundane—null results are deemed "uninteresting" and results contradicting a consensus view are over-scrutinized. By the way, most academics would love to publish a null result if they could; and most everyone understands that a precisely-estimated "there is no effect" is actually informative, if people think there is an effect. Because authors aren't ashamed of null effects, but they do not often appear in journals, the filtering seems to lie in the refereeing and editorial process.

An important point about publication bias for behavioral economics and nudges was made by David Halpern (director of the very successful UK Behavioral Insights Team) in a meeting in Singapore in 2017. Halpern said that in many government domains, randomized experiments are taxpayer-funded and there is an understanding that *all* results will be 'published' in some publicly accessible way, regardless of their results.

Halpern's revelation is amazing, because there is literally no similar burden for academic research in the US, even when it is taxpayer-funded. Suppose you wanted to sift through NIH or

NSF funding, and figure out what the results of all hypothesized experiments were. It would be impossible.

Here is an example of a meta-analysis that I loved (Cadario & Chandon, 2019). It represents the accumulation of available knowledge about nudges used to change eating habits. They culled 299 effect sizes from 96 studies reported in 90 papers. They drily note that "The number of observations per study ranged from 36 to 100 million, with a median of 1231." Figure 2 is a gorgeous summary of what they learned. (The rest of the paper is packed with details and methods; if you are curious about the nuts and bolts of meta-analysis it is a good place to start, as is Stanley & Doucouliagos, 2012).
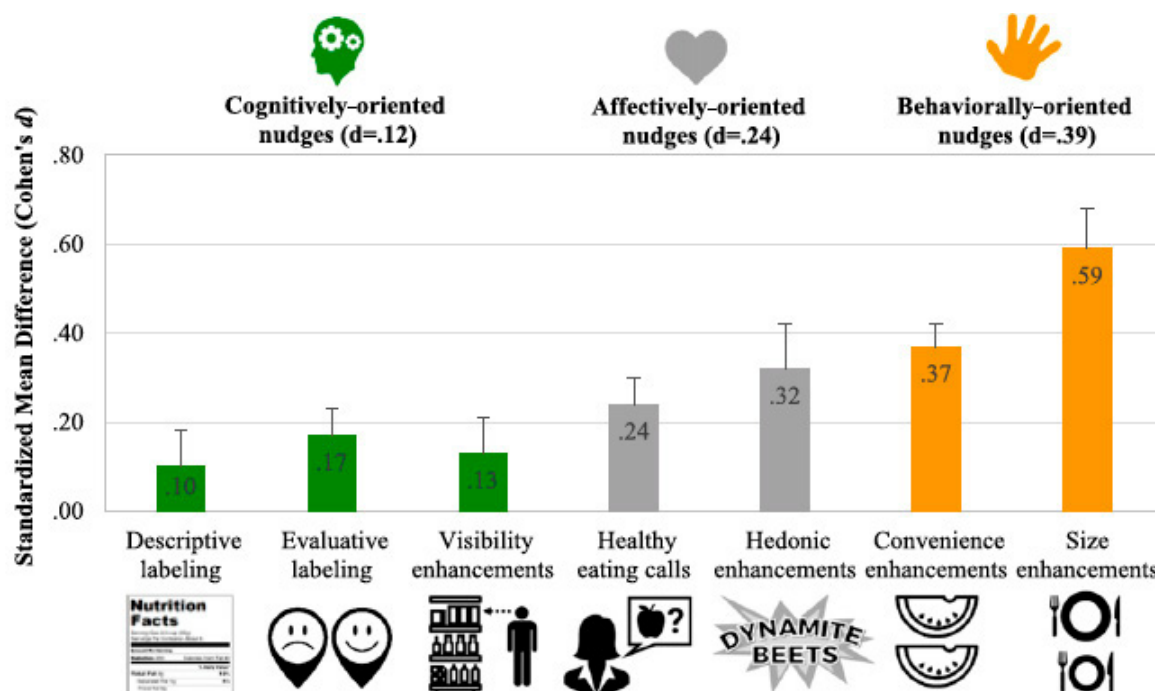


**Figure 2:** Meta-analytic effect sizes d from nudges to change eating. *Source:* Cadario and Chandon (2019).

Their conclusion is that there is a clear ordering from small to large, cognition<affect<behavior. For example, changing plate size works better than adding nutrition details.

There are other prominent meta-analyses of nudges, but they are selective. Benartzi et al. (2017) estimated cost-effectiveness of 20 published studies on typical interventions like increasing savings and college enrollment. Hummel and Maedche (2019) meta-analyze 100 published studies. DellaVigna and Linos (2020) use data from the US "Nudge Unit" and academic publications. They examine only field RCTs with a control group, no financial incentives or default treatments, and binary outcomes. Those filters selected 165 RCTS with 349 nudge treatments from the Nudge Unit (90% unpublished). The same filters selected 26 RCTs with 75 nudge treatments from published papers. The interesting finding is that academic papers report larger effect sizes, around 8.7 percentage point effects, compared to only 1.4 percentage point for Nudge Units. There seems to be publication bias (favoring positive results) in the academic corpus, but not in the nudge unit sample (in which every RCT is reported, as Halpern promised).

We need to see a lot more results like these. And they need to be published prominently. As of this writing, Benartzi et al. (2017) has 319 Google Scholar citations. Hummel and Maedche (2019), which is more recent (but first circulated in 2017), has only 21 citations.

The second challenge which is the focus of this essay is the simultaneous need to take stock about what is known, while also continuing to "import" areas in psychology that have been overlooked and should prove useful to understand behavior and create positive behavior change.

Social sciences are in a Golden Age (Buyalskaya, Gallo, & Camerer, 2019). Our golden age is marked by incredible volume and quality of data and increasing "trade" and collaboration across disciplines to solve hard problems (cf. Mažar's, 2019, allusion to "integrative thinking"). Behavioral economics was an early adopter, and successful exemplar, of this style.

## Taking Stock: What is the "Periodic Table" of Behavioral Elements?

The fertility of behavioral economics is sometimes measured by the sheer number of concepts from behavioral science that have been brought to bear on economic decisions. Many of you will have seen the circular codex of 175 or so cognitive biases created by Buster Benson during parental leave (you can see it at the URL below this citation: Benson, 2016). He writes:

I made several different attempts to try to group these 20 or so at a higher level, and eventually landed on grouping them by the general mental problem that they were attempting to address. Every cognitive bias is there for a reason — primarily to save our brains time or energy. If you look at them by the problem they're trying to solve, it becomes a lot easier to understand why they exist, how they're useful, and the trade-offs (and resulting mental errors) that they introduce.

Benson is a marketing person at Slack, and an author. He does not have a PhD But his codex and the logic behind is a reminder, perhaps humbling, that there are a lot of very talented, scientifically-curious people working in firms, especially in tech, who are essentially applied social scientists. Their products test hypotheses about human behavior.

Benson's rationale for grouping biases into categories is a partial rediscovery of a framework introduced by the vision neuroscientist David Marr in 1982 (see Krakauer et al., 2017). Marr's idea was that understanding a biological system required knowing its functionality or computation (Why? What is it for?), algorithmic specification such as equations or a blueprint (What? What abstract parts characterize it?), and mechanism (How? How does organic material execute the algorithm?). Benson used "What is it for?" to reduce the dimensionality in his codex.

Of course, there are other scientific methods to do dimension-reduction. However, professional career success in behavioral economics (and particularly in psychology) often rewards the discovery of a "new" bias or effect. Those discoveries are necessary; but they are building blocks, meant to be assembled into structures. Equally important to discovery is therefore the disciplined ways of reducing a large number of related biases to a smaller number.

Think about psychometrics. Good psychometric scales ask multiple questions whose answers are highly, but not perfectly correlated, because they are thought to tap subtly different aspects of a single construct. Dimension reduction is achieved by methods like principal components. The goal is something like a periodic table of behavioral elements, all of which are distinct.

In behavioral economics, a pioneering paper on this topic is Stango and Zinman (2019). (Their first version is from 2016 and was revised twice more before the 2019 version; that means it was hard to publish.) They compress a long list of surveyed behaviors, such as beliefs in the gambler's fallacy, loss-aversion, and time discounting into a "B-count". They show that while B-count is highly correlated with measures of intelligence, it has additional predictive power for financial outcomes and other variables.

The desire for a single-dimension B-count for each person is motivated by the suggestion that such numbers could be used to do "welfare analysis" (e.g. Chetty, 2015). Welfare is the economic term for analyzing how policy changes improve outcomes for different groups of people, as those people themselves would judge them.

From a psychological point of view, the B-count approach is a little odd because it imposes a single dimension onto behaviors which are likely to correlate imperfectly and draw on quite different psychological and neural processes. It has the flavor of scales like the South Oaks Gambling Screen (SOGS) diagnostic criteria for pathological gambling (Lesieur & Blume, 1987). The SOGS asks 22 questions and counts up the number of pathology-consistent Yes answers to questions such as "Have you ever lost time from work (or school) due to gambling?". One to four Yes answers means you have "some problems with gambling". Five indicates "probable pathological gambler". We surely don't want all the nuances of behavioral judgments, risk-taking, limits on strategic thinking, etc., to be boiled down to one such simple scale. (Although one can see its value for busy clinicians.)

A different approach to dimension reduction was taken by me and coauthors in Chapman et al. (2018). We did a survey of average Americans and asked questions yielding 21 measures of behaviorally-interesting "econographic" choices, mostly about patience, risk preference, sociality, and mental overconfidence. We then use principal components to see how many distinct dimensions the 21 measures might be reduced to (rather than assuming the measures contribute to a single B-count). We recover five dimensions, which generally cluster over risk, time, and sociality with a couple of interesting exceptions. (Our paper has been difficult to publish too.)

## 'New' Psychology: Design and Salience

A healthy behavioral economics should be dimension-reducing at the same time as new kinds of effects are being discovered. Indeed, given how much psychology and other behavioral sciences have to offer, I often feel that the menu of typical nudge treatments is a little stale. The usual menu consists of defaults, loss/gain framing, prosociality priming, social comparison, and a few others. But there is so much more in psychology (and elsewhere)! Even the best restaurants add new dishes regularly. We should too.

Thaler (2020) expresses a similar view. He wrote that:

"We know a lot about the effect of the strategies Katy [Milkman] used so successfully here such as defaults, reminders, deadlines, guilt, salience and norms…my question is whether they span the entire behavioral science repertoire? Do we not have some new behavioral strategies to employ?"

Along these lines, Mažar's (2019) editorial in last year's Guide mentioned the importance of design; I totally agree. Indeed, Thaler and Sunstein's (2008) book has design discussion in chapter 5, including a picture from Norman's (1990) classic book, illustrating good and bad stove-burner designs. Good designs map burner locations and on-off switches similarly, so the visual system can quickly associate which switch corresponds to which burner.

Design first appears even earlier on the third page of their book. They mention two examples, design of voter ballots and forms, and draw an analogy between choice architecture that influences behavior, and how architectural design of buildings influences behavior. When I worked at Chicago GSB (now Booth) in the early 1990s, there was a single mailroom and just next to it, a coffee area with couches. People would often bump into each other, catch up on research and argue. Newcomers were quickly introduced around this way, and "high-centrality" people connected faculty members from different fields. I'm not sure if this design influenced interdisciplinary understanding for the better (or was even deliberate), but the fact that the entire field of architecture exists and so thoroughly considers its behavioral influence suggests maybe it did.

If you are nudging you are designing, whether you realize it or not. Making forms simpler, reducing visual clutter, creating a good infographic, directing attention to the right place, crafting emails that remind without nagging, minimizing "pain points" in a visuo-motor sequence, etc., are all aspects of design. In social science we tend to abstract from how our brains absorb information in different sensory modalities, haptics, and affordances (outside of social sciences that are focused explicitly on these topics). But such details are crucial for nudging. The details are what determines whether something that is meant to be simple really is simple. (Simple = well-designed.) Behavioral economics has not fully embraced the importance of these details, and how they can be understood scientifically.

Salience has become salient in economics in a few ways. Bordalo, Gennaioli, and Shleifer (2012) introduced a simple formula in which extreme values are more salient, and apply it successful to examples from risky choice, asset pricing, and consumer theory. Another example is visual salience (see Li & Camerer, 2019). Visual salience is special because the visual system is probably the brain circuit and function that is the most well-understood. Cognitive neuroscience has discovered some robust principles about what makes stimuli visually salient (Cornia et al., 2018; Itti & Koch, 2001). Some features are "bottom-up"—color, contrast, and orientation. These features universally grab early attention (in <500msec). Others are "top-down": They depend on expectations, personal experience, task goals (looking for a familiar face at a party, or a new one?), and surprise relative to a Bayesian prior. To a new Volvo-owner, Volvos are suddenly familiar and seem to be everywhere.

Good design makes whatever you want people to see more visually salient and easy to make sense of. That's it.

Here is an example from Li and Camerer (2019) (who use visual salience to predict coordination in visual matching and hider-seeker games). In a particular kind of complicated behavioral intervention, Karing and Naguib (2017) wanted to create credible and noticeable "signals" indicating when Kenyans had dewormed their children. (The idea is that deworming is good for a child, and also is a public good because it prevents worms from spreading to other children.) A good signal must be visible to others, and the parents must know it will be visible to others.

Perceptual salience is essentially necessary for a good signal to do its social job. Ink on the thumb did not work. But a lime-green bracelet did. Figure 1a shows the bracelet. Figure 1b shows a heat map of a visual salience algorithm trained to predict what people will look at. The algorithm predicts that the bracelets are salient (and a colorful logo on the t-shirt is too).

There are many other applications for how visual salience, and other predictive aspects of good design, can be used to take behavioral economics to the next level in practice.

**a.**                                          **b.**
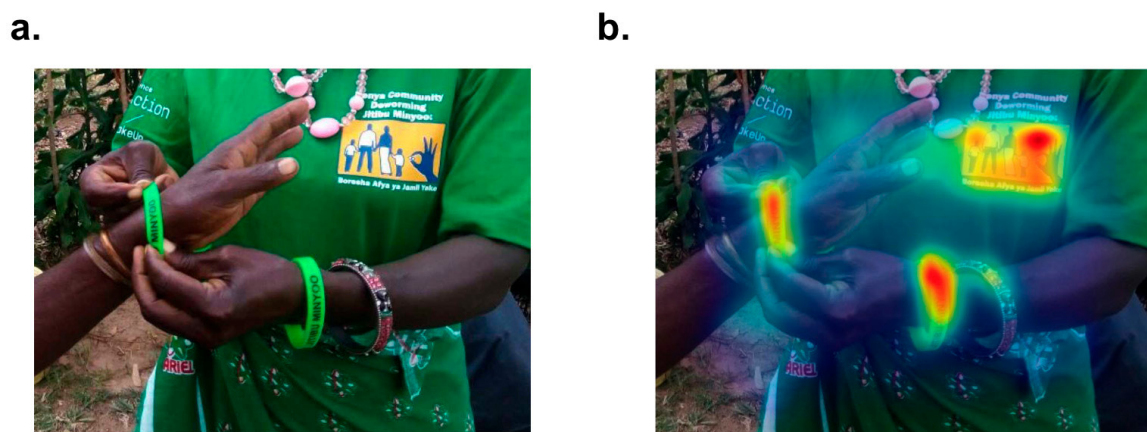


**Figure 3:** Bracelets used to signal compliance with a deworming program in Kenya. *Source:* Photograph (a) courtesy of Anne Karing. Heatmap (b) generated by Xiaomin Li based on Cornia et al. (2018).

## Wrapping up

Active behavioral economists working in academia and practice are well-aware of the three challenges described in this essay. Progress is likely on all three fronts. For example, between the first draft of this essay and the last DellaVigna and Linos (2020) meta-analysis showed up as if my words rubbed a lamp from which a genie emerged. That paper also vindicated Halpern's 2017 statement that nudge units essentially 'publish' everything, whether RCTs worked or not. This practice makes meta-analysis so much easier and can be easily adopted by academics (for which preregistration is a step in the right direction). Whether we'll ever have a Behavioral Insights Truth Scoreboard to keep track of all the knowledge in the world in real time remains to be seen. (Though more than one COVID-19 online trackers already exist, showing a use case of a particular kind.) If there is such a thing, it will benefit greatly from publications like this that regularly report what behavioral insights people are discovering.

## The Author

**Colin Camerer** is the Robert Kirby Professor of Behavioral Economics at the California Institute of Technology. He earned a PhD from the University of Chicago in 1981, worked at Northwestern, Penn, and Chicago, and came to Caltech in 1994. He was elected a Fellow of the Econometric Society in 1999 and named a MacArthur Fellow in 2013. Camerer's research group uses a wide variety of lab and field methods to study computations made in goal-directed economic and social decisions, including strategic interaction and market trading. fMRI projects have isolated self-control in choosing tempting foods, emotional regulation of financial losses, curiosity, and neural circuitry underlying disposition effects stock market  bubbles. Their group have also used TMS to causally influence choice, eyetracking to measure attention, behavior of lesion patients, and competitive touchscreen experiments with chimpanzees. Besides creating lab experiments, Camerer's group tests theories from neuroscience and psychology using field data on sports betting, work decisions, strategic naivete among moviegoers, and habits in consumer choice.

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EDITORIAL

# Giving the Future a Chance

## Behavioral Economic Responses to the Dual Challenges of COVID-19 and the Climate Crisis

Elke U. Weber

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The editorial in each annual edition of the Behavioral Economics Guide is meant to review emerging trends in behavioral economics and related social and behavioral sciences. In 2018, Robert Metcalfe discussed solutions to problems that affect governments and companies and reviewed the use of social image, commitment contracts, and the role of inattention. Last year, Nina Mažar wrote on ethics, integrative thinking, and the need for greater integration across the social sciences. Both commented on the excitement and optimism present in the field.

This year, we find ourselves in a different reality. Like Lewis Carroll's Alice, we have gone down a rabbit hole, emerging in a world that is hardly recognizable. All that we took for granted—as recently as the drop of the crystal ball in Times Square last New Year's Eve—has been called into question: Our ability to go to work; meet with friends and family; find needed products in stores or online; attend conferences, concerts, movies, or plays; travel for work or recreation; attend weddings, funerals, or reunions; and so much more. It is hard to predict when and to what extent our lives will return to even a new normal. Most of us worry about infection with the virus; some, who have fought symptoms, wonder whether they had the disease in the absence of available antigen or antibody tests; those who tested positive worry whether previous exposure confers future immunity; and even those who dismiss the virus threat as a conspiracy committed by a host of hostile groups need to worry about the economic consequences of widespread lockdowns. In such times of deep uncertainty, excitement and optimism are harder to find, not just in global markets and public sentiment, but perhaps also in the behavioral science community. The COVID-19 crisis serves as a cautionary tale about our societal and scientific ability to predict the future, with dystopic science-fiction narratives like the movie Contagion becoming the script for reality seemingly overnight.

Hindsight shows that a coronavirus pandemic was not a 'black swan' (Taleb, 2007), a rare and unpredictable outlier event, but a 'gray rhino' (Wucker, 2016), a highly probable yet neglected threat (Sanger et al., 2020). The current crisis should alert the behavioral science community to the following dangerous combination: Evidence of innumerous sources of uncertainty facing us in many important societal decisions, juxtaposed with cognitive and motivational biases (not only among the general public, but also among scientists and policymakers) that exaggerate our perceived ability to predict (Fischhoff, 1980; Tetlock & Gardner, 2015). One important lesson the field may want to take away from this realization is the importance of employing modeling approaches that explore and acknowledge the true extent of ignorance of future events and creatively guard against probable and unpredictable high-impact surprises. I will say more below about the Robust Decision-Making framework (Lempert, 2006), which does precisely that.

## Behavioral Economics Lessons for Coronavirus and Climate Change Responses

The COVID-19 pandemic may be the most important public health challenge of recent decades, with severe implications for human life, wellbeing, economic prosperity, and security. Yet, over the long term, its impacts will most likely be dwarfed by the consequences of global climate change. There is a growing threat of exceeding critical thresholds of greenhouse gas concentrations in the Earth's atmosphere that keep our planet's climate within livable range and also of exceeding other planetary boundaries, all of which are driven by a growing global population with increasing expectations for improved standards of living and by a global market economy that depends on continuous growth.

While appeals by the scientific community to pay attention to these fundamental and systemic risks of business-as-usual have been ignored for far too long by the political class and the general public, the tide appeared to be changing more recently. Over the past year or so, climate change concerns and calls to action for environmental stewardship and sustainable development had been increasing quite noticeably, driven by the UN Intergovernmental Panel on Climate Change Special Report on the Impacts of Global Warming of 1.5°C above Pre-industrial Levels (IPCC, 2018) and Sustainable Development Goals (Sachs et al., 2019), by emergent youth movements like Greta Thunberg's Fridays for Future, by increased stated concern about carbon risk exposure on the part of institutional investors and even major asset management firms like BlackRock, and by other members of civic society (e.g. employees of companies like Amazon) expressing the desire for increased efforts in climate change risk management and mitigation.

The onset of the COVID-19 crisis has raised fears that a finite pool of worry will derail this momentum (Leiserowitz et al., 2020), as the attention of the public and policymakers shifts from climate change mitigation to dealing with this public health emergency. The jury is still out on what COVID-19 concern and action (both individual and public) will mean for climate change concern and action. The 2020 version of the annual Yale-George Mason climate change survey showed that Americans' positions on climate change were not moved much by the coronavirus pandemic and associated economic crisis: 73 percent of respondents said that climate change was happening, 54 percent were "extremely" or "very" certain that it is happening, and 62 percent accepted the established scientific view that global warming is mostly caused by human activity, all levels that matched the high levels of acceptance previously measured by the survey in 2019 (Leiserowitz et al., 2020). Two large panel studies in which I am currently involved with collaborators, one using a large representative sample of Americans (Constantino et al., 2020) and the other employing three large samples in the US, Italy, and China (Sisco et al., 2020), find that reported worry about climate change and reported worry about COVID-19 are positively correlated, even when controlling for a broad range of demographics. This clearly contradicts the prediction that a simple interpretation of the finite-pool-of-worry hypothesis (Weber, 2006) would make, but it is instead consistent with affect generalization (Johnson and Tversky, 1983). On the other hand, both Twitter activity and media reporting in Sisco et al. (2020) show the predicted negative relationship between climate change coverage and COVID-19 coverage over the past two months in all three countries, with a greater frequency of postings related to COVID-19 replacing postings related to climate change. Twitter activity and media reporting about related risks, namely, between COVID-19 health risks and economic and unemployment risks, on the other hand, show a positive relationship, suggesting that the observed negative correlation between COVID-19 and climate change is not simply due to logistical capacity constraints (Sisco et al., 2020). There is plenty more to understand, and the COVID-19 crisis is a powerful natural experiment that will allow us to examine and qualify the finite-pool-of-worry hypothesis in important ways.

There are other—positive—ways in which the two crises may relate. Media accounts have been speculating about the extent to which the temporary reduction in carbon emissions as a result of the pandemic may help with the climate change challenge. The International Energy Agency predicts that the world will use six percent less energy this year (IEA, 2020), equivalent to losing the entire energy demand of India. Of greater interest to this audience is the question of whether there are ways in which current changes in behavior, enforced by governments or circumstances, may lead to the establishment of new habits or new formal or informal

institutions that will continue to reduce greenhouse gas emissions after current restrictions are removed. Both individuals and organizations are finding out the true costs and benefits of changes in work and travel habits that they had previously resisted, in part out of status quo bias. Working from home and using telepresence to reduce business travel saves time, money, and carbon emissions, and may not compromise employee productivity or meeting effectiveness. Consistent with such positive lessons, several companies, including Facebook, Twitter, and the payment company Square, recently announced that employees would be allowed to work permanently from home. On the other hand, current restrictions on travel and movement in the personal sphere will more likely result in penned-up demand and an increase in activities like airline travel after restrictions are lifted. Additionally, on the downside, continued risk of virus transmission by close personal contact will put a serious damper on the use of public transit options like subways, buses, and trains after economies reopen, in favor of carbon-heavy use of private cars.

Lessons may also go the other way. That is, lessons from behavioral economics on how to deal with the climate crisis may turn out to be useful to address challenges with COVID-19. To explore what these lessons might be, it is useful to think about the ways in which the two crises are similar—and the ways in which they are different. Starting with the latter, the two crises *differ* on at least two important dimensions. The first is psychological distance (Liberman, Trope, & Stephan, 2007), with climate change and its negative impacts being seen as more removed in space, time, and likelihood than coronavirus infection. Using responses from the recent survey mentioned above (Constantino et al., 2020) and shown in the two bottom panels of Figure 1, American respondents across the political spectrum rated the impacts of COVID-19 as falling on the present (right panel), whereas the impacts of climate change (left panel) were judged to fall significantly more on the future, a difference that is greater for Democrats than for Republicans. (I will say more about political polarization below.) Second, the two crises also score differently on the psychological risk dimensions identified in the 1970s as driving public willingness to accept risk or protect against it (Fischhoff et al., 1978). Figure 1 shows boxplots of the scores on which three major psychological risk dimensions were evaluated for climate change and COVID-19 (Constantino et al., 2020). The top panels plot "perceived uncontrollability", which scored somewhat higher for climate change than COVID-19 on average, but for both crises it was seen as much lower (i.e. more controllable) by Republicans than by Democrats. The second row of panels plot "dread". Previous work shows that climate change is not something that elicits visceral feelings of dread (Fox-Glassman & Weber, 2016), a result also shown here. COVID-19, in contrast, shows higher levels of dread, especially for Democrats and Independents.

The following characteristics are *shared* by the two crises, both at an individual and at a policy-level decision-making perspective: a) In both situations, the consequences of action or inaction are delayed, making it hard to learn from experience. (b) COVID-19 infections grow exponentially, and greenhouse gas emissions affect the global climate in complex and highly nonlinear ways that can result in tipping points. Both of these features lead to a drastic underestimation of the costs of delaying mitigative action (Kunreuther & Slovic, 2020). (c) Both hazards are characterized by deep uncertainty that encompasses physical, biological, and chemical processes, technological progress, and behavioral responses. (d) Actions to reduce the risk of infection by COVID-19, and actions to rein in the magnitude of climate change, have upfront costs that need to be paid now and for sure, but their benefits accrue to the individual and to the collective only in the future, and with some uncertainty. (e) Both crises are collective

action problems. (f) The costs and benefits of different ways of responding to both hazards are unequally distributed across geographies, levels of income, and prosperity, as well as age and future generations. (g) Both crises call for cooperative action, even though their negative effects on health, wellbeing, and the economy seem to elicit competitive responses.
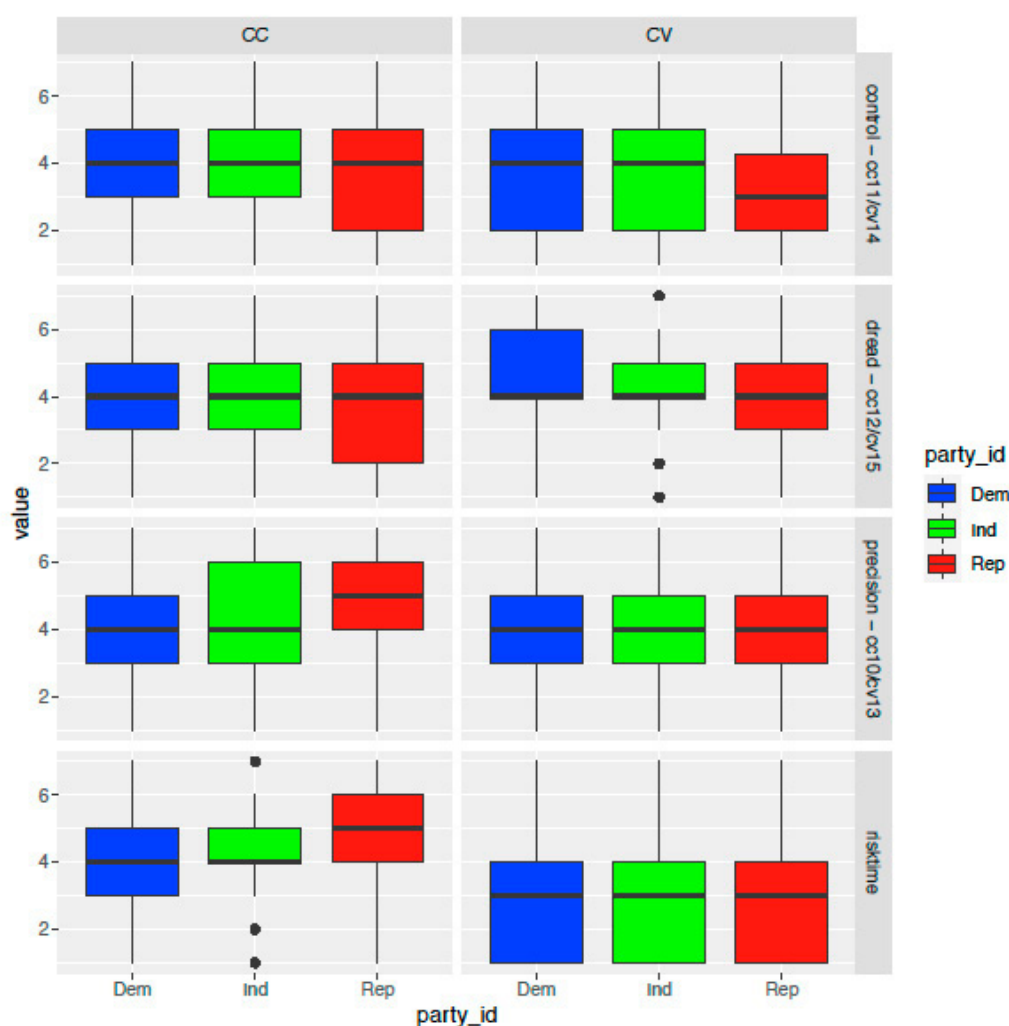


**Figure 1:** Boxplots of three psychological risk dimensions (perceived controllability, dread, and perceived precision of knowledge of impacts) and psychological distance of climate change (CC) risk and COVID-19 (CV) risk, provided by 4,557 American respondents in April 2020, by self-identified political party affiliation (Constantino et al., 2020). Reproduced with permission.

Behavioral economics and allied social sciences have been active in developing solutions for the list of shared challenges described above, which have so far mostly been examined in the context of circumventing challenges related to the climate crisis. A panel of experts convened by the Behavioral Science and Policy Association reviewed the literature on documented solutions that can be applied to energy and environmental policy (Yoeli et al., 2017). As shown in Figure 2, they identified 13 tools that range from choice architecture interventions (e.g. setting defaults, choosing frames, reducing the number of options), to methods of persuasion (e.g. communicating social norms, obtaining commitments) and communication (e.g. providing timely feedback, employing intuitive metrics). More interestingly, perhaps, the experts mapped these 13 tools onto four categories of problems that need solutions. The first objective ("getting people's attention") is a challenge for climate change but does not appear to be a problem for COVID-19, the crisis with a far greater psychological proximity, as described

above. Politicians and media have responded accordingly, with COVID-19 attention and action displacing coverage of many if not most other issues.
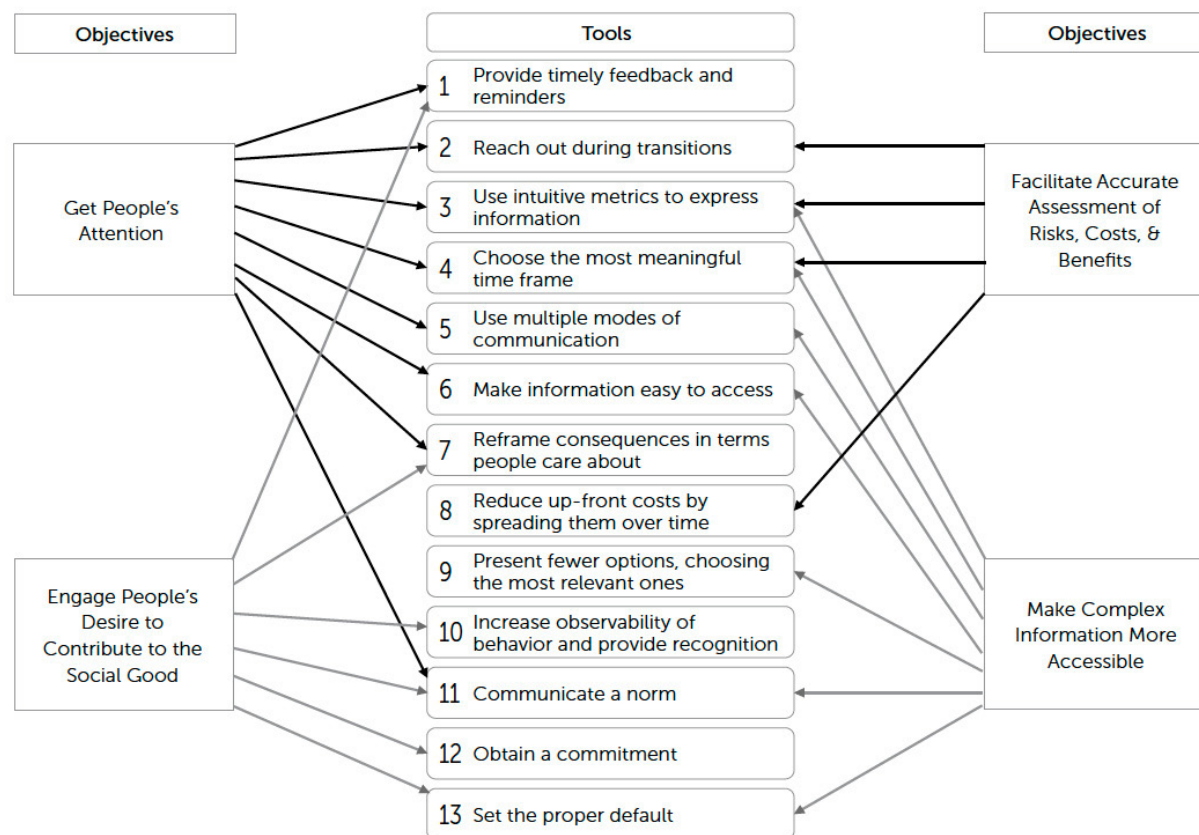


**Figure 2:** Overarching objectives to be achieved by 13 behavioral science tools, in order to strengthen energy and environmental policy, as described by Yoeli et al. (2017). Copyrighted by Behavioral Science and Policy Association (BSPA). Reproduced with permission.

The other three objectives, however ("engaging people's desire to contribute to the social good," "facilitating accurate assessment of risks, costs, and benefits," and "making complex information more accessible"), apply equally well to the challenge of wisely guiding individual and policy responses to COVID-19. The map of tools and objectives in Figure 2 can help in doing so. Communicating appropriate injunctive norms about social distancing and the wearing of face masks (tool 11) will be an important component of effective strategies to move to the next stage of dealing with COVID-19, namely, the gradual reopening of economic, social, and cultural life. Such voluntary restrictions and rules will need to be enforced by the community, which will be helped by the fact that such behaviors are highly visible (tool 10), but they need to be incentivized by informing people about consequences they care about (tool 7), for example protecting their parents or children from infection. As another example, peer-generated and enforced norms of fairness and equity are probably better responses to reduce incidences of hoarding and panic-buying than governmental or store prohibitions. Social norms are currently much in vogue as tools to influence environmental action, in part because they have the potential to lead to tipping points in behavior (Nyborg, 2017).

Responses to both crises show political polarization, i.e. the divergence of concerns, beliefs, and attitudes to ideological extremes. Long established for climate change, both anecdotal evidence and our recent national survey (Constantino et al., 2020) confirm this phenomenon

for COVID-19. Cognitive dissonance, wishful thinking, solution aversion, and a host of other psychological processes and phenomena predict such polarization, which puts limits on the effectiveness of communicating scientific information to inform and modify behavior (Weber, 2017). Even personal experience, long-documented to be a far more effective teacher (Marx et al., 2007), has been shown to be less effective for individuals with strong ideological beliefs in the domain of climate change beliefs and action. For example, as UK residents were exposed to extensive flooding attributable in its frequency and magnitude to climate change, those relatively uncommitted to either a liberal or a conservative ideology became more convinced of the reality and seriousness of climate change ("seeing is believing"), but those at the conservative end of the ideological spectrum failed to take note of the floods ("believing is seeing") (Myers et al., 2013; Weber, 2013). Nevertheless, there are bound to be limits to people's willingness to ignore painful personal experience for the sake of maintaining ideological consistency. Given the greater psychological proximity of COVID-19, it will be interesting to see whether and when "believing is seeing" gives way to "seeing is believing."

## Broader Receptivity to Behavioral Economics

The UK was the first national government to establish a Behavioral Insights Team in 2010 to apply the insights of behavioral economics and allied social sciences to inform public policy design and implementation and improve the collection of taxes and fines and delivery of other public services. The US government established its Social and Behavioral Science Team in 2015, and a long list of other countries have followed suit, from Australia, Canada, and Singapore to Germany, the Netherlands, Indonesia, Ireland, Peru, and others. Behavioral Insight Teams have also been instituted in transnational organizations, including the European Union, the OECD, and the World Bank, with some issuing reports on their efforts and successes (Naru & Cavassini, 2016; World Bank, 2015).

There has been progress in the way behavioral economics has been acknowledged and utilized by the UN Intergovernmental Panel on Climate Change and the energy transition and carbon mitigation policy community. In the first four IPCC reports, the implicit assumption about decision processes on the demand side of mitigation (i.e., energy technology adoption and energy consumption decisions) was rational choice, where individual agents maximize self-focused expected utility, with individual difference variations only in wealth, risk attitude, and time discount rates. A chapter on risk management in the IPCC's 5th Assessment Report (Kunreuther et al. 2014) introduced a broader range of goals (from material goals to self- and other-regarding social goals, and psychological goals) and a broader range of decision processes (calculation-based, but also affect-based, and role- and rule-based processes). The chapter reviewed how experts and the general population differ in their perceptions and responses to risk and uncertainty and pointed policy makers to the importance of understanding and predicting the public's reaction in order to communicate climate risks and uncertainties effectively. It is encouraging that in its 6th Assessment Report the IPCC allocated a full chapter to an expanded treatment of behavioral demand-side mitigation solutions that focuses on human needs as well as human responses in their full complexity (Creutzig et al., 2020).

The introduction of a broader range of goals, decision processes, and individual and cultural differences than those of the compact and homogenous *homo economicus* has important implications for the evaluation of scenarios in the climate change context and elsewhere. On the one hand, it introduces additional variance and uncertainty about the effects of climate

change (e.g., temperature increases or extreme weather) on human behavior and hence future GHG emissions (Beckage et al., 2018). On the other hand, a modeling framework that includes the many drivers and influences on individual decisions that go beyond rational choice and rational expectations (e.g., responses to extreme events, perceived behavioral control, perceived social norms, and framing effects) explains many anomalies observed by ecologists in the field (Constantino, Wijermans, et al., 2020; Schlüter et al., 2017) and generates a broader set of demand-side policy options and more effective ways of implementing them.

Behavioral economics has not just enjoyed broader receptivity in the public policy arena. An increasing number of companies have been acquiring behavioral insight teams to employ them in internal operational and strategic decisions and when interfacing with customers, clients, or other external stakeholder groups. On his website, consultant Steve Shu (2019) lists 37 major companies with internal behavioral economics groups that include BlackRock, Facebook, Google, Microsoft, Prudential, Uber, UBS, SwissRe, and Walmart, as well as 15 consulting firms and practice groups in the behavioral science and behavioral economics space.

## Modeling to Protect Against Dangerous Surprises: Robust Decision-Making

Modeling in behavioral economics has combined the best characteristics of its two parent disciplines. Its origins in the intellectually precise and rigorous traditions of economics have made behavioral economic models of psychological processes more formal, quantitative, and cumulative than psychological explanations, often by adding arguments or parameters to existing rational models of choice. At the same time, the addition of such modeling components is guided by a strong focus on observed empirical regularities of psychology, in contrast to the stronger commitment to the normative option in economics. Adding the present-bias parameter beta to the regular exponential time-discounting parameter delta in the beta-delta model that approximates hyperbolic discounting (Laibson, 1997) is a good example of both of these observations. However, most—if not all—behavioral economics models still fall into the category of (constrained) optimization, providing best estimates of parameter values while making very specific assumptions about the functional form of different sources of uncertainty.

In contrast, Robust Decision-Making (RDM) is an analytic framework in the family of regret models, satisficing evaluation criteria, and sensitivity analyses developed by the RAND Corporation (https://www.rand.org/topics/robust-decision-making.html). It is designed to identify decision strategies that are robust to important classes of deep uncertainty and ignorance. Rather than generating one optimal action recommendation, RDM explores a given set of plausible actions going forward (iteratively generating creative new options and solutions along the way) for their ability to provide acceptable outcomes under a broad range of possible future states of the world (Lempert, 2006). Such an analytic framework, exemplified nicely by Bloom (2014) to prioritize the allocation of health care resources for HIV, seems well suited to the challenges of deciding on wise actions in the face of COVID-19 and the climate crisis, which is very much in the spirit of behavioral economics.

## Walk the Talk

Let me close with some recent insights relevant to more politically charged behavioral economics applications, such as climate change action or COVID-19 responses. In such contexts, the scientist who communicates insights about existing risks and recommendations for how personal action can mitigate these risks may well be judged for his or her personal adherence

to these recommendations. Scientists who fail to do so are perceived as being less credible, and their recommendations are less likely to be followed. Perceived personal lifestyle consistency on part of the scientist ("walking the talk") increases adherence to recommendations when these are about personal lifestyle changes (Attari, Krantz, & Weber, 2016) and about support for governmental action (Attari, Krantz, & Weber, 2019). As with most virtues, however, personal lifestyle consistency can backfire when it is too extreme. When scientists are perceived as too extreme in their sustainable lifestyle pursuit, their decarbonization messages have somewhat lower impacts than those of scientists with merely strong but more relatable personal sustainability profiles (Sparkman & Attari, 2020).

## Conclusion

We live in interesting times, in all senses of the apocryphal Chinese blessing and curse! There is much to be learned about our species' willingness to change lifestyles and behavior when the stakes are high, about the role and ability of feedback and personal experience to overcome ideological opposition to certain classes of solutions, about the finite pool of worry, and about the best ways to model and evaluate action going forward. Behavioral economics and allied social and behavioral sciences have had—and will continue to have—much to contribute to the important endeavor of giving the future a chance.

## The Author

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In her research, Weber examines and models decision-making under uncertainty and time delay in financial and environmental contexts from a psychological and neuroscience perspective. Her expertise in the behavioral decision sciences has been sought out by advisory committees of the National Academy of Sciences on Human Dimensions in Global Change, an American Psychological Association Task Force that issued a report on the Interface between Psychology and Global Climate Change, and Working Group III for the 5th and 6th Assessment Report of the U.N. Intergovernmental Panel on Climate Change (IPCC). She is past president of the Society for Neuroeconomics, the Society for Judgment and Decision Making, and the Society for Mathematical Psychology. She is a fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the American Psychological Association, the Association for Psychological Science, the Society for Risk Analysis, and the Society for Experimental Psychology. She received the Distinguished Scientific Contribution Award from the Society for Risk Analysis and was elected to the German National Academy of Sciences Leopoldina and the US National Academy of Sciences.

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# APPLICATIONS

# Simple Strategies for S.H.A.R.P.E.R. Decision-Making in Groups

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*"Madness is the exception in individuals, but the rule in groups"*

Friedrich Nietzsche, Beyond Good and Evil

## Introduction

The reason why humans have come to dominate this planet is due, to a large extent, to our extraordinary evolutionary capacity for decision-making (Dawes & Hastie, 2010; Sunstein & Hastie, 2015). Over hundreds of years, we have efficiently learnt how to analyse and amend our decisions, ranging from choosing the right food and shelter, to devising complex business strategies and effective public policies. Looking back, it is probably fair to say that, on aggregate, our decisions have had a positive outcome on society, enabling us to enjoy progressively higher levels of safety and prosperity (Harari, 2016). However, many expensive and painful mistakes have been made along the way on both an individual and a societal level. Looking forward, it should therefore be in the interest of our society and each individual to make use of this vast pool of experiences, in order to cultivate strategies leading to positive outcomes and avoid those leading to negative outcomes.

Taking a behavioural science perspective, our aim is to contribute to this process of establishing a better collective understanding of what enables and supports good decision-making. Since many of the most important decisions for businesses and societies alike are taken by groups of people – on boards, ministries, committees and the like – we are particularly interested in the obstacles that present themselves when human beings try to make decisions together, as a collective. Bridging insights from academia and practice, we start with a brief review of the most critical patterns of human decision-making. Subsequently, we discuss four of the most critical biases resulting from these patterns for individuals and groups. This first part follows the simple rational logic that better knowledge of human judgement and decision-making processes can lead to better outcomes. Building thereupon, we present seven simple principles for S.H.A.R.P.E.R. decision-making in groups. This second part follows the behaviourally-informed logic that carefully designed contexts, or 'choice architectures', can greatly improve decisions (Thaler, 2015; Thaler & Sunstein, 2008). We conclude with a short summary and a practitioner-focused outlook on strategic decision-making.

## Critical Patterns, Heuristics and Biases in Strategic Decision-Making

### Critical Patterns in Individual Decision-Making

The most important characteristic in any decision-making process is the degree of uncertainty surrounding future outcomes and the associated risk perceptions of individuals (Noyes et al., 2012). Strategic decisions in private and public settings are often characterised by high complexity, incomplete information and limited resources – factors which pose considerable challenges to 'boundedly rational' individuals (Simon, 1955). Humans often remedy this situation by reverting, mostly subliminally, to simple heuristics that serve as efficient shortcuts in situations of risk and uncertainty (Tversky & Kahneman, 1974). This way, we substitute a complex question with an easier one, and we rely on the most easily and vividly accessible memories and on subjectively appropriate reference values when presented with a complex decision to make (Kahneman, 2003).

While these broadly accurate individual rules of thumb work most of the time and can gener-ally be described as very powerful (Gigerenzer, 1999), they are also the source of systematic biases (Gilovich et al., 2002; Haselton et al., 2005; Kahneman & Frederick, 2002). Moreover, the fact that they are activated quickly and subconsciously complicates their recognition and potential correction (Gilbert, 1991). We even go as far as altering our perception of a situation so that it seems subjectively less uncertain, in order to reduce the tensions we experience in uncomfortable decision challenges (Schwenk, 1984). Not surprisingly, when simplifying or changing perceptions of a complex situation at hand, mistakes can – and will – be made.

Another source of error originates from our desire for consistency and our receptiveness to narratives and processes to which we can easily relate (Nash, 2005). We like to set up and follow script-like procedures at an individual and organisational level. While learned scripts represent a powerful strategy in repetitive short-term situations, such as medical emergency responses, they inadequately cover complex and volatile long-term situations. Problems arise when procedures push decision-makers to incorporate pre-existing beliefs and fill gaps with incomplete or inappropriate information (Halpern, 1989), but they are further exacerbated by our tendency to stick with our initial choices and by our neglect of further examination (Nisbett & Ross, 1980). Unfortunately, history is full of examples in which people have blindly relied on simple heuristics and rigid scripts, resulting in disaster. The 'Tenerife air crash in 1977' is one such example where following a script in a situation of incomplete information resulted in a release for take-off on an occupied runway, leading to the biggest aviation disaster in history (Ziomek & Hopkins, 2020).

**Critical Biases**

We believe the first approach to improving strategic decisions is to create a greater awareness and understanding of the impact of biases caused by our reliance on heuristics and scripts. While more knowledge does not provide a guarantee for less biased decision-making, it is generally considered a prerequisite for more successful coping strategies (Kahneman, 2011). Based on our experience in the field, four key biases stand out, in particular when decisions are made in teams: availability, base rate neglect, confirmation and overconfidence (Affective Advisory Research 2018/19/20).

*Availability bias* describes misjudgements about the likelihoods of events occurring, or of cer-tain outcomes being realised, based on the ease of their mental retrievability. It originates from limitations in our memory and concerns the ease with which information thought to be relevant to a current decision can be recalled (Freudenburg, 1993; Tversky & Kahneman, 1974). The more recent, vivid and salient a past experience may be, the more likely it is to come to mind and present itself as an anchor in a given decision challenge. Availability bias can have great impact on the assessment of risks and associated behaviours. Managers facing a critical choice may overweigh information that was recently available to them (Tversky & Kahneman, 1974), and physicians' recent exposure to a medical condition increases the likelihood of a subsequent diagnosis of the same condition in other patients (Poses & Anthony, 1991).

*Base rate neglect* refers to our human tendency to use data inappropriately, by misinterpreting or ignoring the relevant statistical base rates (Dawes & Hastie, 2010). We underestimate the probabilities in favour of matching information from a small sample that we think is repre-sentative when, in reality, it is not so; for example, when one only draws black marbles from a sample, we tend to assume that only black marbles are in the sample, forgetting that white

ones might be present as well (Pennycook et al., 2014). As a result, we often make decisions on the basis of insufficient and unreliable information, which in turn leads to errors. Our propensity to fall for representative stereotypes or ascribe an event to a familiar class is particularly pronounced when the sample information represents a vibrant and compelling image to which we can easily relate (Bazerman & Moore, 2008). Billy Beane, the manager of the Oakland A baseball team, had successfully recognised the neglect of the base rate of many scouts and selected his players based on remarkable performances in the past, rather than rejecting them because they did not fit into a known stereotype. The team achieved excellent results and became the basis of Michael Lewis' bestseller 'Moneyball' (Kahneman, 2011).

*Confirmation bias* occurs when people seek out and evaluate information in a way that fits with their preconceptions. It captures our deeply ingrained tendency to notice and select information that confirms our existing beliefs and set objectives, or fits the pattern of previous behaviours, leading to systematic errors despite opportunities to learn (Jonas et al., 2001; Nickerson, 1998). In many circumstances, we do not even realise we are stuck in a confirming cycle, looking only for supporting rather than disproving information, a tendency Kahneman (2011) nicely captured as 'what we see is all there is'. During negotiations, opposite parties can even feel validated in their own opposite beliefs on exactly the same evidence. In a famous 1979 Stanford study, for instance, two groups with opposing beliefs about the death penalty were asked to read two completely made-up studies, one for and one against the punishment. In the analysis, both groups assessed the credibility of the studies in accordance with their previously held beliefs and opinions. Even worse, the beliefs of both groups were further strengthened, so that they reported even stronger opinions after the study (Lord et al., 1979). Likewise, a recent study demonstrated that US voters rated the outcome of polls as more trustworthy if the results corresponded with their initial expectations, further supporting the finding that people have a tendency for selecting confirming information (Madson & Hillygus, 2019).

*Overconfidence bias* can be summarised as the difference between people's subjective confidence in their own ability to perform a task or predict an outcome, and the objective of their real performance or effective outcome (Montibeller & von Winterfeldt, 2015; Pallier et al., 2002). It is supported by a subliminal feedback-loop reinforcing belief in one's own judgement after observing positive outcomes from previous decisions. The ideal circumstances for overconfidence bias are situations to which a high degree of commitment and importance are attributed (Frey, 1981). Perhaps the most celebrated example in this regard is Svenson's (1981) finding that 93% of American drivers rated themselves better than average, which is statistically impossible. This way, overconfidence can be seen as the final step in the decision process, in an attempt to bring a level of certainty into an uncertain situation (Williams, 2007).

While this list of biases is by no means complete and exclusive, it describes the most frequently observable and most problematic deviations from good decision-making. Even more, these four biases especially persist in group settings and can even be amplified in situations in which strategic decisions are taken together.

## Simple Strategies for Improving Strategic Decision-Making

### Critical Patterns in Group Decision-Making

Beyond an awareness and understanding of the biases previously outlined, it follows that another approach is required, and in order to improve strategic decision-making it should focus on the processes and interactions of individuals in groups. Particular attention is required in this regard, as group settings do not automatically lead to the correction of individual biases and thus better outcomes. On the contrary, a growing body of research demonstrates that groups are often unable to utilise the greater pool of collective knowledge available, are often incapable of overcoming biases, resulting for example from individual past experiences, and regularly fail to control for in-group effects in strategic decision-making (Pavitt, 2003).

Groups may even perform worse than individuals, in particular in situations where the communication and processes between individuals cannot be controlled (Sunstein & Hastie, 2015; Tversky & Kahneman, 1983); for example, Tindale et al. (1990) showed that errors in probability estimation can be greater for groups than for individuals. Even under ideal circumstances, the error rate for groups can be 37% higher than for individuals (Tindale et al., 1993), and moreover, groups often fail to combine and contrast individually held information effectively. Consequently, groups can reach extreme positions far beyond any individual's preferences (Stasser & Titus, 1985). Especially in situations exemplified by high cohesion, structural faults and justification-based contexts, groups exhibit dysfunctional symptoms, often referred to as 'groupthink' (Janis, 2008). Socially motivated concurrence-seeking and dissent-preventing tendencies lead to singular suboptimal conclusions (Forsyth & Elliott, 1999; Frey et al., 2013). History is full of examples of groupthink, including the start of the Iraq War, the Challenger Space Shuttle disaster and the Bay of Pigs invasion (Janis, 2008).

In this way, groups offer an ideal breeding ground for the four previously discussed biases, whilst individually provided information quickly serves as an anchor for all; thus, availability bias is easily extended across the entire membership. Groupthink tendencies facilitate the misjudgement of important (base-rate) information by suppressing a critical analysis of subjectively representative samples and silencing potential objections. Particularly, inputs by people of higher seniority are commonly presented with higher salience and therefore often weighted disproportionality. Naturally, this narrow focus, paired with attendant pressure on potential dissenters to conform, results in a collective reinforcement of individual confirmation bias (Frey et al., 2013). Finally, situations with a high degree of commitment and significance (Frey, 1981) – factors that to a large extent require group decision-making in the first place – give rise to overconfidence. As a result, information is often incompletely and incorrectly taken into account, risk is assessed inadequately and mis-judgements are made easily.

### Seven Simple Principles for Better Decision-Making

As we have seen, many things can go wrong in strategic decision-making, particularly in groups. Subliminal biases can severely impair our individual capacity for good judgement without us being able to recognise it, let alone correct it, and making decisions with other people adds an extra layer of complexity on top, since biases can be amplified further by the interaction between group members. However, on closer inspection, this interaction also contains the very solution to our challenge. We must focus on setup, processes and principles for groups, in order to leverage their potential for better decision-making, and rather than teaching indi-

vidual members only how to think about processes and biases (which is extremely hard and not too promising after all), we need to provide group contexts that are capable of overcoming distortions and ultimately achieving better outcomes. To achieve this aim, the growing field of behavioural science has some interesting approaches to offer. In the following, we present seven simple pieces of advice, which, according to scholarly and applied research, can effectively improve the quality of group setups and interactions, ultimately resulting in S.H.A.R.P.E.R. decision-making.

### S.maller groups work better

Research demonstrates that large groups show significantly greater tendencies towards biased decision-making. Frey et al. (2013), for example, conclude that groups of seven or more individuals display a significant increase in overconfidence bias, reaching levels of almost 100% confidence in their decision-making capabilities. It is obviously hard to advise on an ideal number of group members, since different tasks demand different compositions; however, research suggests that, whenever possible, it is advised to aim for the often self-selected 'natural group size of 2-4 people', for an effective operation (Moreland et al., 2013). This way, the negative effects found in larger groups can be reduced, and the benefits of having multiple perspectives can still be guaranteed.

### H.eterogeneity beats homogeneity (most of the time)

Various studies have shown that groups consisting of individuals sharing the same (homogeneous) opinions and beliefs are not only consistently more confident about decisions, but they also show a stronger tendency toward confirmation bias (Schultz et al., 2007). Differently, potentially opposing perspectives can effectively mitigate group bias. Moreland et al. (2013), for instance, found that especially in complex tasks requiring different abilities and perspectives, e.g. creative processes in marketing and communication or research and development, heterogeneous groups substantially outperform homogeneous groups. On the other hand, if a task requires convergent thinking in very structured environments, e.g. repetitive safety procedures in flying or healthcare, homogenous groups can actually outperform more heterogenous setups (Moreland et al., 2013).

### A.ppoint a strategic dissenter (or even two)

One element to increase heterogeneity and diversity further in a group is to appoint a so-called 'devil's advocate' – an elected person equipped with the mandate to stimulate dissent actively amongst members. Various business and military examples show that appointing one person to act as a deliberate counterforce against consenting group dynamics leads to significant improvements in decision quality (for a good overview see Senor & Singer, 2011). Depending on the group size (more than seven people are considered a large group in this regard), a sole dissenter can be seen and isolated as a disturbing troublemaker, thereby diminishing their effects (Svenson, 1992). It is therefore advised to appoint at least two devil's advocates, in order to ensure that dissenting voices are effectively heard and followed (Frey et al., 2013).

### R.ate options independently

Another piece of advice to help increase the quality of decisions in groups is the independent and anonymous rating of options by group members. In this regard, simple processes such as the well-established 'Delphi method' can be used (Sunstein & Hastie, 2015; Webler et al.,

1991). In a first round, all members are asked to note down their favourite options, following which all options are collected and exchanged anonymously within the group. In a subsequent round, people are asked to choose their preferred option, now being aware of the opinions of all other group members. Again, this should be done independently and anonymously, before any opinions are finally shared and presented in the plenary. This iterative process helps in mitigating biases and safeguarding more balanced group results independent of seniority, rank and alleged expertise. An additional benefit of independent evaluation processes is that responsibility for the decision outcome is shared by the entire group and that the creativity, transparency and objectivity of strategic decisions actually increases (Nowack et al., 2011).

### P.rovide a safe space to speak up

The basis for the effectiveness of deviant devil's advocates and discussions on constructing individual viewpoints, as discussed earlier, is the existence of psychological security among team members. People need to feel safe to speak up (Edmondson, 2018), and room for re-flecting and discussing failure in an intelligent way must be guaranteed (Sitkin & Pablo, 1992). Only when all members feel comfortable and secure in sharing their thoughts and doubts about a potential solution can a group make use of its diverse knowledge and experience base. Edmondson (2018) suggests three basic rules for creating safe spaces to speak up: first, feedback should always be focused on the decision or discussed option, not on the individual. Second, comments should be expressed as a suggestion, and not in an overly dictating way. Third, recommendations and critique should always be functional, not patronising.

### E.xperts - please handle with care

Many people assume that the quality of group decision-making increases when adding people who are considered or consider themselves to be experts (for a good discussion on what constitutes an expert see Ericsson et al., 2007). While it is generally advisable to bring on sub-ject-matter-expertise, one should be aware that experts are equally prone to biases (Frey et al., 2013), so one should therefore make it very explicit in what area experts can help – and in what they may not be of assistance. While general expertise is a desirable trait, it rarely exists in practice. Halo effects (i.e. the spillover of an impression we have about someone in one domain to other domains), attributed authority and a high level of confidence in expert judge-ments can easily be misleading and actually take the group along the wrong path (Kahneman, 2011). For this reason, it is advised to invite experts for their opinion on a clearly defined subject matter and position them as an informed outsider to the group.

### R.esponsibility - share it collectively

Often, during difficult and fractious discussions, a representative is selected to govern the in-formation-seeking and decision-making process. What sounds like a good and straightforward idea can often lead to systematic biases. Research shows that elected group representatives often consider themselves infallible and exert above-average influence when they are chosen for this task (Frey et al., 2013; Sunstein & Hastie, 2015). Moreover, high-stake group decisions are often justified and communicated by one (senior) group member, which further promotes the potential for individual justification, dissonance and feelings of infallibility of individuals with effects on the overall decision-making process in the plenary. The simple – and yet pow-erful – advice to mitigate such effects is a joint declaration of shared accountability for the group's final decision. Being explicit in this way, not only about a shared responsibility for the

outcome, but also for the process leading to the decision (e.g. signing a joint responsibility statement at the outset, or assigning responsibilities for specific group tasks), can successfully balance the perception of individual team members and, hence, decision outcomes (Schultz et al., 2007).

## Conclusion

Since strategic decision-making plays a key function in modern-day political, corporate and non-profit strategy, it is crucial to focus on a closer analysis of critical patterns and suitable aids, to support better decision outcomes. With this article, we aim to contribute to applied behavioural science research by raising awareness of the key patterns and biases in individual and group decision-making, and by providing a simple set of seven powerful principles for S.H.A.R.P.E.R. decision-making. We are convinced that it is essential to first develop a better understanding of how we make decisions and what can go wrong in this process. Building thereupon, we believe it is important to provide practitioners with a set of simple yet effective principles for designing deliberate group contexts that enable better decision-making processes (and thus better outcomes). As with any serious behavioural science intervention, these strategies should be subject to an evidence-led application, analysis and adaption process, and so in this regard we look forward to further debates with academics and practitioners, as well as joint applications and further developments of our recommendations.

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# Uncovering Emerging Trends and Critical Responses to Behavioral Economics

## A Network Analysis of Behavioral Economics Tweets in 2019

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## Abstract

Behavioral economics is an ever-evolving field, which is why professionals and academics need to stay on top of new ideas. The academic sphere is exciting, but so is public opinion. An instant way of ascertaining general perceptions about a specific subject is through social networks, which nowadays offer an incredible information flow where target opinions can get lost. By using analysis and big data visualization tools, the current research analyzed 2019 tweets related to *behavioral economics*. The analysis results, from 24,824 tweets, generated some interesting emerging trends and critical opinions about behavioral economics.

## Introduction

In behavioral economics, new ideas and applications arise every day, and it is crucial to maintain the state of the art. The impact of a behavioral economist's work relies on staying up to date through the use of tools such as journals, blogs, or social networks, the latter of which contain a tremendous volume of topics and reveal the immediate interests of the audience. Social media platforms allow people to connect, share, and discuss any issue—anywhere, and at any time. This hyperconnectivity is classed as "mass self-communication" (Castells, 2009) and has experienced exponential growth, due to social smartphone penetration.

According to Del Fresno, Daly, and Supoyitz (2015), social media categories may include social networking platforms (Facebook, LinkedIn), microblogging (Twitter, Weibo), photography (Flickr, Instagram, Pinterest), video (YouTube, Vimeo, MetaCafe), social news (Meneame, Digg, Reddit), live broadcasts (Livecast, Ustream), social gaming (World of Warcraft), bookmarking (Delicious, StumbleUpon), or blogs (WordPress, Blogger). Nowadays, new applications exist, such as WhatsApp, Facebook Messenger, WeChat, Twitch, Fortnite, and League of Legends, among others. All of these media applications are in a state of continuous renewal, to facilitate the current need for connection and information.

Social networks, particularly Twitter, are ideal information sources when seeking to analyze trends and interests in a specific subject. Tweets may contain opinions, queries, or news, linked to hashtags and keywords, thereby enabling information extraction. Data complexity, high-volume processing, and mining represent several problems for information analysis, and it is necessary to use specific tools and techniques to process the information and visualize the results. According to del Fresno (del Fresno et al., 2015):

> Twitter is currently the fastest, simplest, and cheapest social medium through which all kinds of information, news, ideas, events, rumors, multimedia materials, etc. circulate, broadcast from any professional media or other social media in real time. Thus, on Twitter, both professional media (television, print media, magazines, radio, etc.) and any other social media (Facebook, Instagram, YouTube, Flickr, blogs, forums, etc.) intersect with an extensive registry of typologies of user profiles (individuals, NGOs, government entities, mass media, pressure groups, scientific magazines, companies, brands, etc.). All of this gives Twitter a privileged field for research, since, in practice, it would be playing the role of a sort of central nervous system of the Internet.

Social network analysis (SNA) recently emerged as a set of techniques sharing a methodological approach (Sanz Menéndez, 2003). SNA connects individuals and organizations with social structures arising from established relationships between them. Graph theory is a prominent

technique employed to perform SNA, and, due to its impact, it was selected to perform the subsequent research analysis.

One of SNA's fundamental ideas posits that interactions between individuals and organizations influence people's behavior, thus making social networks both the cause and the result of individual behavior. According to Del Fresno (2014, p 246), the merging of sociability and technology generates a massive social network that:

> [...] connects us to people, information, events, and places, facilitating or restricting the flow of information, ideas, and perceptions, in an instantaneous and massive network communication system.

However, these interpersonal relationships, generated massively on social networks, tend to remain invisible, due to the complexity involved in handling such large volumes of data.

This research aims to present issues related to behavioral economics and addressed by Twitter users via tweets and retweets throughout 2019. The study considers social media mining (SMM) and SNA tools to capture, represent, and analyze social network interactions. These tools allowed us to conduct a study on a massive scale and to perform a prospective analysis of Twitter's topics of interest.

The intersection between SMM, SNA, and Twitter allowed for tracking, capturing, and analyzing massive amounts of data in a retrospective way. This work presents essential information about meaningful explicit relationships (e.g. following a specific user) and, more significantly, implicit relationships, the latter of which were inferred from the users' behaviors (Golbeck, 2013), such as retweets, mentions, or responses.

The research questions that guided this research were as follows:

• What topics of interest about behavioral economics were discussed on Twitter during 2019?

• How did these topics evolve throughout the year?

• What were the most influential accounts in the behavioral economics field?

• What topics could be unexplored and become a trend?

## Methodology

For this study, the research considered all the tweets related to the term "behavioral economics" and the hashtag subject #behavioraleconomics in 2019. As free license tools only extract the most recent tweets, this was a problem, as the research began in late 2019. We therefore applied a payment solution to extract the data, and we ultimately recovered 24,824 tweets related to the terms defined above.

Once the data were obtained, the following analysis tools were selected:

• Voyant Tools (Sinclair & Rockwell, 2019): An open source, web-based application for performing annual text analysis.

• Microsoft Excel: Formulas and dynamics tables, to obtain influential accounts.

- InfraNodus: Used to seek and explore new fields, according to the method proposed by Paranyushkin (2011).

Before executing the analysis, we performed data cleaning, which eliminates several words from the text corpus to improve the overall analysis. Examples of these words are variations on "behavioral economics," usernames, expressions (http://), function words, and URL shorteners (t.co). We gathered all of these words in a single file (stopwords.txt), and the analysis tool was instructed to not consider these terms, for both concept analysis and new field exploration.

## Results

### Most Influential Terms and Emerging Matters

From the generated dataset, we performed a data selection process, to search for tweets in English with more than 20 retweets and 30 likes. The process returned the 280 most influential tweets in 2019, and we then used an analysis tool (Paranyushkin, 2011) to examine the generated text corpus.

Figure 1 presents the results of the text network analysis. It is composed of nodes and edges which represent words and the connections between them. Closer nodes mean those words usually appeared together. The graph represents the next-generation tag cloud, emphasizing relevant words and showing the context in which they appear.
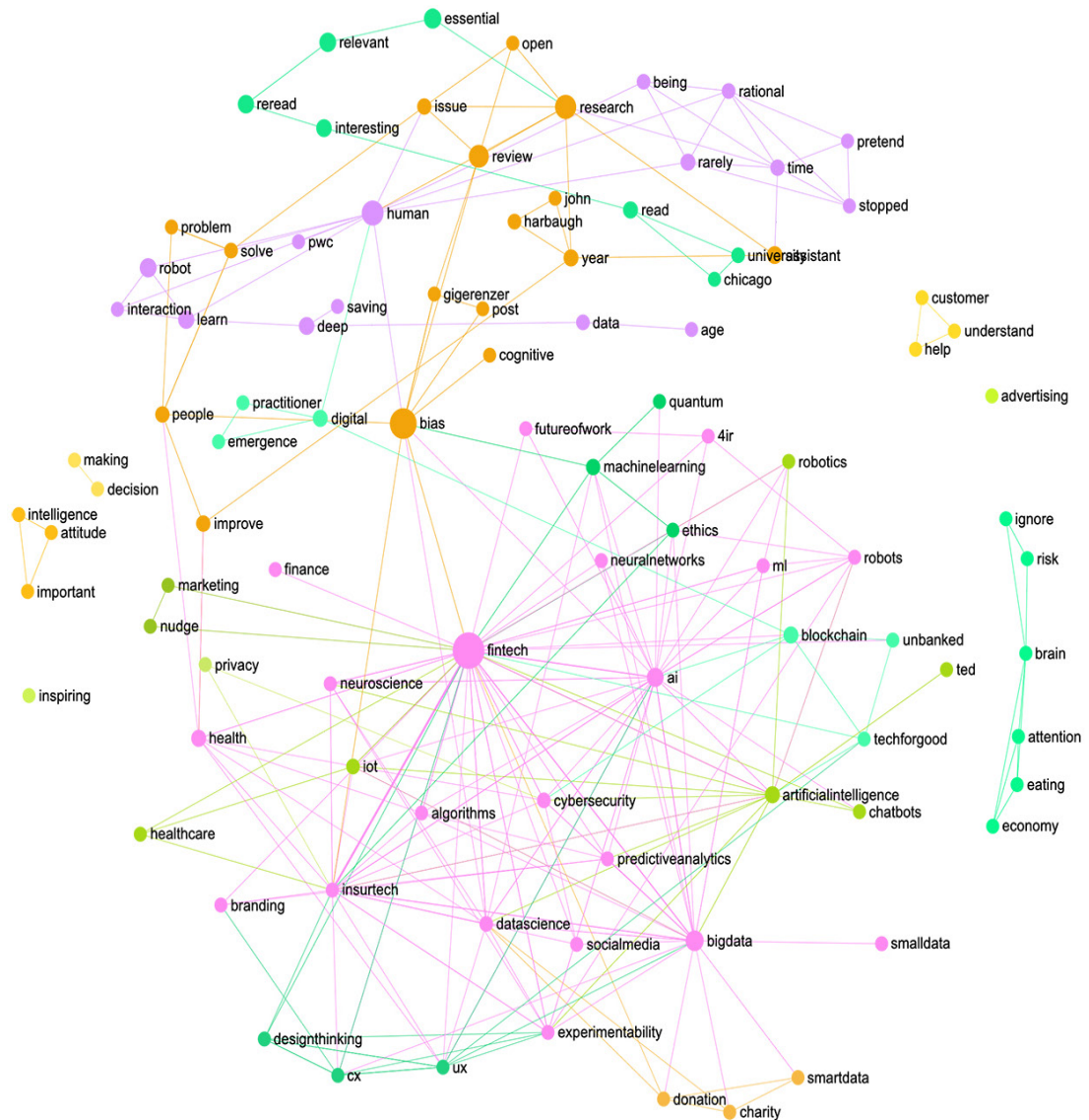
**Figure 1:** The most influential tweets in 2019 text network graph.

The topics around behavioral economics were diverse, thereby indicating a balanced representation of several perspectives. We listed, in terms of influence, the top ten topic groups:

1. *fintech-ai-bigdata*

2. *bias-research-solve*

3. *human-rational-time*

4. *reread-relevant-interesting*

5. *blockchain-techforgood-digital*

6. *brain-economy-eating*

7. *artificialintelligence-iot-robotics*

8. *machinelearning-ethics-quantum*

9.  *ux-cx-designthinking*

10. *understand-help-customer*

The connection between fintech, artificial intelligence, and big data was the topic discussed most often in 2019. Taking a closer look, the topic group related to specific subjects such as *algorithms, cybersecurity, data science, neural networks, internet of things, insurtech, machine learning, user experience, experimentability, predictive analytics*, and *ethics* (Figure 2).
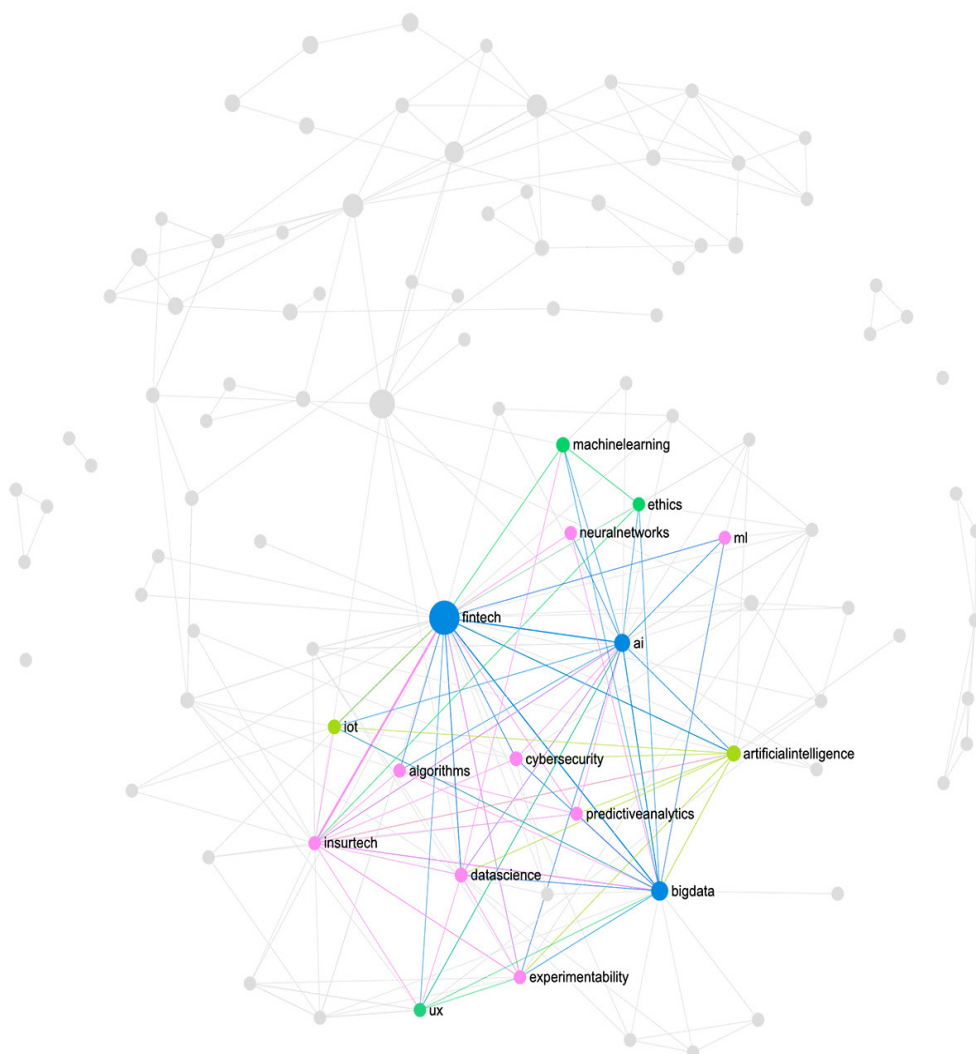


**Figure 2:** The fintech-ai-bigdata topics text network graph.

The second topic group is composed of the words bias, research, human, and solve. Figure 3 presents the subjects' connections, illustrating that the scientific community planned to correct human biases by using scientific research. The third topic group (Figure 4) was a strong influence, due to the prominent phrase "*Human beings are rarely rational, so it's time we all stopped pretending they are.*"
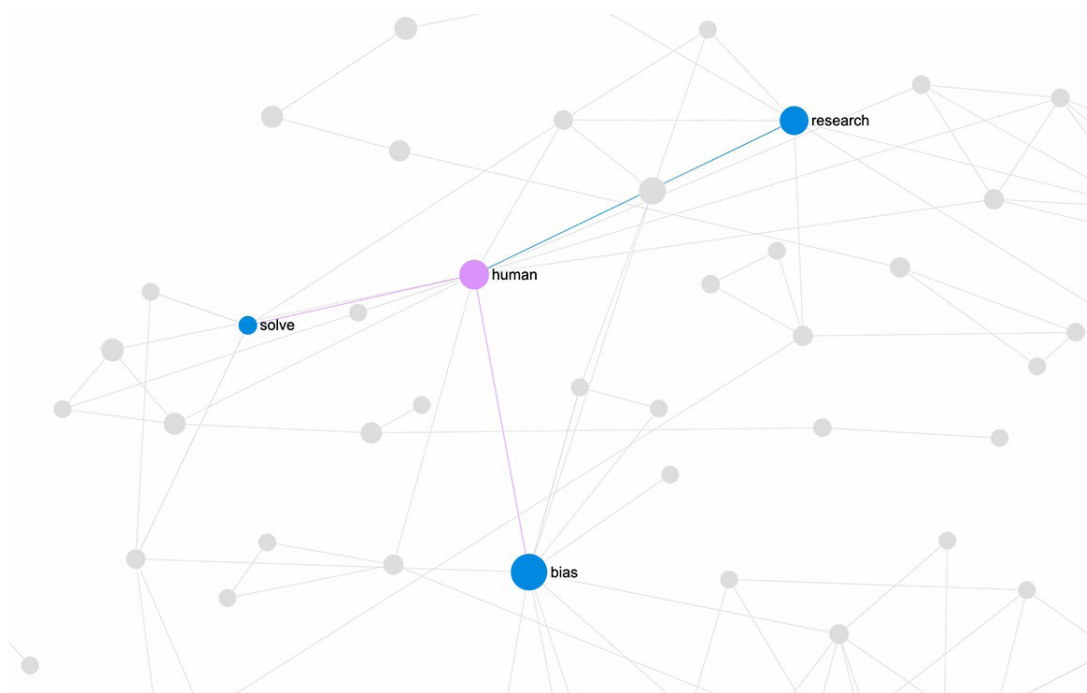
**Figure 3:** The bias-research-solve topics text network graph.
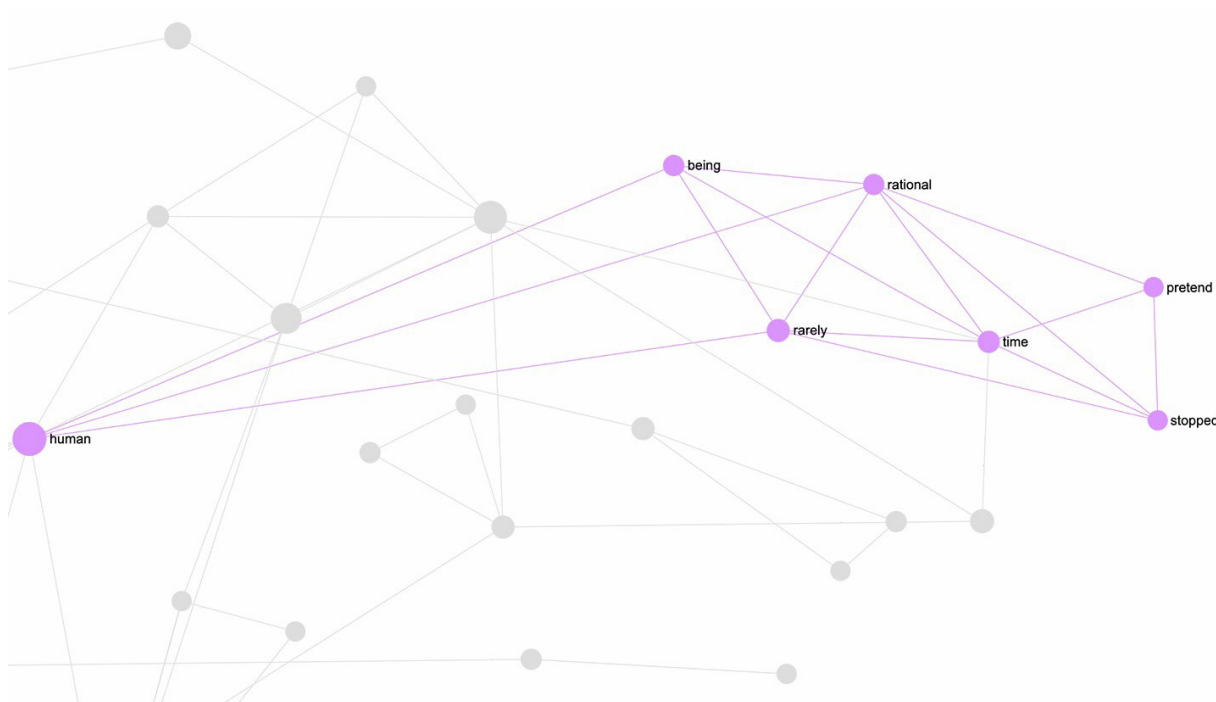


**Figure 4:** The human-rational-time topics text network graph.

Emerging terms, such as *insurtech* and *research*, have a significant and local influence. As mentioned before, the topics were diverse, meaning a balanced representation of several approaches; however, a structural gap exists between the less represented topics. We expect that during 2020, these topics will have an increasing impact and generate new fields.

Removing rarely repeated terms such as reread, solve, and year, the graph presented a gap between *userexperience-health-costumerexperience* and *bias-machinelearning-research*. These findings suggest that user and customer experience in the health field could appear as an emerging topic, on a par with research and machine learning. A combination of these topics could be how insurtech uses machine learning and research to improve user/client experience in the health field. The idea could be an interesting topic to follow in 2020.

### Influence Analysis

The extracted data displayed 24,824 tweets mentioning "behavioral economics," in the text or as a hashtag. People retweeted these tweets 114,317 times, and they received 45,205 "likes."

Influence analysis searched for users generating more content and for those who had a greater reach. It considered published tweets, likes, and retweets received, albeit only likes and retweets using the term *behavioral economics* were recorded.

Table 1 presents the top five content generators. These accounts were the most active in terms of the number of original tweets made. With a considerable difference, @andi_staub was the most influential user account with 920 original tweets, 13,899 likes, and 11,879 retweets. The account came first in three categories: Published tweets, received likes, and received retweets.

In second place, @FehrAdvice appeared with 416 tweets. Although this account is very active in terms of publications, it only received 449 likes, ranking it in this regard in 19th place. With 415 total retweets, it ranked ninth in this category.

In the remaining positions appeared the accounts @thebrainybiz (409 tweets, 409 likes, 232 retweets), @jjcousins (368 tweets, 51 likes, 29 retweets), and @HLSPaola (276 tweets, 238 likes, 209 retweets).

| User | Tweets posted | Likes received | Retweets received | Retweets/ tweets ratio |
|---|---|---|---|---|
| @andi_staub | 920 | 13,899 | 11,879 | 1,291.20% |
| @FehrAdvice | 416 | 449 | 415 | 99.75% |
| @thebrainybiz | 409 | 409 | 232 | 56.72% |
| @jjcousins | 368 | 51 | 29 | 7.88% |
| @HLSPaola | 276 | 238 | 209 | 75.72% |

**Table 1:** Top five content generators against likes received and retweets received.

From a different perspective, Table 2 shows the ranking for accounts with more likes received. As mentioned previously, @andi_satub placed first; however, the accounts @SheilKapadia and @FieldYates came in second and third places, respectively. These two accounts specialized in sports and mentioned behavioral economics only in four tweets. Their reach and influence, ranked by numbers of followers, meant that at 51.3 million and 512,0000 followers they came in second and third places, respectively. The reader can find their most-liked tweets in Table 5.

| Users | Likes received | Tweets posted | Retweets received | Retweets/ tweets ratio |
|---|---|---|---|---|
| @andi_staub | 13,899 | 920 | 11,879 | 1,291.20% |
| @SheilKapadia | 9,072 | 3 | 1,638 | 54,600.00% |
| @FieldYates | 5,230 | 1 | 732 | 73,200.00% |
| @kaushikcbasu | 3,486 | 3 | 716 | 23,866.67% |
| @nntaleb | 2,117 | 5 | 538 | 10,760.00% |

**Table 2:** Top five likes received by accounts against tweets posted and retweets received.

The last two places were filled by @kayshikcbasu and @nntaleb, both of whom took a critical stance against behavioral economics. The @kayshikcbasu account posted three tweets, but they accumulated 3,486 likes from 135,000 followers. The account tweets were[1]:

*Behavioral economics: They decide on the price, they decide how large to make each pack, and they decide to call it "40% extra". Alas for the gullible consumer.*

*Here is a behavioral economics hypothesis worth testing. If you invite people for dinner at 8.05 pm instead of 8.00 pm not only will they be more punctual but will probably arrive earlier.*

*Behavioral economics. This toothbrush removes bacteria not 150% but 151% more. It sounds like hard science and therefore more consumers are likely to buy.*

On the other hand, @nntaleb received 2,117 likes from 545,000 followers. This account holds radical opinions on behavioral economics, exemplified by the following tweets:

*NUDGE SINISTER: How Behavioral Economics is Dangerous Verbalism. A project that will end up putting Nudgevillain @R_Thaler in his place. Filling in the math progressively.*

*For those who think behavioral economics has been "helpful" (outside consulting fees), some news.*

*How Behavioral Economics is Dangerous BS. Very dangerous.*

*You can be fooled by people, and you can be fooled by fields. For instance I was fooled by behavioral economics...*

*The end of Behavioral Economics.*

The reach and influence this account maintained against behavioral economics are impressive. In behavior terms, it is very consistent with the human being.

Table 3 presents the most retweeted user accounts. The first three positions from Table 2 appear on this occasion in 1st, 2nd, and 5th places, respectively. @wirojlak tweeted about education and the economy and generated 1,570 retweets to 137,000 followers. In fourth position, @Gleb_Tsipursky received 1,031 retweets on shared content about decision-making.

| Users | Retweets received | Likes received | Tweets posted | Retweets/ tweets ratio |
|---|---|---|---|---|
| **@andi_staub** | 11,879 | 13,899 | 920 | 1,291.20% |
| **@SheilKapadia** | 1,638 | 9,072 | 3 | 54,600.00% |
| **@wirojlak** | 1,570 | 505 | 2 | 78,500.00% |
| **@Gleb_Tsipursky** | 1,031 | 1,919 | 121 | 852.06% |
| **@FieldYates** | 732 | 5,230 | 1 | 73,200.00% |

**Table 3:** Top five retweets received accounts against likes received and tweets posted.

Changing the angle from user accounts to tweets, Table 4 displays the more retweeted posts related to behavioral economics. The first position is taken by the @SheilKapadia tweet mentioned previously, whilst second place is for the @wirojlak account, which tweeted about the *last-place aversion*. @FieldYates mentioned the Redskins in a tweet about how Ravens had hired a behavioral economist for decision-making support during games. The last two comments came from new account users in the ranks. Oddly, @parpnn posted 5,360 tweets and received 363 retweets with just eight followers. To finish the ranking, the @jhaushofer account received 337 retweets with an exciting job offer.

| User | Text posted | Total retweets |
|---|---|---|
| **@SheilKapadia** | John Harbaugh has a 25-year-old behavioral economics major giving him win probabilities during games. John Harbaugh has become the most aggressive 4th-down coach in the NFL. These 2 things are related. Really enjoyed reporting this story from Baltimore. | 1,631 |
| **@wirojlak** | Between 2 situations A: I myself can +1, other people +10 Vs B: You can get yourself 0 or -1, others get -10. Believe it or not, many people choose to emulate the latter. Or situation B This behavior is called "Last place aversion" | 1,570 |
| **@FieldYates** | John Harbaugh and the Ravens: let's hire and develop a Yale graduate with a degree in behavioral economics to help in-game decision making. Redskins | 732 |
| **@parnpnn_** | 1. How to love:  Content according to the title of the book ;)<br>2. The art of thinking clearly.<br>3. Nudge. This book is very good. Reading will give a new perspective on economics. If anyone is interested in these behaviors, the Behavioral economics is 2 books that are recommended to read and enjoy. # Request-3books2019 | 363 |
| **@jhaushofer** | I'm looking for 1-2 full-time research assistants to join my group for 2 years. Based in Nairobi, you will work on a cool portfolio of lab and field studies in economics/psychology. Great for recent BA/MA | 337 |

**Table 4:** Top five most retweeted tweets.

Table 5 presents the most liked tweets in 2019. The already mentioned accounts @SheilKapadia, @FieldYates, and @kaushikcbasu ranked in the first four positions. @GregGutfeldShow (a Fox News journalist) received 1,115 likes with a tweet to present a show guest.

| User | Text posted | Likes number |
|---|---|---|
| **@SheilKapadia** | John Harbaugh has a 25-year-old behavioral economics major giving him win probabilities during games. John Harbaugh has become the most aggressive 4th-down coach in the NFL. These 2 things are related. Really enjoyed reporting this story from Baltimore. | 9,034 |
| **@FieldYates** | John Harbaugh and the Ravens: let's hire and develop a Yale graduate with a degree in behavioral economics to help in-game decision making. Redskins. | 5,230 |
| **@kaushikcbasu** | Behavioral economics: They decide on the price, they decide how large to make each pack, and they decide to call it "40% extra". Alas for the gullible consumer. | 1,654 |
| **@kaushikcbasu** | Here is a behavioral economics hypothesis worth testing. If you invite people for dinner at 8.05 pm instead of 8.00 pm not only will they be more punctual but will probably arrive earlier. | 1,323 |
| **@GregGutfeldShow** | He's the master of comics and behavioral economics. Creator of Dilbert, legendary cartoonist, and author @ ScottAdamsSays is on #Gutfeld TONIGHT! | 1,115 |

**Table 5:** Top five most liked tweets.

**Annual Analysis**

The first step was to analyze each month, to discover the top five most used words. Figure 5 presents the evolution of these five terms during 2019. Behavioral economics appeared in relation to terms such as *fintech, artificial intelligence, psychology,* and *marketing*, all of which are associated with human behavior, and were very popular in each month, except for May.

In the fifth month, the results were 2,142, and the term *automation* was streets ahead of the second word. The appearance of the new term occurred in the tweet "*When deployed correctly, the inclusion of desktop automation technology can improve process design, reinvigorating humans to focus better, and access creative thinking. Is RPA going to restore natural order in the workplace?*" This tweet linked to a video series in which Dan Ariely reflected on the benefits of collaboration between humans and robots. It was so widely disseminated and commented upon that it changed the word ranking compared to previous months.
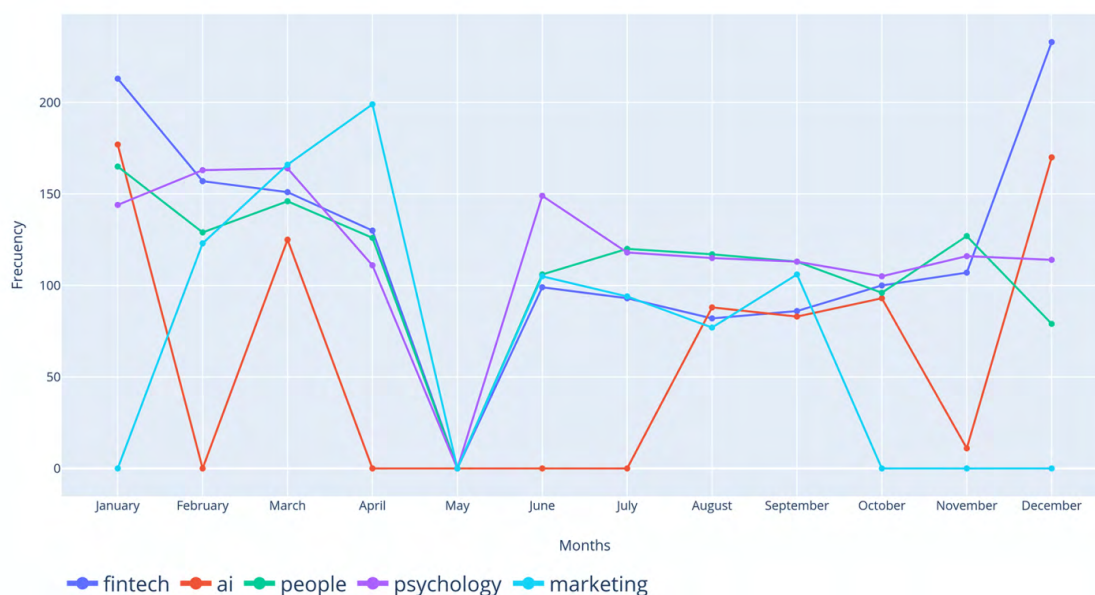
**Figure 5:** Words with the highest appearance during 2019.

## Conclusions and Implications

The present research analyzed over 2019 tweets related to behavioral economics. The analysis returned the top user accounts in terms of content generation, likes, and retweets. Also, it found the most popular tweets and their reach according to likes and retweets. In a second experiment, we performed a prospective analysis of the most popular topics in 2019, which generated several text networks to detect the relationships between and influence of these topics. Ultimately, we established what topic groups may be present in 2020.

In summary, this work resulted in three important findings: Emerging topics, critical responses to and skeptical discourse on the behavioral economics field, and the influence of key tweeters. The prospective analysis delivered interesting results on how several topics were related in 2019 and how new topic groups could become indicators for upcoming areas to follow.

Behavioral economics, as an emergent field, should consider critiques and concerns for future studies, which will lead to richer and better considered behavioral economics practice. Finally, the analysis of user account and tweet influence showed that a number of tweeters had a profound impact on what is liked and retweeted. Therefore, a few users have the potential to influence the behavioral economics field and the direction in which it might move.

As mentioned, the joining of topics such as i*nsurtech, health, research*, and *machine learning* will be interesting to follow during 2020. Of course, the disruption caused by COVID-19 will mark the evolution of the year, but it will be exciting to follow the mentioned terms on Twitter and check their receipt in light of this new reality.

Also, it is important to mention research limitations to be considered in future works. For instance, bots' participation in the most popular tweets or likes is unknown, but this may influence results, and we cannot definitively establish their reach in the current work. Also, the experiments were only carried out on the Twitter platform, and we cannot extend the results to the complete audience. Many interested people, academics, and experts may not use

this network; furthermore, Twitter users tend to be younger and have different perspectives (Stefan & Hughes, 2019).

This research produced some interesting findings by using a certain type of analysis; however, there is too much space to be explored. As part of future work, we therefore propose to perform a similar analysis on different social media platforms, such as LinkedIn, WordPress, or Blogger. In addition, research terms could be broadened beyond American English spelling, to avoid excluding other countries that engage in the community.

## The Authors

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# Applying Behavioral Science to Health and Financial Decisions

## Five Case Studies on the Impact of Framing on Real-World Decisions

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## It's the Year 2010

Sixteen-year-old Justin Bieber just came out with his hit "Baby," Apple unveils the iPad for the first time, and Obama's Affordable Care Act is passed. The world is beginning to recover from the financial crisis of 2008, and Dan Ariely's Predictably Irrational is still a newbie on the bestseller list. Now zoom into a typical behavioral research lab. You, the research participant, are led into a room to give your informed consent and play a "debt management game." You're put in front of a computer and given a set of hypothetical debt accounts to decide how much money you'll put into each. After 25 rounds of allocating hypothetical dollars into these hypothetical accounts, you collect compensation for your participation and are on your way. You and 162 other students in this lab study (Amar, Ariely, Ayal, Cryder & Rick, 2011), combined with three additional studies, will give the researchers mounting evidence of a single phenomenon: People fail to pay off debt rationally. Rather than allocating money to the highest interest-bearing accounts first, people prefer to pay off smaller accounts with lower interest rates in order to have fewer remaining accounts open, a phenomenon that the researchers termed "account aversion."

The most casual observer might note that the debt management game in this study is quite far removed from debt management in the real world—the order of the lab fails to capture the disorder of the field. We may learn that people are highly motivated to close hypothetical debt accounts in the lab, but the same people may treat their actual debt accounts very differently in life, perhaps simply paying off the default amount of the minimum monthly balance for their accounts. One would be right to question the ecological validity of these sorts of lab studies. While they do teach us something about human behavior, they don't teach us everything.

## Fast Forward to 2020

In the decade since Amar et al.'s study, the observation that even well-executed studies from controlled lab environments cannot fully predict behavior in the wild has transformed into a movement to supplement traditional lab research with a new form of field research. At Duke University's Center for Advanced Hindsight where we work, for example, we move beyond the laboratory setting, mixing the science of controlled experimentation with the art of real-world application (for published examples, see Schwartz, Riis, Elbel & Ariely, 2011; Schwartz, Mochon, Maroba, Patel, Wyper & Ariely, 2014).

A field that used to be confined to ivory towers has taken a cue from Rapunzel to let down its proverbial hair and enter the real world. This shift has enabled researchers to not only focus on applied research questions that address real-life issues, but also to emphasize impact with an eye toward designing, testing, and implementing interventions that truly improve people's lives in rich and meaningful ways.

## A Shift to Real-World Applied Behavioral Science

The expansion of research into the real world is increasingly welcomed through a new kind of partnership between academia and industry—partnerships that emphasize how behavioral insights manifest in real, everyday behaviors and can thus be leveraged to help organizations and their clients make more informed choices. The relationship is symbiotic; researchers can test the ecological validity and scalability of their hypotheses under real-world operational constraints while industry or public sector partners gain insights from the rigorous testing of

hypotheses in ways that are customized to their unique products, services, and organizational goals.

Industry adoption of behavioral science has been an impetus to expand research methodologies and embrace new models for understanding human behavior. Technological advances of the past decade, combined with the proliferation and availability of behavioral data, have made it possible for researchers and industry partners to better understand decision-making in real time within the nitty gritty contexts of people's lives. The study of relationships is now very different with the invention of online dating apps, just as the study of physical activity has changed dramatically with the popularity of wearables, or the study of financial decision-making has evolved alongside the increasing ubiquity of digital wallets.

As applied behavioral scientists, we adapt to the needs and practices of industry partners to translate academic work, develop practical frameworks, and solve problems with real-world behavioral challenges. At the Center for Advanced Hindsight, we achieve this through in-depth workshops for each project (for an example of a workshop with Centene, see Corbin, Rayburn-Reeves & Lindemans, 2020). We work with key stakeholders at a range of organizations to identify their pain points and map the steps, barriers and opportunities involved to fully understand each problem we tackle. Our process of behavioral discovery, diagnosis, intervention design, testing and reporting ensures the customization of research to the unique problem at hand: from adherence to retention, from saving to exercise. Such industry collaborations are not only beneficial to the organizations we work with, but also ensure that the research is likely to have a real-world impact and can inform the public to further the collective understanding of human behavior in tangible ways.

The shift to conducting research in real-world environments with industry partners has substantial—and often-overlooked—benefits to the quality of research at large. By testing and re-testing in different environments — by looking at the same problems through different lenses ("what are all the behavioral principles that might apply here?") and different problems through the same lens ("how might confirmation bias play into problem A versus problem B?"), we can accumulate evidence that, when combined, leads us toward a greater understanding of human behavior in all its complexities and situation-dependencies. And perhaps most importantly, by supplementing neatly controlled lab studies with the messy realities of field studies and experimentation in the real world, we are better able to understand the generalizability of any particular finding. Take the behavioral science concept of framing as a model.

## The Study of Framing

A wealth of research shows that decisions can be influenced by the mere description, or "framing", of choices (Levin, Schneider, & Gaeth, 1998). People prefer meat labeled as 75% lean rather than as 25% fat (Levin & Gaeth, 1988). And an extension of classic research on the influence of framing on risk decision-making (e.g. Kahneman & Tversky, 1979) would suggest that the majority of people today would probably favor a coronavirus vaccine that saves 90% of patients over one where 10% of patients die.

Lab studies on the influence of framing are prolific, but researchers are only beginning to test the robustness of framing in the real world where things are, frankly, far from immaculate. At the Center for Advanced Hindsight, we are generating evidence on the impact of different types of decision framing in both lab and field contexts, in both the health (e.g. Mochon,

Johnson, Schwartz & Ariely, 2017) and the financial (e.g. Lee, Morewedge, Hochman & Ariely, 2019) domains.

Health and financial decisions often require people to trade off short- and long-term benefits (it hurts to save money or exercise now, but there are long-term benefits to both), and because people frequently behave in shortsighted ways—as if the only moment that matters is the present—our goal is to help them make decisions that serve their long-term interests. The insights from our lab and field research are used to help our industry sponsors develop and test the framing that both improves well-being and works best for their organizations.

In what follows, we present five case studies on the impact of framing in the real world: two in the financial domain on loan repayment and savings, and three from the health domain on exercise and vaccination. Across these five case studies, we consider how reframing could help people make better health and financial decisions.

## Framing in Financial Decision-Making

In the financial domain, MetLife Foundation and BlackRock support the Center for Advanced Hindsight's research on strategies to help people decrease their debt and increase their savings. The following two case studies demonstrate this in the context of loan payments and savings instruments, where the short-term pain of paying off debt and saving money compete with the long-term benefits of financial security.

### Financial Case Study #1: Reframing Loan Payments

*Background*

People are motivated to eliminate debt (Amar et al., 2011). Consumers prefer putting $100 toward fully paying off a loan with 2% interest over putting that same $100 toward paying down the balance of a larger loan with 4% interest. This tendency underscores the premium consumers are willing to pay for the satisfaction of feeling fully paid.

*Hypotheses and Key Insights*

We build on the finding of "debt aversion" by examining whether feelings of ownership (versus reminders of the loan) can facilitate loan repayment. The financial advantage of framing loan repayment as progress towards what is owned, as compared to what is owed, may be especially beneficial early in the life of a loan where consumers can shorten the duration of payments and avoid paying some interest.

*Experiment*

We asked 300 participants to imagine they had recently purchased a $1,000 sofa – with a one-year financing deal of 20% down, 0% interest, and equal monthly payments. They were randomly assigned to condition, with financing framed as having 12 months to pay off the loan, pay off the sofa, or own the sofa. Next, we asked participants to fast-forward three months, and reflect on their repayment progress. For the "pay off" and "own" conditions, the down payment was included in the amount. They were then asked whether they wanted to put some of their $300 tax refund toward the sofa purchase (even though they still had 9 months of interest-free payments).

*Conditions*

- *Loan:* payment framed as the amount required to pay off the loan

- *Pay off sofa:* payment framed as the amount required to pay off the sofa

- *Own sofa:* payment framed as the amount required to own the sofa

*Dependent Variable:* amount of a $300 tax refund put toward the sofa purchase

*Results*

Participants contributed significantly more of their refund to "owning" the sofa than to "paying off the loan." In part, these results were driven by how people conceptualize progress toward the goal of owning versus paying. The price of the sofa was the same in all three conditions, but for participants in the "own sofa" (and the "pay off sofa") condition, the down payment was counted as progress towards the entire purchase.

Participants in the "loan" condition focused on how much of the loan remained to be paid, which was a smaller percentage of the whole and therefore made it feel like less overall progress. Of course, this framing is the industry standard. Most consumers get bills with their payments and progress on the balance of their loan, rather than progress made. These results suggest that helping people think about what they already own, or including reminders of their equity in a purchase, may help them see the light and get to the end of the debt tunnel sooner.
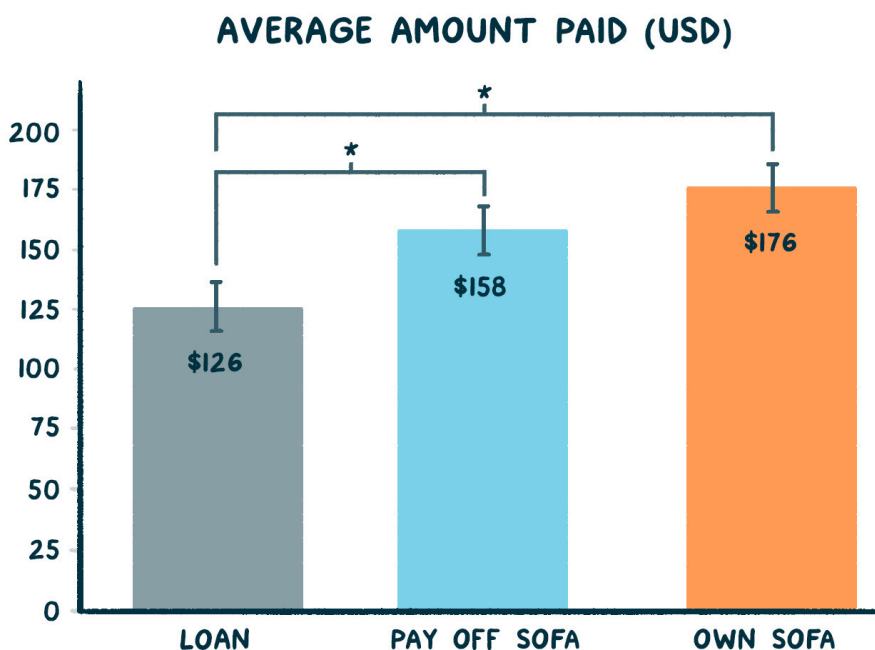


**Figure 1:** Average amount of a $300 tax refund put toward a sofa purchase across three conditions framing payment as paying off the loan, paying off the sofa, or owning the sofa. *Note:* *Asterisk denotes that the difference between groups is statistically significant.

**Financial Case Study #2: Reframing Certificates of Deposit**

*Background*

Locked savings products, in which account holders cannot withdraw their money until a predetermined date, have shown impressive results in increasing savings (Brune, Gine, Goldberg & Yang, 2011). In the following case study, our Common Cents Lab collaborated with the online bank Simple to explore the framing of time-locked savings products.

*Hypotheses and Key Insights*

In the US, most time-locked savings products are called "certificates of deposit" (CDs). We hypothesized that they are less successful than they could be as a result of negative associations (they prohibit you from accessing your money, rather than empower you to keep your money safe until you truly need it). We hypothesized that reframing CDs in a more positive light could lead to higher uptake and ultimately greater savings.

*Experiment*

We tested the framing of a hypothetical "Super Locked Savings Goal" product compared to a traditional "Certificate of Deposit (CD)" product—identical aside from the account framing—in a survey sent to 344 active Simple account holders. We also tested the impact of a meaningful, but feasible, interest rate change (2% vs. 3% for 6 months of money held) across the products to test the relative impact of interest rates on uptake compared to account framing.

*Conditions*

- *CD framing, 2% interest:* Certificate of Deposit (CD) with 2% interest

- *CD framing, 3% interest:* Certificate of Deposit (CD) with 3% interest

- *Super Locked framing, 2% interest:* Super Locked Savings with 2% interest

- *Super Locked framing, 3% interest:* Super Locked Savings with 3% interest

*Dependent Variables:* likelihood of using the product, and amount expected to save.

*Results*

Consistent with the hypothesis that negative associations unfavorably impact CDs, people said they would be more likely to put their money in the "Super Locked Savings Goal" product compared to a "Certificate of Deposit." Although there was no statistically significant difference between conditions in the amount of money people said they would put into the respective products, their savings account balances were predictive of their reported willingness.

Changing from a 2% to a 3% interest rate significantly increased how likely someone was to put money into the product. Importantly, switching from a "CD" to a "Super Locked Savings Account" had the same effect as the switch from a 2% to a 3% interest rate. This suggests that financial institutions can increase savings rates by reframing their products.

## SUPER LOCKED SAVINGS GOALS COMPARED TO CERTIFICATES OF DEPOSIT
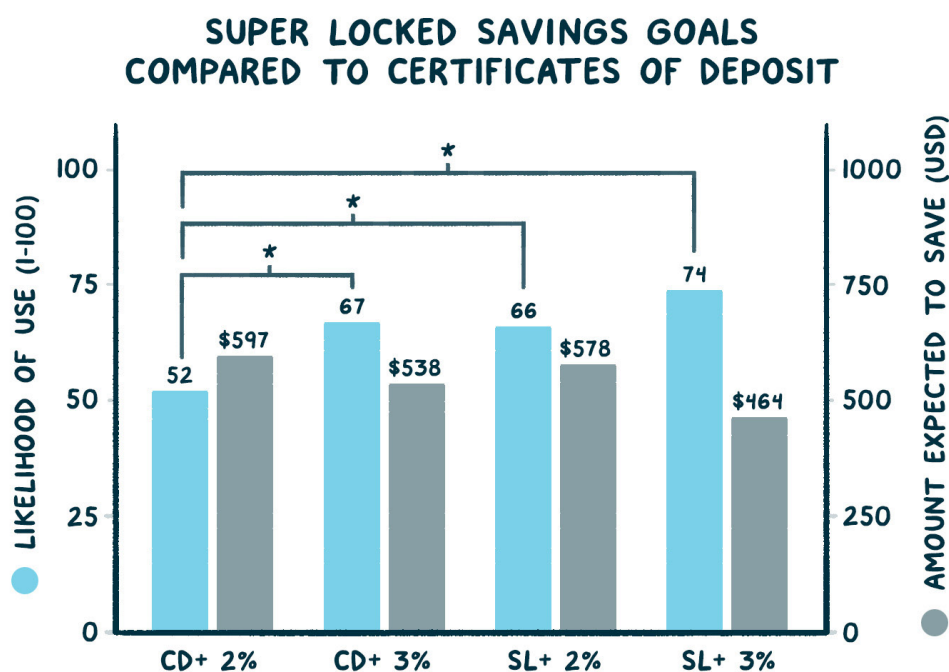


**Figure 2:** Likelihood of use and amount expected to save across four conditions that vary the interest rate (2% or 3%) and the framing of a financial product (Super Locked Savings Goal product or Certificate of Deposit). *Note:* *Asterisk denotes that the difference between groups is statistically significant.

Across these two case studies in financial decision-making, we found that reframing—in terms of progress made on loan repayment and the name of a savings account—showed promise in helping people make better long-term financial decisions.

## Framing in Health Decision-Making

In the health domain, our research focuses on how to help people be happier and healthier. The following three case studies demonstrate this in the context of exercise and vaccination decisions. These case studies focus on how to reframe the short-term pain, discomfort, and lack of motivation often identified as barriers to beneficial long-term health decisions.

**Health Case Study #1: Reframing Exercise Pain**

*Background*

Although some exercisers love to "feel the burn," many find that the discomfort of exercise is a barrier to starting and maintaining an active routine. While the pain of exercise is a true physiological phenomenon, it can also be influenced by cognitive and emotional factors in ways similar to placebo effects (Ekkekakis & Zenko, 2016).

*Hypotheses and Key Insights*

Building on lab research (e.g. Shiv, Carmon & Ariely 2005; Weber, Shiv, Carmon & Ariely, 2008) showing that people experience greater pain relief and cognitive acuity depending on how a placebo is described (e.g. its price), we tested whether framing exercise pain as helpful, or indicative of "working" could influence people's exercise-related thoughts and behavior. In a recently published study (Berman, O'Brien, Zenko & Ariely, 2019), we examined this framing

effect, also known as "cognitive reappraisal" (Gross & Thompson, 2007), or changing how participants interpret the meaning of a feeling before it is experienced. We hypothesized that the "helpful" framing would lead to higher exercise persistence and improved affect during exercise.

*Experiment*

We asked 78 participants (ages 18-55) to perform as many bench presses as possible in order to collect a baseline measure of their exercise persistence. We then randomly assigned them to listen to a voice recording that described the purpose of exercise pain as either "helpful" or "harmful," then asked them to repeat the bench press task to compare their post-framing persistence against their baseline measure.

*Conditions*

- *Helpful:* pain framed as a sign of muscle-building

- *Harmful:* pain framed as a sign of muscle-tearing and possible injury

**Dependent variables:** exercise persistence (number of completed bench press repetitions), affective valence, pain valence, pain intensity, exercise-task anxiety, and arousal.

*Results*

Participants in the "helpful" condition felt less negatively about their pain, but no other variables differed between groups (including the number of completed bench presses).

Although the manipulation did not affect exercise persistence, this study shows that it is possible to change feelings during exercise while its physiological nature remains unchanged. Participants lifted weights the same number of times across condition but felt less negatively about their pain when it was reframed positively.

Affect during exercise is associated with future exercise intentions (Rhodes & Kates, 2015), so it is possible that a framing manipulation like this could also lead to improvements in people's plans to exercise in the future, and further research could examine potential long-term behavioral impacts of reframing pain.
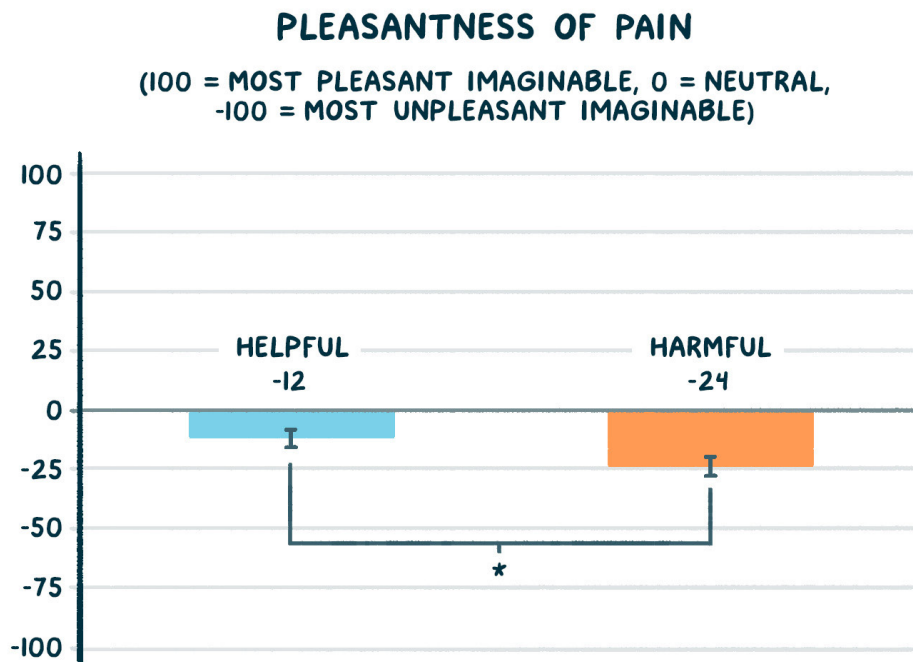
**Figure 3:** Pleasantness of pain reported across two conditions framing exercise pain as helpful or harmful. *Note:* *Asterisk denotes that the difference between groups is statistically significant.

**Health Case Study #2: Reframing Vaccination Pain**

*Background*

Vaccination is a powerful way to prevent illness (Orenstein & Ahmed, 2017; Andre et al., 2008); however, vaccine availability does not automatically translate into behavior, and structural and psychological barriers can prevent people from getting vaccinated.

*Hypotheses and Key Insights*

Memories of negative affect can influence intentions toward future health behaviors such as exercise (Kwan, Stevens, & Bryan, 2017) and vaccination (Taddio et al., 2009). In collaboration with the Duke School of Nursing, we asked participants to reframe the pain they experienced from a recent flu vaccine and measured whether their remembered pain influenced their intentions to get a flu vaccination the following year. For eligible participants, we also asked about their intentions to get the human papillomavirus (HPV) vaccination.

Since cognitive reappraisal can help individuals manage pain (Hampton, Hadjistavropoulos, Gagnon, Williams & Clark, 2015) and negative emotions (Kalokerinos, Greenaway & Denson, 2014), we hypothesized that individuals in the "pain reappraisal" condition would rate their pain as lower and show stronger intentions to get flu and HPV vaccinations compared to the "baseline control" and "pain control" conditions.

*Experiment*

A sample of 1,657 Duke students, faculty and staff received flu vaccines at a pop-up clinic, of which 1,478 completed our experimental measures (89% response rate). Participants received one of three flyers (shown below) and temporary tattoos with messages about the pain of a flu shot.

*Conditions*

- *Baseline Control:* flu shot described as a good way to stay healthy

- *Pain Control:* flu shot pain described with arm soreness solutions

- *Pain Reappraisal:* flu shot pain framed as the body getting stronger



Baseline Control Flyer
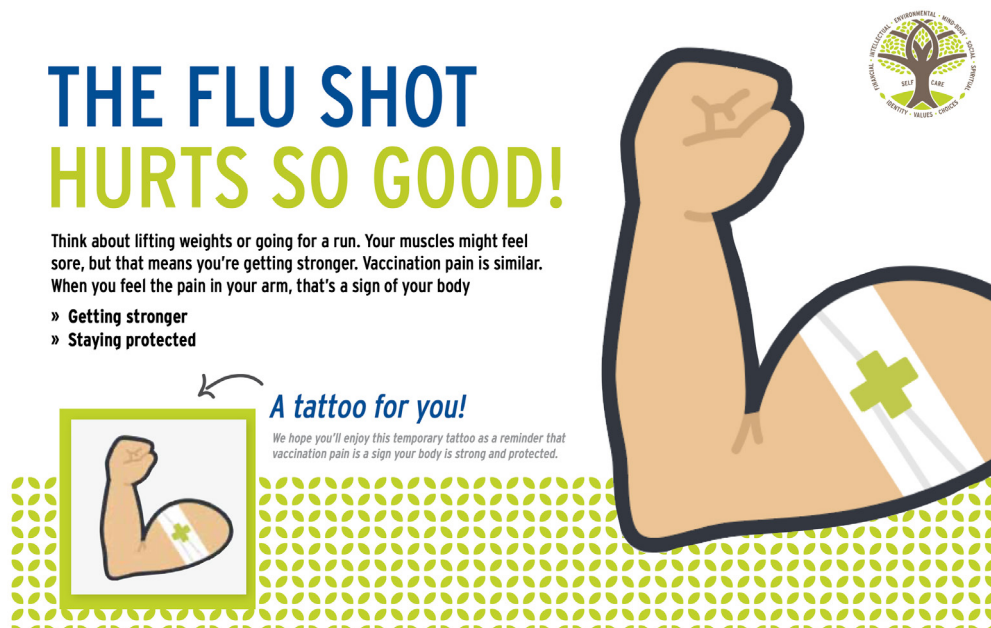


Pain Control Flyer

Pain Reappraisal Flyer

**Figure 4:** Flyers given to participants across three conditions to reframe the pain of vaccination: Baseline control flyer, pain control flyer, and pain reappraisal flyer.

*Dependent Variables:* intention to get a flu and HPV vaccination.

*Results*

We found no difference across condition in the intention to get a flu or HPV vaccination. This may have been because pain perception was already very low (an average rating of 2.5 from their previous flu shot on a scale of 1-10), and vaccination intentions were already high in this sample (with an average interest of 2.72 on a 1-5 scale for the HPV vaccine (SD=1.33), and an average interest of 4.33 (SD=0.86) for the flu vaccine.) This potential floor effect for pain, and ceiling effect for vaccination intention, could have resulted in too little variation to detect any differences from our manipulation. We are following up to examine reappraisal in vaccinations that may be associated with greater arm soreness or require multiple doses to examine the impact of reframing pain on more painful vaccination types.

The positive effect of reframing pain in our exercise study did not emerge in our vaccination study, perhaps due to the low level of pain that participants associated with the flu shot. As such, we attempted to reframe another aspect of vaccination that we believed may be more relevant than pain: Motivation for getting a vaccination.

**Health Case Study #3: Reframing Vaccination Motivation**

*Background*

Changing the frame can increase healthy eating in adolescents (Bryan, Yeager, Hinojosa, Chabot, Bergen, Kawamura & Steubing, 2016), a behavior that is particularly challenging to promote with teenagers (Stevenson et al., 2007). One iconoclastic intervention successfully capitalized on the desire for social justice and autonomy by presenting healthy eating as a way to take a stand against large corporations and manipulative marketing campaigns. Given

Americans' general antipathy toward health insurance companies (Gallup, 2018), we tested a similar strategy in the context of flu vaccination with an adult sample.

*Hypotheses and Key Insights*

Many people feel that the cost of their health insurance is too high relative to the benefits they receive and are skeptical that insurers have their best interests at heart (Gallup, 2018; 2019). We hypothesized that framing vaccination as a way to stick it to one's health insurance company (the "spite" condition) would result in the greatest intention to get a flu vaccine.

*Experiment*

A total of 800 adults were randomly assigned to one of three conditions: "control," "maximize," or "spite."

*Conditions*

- *Control:* flu shot framed as a way to stay healthy

- *Maximize:* flu shot framed as a way to maximize your insurance benefits

- *Spite:* flu shot framed as a way to spite your insurance company

*Dependent Variable:* intention to get a flu vaccine.

*Results*

Compared to the control group, the "maximize" and "spite" conditions both significantly increased the percentage of people interested in getting a flu vaccination. Additionally, participants in the "maximize" condition expressed slightly less dislike for their insurance company than in the "spite" condition, though this difference was not statistically significant. Framing the flu shot as either a way to maximize a benefit or spite one's insurance company led to ~10% more people interested in vaccination when compared to the control framing.

Across these three case studies in health decision-making, we found that reframing had varying effects on affective and intention outcomes. Reframing pain improved people's experience of exercise pain but didn't impact vaccination pain or intentions. However, using spite to reframe the motivation for getting a vaccination did increase vaccination intentions.

## INTENTION TO VACCINATE (%)
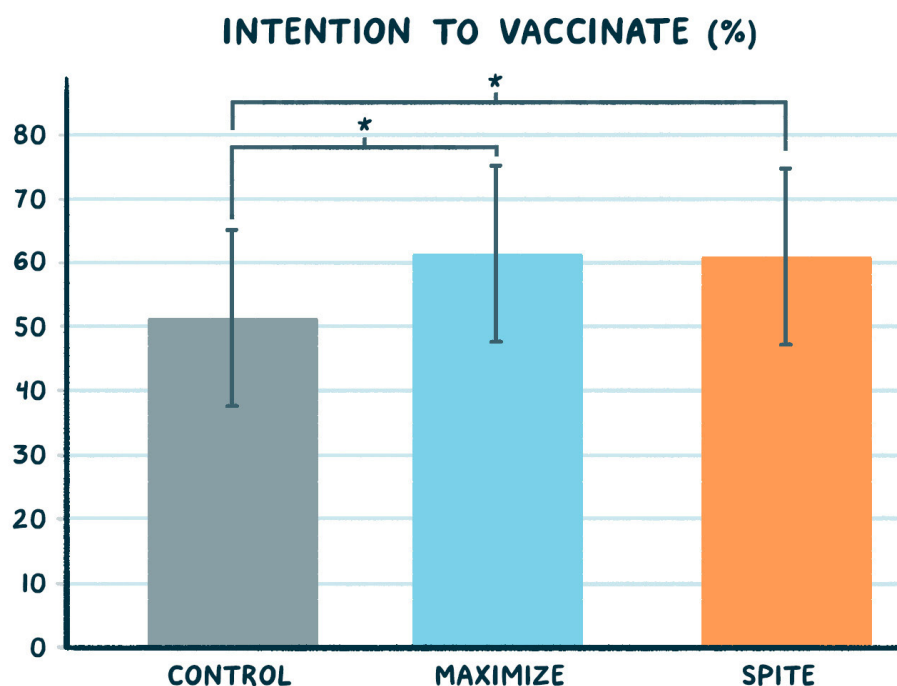


**Figure 5:** Intention to vaccinate across three conditions framing vaccination motivation as a way to stay healthy (control), maximize insurance benefits, or spite your insurance company. *Note:* *Asterisk denotes that the difference between groups is statistically significant.

### Framing Matters

Through five case studies conducted in the lab and the field, we demonstrate how and when different varieties of framing can influence decision-making. We saw in the financial domain that framing payment as the amount one puts toward ownership led people to allocate more money into paying off their debt than when the same decision was framed as paying off their loan. And we saw how reframing Certificate of Deposit (CD) products as Super Locked Savings products led to the same increase in reported likelihood to save as increasing interest from 2% to 3%.

In the health domain, we saw how framing exercise pain as a sign of muscle-building led people to feel less negatively about exercise but framing vaccination pain as a sign of the body getting stronger did not lead to a comparable effect. Reframing the motivation behind vaccination, however, did have an impact on people's intentions to get a flu vaccine; framing the flu shot as a way to maximize insurance benefits or to spite one's insurance company led to greater intention to vaccinate than when the flu shot was simply framed as a way to stay healthy.

Choice architects are tasked with using framing techniques to promote positive behavior change—whether it is encouraging vaccination or saving behavior—and each insight tested in the lab and the field builds a stronger foundation to inform future behavioral interventions.

The practice of behavioral science has come a long way since 2010 when lab studies reigned supreme, and its evolution—both in terms of the complementary mixture of lab and field studies, and in the development of academic-industry partnerships—is an important shift toward a more complete understanding of human behavior that considers both context and real-world impact.

**Thanks to our sponsors and funding agencies**

## The Authors

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**Matt Trower** is the resident artist at the Center for Advanced Hindsight. At the Center, they use illustration and design to enrich the way the lab communicates with the world and conducts research. Whether it's comics, illustrations, charts, or designs, Matt believes in the power of visual media to easily convey concepts that are difficult to explain in text or speech alone.

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# Green New Deals

## Social Boasting and the True Value of Ethical Branding

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## Executive Summary

More and more shoppers seem to be making purchase decisions based on their value judgements about ethical issues (Steinhoffer, 2018). Concomitantly, there has been a sharp rise in the number of brands pushing ethics to the forefront of their propositions. It's fair to say, then, that brands are responding to the drivers behind consumer purchasing behaviour. Or are they? We leveraged a range of research methodologies to find out.

Our headline finding is that people exaggerate how ethical they are, and this is especially true for those behaviours that are topical and require a considerable amount of effort; for example, more than one in three consumers exaggerate their recycling behaviour. Our research found that almost nine in ten (87%) people claim to have recycled in the last week, but only just over half of them actually did so (52%). Consumers also overstate their sustainable travel behaviour, with one in four falsely claiming that they had chosen to travel by bike or on foot instead of taking the car or public transport in the last month.

Across the vast majority of demographics, people overstate behaviours that they think fit with social norms. We find such 'social boasting' is highest when it comes to recycling, travel behaviour and avoiding products with palm oil. All of these behaviours are prevalent in today's society, with many media reports and campaigns focusing on their impact on the environment. But when it comes to 'Keeping up with the Attenboroughs', it appears to be shoppers' words, not deeds, which are adding to the ethical consumerism hype.

The second part of our research corroborates this finding, suggesting that ethical consumerism is not currently a purchase driver. Consumers are not moved to purchase a brand's ethical product by virtue of it having an ethical image; instead, how much they like a brand and consider it affordable are much stronger purchase drivers. Consequently, not only do consumers behave less ethically than they claim to, they also do not generally care whether or not a company is actually ethical or not.

That said, there are some minor exceptions to this general rule, with specific ethical levers available to brands that can help boost sales. In the Health & Beauty industry, for instance, consumers are willing to pay the greatest premium for products that aren't tested on animals (17%). Key to unlocking this potential value is modelling consumer data. Our research finds that a number of demographics stand out from the crowd as more likely to make ethical purchase decisions: females and people with a degree.

However, none of the findings in this report would be reliable had we relied on self-reporting. People are not good at introspection, so brands should not rely on standard research approaches such as qualitative interviews and focus groups. Instead, methods like the unmatched count technique (Govind et al., 2017) and randomised control trials help elicit true behaviours and uncover real insights. To illustrate this point, our research discovers a substantial disconnect between those people who rated themselves as either an extremely unethical shopper or an extremely ethical shopper, with both having a 30% propensity to purchase ethical products.

## Chapter One: He, Who Shouts the Loudest

People often claim to act in ways they think conform with the rest of society, generally due to social norming (Farrow et al., 2017). Of course, these claims do not always map onto the truth,

so in order to determine how ethical consumers actually are, we used the unmatched count technique to elicit real behaviours. The main finding is revealing, in that they often exaggerate how ethical they are.

As social creatures, we care about what other people think of us. When the majority of our friends, family and colleagues act in a certain way, or share a similar set of values, our default is to fall in line. Therefore, we used the unmatched count technique (Raghavaro & Federer, 1979) to provide respondents with a veil of anonymity and encourage them to answer more truthfully.

## Overstated Actions, Undervalued Ethics

Using the Unmatched Count Technique (UCT, see Methodology section), we randomly split the consumers into three groups. One group was asked which of eight ethical statements were true for them. The second group was asked how many statements were true from a fixed list of four uncontroversial statements (e.g. I have been to America), but they were not asked to indicate which of the statements were true. The third group was presented with another list of uncontroversial statements, but these also included one of the eight ethical statements, chosen at random for each consumer. This group was also asked to detail how many of the statements were true, but not which specific ones.

By comparing the results for those that did and did not see an ethical statement, we were able to determine the actual prevalence of each ethical behaviour. The results (Figure 1) show that people tend to overstate the occurrence of seven of these behaviours, though to varying extents. This is especially true of behaviours that are more typical – such as recycling – and those that require a considerable amount of effort – such as sustainable travel.

Consumers' biggest ethical exaggeration relates to their recycling behaviour, with more than one in three overstating their conformity in the past week (35% difference between stated and actual behaviour). Similarly, the research finds that while three in five consumers claim to have engaged in sustainable travel behaviour in the past month (60%), just over one-third actually do walk or cycle instead of taking the car or public transport (35%). This means that one in four consumers exaggerates their travel behaviour.

However, if an ethical behaviour is not particularly prominent and does not involve a significant amount of effort, consumers exaggerate their actions much less. This is most clearly seen with the finding that almost 50% fewer people claim that they donated to a food bank in the last year, compared to claims about sustainable travelling. And where ethical behaviour is less intensive and provides a direct benefit to the consumer – as in the case of reusing a plastic bag – consumers overstate their actions to a far lesser degree.

## Listen, I'm Like You

Underpinning consumers' exaggeration of their own ethical behaviour is the phenomenon of social boasting, which captures people's tendency to over-report behaviours that are deemed to fit in with social ideals. According to the research, it appears that the general consensus and overall salience of these ethical behaviours contributed most to consumers' responses (Cialdini et al., 2006).
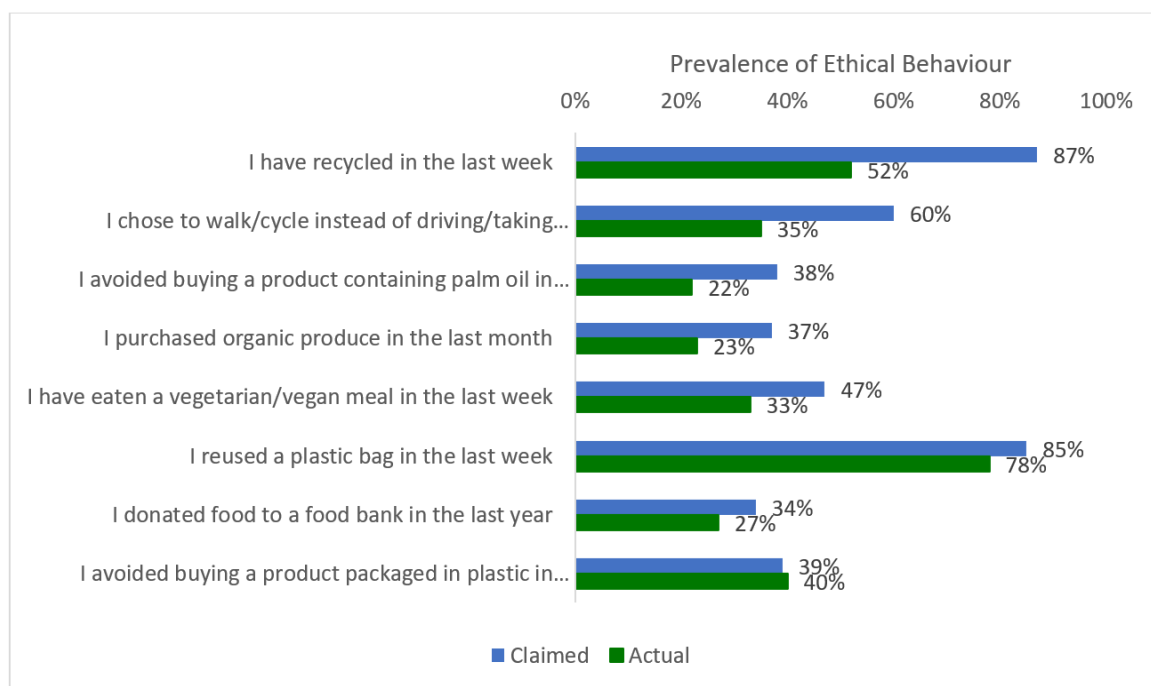
**Figure 1:** Comparison of claimed consumer behaviour vs actual consumer behaviour.

## Chapter Two: Is Being Liked More Important Than Being Ethical?

From Audi's latest E-tron vehicle, to the latest single-plastic pledge, brands everywhere seem to be responding to consumer concerns and incorporating new ethical features into their propositions. We wanted to find out whether being perceived as an ethical company persuades consumers to purchase ethical products. The answer is, 'it depends'.

Our behavioural survey focuses on what persuades consumers to move from the awareness stage to the purchase consideration stage, and across five major industries, the extent to which consumers find a brand 'Likeable' and 'Competent' are the most significant drivers when it comes to brand consideration.

By modelling how brand perceptions affect consumer purchases, we discover that consumers don't particularly consider the ethics of a company when deciding where to purchase. This finding is a challenge to brands that have made wholesale changes to their offer in response to a perceived increase in demand for ethical products.

In fact, while ethical considerations make up one of the six distinct and differentiating dimensions uncovered by the research using factor analysis (see Table 1), consumers are more persuaded by their trust and affinity with a brand (see Table 2). In fact, how much consumers like a brand is over two times more persuasive for deciding where to purchase compared to ethical considerations (8% vs 3%). Furthermore, consumers that think a brand delivers good-quality products and services ('Competent') and offers good value compared to the market ('Affordable') are also more influential factors than a brand's perceived ethics.

| | |
|---|---|
| **Likeability:** | encompasses affinity and trust towards a brand |
| **Competent:** | involves a range of perceptions around customer experience and a brand's range, service and expertise |
| **Affordable:** | represents how cheap a brand's price is relative to the market |
| **Ethical:** | covers a range of perceptions around sustainability, equity and morality |
| **Reliable:** | indicates how dependable a brand is |
| **Reputable:** | represents how familiar and respected a brand is |

**Table 1:** Guide to brand perception factors.

| Perception | Across Industry | Fashion | Energy | Health & Beauty | Food Delivery | Supermarkets |
|---|---|---|---|---|---|---|
| Likeable | **8%** | **14%** | **16%** | **13%** | **9%** | 0% |
| Competent | **5%** | 4% | 6% | 4% | 6% | 1% |
| Affordable | **3%** | **7%** | **4%** | **5%** | 2% | 1% |
| Ethical | 3% | **7%** | 7% | **6%** | 3% | 0% |
| Reliable | 2% | 2% | 4% | 2% | 3% | 0% |
| Reputable | 1% | 0% | **5%** | 1% | **4%** | -1% |

**Table 2:** Impact of brand perceptions on purchase consideration. *Note:* the proportions in the table indicate the size and direction of impact on purchase consideration; for example, if people think a fashion label's prices are better than other brands, they are 7% more likely to consider that label when making a purchase. Numbers in bold indicate perceptions that have a statistically significant impact on brand consideration (95% confidence level).

### Ethical Perceptions Do Matter, Sometimes

There are some industries where being perceived as an ethical brand can add value; for instance, brands that are perceived as ethical have some pull in converting shoppers in the fashion and health & beauty sectors. Our research reveals that the second biggest influence on consumers' purchase decisions in the health & beauty sector is the 'Ethical' perception dimension (6%). And in the case of the fashion industry, consumers' views of a brand's ethics have the joint second biggest impact on purchase decisions, alongside 'Affordability' (both 7%).

It is worth noting that health & beauty brands have engaged in conversations about broad ethical considerations since at least the 1970s (Chesters, 2011). By and large, this has left today's consumer aware of how some products involve animal testing and the environmental harm caused by some ingredients and the wider supply chain.

Consumer considerations for animal welfare have also affected the fashion industry. Since 2017, for instance, a number of consumers across the globe have protested outside Canada

Goose shops, taking exception to the alleged animal cruelty involved in making the fashion label's famous down jackets. And leading industry figures, like Stella McCartney (Franklin-Wallis, 2018), and respected journalists at renowned publications such as Vogue (Singer, 2019), have also helped drive ethical consumerism to the fore.

## Chapter Three: Ethical Purchase Drivers

If ethical considerations are not at the forefront of most consumers' minds when they make a purchase decision, brands might wonder whether there is value in ethical propositions. But our research uncovers the finding that industry-specific ethical levers can yield price premiums for companies that successfully target ethical consumers.

These ethical levers provide opportunities to generate value for both consumers and companies. In this part of the research, we ran an RCT experiment to eliminate any inherent preferences for a particular brand and focused on whether respondents chose a proposition with an ethical feature. Binomial regression was used to model the estimated premium brands can charge, by adding a select ethical feature to a product proposition.

### Industry-Specific Levers

Across five industries, the research finds a range of ethical levers for which consumers are willing to pay a premium. The highest average premium is 11.5% in the health & beauty sector, which also contains the highest ethical feature premium across all industries for products that have not involved animal testing (17.0%). Interestingly, the second highest average ethical price premium is available to food delivery platforms (7.9%), which shares a similar premium to supermarkets relating to sustainable packaging (see Table 3).

While there are a number of reasons why some ethical feature premiums rank higher than others, two factors seem to have the most impact: how salient an issue is, and how long it's been around. In the case of the sustainable packaging premium, many recent marketing campaigns and initiatives have raised consumer awareness about the peril that plastic poses to the environment and wildlife. Moreover, regarding the animal testing premium, this issue has been covered since the 1970s, when the Body Shop was one of the first high street brands to highlight the harm done to animals during production.

Arguably, the potential premiums on offer for supermarket and fashion brands in the case of local goods (6.0% and 8.9%, respectively) are also a result of growing consumer awareness. This interest in where clothes are sourced, how they are made and in what working conditions has contributed to the commercial success of labels like Private White V.C. Acknowledging this consumer interest, high street brands have tapped into this ethical consumerism and specifically mark some of their clothes as 'Made in Britain' (Wright, 2019).

Nonetheless, having previously found that fashion brands that are perceived as ethical can persuade consumers to purchase, the relatively low average premium for the sector (6.6%) can be explained by the poor score of the clothes recycling scheme (3.3%). While H&M Group has laudably done its best to push its clothes recycling scheme through its subsidiary brands, it has not found much traction among consumers. Consequently, this relatively new initiative has not reached the mainstream and does not offer brands much of a price premium. fashion

brands should bear this in mind when reflecting on the potential ethical premiums available to them.

| Industry | Overall Premium | Ethical Feature Premiums | Specific Ethical Premium |
|---|---|---|---|
| Health and Beauty | 11.5% | Feature 1: Not tested on animals | **17.0%** |
| | | Feature 2: 100% natural ingredients | 8.6% |
| | | Feature 3: Suitable for vegans | 8.2% |
| Food Delivery | 7.9% | Feature 1: Recyclable packaging | **10.8%** |
| | | Feature 2: No zero-hour contracts | **6.5%** |
| | | Feature 3: Carbon neutral delivery | 6.0% |
| Supermarkets | 6.6% | Feature 1: Plastic-free packaging | **8.7%** |
| | | Feature 2: Sourced from British farmers | **6.0%** |
| | | Feature 3: Fairtrade | **5.6%** |
| Fashion | 6.6% | Feature 1: Made in Britain | **8.9%** |
| | | Feature 2: Fairtrade | **7.8%** |
| | | Feature 3: Clothes recycling scheme | 3.3% |
| Energy | 2.2% | Feature 1: 100% renewable electricity & carbon neutral gas | **2.7%** |
| | | Feature 2: Switch and we'll donate £10 to charity | **1.9%** |
| | | Feature 3: Reduce energy consumption by 20% | **1.9%** |

**Table 3:** A cross-industry assessment of the premium a brand can charge through implementing ethical features into their proposition. *Note:* Numbers in bold reflect statistical significance at a 95% confidence level. The Ethical feature's premium reflects the relative premium a brand can charge on average for a product with the respective ethical feature; for example, customers are willing to pay an additional 2.7% for a renewable energy tariff.

### A Potential Windfall

Further analysis we conducted suggests there is £82 billion worth of value in ethical premiums across all UK sectors. Using the latest ONS data on household weekly expenditure and the number of UK households, we worked out the annual market figure at approximately £810 billion (ONS, 2020).

And our analysis finds a 10.1% ethical premium available to brands from all sectors, which equates to a potential annual revenue figure from ethical features of £82 billion. Although there is no data to confirm how much of this has already been realised, and the revenue figure does not account for the costs of implementing the ethical features, it's clear that brands have an opportunity to capitalise on ethical consumerism.

One prominent example includes supermarket brands, which could stand to gain as much as £5 billion in revenues if they were to incorporate successfully the ethical levers used in this research into their proposition. As the table above shows, one of the most valuable premiums that supermarkets could leverage is the removal of plastic packaging. Morrisons has done just this, becoming the first supermarket chain to remove packaging from its fruit and vegetables (Quinn, 2019).

Elsewhere, and as supported by other research in this report, our analysis finds a real opportunity for fashion the fashion and health & beauty brands. By catering their propositions to ethical consumers, brands in these industries could boost their top lines by around £2 billion.

| Industry | Ethical Premium | Annual Market Revenue (£billions) | Potential Annual Revenue from Ethical (£billions) |
|---|---|---|---|
| Supermarkets | 6.6% | £78 | £5.2 |
| Health & Beauty | 11.5% | £18 | £2.0 |
| Fashion | 6.6% | £28 | £1.8 |
| Energy | 2.2% | £28 | £0.53 |
| Food delivery | 7.9% | £0.85 | £0.067 |

**Table 4:** Estimation of the potential value added by incorporating an ethical feature into propositions in different industries. *Note:* Average annual spend for all industries, food delivery per household. For food delivery, the average annual spend is per customer.

Key to unlocking this potential windfall is tailored, well-targeted communication that stimulates consumers' more deliberative ways of thinking. Since, by themselves, shoppers are unlikely to change their consumption habits, it is thus incumbent upon brands to engage people in such a way that persuades them to make more ethically considered purchases.

## Chapter Four: The Limits of Self-Reporting

It is noteworthy that the findings documented here could only be found by using robust research methodologies that avoid inaccurate self-reporting. It follows that if companies choose an inappropriate methodology for their research, then it's likely that the results will be misleading at best and erroneous at worst.

Self-reporting is not a good way of understanding why customers make purchase decisions, because on the whole, people are not good at introspection; they often don't know why they made a certain choice, and many post-justify their decision to make themselves feel better.

If introspection provided a good prediction of ethical consumer behaviour, then there would be a positive relationship between consumer purchase decisions and their self-rating of how ethically they behave.

Yet, in reality, those who rate themselves as either extremely unethical or extremely ethical are equally as likely to actually purchase ethically (both 30%, see Figure 2). The research also finds that females tend to rate themselves significantly less ethically than males, and yet they are significantly more likely to purchase ethically.
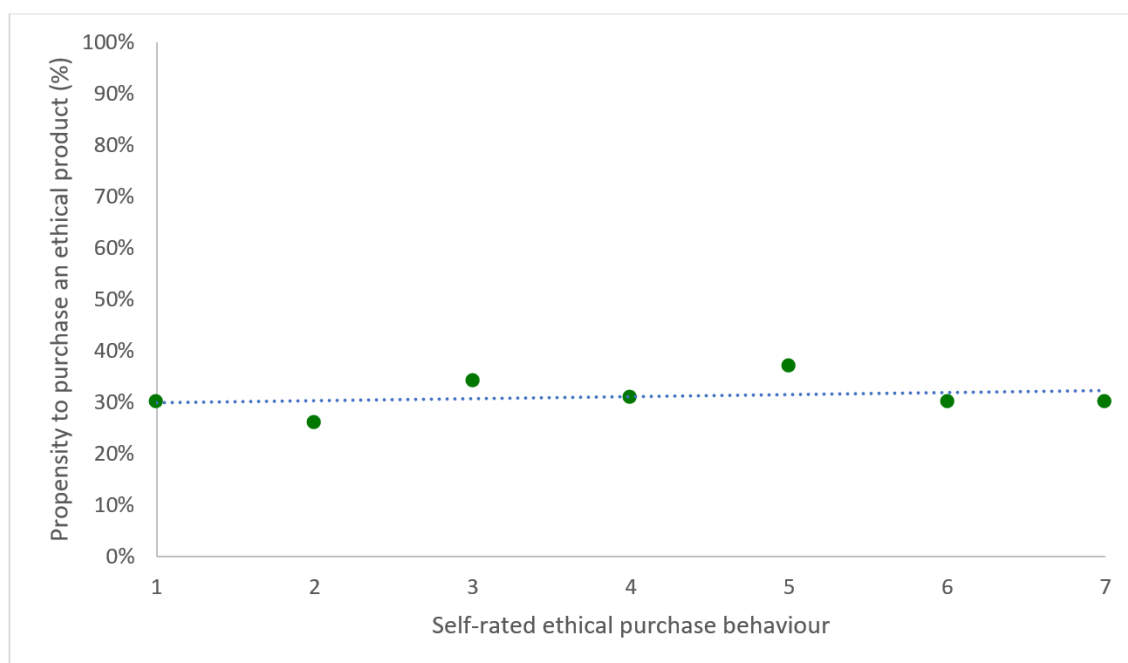
**Figure 2:** Comparison of self-rated ethical purchase behaviour against actual propensity to purchase ethically.

Instead of relying on qualitative and focus group research, brands should employ an experimental method, since this approach is well attuned to assessing consumer preferences that relate to socially desirable ends, such as with ethical consumerism. A number of experimental methods were used in this research to test hypotheses more robustly in a controlled environment. Consequently, the findings detailed in this report provide reliable insights that brands can use to improve their business propositions.

## Recommendations for Retailers

*Ensure your business case is proportional to your target market*

Brands should ensure that any changes to their proposition, targeting and communications correspond to the size of their addressable market, which might be smaller than expected.

*Educate consumers to improve the environment, society and your balance sheet*

In order to better leverage ethical credentials, companies should invest in education campaigns to bring ethical considerations front of mind. An increase in ethical purchases may well benefit brands, consumers and the wider world.

*Identify the specific ethical features with the greatest sales leverage in your specific market*

Brands should conduct objective, mixed-method research and econometric analysis in order to establish the most valuable ethical features and gauge potential profitability.

*Don't rely on self-reporting to identify relevant ethical levers*

Introspection is notoriously unreliable. Experimental research carried out in a controlled environment is more likely to yield robust insights and help brands identify the right ethical levers for their market.

## Methodology

This research used a combination of a behavioural survey, the unmatched count technique (UCT) and a randomised controlled trial (RCT) to generate the insights reported.

The RCT involved taking participants through a realistic simulation of purchasing a product through a price comparison website. Each participant was required to make two purchases for two different products selected at random from utilities, supermarkets, fashion, health & beauty or online food delivery.

Each experiment presented three fixed control propositions that were exactly the same for each participant, and one test proposition that varied between-subject. All participants were shown the same four brands within each product area, with the propositions replicating real-life offers and the brands chosen typically representing the most established in that industry. There were some exceptions to this, in that brands that currently offer ethical products could be included, in order to assess congruence to brand. The propositions were always ordered from lowest price to highest price as is typical of a price comparison website, but the order in which brands were presented to a participant varied between-subject, so that each brand was randomly assigned to a proposition. The test proposition varied in two ways: (1) the price was randomly chosen between a range that stretched below and above the control offers with fixed increments and (2) one ethical feature from a possible three could be shown at random, or not at all. The ethical features tested for each industry were designed in order to be topical and impactful.

By keeping the propositions consistent between participants, the impact of brand desirability was isolated, thereby ensuring a clean test of the influence of including an ethical feature in a proposition. The key outcome measure was product choice, specifically whether a product with an ethical feature was chosen.

The unmatched count is a technique used to improve the reliability of responses to sensitive or possibly embarrassing questions by providing the respondent with anonymity. It was introduced by statisticians Raghavarao and Federer in 1979. We used it in this research to establish more accurately how people actually behave, rather than relying on self-reporting.

### Sampling

The research was conducted online with a nationally representative sample of 2,497 UK consumers aged 18 and over.

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# Thinking as Behavioral Scientists, Acting as Designers

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*"The proper study of mankind has been said to be man. But I have argued that man—or at least the intellective component of man—may be relatively simple, that most of the complexity of his behavior may be drawn from man's environment, …. If I have made my case, then we can conclude that, in large part, the proper study of mankind is the science of design, not only as the professional component of a technical education, but as a core discipline for every liberally educated person."*

Herbert A. Simon.

## Introduction

Behavioral sciences (BSs) and design are old friends, although this long-standing relationship is going to change significantly in the years to come, yielding benefits to behavioral and social scientists, economists and designers.

Design schools and universities do not refer to any specific scientific school of thought or body of knowledge, and yet the breadth of information that human sciences can provide is often used to support design propositions implicitly. Behavioral sciences play an outstanding role in influencing design directions, especially in the digital economy. In recent years, insights from BSs have been misused by various digital technology companies, in that they have extracted value from the Internet, shaping behavioral experiences through skilful manipulation of emotions and digital behavior. For instance, in political contests we have witnessed the consistent use of Web-based communication strategies forming cognitive lock-in loops, in order to manipulate the judgment of people and guide them toward choices that misrepresent their best interests, Cambridge Analytica being an exemplary case of data misappropriation and brokerage (see https://en.wikipedia.org/wiki/Cambridge_Analytica). BS heuristics in framing, anchoring, and priming can be used by interaction designers to set preferences in such a way that control is taken away from users, thus making it very difficult for them to evaluate the consequences of oversimplified choices. Furthermore, it has become relatively easy and legitimate for large-scale marketing programs and advertising strategies to use personal data via release forms that can confuse even the most cautious. Content strategies that implement information architectures with hierarchies that favor deception, proposing over-simplified choices or over-informative—and hence overwhelmingly misleading—contents, are even more subtle. Usability tests can be easily designed to favor simplification strategies or information hierarchies that lead to channeling preferences reflecting business goals rather than actual user preferences.

A backlash is underway, and BSs are being held up as instrumental in behavioral control (see Schneier, 2015; Zuboff, 2019) devaluing the role that good science can have in improving coping capabilities and users' competence in managing uncertainty. However, the answer to this potential threat can be found in a more sophisticated use of BSs, which can—and should—play a key role in setting new horizons to increase the impact of strategic behavioral design in business. Currently, the role of good design involves integrating values such as *utility (functionalities)*, *usability (flow)*, and *pleasure (emotional engagement)* (Visciola, 2000), but a new frontier requires the reduction of information noise and an increase in giving people the chance to become more competent in their daily life, while enhancing cooperation patterns to address our challenges seriously.

The digital economy is still unable to deal with requests aimed at reducing misbehavior, or to reflect on communities and society's new and progressive evolutionary values. Behavioral

sciences and design can generate the conditions for new narratives in business strategies and in policy definition, to find sustainable solutions to the enormous social challenges we currently face.

This position paper argues that strategic design should aim to go beyond current standards that focus on experience design and frictionless decision-making, and set new standards fostering competent-rich decision-making and real-life cooperation, hence drafting a new design ethics. I believe new standards require combining observation and behavioral modeling techniques. Furthermore, this new design frontier requires BSs to move beyond set laboratory settings, suggest experimental methodologies that can correctly emphasize the role of context in defining information resources, and document what people need, in order to become more competent and collaborative in their daily lives.

Theory-wise, BSs should converge with the body of knowledge from the most advanced available theory of behavioral and cultural changes, namely, the theory of evolution, which enables us to understand how the pressure to change can shape how we describe adapting to such change. Behavioral change programs based on (behavioral) models can be based on an understanding of the relationship between mental routines, habits, value systems, and contextual cultural constraints. However, the most appropriate paths to ensure a sustainable change able to foster competence and collaboration require a sound theory of change, which is where the theory of evolution is of great help.

In the following sections, I shall illustrate how this methodological framework has enabled us to build behavior modification programs in leading sectors of digital innovation, such as the design of:

a)  tools for financial savings and

b)  a masterplan of services for the elderly.

## Natural Contexts and Adaptive Forces

Complexity typical of natural contexts in daily life reveals the fallacy of behavioral nudging programs based on raising awareness and counting on the willingness of the target audience to adapt to the recommended practices. For instance, people's resistance or lack of adherence to well-known standards and lifestyle recommendations are often due to constraints (and pressure to stay stable) that were at the very origin of the formation of bad habits. Smoking, regular over-eating, or poor nutrition are cases in point. This means that these issues cannot be addressed by relying on mere willpower.

Very often, people do not know how to upgrade their competence in managing complex health and financial issues. For instance, patients do not know how to modify lifestyles to address health-related issues, due to a lack of control over their surroundings. This is one of the main reasons for non-compliance with clinical trial protocols, whereby people decide to discontinue a prescribed regime or deviate from it, thus compromising the results. Such behavior is due to the mismatch between controlled clinical trial practices and clinical practice requirements in real life. Prescribed behavior that fails to consider real-life constraints is likely not to work even when people volunteer for trials. In the financial sector, our research into designing financial tools for saving has shown that saving capacities are distributed very unevenly among people

within the same income bracket. We observed a variety of heuristics and captured psychological routines at different levels of sophistication where a range of abilities in maintaining financial stability and planning for future projects has been reported and documented.

Even when social norms are accepted and behavioral prescriptions are defined to set good reference points, the internalization of norms or standards can prove difficult because of the inherent costs of adapting to settings not from one's original ethnic group. This is very often the case in multicultural and multiethnic societies. Heuristics such as "copy success" or "copy plurality", which are learning strategies in bounded rationality that can be observed in laboratory settings (see Apesteguia, Huck & Oeschssler, 2007), are impracticable in real life until local institutions build a targeted set of meanings for each ethnic group, so that preferences between different ethnic groups can be calibrated and balanced (see further on in this text, and the 2015 Aging Gracefully Report).

To represent the complexity of natural contexts, we need visual tools such as a two-axes chart to map people's mental routines and the evolution of their competences in adapting to specific challenges.

## Behavioral Models and the Theory of Change

Biological and cultural evolution share the same characteristics (Lewens, 2015), in that biological and cultural forces interact according to co-evolutionary paths and can be described using the same set of principles, i.e. migration or mutation, which are the outcomes of selective pressures and can ultimately result in persistent drift (see Cavalli-Sforza 1981).

We can observe and describe people's behaviors and their differential patterns as *adaptive* or *maladaptive* reactions (Wood, 2019) in the presence of "selective pressures" and psychological forces in society. The pressure to change is part of the cultural life of any creature as a result of the biological pressure to fit in. Every biological creature has inherited or acquired mechanisms to reduce the pressure to change and maintain stability or select the opportunities that might improve their living conditions. Homeostasis—the tendency towards a relatively stable equilibrium between interdependent elements—is one of the driving forces within our brain and helps reduce unwanted consequences of change. Many cultural adaptations to external pressure result into cultural evolution (see Damasio, 2018).

Cultural change can be facilitated, or hindered, as a function of how norms, standards, values, and belief systems are framed, since both individual and societal systems have recurring narratives that build upon implicit or explicit reference points and mental representations structured as belief systems. Our modern societies are highly regulated, and cultural change is often the result of strategies employed to generate selective pressures to change. However, cultural change can also result from pressures that are not properly managed, due to limited rationality or to the presence of different and competing value systems. In such cases, cultural changes are often triggered by technological and marketing strategies that happen before new regulatory systems are able to control them, or before regulatory decisions can determine behavioral and cultural drift.

This implies that even in our highly regulated societies, the pressure to change can lead to a variety of reactions. An ethnographic study can reveal how people and cultures react to given pressures to change, for instance to the availability of innovative technologies and infrastruc-

tures at a given time. By observing people's behavior during periods of technological transformation, we can reveal how new habits are formed as well as how old habits decline.
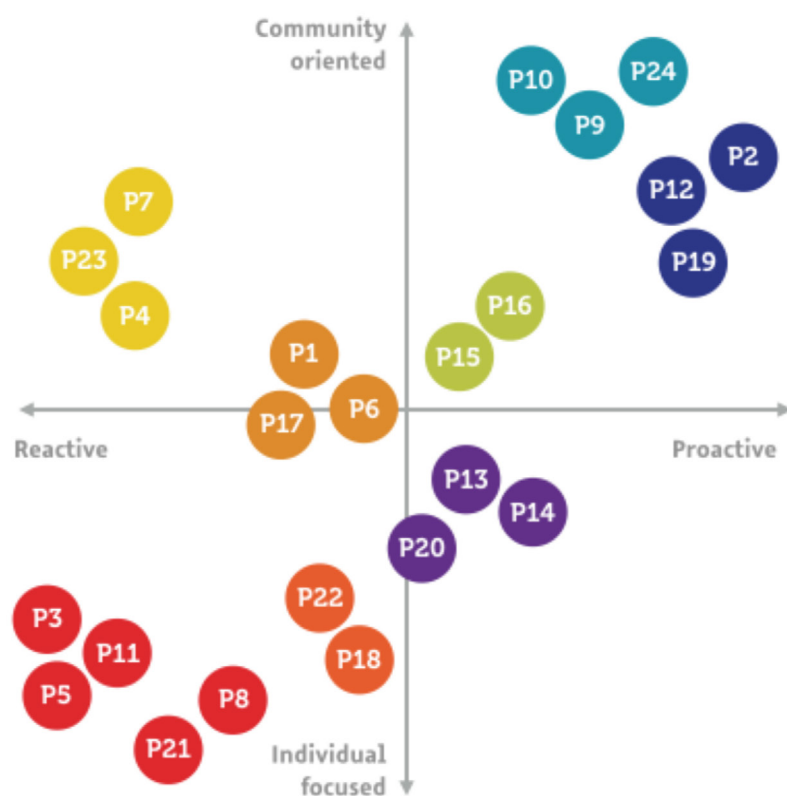


**Figure 1:** Clusters of elderly profiles on a map with the zone of proximal development.

From a cultural perspective, the evolution of behavior can be described along a continuum and mapped out across two axes, allowing us to define both adjacent and distant patterns or clusters (see Figure 1). As described later, this map shows the position of different clusters across two dimensions: On the horizontal axis we observe pro-activity vs. reactivity, i.e. the level of competence in using healthcare services and their relative capacity to anticipate and control the outcomes of their actions in that domain, and on the vertical axis we see the social traits of a person and their relative propensity to remain socially engaged and active in communities versus being isolated and individualistic instead. The construction of behavioral models through representations of how people can be differentiated according to their level of competence, and the collaborative fabric within which they act, has the advantage of identifying the levers necessary to plan change programs.

The theory of evolution implies the "migration" of habits to adjacent possibilities: A set of choices is a more frequent cause of behavioral change than those due to a disruptive mutation of habits. In our maps, we represent behavioral models to highlight how it is more realistic and inclusive to expect people to move along the axes towards adjacent models, while it is more difficult to propose disruptive evolutionary models. In biology, successful mutations are said to be rare, whilst in cultural evolution, when they occur, mutations can be exclusive and create barriers to inclusive and sustainable growth.

Cultural change programs can be conceived as behavior modification programs, in that they replace old habits with new ones. Technological solutions and the design of new personalized

services, to encourage a gradual advancement along the axes of competence and collaboration, can consequently create value for people while generating positive social impact.

There are many examples of how cultural and behavioral evolution took place gradually, and how technology has followed the model of migration to adjacent evolutionary tiers. This also applies to the digital world and to mobile phones. For instance, the gradual evolution of mobile technology solutions evolved from the 2-mode rinGO mobile phone (the so-called "bimbo phone" because of its simplicity), to the Nokia "navikey" (second mobile generation), to the touch-phone (the third mobile generation, launched with the iPhone), which is gradually transforming and anticipating the next phase of mobile migration whereby people will navigate towards interacting with proximal digital information embedded in physical reality (see Visciola, 2013). It is a case of gradual transformation, rather than disruptive innovation!

Formidable selective pressures can occur when technological and infrastructure innovations and regulation act in unison. However, resistance to change or objective difficulties are more evident when the impact of the innovative solution in increasing people's competence to cope with societal challenges and encourage cooperation and collaboration is not explicitly stated.

Furthermore, when applying the theory of evolution to digital culture, we can also foresee that nudges (Thaler & Sunstein, 2009) will function most effectively when information is framed in such a way that people grasp that achieving the preferred objective will enable them to stabilize certain behavioral patterns and sets of preferences and/or create an aspirational path.

## Behavioral Models in Practice

In any complex domain such as saving and investing, protecting personal assets, aging, and making lifestyle choices for wellbeing and longevity, people display different levels of competence and a variety of belief systems. In building preferences and habits, people form mental routines and frame choices according to reference points, so that contextual factors can be adequately modified or manipulated to achieve the desired purposes (see Slovic, 2000).

Understanding the prominent and dominant mental structures that regulate habits and behavior should allow us to shape the possible directions of preferences so that people can be oriented towards choices that strengthen good habits or help modify bad ones. Methods employed in modeling new directions and habits help deconstruct and reconstruct the various elements that define people's preferences and choices.

Reactive ←                                                                                          Proact



| | The ceaseless breadwinner | The isolated invalid | The decelerating retiree | The spiritual believer | The overwhelmed caregiver | The engaged elderly | The unequipped volunteer | The ageing go-getter |
|---|---|---|---|---|---|---|---|---|
| For behavioural change, these personas need: | Culturally appropriate cues to help create a relationship between personas and the healthcare system. | Understanding that healthcare services offerings could be more beneficial than personal strategies. | | To recognise those healthcare service options and experiences that address their needs, maximise their skills, and provide lifestyle support. | | | Rewarding healthcare experiences and interactions, for themselves and others around them. | |
| Why? | Can't relate effectively and feels misunderstood, so this persona distanced himself from the healthcare system, or avoided healthcare completely. | The personas in this grouping have different educational levels, but are motivated by the feeling that the system doesn't suit their needs, so they must create their own solutions. | | Previous disappointing experiences mean personas have lost confidence in the healthcare system and their ability to manage it. So they turn away from the system and towards other options. | | | These personas are high seekers of knowledge, community engaged, and feel rewarded by managing challenges. However inefficiencies in the healthcare system, its processes and delivery has led frustration, and sometimes, to a negative interpretation of clinical medicine. | |
| Healthcare service delivery should: | Be highly engaging and rewarding, so that curiosity leads to initial adoption then to a long-term relationship. | Offer linguistic, culturally appropriate support, so they can use existing knowledge and align their expectations with the healthcare system.  Seeing how the present impacts the future and why things happen will help them internalise and make sense of their interactions. | | Demonstrate that there are healthcare service options and experiences that do address their needs, maximise their skills, and provide lifestyle support. | | | Reduce procedural hurdles to improve personal and general situation, with more satisfying opportunities for personas to use their skills or develop new ones. | |
| Initial engagement | · Provide elements of surprise or inquiry to catch attention.  To: help persona see the underlying structures of the services they use. | · Give personas autonomy to use different methods and strategies.  Help them perceive the availability of choice and self-organisation.  To: help personas align expectations and improve their healthcare reality. | | · Provide personas with services that clearly express objectives and intended outcomes so that they can evaluate their likelihood of success.  · Provide feedback on where personas fit into the healthcare system.  · Tailor experiences to offer personas more control and choice. | | | · Provide opportunities to bridge Western and Eastern culture so that personas can use their skills or develop new ones.  · Provide feedback and reinforcement so they are motivated to keep engaging with the system. | |

**Figure 2:** Some recommendations on what to do to help people become more competent and proactive, and what services could be conceived and designed for this purpose.

*Persona* is one of the artifacts that designers use to represent differences when considering people and peculiar traits. *Persona* can do much more than simply describe the socio-demographics of customer segmentations—it is a powerful tool to shape services and innovations actively, thus promoting behavioral evolution and cultural change in the segments the *personas* represent. *Persona* models offer insights into the drivers of people's habits and behaviors, by situating them within customers' goals, cycles, and patterns of behaviors, engagement with service solutions, and interaction with physical and digital service touchpoints. *Persona's* distinguishing traits are not static, though, because behaviors, expectations, and values can evolve. Consequently, *persona* modeling aims to map potential evolutionary pathways that can describe how behavioral change can be nudged through the appropriate service model (see Figure 2).

Furthermore, *persona* identifies key user traits, namely, beliefs, behavior, mental routines, expectations, and goals, and brings users to life by giving them names depicting some archetypal features. Although *personas* are fictitious, they are nevertheless based on knowledge of real people. Some form of ethnographic research is conducted before they are defined, to ensure they represent real people rather than the opinions of the researchers shaping their main traits. By generating insights and better expectations of how these profiles are likely to behave in a context of use, these models increase our understanding of user requirements, i.e. those the digital solution should satisfy. We call these artifacts *behavioral models*, as they represent behavioral traits in the ongoing adaptation to the environment's demands.

Tech-driven innovation initiatives in many sectors are often driven by assumptions of what matters to people, and they are created by marketers, designers, or decision-makers. These assumptions are not necessarily based on a real-life understanding of how people behave, and therefore they cannot necessarily guide how to design products, services, and strategies so that they positively influence people's behaviors. To avoid false assumptions, behavioral mod-

els are built upon people's observed behaviors, by exploring their daily contexts and modeling their interactions with services, touchpoints, challenges, and solutions. A well thought through behavioral model can help people understand the implications of their decisions, and possibly enable them to move in a more sustainable direction. The following cases show how these behavioral models work in two highly complex domains which are part of everyday life.

## Behavioral Design for Aging Gracefully

Ageing can be considered a cultural matter, as it affects the social fabric, the systems and structures that make up cities, governments, and individual life. The Government of Singapore and the Design Council asked Experientia, a user experience design consultancy firm, to help them conceive innovative service solutions to make daily life more inclusive for elderly citizens, and particularly to ensure that they could have seamless access to healthcare and pursue active and healthy lifestyles. We ran an extensive ethnographic program involving shadowing sessions, i.e. participatory workshops with more than 100 stakeholders, and defined behavioral models to support the ideation of new services.

The people selected for the study were clustered according to how well they represented the characteristics along the two axes, which were used to frame the *personas* (see Figure 1). Singaporeans ranged from "individual-focused" to "community-oriented" people. Their attitudes to health and healthcare ranged from "proactively" exploring opportunities and addressing their adaptive goals, to "reactively" responding to what they were told to do, without really evaluating what was fit for them. As shown in Figure 2, the elderly in Singapore are mapped out along the competence axis, ranging from reactive to proactive, thereby representing their understanding of healthcare service offers from the public healthcare system.

The masterplan of services for the elderly resulting from our behavioral model was conceived to foster persona-centric services, to increase their level of competence in terms of the availability of services for the elderly, and to reduce isolation for some of them (see an example in Figure 2). Moreover, it had to reproduce an ethnicity-centric infrastructure, tracking the zone of proximal development and facilitating a smooth evolution of behaviors. Behavioral modeling was a sort of reference model for designing a collaborative ecosystem, and the masterplan of services was a type of hypothetical behavioral change program.

## Behavioral Design for Financial Savings

Experientia conducted an extensive ethnographic research and design project on "personal finance management" (PFM is the acronym used in the finance industry) behavior in Italy. The project included contextual interviews, formative evaluations, persona development and behavioral modeling, information architecture sessions, and design concept development to inform software development planning and the release of the PFM tool. From the definition of differentiating factors in spending behavior and saving habits, coping skills, mental accounting, and other routines, we created a "behavioral model" as shown in Figure 3. The model describes the two control mechanisms aimed at maintaining stability and pursuing aspirations, respectively. The different phases through which we mapped mental routines to control behaviors and decisions is called an "activity model", and it comprises the following five activities: Monitoring, analysis, budgeting, simulation, and planning. We found these activities embedded in typical routines carried out by the observed sample of 36 participants. Behavioral models were based on distinguishing behavioral traits for each persona and ability to run with the

five outlined activities and therefore manage income and save money. This model informed the four software design development phases and the design iterations in integrating the system features (see Figure 4).
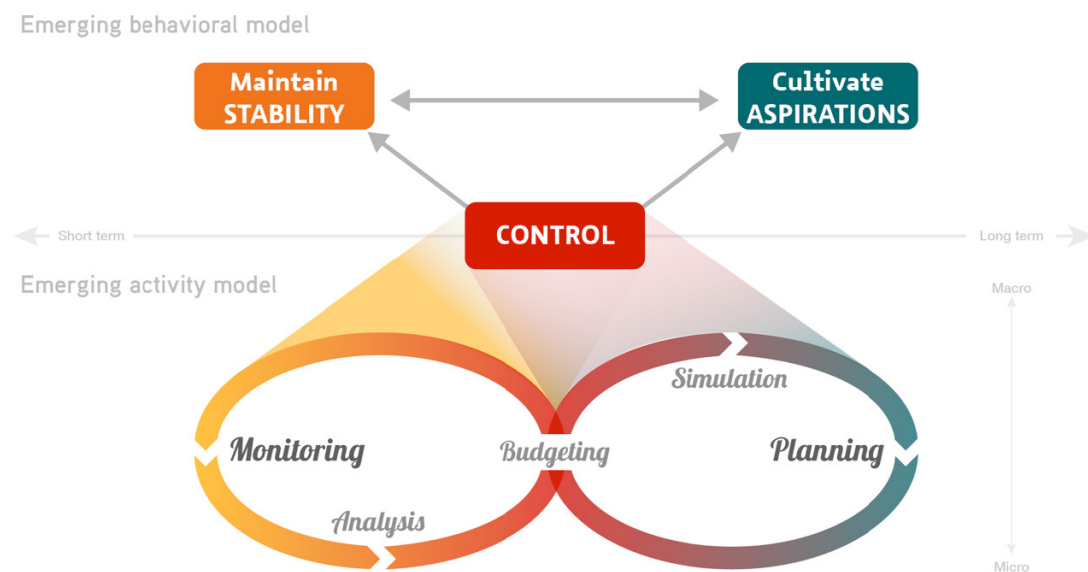


**Figure 3:** The behavioral model, used to inform the design of a personal finance management tool.
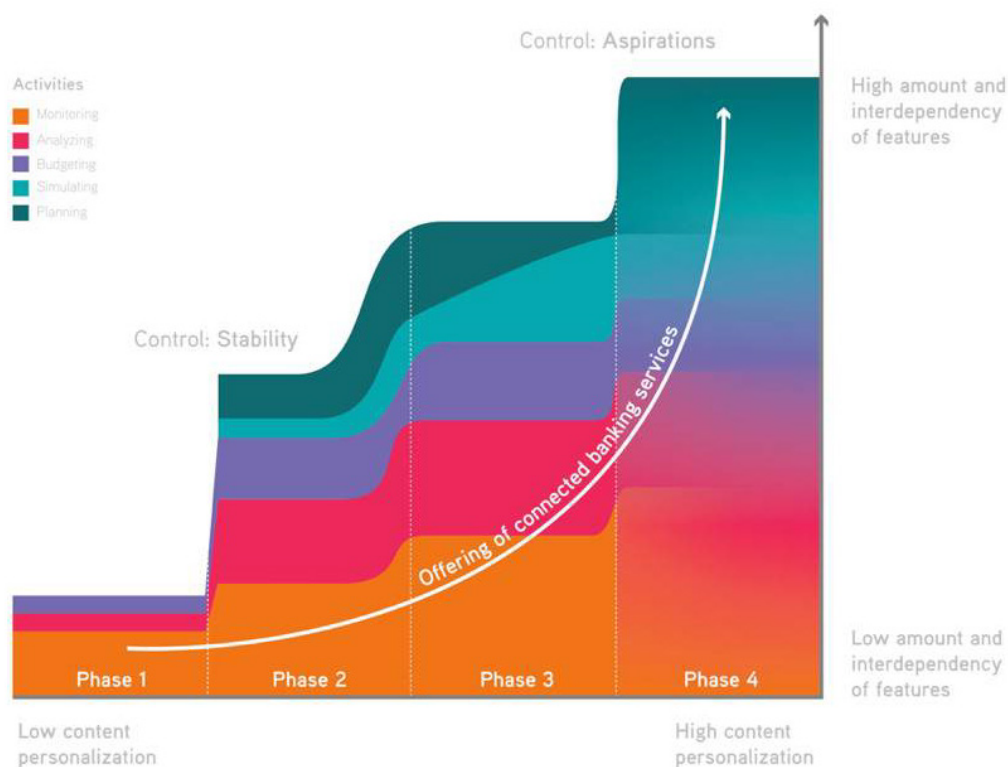


**Figure 4:** Software design roadmap, informed by the behavioral model and activity model.

The final tool was conceived for initial users (also beginners in their understanding of finance) to support just "monitoring" and "analysis" activities. Besides, the tool has dedicated features to learn how to allocate resources in different baskets ("budgeting") (see Figure 5). Finally, for

the most sophisticated users, the tool contributes to a "simulation" of different saving and spending objectives and then helps reduce fungibility, once a plan has been established in the family and agreed with the bank ("planning") (see Figure 6).

Our behavioral model was conceived to improve savings competence. Maintaining stability between monthly income and outgoings is the first important goal to manage. This is achieved by learning to use simple analytical reporting on how income has been spent (i.e. the "monitoring" and "analysis" activities in the behavioral model). Once this learning is achieved, the software gently suggests allocating some money (the "budgeting" activity) for typical recurring expenses (e.g. food, house rental, utilities). As soon as the people have learned to manage the budgeting tool, they are encouraged to start using the tool to plan and to simulate different spending scenarios (i.e. the "simulation" and "planning" activities in the behavioral model).
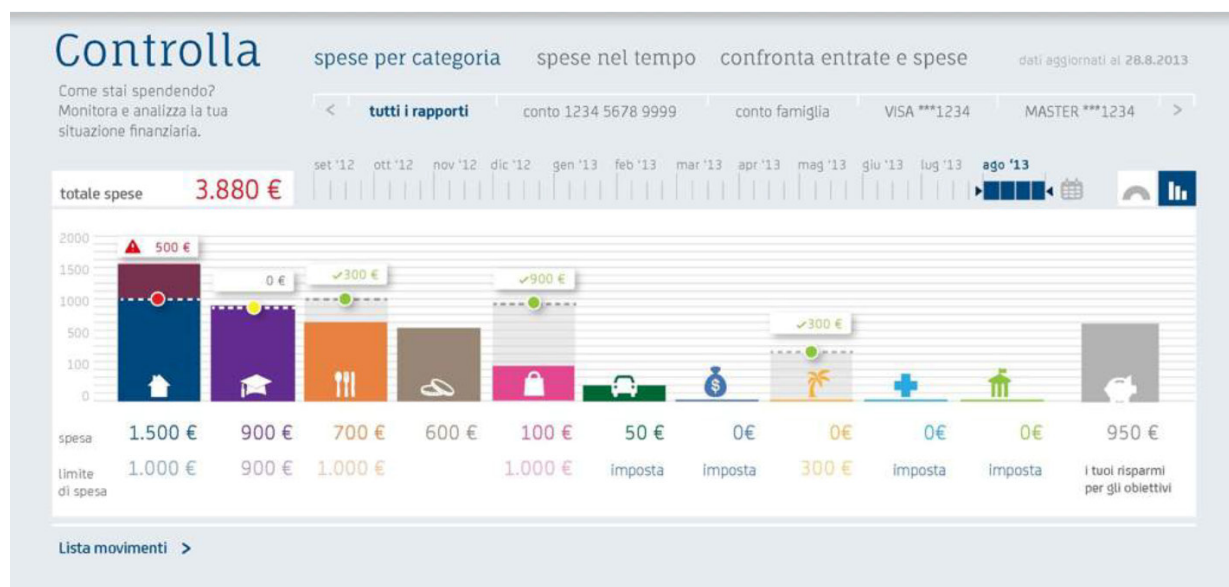


**Figure 5:** Dashboard used to monitor expenses and allocate resources. Expenses can be traced by category, in a time window, and compared versus income.
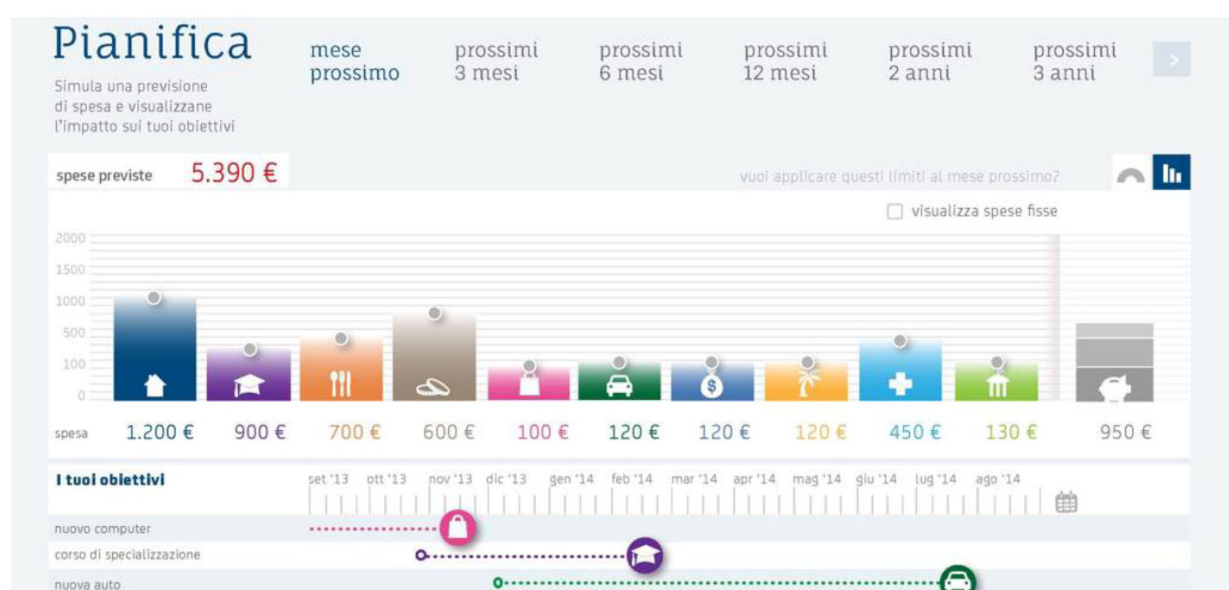


**Figure 6:** Dashboard to simulate goals and allocate fungible resources to plans. The planning can be done in different time windows, i.e. any 3 months, 6 months, and so on up to 5 years.

In conclusion, to set up programs that can facilitate behavioral change, we need to understand better how cultural changes can be facilitated at the individual and group levels, by using behavioral representations in a map and then designing services and solutions that can improve the competence levels of people in addressing their distinct challenges. At a social level, such programs can be conceived as experiments in real-life contexts that can allow selective pressure and thus facilitate migration to the adjacent zone, in line with individual and community aspirations and societal ethics.

## The Author

**Michele Visciòla** is founding partner, CEO & Chair of Experientia Global where he is personally involved in projects that deal with the following topics in a variety of industries: digital transformation of services; behavioral modeling and culture evolution implied in service innovation; business innovation; user-centered design and policy making.

Michele has an international curriculum and extensive experience in strategic user experience analysis and modeling. His career started as research fellow in Cognitive Sciences at the Italian National Research Council and focused on the digitalization of services in complex systems, with a specialization in human error analysis and information design.

As entrepreneur, Michele has founded pioneering start-ups on usability and human-factors consultancy and was part of the team that founded the World Usability Day.

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# Costly Behaviours

## Using Behavioural Economics to Manage the Company Cost Base

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## Introduction: BE in the Commercial Arena

When working with businesses, we often hear that many examples reported about behavioural economics (BE) are either too theoretical, too time-consuming or just too focused on the public sector to be of practical use in commercial settings. This may occur because there are factors that hinder publishing studies in the private sector, such as interest in keeping the details of successful interventions secret from competitors[1].

Marketing objectives are often behind the application of BE techniques within firms (Caldwell, 2018). Much of the work by neuromarketeers and consumer psychologists looks at how behavioural insights can help to increase conversion rates and improve revenues, while rather less has been done on how it can help in, for example, managing costs.

This article concentrates on costs. If we get companies to ask themselves the simple but powerful question, *'Which behaviours are driving my cost base?'*, we can shine a new light on cost management. We illustrate this notion through two case studies on companies that were able to cut their costs in new and unexpected ways:

- A water company tackling sewer blockages and

- A retail bank managing costs to compete better against lower-cost digital-first competitors.

These case studies illustrate the rigorous and effective application of behavioural economics in a commercial setting. Embracing an approach firmly footed in behavioural economics helped these firms address both little-researched private behaviours and well-ingrained habits, resulting in reduced costs and better outcomes.

## Case: Changing Very Private Behaviours to Prevent Sewer Blockages and Save Costs

Water utility companies in the UK are regulated by Ofwat, to control how they deliver water and sewerage services, and they run operations to extract water from rivers and reservoirs, before delivering it clean to customers. Importantly, but perhaps less often considered by the public, they also take away and treat sewerage, before subsequently cleaning and releasing it safely back into the environment.

### What is the Costly Behaviour?

We all use sewerage services every day, but consciously we don't think about them very often. Jane Taylor, a householder from a bustling town in England,[2] had to think about these services a lot when the sewer outside her house became blocked. Raw sewage spewed out of the pipes in the street and spilled into her front garden. She had to call the water company to come and unblock the sewer – and fast. The direct cost to the industry of such blockages comes close to £100m per year across the UK (Water UK, 2017), plus the cost and hassle to Jane and families such as hers of clearing up and paying related insurance premia.

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[1] See Caldwell (2018) for an extensive review of these factors.

[2] From interviews conducted with customers for this case, names changed to maintain confidentiality.

Sewer blockages are caused by a number of factors. A common one is the build-up of 'wet wipes' that people use in their homes and then flush down the toilet. These combine with congealed fats, oils and grease that come from both households and businesses (e.g. restaurants or fast-food shops) to form 'fatbergs' that block the sewers.

There has been a burst of media attention on fatbergs, and water companies have urged people not to flush wet wipes. Nevertheless, the incidence of related blockages continues to be a costly problem for the industry, with over 300,000 such impasses occurring every year in the UK. In one industry study, the majority (around 93%) of the sewer blockage material, when recovered, comprised of non-flushable wipes (Water UK, 2017).

So how can the behaviour of people flushing wet wipes down toilets be changed, and how can this be done more cheaply than getting rid of the blockages themselves?

**Using BE to Develop New Approaches**

Several initiatives are underway to address the issue. We summarise one approach here from our work with a company that carries out industry-leading customer research.

*Diagnosis:* Combining purchase data for wipes[3] with details of sewer blockages, we were able to identify postcode areas with both higher sales of wipes and more blockages. Using trained consumer psychologists, we then conducted a series of in-depth interviews with people recruited from these areas.

The interviews 'retracked' people's actions from purchase decision through use and disposal, without directly revealing the purpose of the discussion (Graves, 2010). We found that several billion wipes are purchased in the UK every year, with baby wipes being the biggest segment, followed by skin care and personal hygiene (WC). Consumers find them relatively cheap, convenient and effective, and often they started buying them after having children. People using wipes for personal hygiene and for young children were the ones most likely to flush them down the toilet, so they became the focus of our study.

We needed to focus on what was taking place 'behind closed doors', with no traceability linking the behaviour to the outcome. We used the insights from the interviews as a stimulus to develop creative solutions and then a novel behavioural experiment.

Interviews revealed that wipe-flushing had become a habit for many customers. Habits can be defined as automated actions that reduce cognition costs and are difficult to change (Lally et al., 2010), whilst behaviours turn into habits after they are repeatedly performed in the presence of a cue or set of cues. The interviews also revealed that ease and reward were important factors in forming the wipe-flushing habit: wipes are convenient and consumers feel refreshed after using them. For many interviewees, this positive reinforcement turned the act of using wet wipes into a habit.

Furthermore, the vast majority of individuals did not make a direct connection between flushing a wipe and a sewer blockage. Why not? Because it says on some packs that they are 'flushable', and sure enough, the dirty wipe does indeed flush away. As for sewer blockages, however,

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[3] Detailed data on purchases of wipes from Kantar Worldpanel survey of 30,000 households in the UK.

they are expensive and messy, but comparatively rare, and may not even happen near the houses responsible for the flushing, so they are not salient. They also happen in the future, which is an abstract world for many of us. The literature on intertemporal choices shows that people tend to think of the future as a distant place that they will never inhabit, and instead they tend to have a bias for the present (O'Donoghue & Rabin, 1999). In the case (or wipe) at hand, this implies that users put more weight on the present refreshing experience and less weight on the less salient and future blockage disaster. In conclusion, we are seeking to alter a private, well-ingrained habit with no apparent reward for changing it.

We left aside broader possibilities such as reducing sales or redesigning wipe materials for their decomposition, as these were being discussed by industry-wide initiatives. Therefore, we concentrated on what was more practical for the company in the short to medium term. Note we did not know what proportion or segment of the population was flushing wipes, or how their behaviours were affected by exhortations to reduce flushing.

*Targeting:* The diagnosis pointed to a need to influence people's behaviour and change their habits of flushing wipes by providing links that appear to be missing in their decision process. Could we make the outcomes more salient and generate an association between flushing and the consequences of their actions?

Previous interventions showed that providing information on the positive consequences of a behavioural change may aid habit development by enhancing motivation (Gardner & Rebar, 2019); for instance, information on the health risks of inactivity and an unhealthy diet can increase exercising and healthy eating (Storm et al., 2016).

The communications team used these insights to devise alternative messages to share with customers. These targeted the hidden costs of flushing. We aided them by designing the messages so that they followed the EAST framework (Behavioural Insights Team, 2014), i.e. easy, attractive, social and timely, which gave us two alternative messages to test, using a randomised control trial.

One message focused on environmental costs (wipes ending up on beaches) and the other message on household costs (sewage in your backyard and the hassle and cost of clearing up).

*Field trials:* But how do you conduct field experiments and randomised control trials to test something like this? In previous trials, water companies hung nets like spider webs across main sewers to catch flushed wipes. These were then extracted and counted to see if initiatives in the communities upstream of the nets were having any effect on the volume of wipes flushed. These trials can be expensive, take many weeks to complete and do not effectively establish significant impacts.

We therefore decided to collect data closer to the source, for which we needed somewhere busy with a representative sample of the local community and a way of randomising the messaging at point of use. A very large shopping centre in the region agreed to allow us to run experiments in their main toilets so we could get the measure of thousands of people in a short period of time.

By providing a known number of wipes, normal toilet paper rolls and a bin in each toilet cubicle, we could measure what proportion was flushed and what was binned in both men's and

women's washrooms. By displaying different messages, we could gauge what impact they had on flushing behaviour compared with control groups that had no message.

- *Note:* No other messages were visible in the cubicles, except those provided on the inside of the doors of the treatment groups. The messages on the doors were not visible from the outside. The wall-mounted wipe dispenser was placed next to the paper roll and dispensed wipes individually.
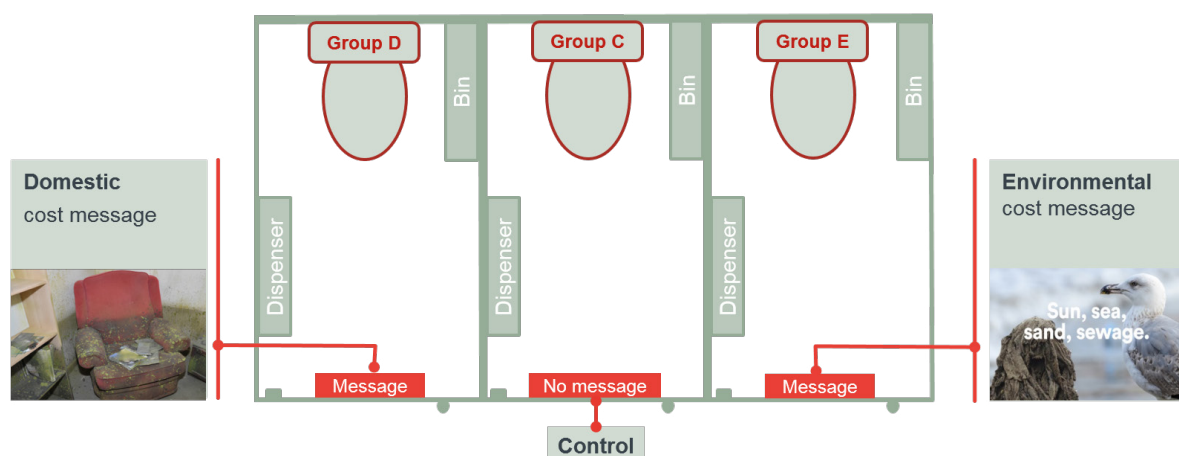


**Figure 1:** Set up of 'cubicle trials' for messages in a busy shopping centre. *Source:* Frontier case work with a UK water company. Shopping centre cubicle trials.

A well-protected sanitary team counted how many wipes were left at the end of each period, how many had been disposed of in the bins in each cubicle and how many people had used each cubicle. The simple core equation is thus:

$$\text{Wipes flushed} = \text{Wipes dispensed} - \text{Wipes binned.}$$

This approach produced quicker, more directly pertinent results at much lower cost than the spider web trials.

*Results:* The results cast new light on the extent of the problem, and how to design messages to deter people from flushing wet wipes. We obtained 1,602 observations across control and treatment groups from 20 cubicles over a 9-hour period.

| Treatment groups | Cubicles | Used | Flushed | % Flushed | % difference flushed compared to control |
|---|---|---|---|---|---|
| C - Control | 5 | 459 | 170 | 37% | NA |
| D - Domestic cost | 8 | 624 | 171 | 27% | 27% |
| E - Environmental cost | 7 | 520 | 130 | 25% | 32% |

**Table 1:** Summary of results obtained in each type of cubicle *Note:* Differences between treatments in the proportion of wipes flushed down the toilet were analysed using a generalised linear model (GLM) with a binomial error structure. Every predictor used was highly significant ($p < 0.05$, measure of statistical significance). *Source:* Frontier case work with a UK water company. Shopping centre cubicle trials.

We found that:

- The control group showed that over a third (37%) of wipes are flushed by the general population in private with no 'nudges', even when bins are provided.

- The treatment groups showed that 'point of use' messaging reduces the number of wipes flushed by over a quarter compared to the control groups, especially in the environmental costs message:

  · The domestic cost message reduced flushing of wipes by 27% compared to the control, whilst the environmental cost messages reduced flushing by 32%.

  · These results were significantly beyond the expectations of the company, based on its experience with previous initiatives. What's more, sewerage engineers at the water company considered this effect to be enough to have a meaningful impact on the number of blockages.

*Discussion:* The cubicle trials provided a model to test and measure behaviour that was not possible to measure in the home. Whilst the context is different to that of people's own homes in a number of respects, we would argue that the set-up (individual cubicles, free choice, no obvious priming) provides insights into behaviours that are likely to take place in the home. The messages that we tested directly targeted a specific trait in our assessment of the unconscious drivers of the behaviours – to make the future (hidden) costs of people's actions more salient at point of use.

*Rollout:* The water company has adapted its approach to encourage people to reduce the flushing of wipes by highlighting both the domestic and environmental costs. Point-of-use reminders were provided to public locations such as schools and nurseries, and social media video messages were shared directly linking the behaviour to the costs. Through applying BE to address the costs of blockages, the company has gained greater awareness of people's behaviours and what works to change their habits. The success of the new approach will be judged by the incidence of costly blockages over the forthcoming five-year regulatory cycle. Early in the COVID-19 crisis, toilet paper shortages occurred, and so the company re-iterated messaging as people switched to wipes: "*[If you flush wipes, they] will build up and cause blockages, and that will lead to the nightmare of sewage overflowing in or around your home or expensive plumbing bills. That really is the last thing anyone needs at the moment.*"

## Case: Nudging Customers Away From Dealing With Bank Branches and Contact Centres Toward Lower-Cost Digital Channels

Maintaining an extensive branch network is an important part of the multi-channel strategies of many European banks. Their presence on the high street is reassuring for customers and is a vital source of new business and sales, but such networks are expensive to maintain. Major retail banks in the UK spent on average 21% of their total cost base on running their high street operations, with an average cost per branch of £590,000 (Financial Conduct Authority, 2018). In today's digital markets, many banking services needed by banking customers can be provided easily online and at significantly lower marginal costs, and so most incumbent banks have been pursuing branch closures and migration to digital channels. But how many of them actively seek to use BE to improve the outcomes of such programmes?

Working with one major retail bank as part of their digital transformation strategy, we helped them to save many millions of pounds by applying insights from BE. The challenge was to 'nudge' customers away from the branch network toward using the bank's online channels. Interestingly, we found that customers making more use of the digital services said they had become more satisfied with the bank and, over time, had shifted their behaviours to greater use of digital channels. However, despite previous nudges, many customers continued to stick with their branch visits, calls to the call centre and preferences for paper statements.

What new insight could BE bring to help the bank address these more 'sticky' behaviours?

## What Were the Costly Behaviours?

The answer, as often, lay in the data already held by the bank. Thanks to detailed activity-based cost (ABC) analysis of transaction-level data, we were able to pinpoint the main behaviours that were determining the bank's cost base – and the customers responsible. This was a non-trivial exercise, given the bank's tens of millions of clients, but it helped us keep the economics in BE and concentrate efforts on areas with the largest potential for saving.
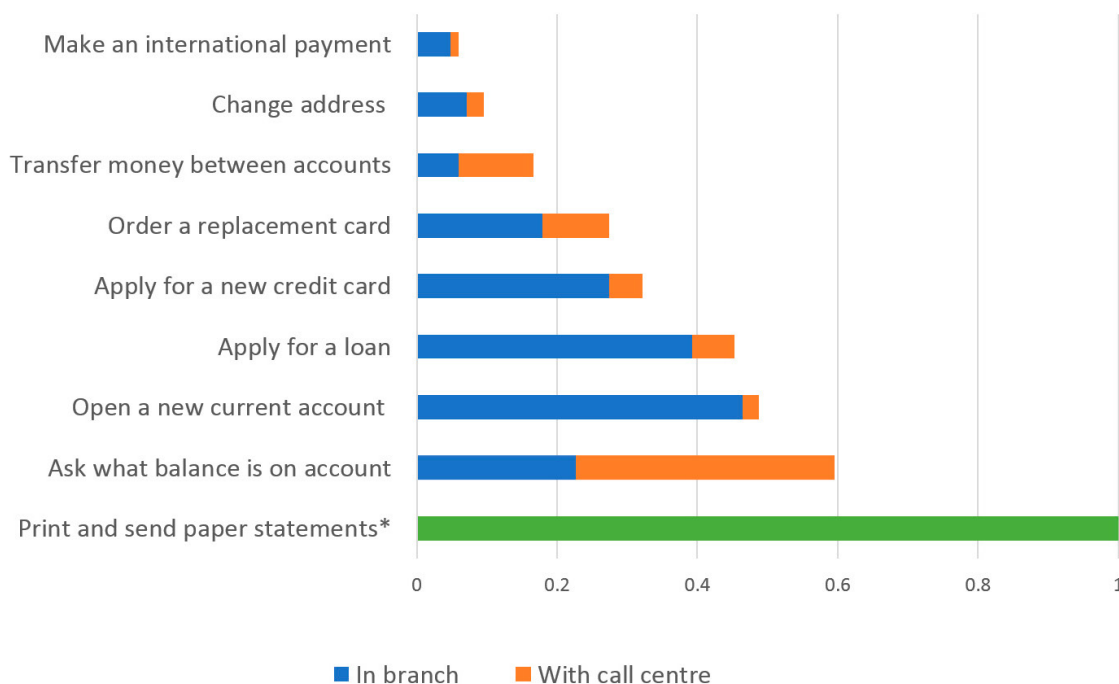


**Figure 2:** Selected activity-based costs for customer behaviours. *Note:* * Cost figures relative to print and paper statement costs. *Source:* Frontier case work with a retail bank.

We found, for example, that customers called the contact centres many millions of times a year simply to find out the balance on their accounts, whilst others repeatedly went to a branch to ask for copies of their statements. Moreover, others rang the call centres to transfer money between their accounts despite having an active internet banking facility. Being careful not to lose out on the most valuable face-to-face contacts in a branch, we screened for high-cost but relatively low-engagement transactions.

**Getting to the Heart of Costly Behaviours**

Behaviour-based costing gave the bank a new way of segmenting its clients. Customers who asked in person for a statement, or who phoned up for their balance, were not classified according to typical demographic characteristics or their banking products; rather, they were segmented by their patterns of behaviour. For instance, there was a significant share of older customers who did not use the bank's own digital channels extensively but who, we could see, were regular shoppers on Amazon. Next, we recruited and interviewed a sample of customers in each behavioural segment to understand better what made them behave as they did, and to identify potential barriers to changing their habits.

Consumer psychologists 'retracked' each specific behaviour to highlight the possible unconscious drivers at play (Festinger, 1957). The insights they gleaned often differed from what customers had reported in previous survey-based research. For example, in surveys, some had said they were 'concerned with security' online, in order to explain why they kept going to a branch. Behavioural interviews, by contrast, revealed the reason in many cases was not security per se but the customer's fear of making a mistake when transacting online – a fear they did not feel when dealing through a bank teller.

Such behavioural insights formed the starting point for joint creative sessions with bank staff. These sessions used Frontier's 'Nine traits' framework to help them consider how the unconscious can influence customer decisions in different contexts. Over 150 new ideas covering around a dozen selected behaviours of interest resulted.
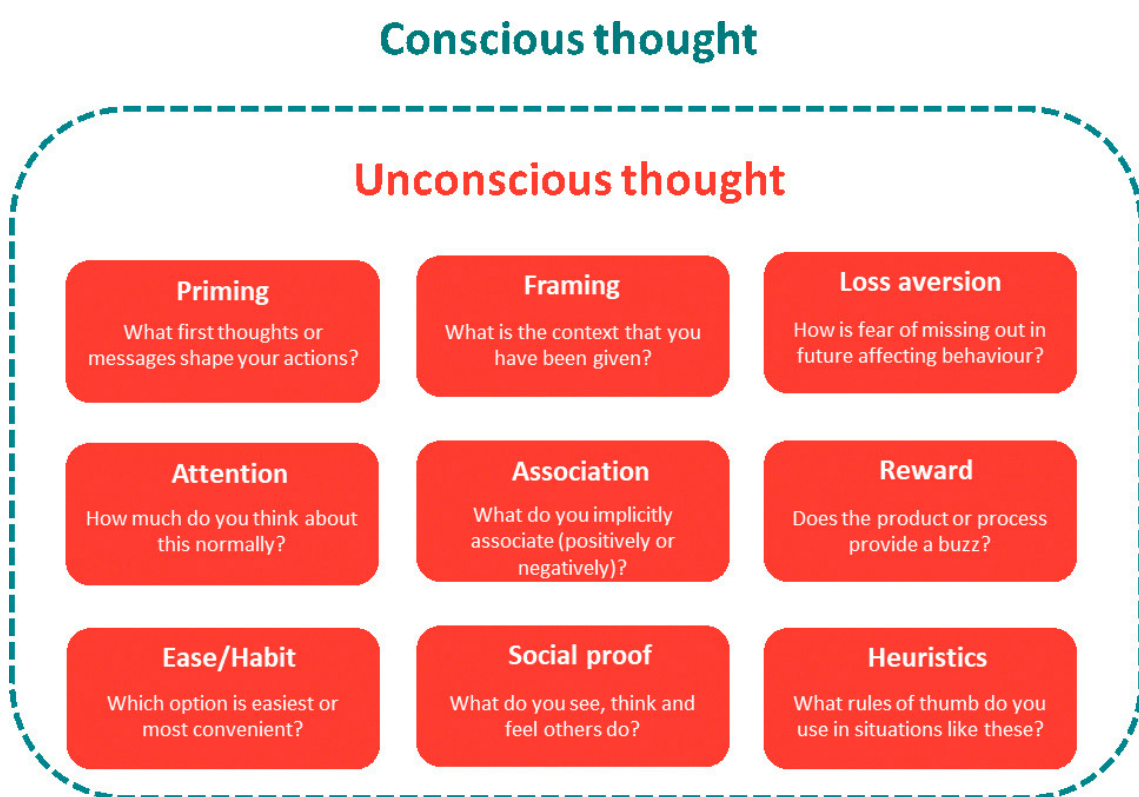


**Figure 3:** The 'Nine traits' framework. *Source:* Frontier Economics.

### Costly, but Important, Pieces of Paper

One behaviour of particular interest was the continued use of paper statements by a subset of customers. In the UK, there are many people for whom paper statements are clearly needed, since they do not bank online, and yet a significant number of the bank's active online customers chose to stick with paper statements even when asked to switch. What was going on? Printing and sending paper statements cost the bank tens of millions of pounds per year, and the bank did not really understand the behaviour of this group. Again, thanks to specialist interviews with people from this cohort and the Nine traits framework, we were able to provide new insights with which the bank could re-evaluate its approach:

- *Habit:* Paper statements were familiar and linked to deeply ingrained personal finance habits and record-keeping. Specifically, they were associated with good financial management.

- *Reward:* Some customers used statements to mark and tick off items. This brought a sense of reward when they were checked and filed. This was not possible with online versions.

- *Loss aversion:* Many customers saw paper statements as a more official record. Often, they felt the need to keep them, as they thought the tax authority would require them and would squirrel them away just in case they were needed. They were anxious that the online versions might not be available when needed.

- *Association:* Bank statements were often printed on high-quality official-looking paper, thus signalling to customers unconsciously that they were valuable and to be kept.

These insights helped the bank understand that the paper statement fulfils important and hitherto little-explored roles in people's financial habits and routines. Not only did the bank have to work harder at 'nudges' to get customers to change their ways, but its own online statement service had to become 'smarter', easier and more rewarding, to meet its customers' needs. Furthermore, its online service had to be easier to sort and check-off items – and so become part of some customers' good financial housekeeping routines. These challenges were thus made clear in a new way for the design team.

### Discussion: The Bottom Line

This application of behavioural science formed part of this bank's digital transformation. An extended testing phase followed where different variants of the ideas developed were trialled across digital channels, in call centres – and on paper statements. The bank rolled out over a dozen of these ideas to help make annual cost savings of over £150m whilst changing the financial habits of some, very particular, segments of their client base.

## Conclusions

Whilst the application of behavioural economics in the private sector is not an academic undertaking, it can still benefit from rigorous diagnosis, experimental design and testing. Behavioural economics can suggest new approaches to difficult problems and yield novel solutions that help firms manage their costs.

Whether they are regulated monopolies or active in competitive markets, companies can harness behavioural economics to nudge their customers to change costly habits. To do this,

companies can integrate behavioural economics with many of their existing methods, such as 'Activity-Based Costing' and 'Agile' transformation techniques.

For organisations which understand the limitations of traditional market research, behavioural economics research techniques and frameworks can open up new avenues for creativity and innovation. Importantly, we have shown in these and other cases that applying behavioural insights can give companies a competitive advantage by helping them bear down on their costs by reducing fatbergs, if you are a water company, or paper mountains, if you are a bank.

## The Authors

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# How Online Behavioural Experiments Are Opening New Opportunities for Behavioural Economists

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Picking a wine in a restaurant can be a nightmare, even if there are just three to choose from. Do you opt for the cheapest one, which sounds dependable? Or the mid-priced one that apparently goes with your food better? Or perhaps the most expensive one, even though it has a less appealing description than the mid-priced one? Chances are you will opt for the middle wine, even though it costs more than you want to pay. If so, you have experienced the decoy effect; the presence of the expensive option made you more likely to opt for the mid-priced wine than the cheap one.

The decoy effect is a classic piece of behavioural economics, backed up by numerous studies stretching back to the 1980s, and is used as a sales and marketing technique by countless companies (Huber, Payne & Puto, 1982). And yet, for a while, it was on the ropes after attempts to replicate some well-known decoy studies failed.

Being able to replicate and validate the results of research is the cornerstone of science, and the replication crisis that has torn through many scientific fields has seen key studies overturned after their results could not be repeated, whilst many others exist under the long shadow of suspicion (Camerer et al., 2016; Chang & Li, 2015).

Scientists have blamed the replication crisis on numerous factors, including small and weird samples. First, when collecting data in a lab, it can take days, if not months, to collect data face to face, so labs have often collected the smallest sample possible to detect the studied effect, and this makes their results weaker than they would otherwise be. Second, if you are testing in a lab, the easiest sample to test is your department's undergraduate students.  To support this strategy, many departments require their students to take part in experiments. However, undergraduate behavioural science students do not represent the full diversity of the wider population; consequently, we know a lot about how behavioural science students behave, but there is no guarantee that this will transfer to a general population.

To increase reproducibility, behavioural scientists have sought approaches that allow them to increase the size and diversity of their samples. One way to do this is to take research online, as it allows access a large and diverse sample quickly and easily (Anwyl-Irvine et al., 2020). With an online behavioural task, a wide range of market research agencies and participant recruitment services will provide participants for a fee, thus assuring a representative sample of a thousand participants in a matter of hours.

Nevertheless, these gains come at a cost.  Running experiments online requires researchers to give up control and accept a higher degree of uncertainty about the identity of participants and testing conditions (Rodd, 2019). Additionally, while the timing accuracy provided by browsers as of 2015 is good enough for a wide range of behavioural research (Reimers & Stewart, 2015), it is not as good as the timing accuracy of installed software typically used in the lab (Bridges et al., 2020).

By taking research online, behavioural researchers can trade a small amount of control and precision for a huge increase in experimental power, more representative samples and a dramatic increase in the pace of research. Online methods can then be used in conjunction with other research methods (natural experiments, field studies, focus groups, surveys, etc.) to provide a robust evidence base.

## Rapid Deployment, Rapid Results

This increase in speed means that research can be done in response to current events and still provide reliable findings that can be used to inform policy.

For example, experiments have already shown how subtle differences in messaging about the new coronavirus could influence how people respond to lockdown guidance – and thus the rate of virus transmission. Shane Timmons at the Economic and Social Research Institute in Dublin, Ireland, and his colleagues discovered two key findings by showing people different posters in an online experiment.

They found that highlighting risks to people particularly vulnerable to covid-19, such as the elderly and healthcare workers, and focusing on the exponential rate of transmission made people more cautious about "marginal behaviours" related to social distancing, such as meeting up with friends outdoors, visiting parents and letting children play together (Lunn et al., 2020).

This suggests that there are better ways to promote social distancing than the current official advice, said Timmons on Twitter (2020).

Timmon's study went from conception to pre-print in a matter of weeks, which would not have been possible with a lab-based study.

## Ecological Validity

Mircea Zloteanu and colleagues ran a series of experiments examining people's online behaviour on sharing economy platforms. His team created a simulated AirBnB-style website to measure how people make decisions about hosts who have been given different reviews or star ratings (Zloteanu et al., 2018). They found that participants over-weighed social information and under-weighed non-social information, drawing attention to a cognitive bias that can lead to poorer decision-making on a sharing economy platform.

As more of our lives happen online, for instance in the forms of social media, banking, shopping and dating, online environments open up as ecologically valid settings for psychological research. Creating facsimiles of the websites that we use, and using them to study behaviour, gives us the experimental control we need to understand how people behave in the digital world.

## Embedding Digital Experimentation in Industry

Many companies have struggled to embrace digital experimentation because of the wide range of specialist skills needed to do it successfully. Until recently, one would need a behavioural science graduate, a programmer and potentially also a data scientist. A key aspect in changing this situation is to ensure that the next generation of behavioural scientists graduates with the skills and experience to create and analyse digital experiments independently.

"[Online experiment builders have] allowed our students to follow their scientific curiosity, and be rewarded with real data, from the very first stages of their degree," says Daniel C. Richardson, an experimental psychologist at University College London.

He and his colleagues have used such tools in their lectures, seminars and lab modules. Their students generated their own hypotheses, then designed and created their own online experiments investigating what makes people donate money to charity and, finally, collected their own data.

Each experiment began with participants being told to imagine that they had just won £100. Then they were shown one of two slightly different charity appeals, which could be an image, text or even a movie. Participants were then asked how much money they wished to donate.

Crucially, there was a small difference between the two appeals, thus allowing the students to test a range of hypotheses relating to pro-social behaviour.

One of the most interesting findings was that in an advert for a domestic abuse charity, referring to someone as a "survivor" rather than as a "victim" increased donations by more than 25%.

Students made posters displaying their results, and two of them were accepted to the British Psychological Society's social psychology conference and won awards, even though they were first-year students competing against graduate students and established researchers.

As these students move on to careers in academia or industry, courses like this should help embed a culture of digital experimentation and evidence-based decision-making in a wide range of industries, including marketing, advertising, recruitment, PR and policy-making.

## Large, Robust Study Sizes

A key aspect of reliable science is having a large enough sample size to be confident in the results. This is an area in which digital experiments can really help. The speed, scale and reach of online research can be tremendous.

The large sample size made it possible for Richardson's students to produce award-winning studies. "The students ran around 30 different experiments, crowd-sourcing data from over 1200 people, across more than 20 countries," says Richardson. "I was astonished by this – that's more data than my lab by itself would typically collect in a year. What was also impressive was the variety of ideas and theories that the students tested."

If you do not have a cohort of students willing to leverage their social networks, then pairing an online experiment platform with a recruitment service like Prolific makes it possible to get thousands of participants to take part in a study in a day. For small studies of 100 participants, the main benefit is the time-saving, in that it might take a lab 6 weeks to test 100 participants, but only an hour to do so online. However, the more important revelation is that one can also test 1000 or 10,000 participants online in not much more time. Sample sizes of these magnitudes would be near impossible in a lab-based setting, and so the result is that researchers can ask and answer questions at pace, and build each new study on firm foundations of properly powered studies.

## The Intention-Action Gap

David Ogilvy famously said, "*People don't think what they feel, don't say what they think and don't do what they say*". Behavioural research measures what people actually do, rather than what

they say.  Consequently, a new generation of behavioural science consultancies are going beyond traditional surveys and embracing behavioural experimentation to bridge this gap.

In a revealing example, behavioural change consultancy MoreThanNow wanted to see if messaging tweaks could boost the number of women applying for science, technology, engineering or mathematics (STEM) jobs.

In STEM-focused organisations, women hold only 5% of board positions, and there is little evidence of a shift on the horizon. MoreThanNow wanted to address the disparity in application rates for technology careers by focusing on the effectiveness of recruitment messages, in an attempt to understand not just what people think, but also how they actually behave in a recruitment situation.

Using a large sample of 18- to 23-year-olds, they tested different recruitment adverts and messages using a survey, but they also gave participants the option of leaving the survey to explore current technology graduate roles on a popular recruitment website, in order to understand if any of the messages changed behaviour.

By simply adding a button to the end of a survey, MoreThanNow added a behavioural measure to test each job advert to measure the gap between self-reported intentions and action.

Three types of message were tested: prosocial ones, focusing on helping people and solving social problems; self-interest ones, that talked about increasing personal reward and career opportunities; and communal ones, talking about work in a close community and being supported by a tight-knit team.

The survey part of the experiment showed that, in line with most self-report research on this topic, women responded to pro-social messages, and men to those of self-interest. In contrast, the behavioural measure showed a different result, in that there was no statistical difference in gendered responses to pro-social or self-interest messaging. Instead, men responded to the communal message "join a community that works together" far more than women.

By using behavioural insights, rather than survey data, MoreThanNow have created adverts that have doubled the number of women exploring technology careers. These findings underline how self-report surveys could lead us to draw false conclusions that won't work if they are not confirmed with behavioural measures (Women in Technology – A Behavioural Approach, 2019).

## Refining Advisory Services With Context-Specific Experimentation

When it comes to human behaviour, the rich pageant of our cultures, knowledge and languages can influence what we do or how we act. It may be that there are not many theories that seamlessly replicate across people, industries, contexts, personalities and emotional states; rather, there are subtle location-specific differences.  This is where online experimentation can really come into its own.

For example, the Behavioural Science Unit of public relations firm Hill + Knowlton Strategies (H+K) has tried to understand how changes to adverts about cold and 'flu remedies affect whether people buy related products from a certain healthcare firm.

Focus groups and interviews had proved time-consuming and generated insufficient insights to act on confidently. So the firm supplemented this work with digital experimentation to create a virtual walkthrough of a realistic, cluttered pharmacy. Participants could choose where to go with the click of a button, what shelves to look at and choose products to add to their basket. They could also interact with digital pharmacists. A bit like being in a computer game.

H+K used a between-subject design, in which participants were allocated to a group that tested a single variation of the messaging. An advert or a series of adverts were placed within the pharmacy, but other than that, conditions were identical. The messages on the adverts differed in terms of what behavioural insights they addressed.

Around half of participants did not notice the messages, which provides evidence for the validity of the simulation, i.e. in real-life, people tend not to attend consciously to such material.

The best-performing message increased purchases by around 10% compared with the worst-performing message. There was also evidence for variation in the effectiveness of different messages in different markets, which means the healthcare firm could then adapt its messaging to different territories.

While the behavioural literature can inform consultancies of the likely levers that will influence behaviour, behavioural experimentation can go further and allow companies to optimise interventions for maximum impact in their specific context.

## The Promise of Impact

A wide number of challenges facing society have behavioural solutions: climate change, tax evasion and obesity, to name a few. Using behavioural insights to inform policy will allow the behavioural sciences to deliver on the promise of improving lives.

For example, the University of Oxford's Nuffield Department of Primary Care and Health Sciences has used an online tool to design a virtual supermarket to test how people respond to tweaks to food labelling. The fundamental premise is that if we can change what people buy, we can change what people eat. And if we can change what people eat, we can improve diets and reduce lifestyle diseases.

"It would be very challenging, if not impossible, to run these studies in real online supermarkets," says team member Dimitrios Koutoukidis. "The experimental supermarket platform allows us to test and optimise different interventions quickly and relatively cheaply."

Until recently, any changes to messaging were largely tested in focus groups, if at all, so they were only likely to discern self-reported intentions, not the reality of a situation.

Containing all the features one would find and experience in a normal online supermarket, such as browsing for products, adding items to a basket and checking out, the specially designed online supermarket also contains features such as shopping lists and basket budgets. Behind the scenes, researchers can change adverts, add taxes and rebates, change the order in which lists of products appear, highlight nutritional information and change food labelling. They can also offer swaps for alternative items that might be a healthier or differently priced option.

The supermarket has revealed that fiscal policies that tax food or drinks may be an effective means of altering food purchasing, with a 20% rate being enough to significantly alter purchases of breakfast cereals and soft drinks (Zizzo et al., 2016).

The supermarket has also revealed that listing foods so that those with less saturated fat are at the top reduces the total amount of saturated fats in the shopping basket at checkout (Koutoukidis et al., 2019).

This exceptional degree of experimental control gives tools like this great power to inform public policy and, ultimately, improve lives.

## Conclusion

All of these case studies demonstrate how online tools – like the Gorilla Experiment Builder and Testable – are opening up a new frontier for behavioural science.  The ability to gain behavioural insights from experiments with large sample sizes in a short space of time eclipses what can be done in the lab and opens up new opportunities.

Online tools have already been used to investigate a wide range of topics, but they have certainly not reached their limits. As Bill Gates once said, "If you give people tools, and they use their natural abilities and their curiosity, they will develop things in ways that will surprise you very much beyond what you might have expected."

Getting the science of behavioural economics right will have profound results. Academia has the opportunity to banish the ghost of the replication crisis and shift the evidence base back onto a firmer footing. Students can equip themselves for a future that will benefit from digital experimentation in a wide range of industries.  Industry can use the insights gained to make better products and services that improve lives. And finally, policy-makers can create evidence-informed regulations that improve society. Altogether, these initiatives will combine to improve our health, wealth, happiness and education.

## The Author

**Jo Evershed** is Founder CEO of Gorilla Experiment Builder, a powerful, flexible and intuitive platform for running behavioural research online. A former financial and business analyst with a background working for the likes of Shell and Telereal Trillium, her first business venture saw her develop a training tool to unleash innovation.

Jo holds a BSc in Economics and Business from Oxford Brookes and a BSc in Psychology from UCL. An Innovate UK *Women in Innovation Award* Winner, Jo is passionate about providing behavioural scientists with tools to liberate their work from the lab and accelerate the creation of evidence-tested interventions. Her unique experience and skillset enables her to lead a multidisciplinary team of software engineers and psychologists to bring behavioural scientists the best possible research software.

Jo is proud to lead a talented growing team at Gorilla who serve a wide community of students, researchers and practitioners running experiments and ultimately creating insights to increase health, wealth, happiness and education. Based in Cambridge, UK, Gorilla now boasts thou-

sands of users globally, and it is trusted by top institutions, including UCL, University of Oxford, LSE and Cambridge University, as well as a variety of commercial agencies and public-sector organisations.

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# The Double-Edged Sword of the Sharing Economy

## How Sharing Ownership and Usage Influences Sustainable Consumption

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Shared ownership arrangements between consumers (C2C) have grown in popularity and adoption, following a societal trend towards a sharing economy in which consumers grant others temporary access to their physical assets, possibly in return for payment (Frenken & Schor, 2017). However, sharing is not new. It is an ancient, universal form of "human economic behaviour" (Price, 1975). The internet age has enabled the sharing economy to really take off (Belk, 2014), and consequently the popularity of sharing-based ownership arrangements has grown. Many of us have some experience of sharing, whether lending a lawnmower to a neighbour or a car to a family member. Although people may get paid or have their favour returned, true sharing need not be reciprocal. Types of non-reciprocal C2C arrangements include joint ownership (i.e. multiple owners of a single item) and shared single ownership (i.e. a single owner sharing their item). These differ from the classic form of private ownership where the owner is also the sole user.

There are multiple reasons to participate in the sharing economy and to adopt emerging forms of non-reciprocal sharing-based ownership. Consumers no longer need to buy some products (for the full amount) in order to use them. Therefore, joint and shared single ownership allow consumers to buy fewer products while maintaining access to a wider range. This reduces not only spending and hyper-consumption, but also demand for raw production materials. It is therefore expected to be more sustainable (Bani & Blom, 2020) and can motivate consumers to participate in the sharing economy (Böckner & Meelen, 2017; Hamari et al., 2015).

But is this view rose-tinted? At first glance, it may seem that sharing indeed reduces environmental impact. But there may be more to the story, as moving to a sharing economy could have undesirable flow-on effects. In this research, we will address drawbacks of sharing-based ownership arrangements from a sustainable perspective. We will show that owners of jointly purchased or shared products are more likely to throw away, replace and resell them, compared to owners of privately-owned and used products. Focusing on product end of use (e.g. disposal or replacement), will shed light on how sustainable sharing-based ownership really is.

## Sharing-Based Ownership Arrangements

Ownership arrangements affect our relationship with a product in terms of who makes the purchase and who uses it. In traditional private ownership arrangements, the owner buys the item and in return has unlimited and continuous use. Any wear and tear on the item is the direct result of the owner and the owner's responsibility.

However, private ownership is just one of multiple options, sharing-based ownership forms also exist. Shared single ownership is an arrangement whereby a private owner allows others (e.g. friends or relatives) to use their possession at agreed times, often as a sociable gesture. The private owner buys the item and others use it for free. Any wear and tear on the item is the direct result of usage by both the owner and other users.

Another sharing-based option is joint ownership. In this case, all users buy the item together, and all partial owners can use it. The cost of the item might be shared equally or in a way that reflects how each joint owner anticipates using it. Joint ownership means multiple people use the item, and any wear and tear on the item is the direct result of shared use by the group.

A commonality across these three distinct forms of ownership is that they require owners (not users) to make major decisions regarding the product. After purchase, owners manage main-

tenance (e.g. storage, cleaning, repairs) and make decisions regarding the product's end of use (e.g. disposal, replacement, reselling). Differing ownership arrangements (varying in levels of ownership and usage) may influence these decisions. In this paper, we specifically address how decisions regarding ending ownership and use are affected by the ownership arrangement.

| Usage | | |
|---|---|---|
| | *Single* | *Multiple* |
| **Ownership** — *Single* | **Private ownership** <br> The item is only used by its one owner | **Shared single ownership** <br> The item is used by both its one owner and others as arranged by the owner |
| *Multiple* | N.A. | **Joint ownership** <br> The item is used by its multiple owners. |

**Table 1:** Ownership and usage types.

## Consumer Contamination

But why would owners treat products differently when jointly owned or shared with others? Their perception of the physical state of the item may be influenced by having multiple users. Obviously, multiple users could lead to the intensified use of a product (Plepys & Singh, 2019), but a perceived physical state does not purely depend on usage frequency. Research has shown that a product that has been in contact with other consumers can be viewed as contaminated, even when it has been objectively unharmed (Argo et al., 2006). Contact can result in both positive and negative contamination (Argo et al., 2008). People generally feel uncomfortable about products touched by others, but when touched by a highly attractive person, product evaluations may increase. Negative contamination primarily occurs as a result of physical contact (Argo et al., 2008), when the essence of a user is transferred onto and remains part of the product (Nemeroff & Rozin, 1994). Feelings of disgust can consequently arise (Rozin et al., 1986; Rozin & Fallon, 1987; Argo et al, 2006).

Interestingly, physical contact is not needed to formally contaminate a product (Rozin et al., 1994), and implicit cues in the environment can be enough to create the illusion of contamination (Argo et al., 2006). The stronger a cue signals contact between a consumer and a product, the greater the chance that people will perceive that product to be contaminated. Three aspects in the environment can induce and strengthen this contamination cue: proximity between product and consumer, time passed since a consumer touched the product and the number of consumers touching it.

Perceived contamination affects our decisions regarding products (Baxter et al., 2017). In the retail consumption context, consumers have been found to be less attracted to in-store products that have been touched by other potential buyers (Argo et al., 2006), that have superficially damaged packaging (White et al., 2016) or that are made of easily contaminated soft fabric (compared to hard material, Edbring et al., 2016). But effects of perceived contamination are not limited to the retail sector, they also appear in other areas such as the sharing economy.

Previous research on the sharing economy has focused on the role of contamination in the adoption of access-based services (e.g. car-sharing platforms). It has been found that consumers believe access-based products, touched by (unfamiliar) others, are contaminated, decreasing both access-based service evaluation and adoption (Hazée et al., 2019). This sheds light on the potential effects of contamination on sharing activities from the user's perspective within B2C sharing platforms. However, to the best of our knowledge, no research to date has investigated how perceived contamination influences the owner's end-of-use decisions or how it impacts C2C sharing initiatives.

Addressing this gap in the literature seems important for understanding (unforeseen) consequences of sharing-based ownership arrangements. The success of these arrangements depends primarily on owners. They are the decision-maker regarding maintenance and end of use, and therefore have ultimate control over the impact of these sustainably-driven behaviours. We believe that decisions regarding shared possessions are influenced by the owner's perception of how contaminated products are. Consequently, decisions relating to shared products will differ relative to those that are privately owned.

## Possession Attachment

Owners have difficulty letting possessions go. Once people own an item, they become attached to it and adverse to ending its use (Thaler, 1980; Kahneman et al., 1990) driving a range of consumption decisions. For example, possession attachment can inflate the resale price an owner is willing to accept, reducing the likelihood of a transaction (Shu & Peck, 2011; Reb & Connely, 2007). Moreover, it affects people's willingness to dispose of an item and can lead to hoarding behaviour (Cherrier & Ponnor, 2010) and a decreased likelihood of "returning" it to a second-hand market (Simpson et al., 2019).

However, joint ownership structures may change these perceptions. It is possible that shared product ownership impacts the endowment felt by owners. On the one hand, possession attachment may be reduced with shared ownership, in that paying for – and therefore owning – only a portion of an item may mean one feels less attached to it. With multiple people using an item, the owner also has less control over it and may feel more distanced.

On the other hand, it is reasonable to suggest that people are attached to items that are jointly owned, similarly to those that are privately owned (e.g. shared single or private ownership). When people share product ownership, that product can still be considered part of the aggregated extended self and provide meaning to their identity (Belk, 2010). Consequently, they can feel attachment towards products that are not fully theirs, or even towards collective possessions such as monuments (Belk, 1992). The strength of the attachment to shared products might be slightly less. Nonetheless, what we own reflects who we are, even if we own only a portion of that item. Attachment towards an item, independent of the strength of attachment, may therefore influence end-of-use decisions. This would mean that similar to private ownership and shared single ownership, which are both characterised by a single owner, owners of joint possessions will feel attached to their items too, finding it hard to distance themselves from them and valuing them highly.

So, we presume that shared ownership does not affect end-of-use decisions. The attachment strength might be less for joint possessions, but it does not cancel out the influence of attachment in itself. Consequently, the impact of possession attachment on end-of-use decisions

does not differ across ownership arrangements. Instead, we believe that these decisions are likely to be affected by shared usage. With multiple users, contamination can become a worry. We hypothesise that shared usage (not ownership) of a possession increases the willingness to end product use, because the product is perceived as more contaminated.

## Study 1: Lawnmower

In the first study, we investigate whether sharing-based ownership arrangements, characterised by multiple users and sometimes multiple owners, cause owners to end product use. We test if owners are more likely to replace a shared product than one that is privately owned. We expect this effect will occur for both shared single ownership and joint ownership, proving that shared usage, not shared ownership, drives end-of-use decisions.

### Method

*Participants.* Two hundred and eight American adults participated in a scenario study on Amazon Mechanical Turk (60.1% male, $M_{age}$ = 31.71, $SD_{age}$ = 9.90). Participants were randomly assigned to one of three conditions (private ownership, shared single ownership or joint ownership) in a between-subjects design.

*Procedure.* All participants read a scenario indicating they had bought a lawnmower for $199 a few years ago. Depending on the condition, they were either informed that they were the only owner and user of the lawnmower (private ownership condition), the only owner who shared the lawnmower with neighbours (shared single ownership condition) or jointly owned and shared the lawnmower with neighbours (joint ownership condition). In all conditions, the lawnmower was used 200 times in total. After reading the scenario, participants indicated whether they would replace the lawnmower in the next five years (1 = very unlikely, 9 = very likely). Finally, participants answered three attention checks ("Who is the owner of the lawnmower?", "Who uses the lawnmower?" and "How much did you pay for the lawnmower?"). Four participants incorrectly responded to one of them and were excluded from analysis. In addition, the scores of one participant were marked as outliers (Box-and-Whisker plots method, Tukey, 1977) and excluded from the analysis.

### Results & Discussion

A two-way ANOVA[1]  of usage and ownership on the intention to replace the lawnmower showed that, as expected, usage ($F$(1,189) = 21.896, $p < .001$, *Cohen's d* = 0.71) and not ownership ($F$(1,189) = 0.074, $p = .786$, *Cohen's d* = 0.04) has a significant effect. Simple contrasts showed that participants in the private ownership condition ($M_{PO}$ = 5.37, $SD_{PO}$ = 2.32) were least likely to replace the lawnmower and significantly differed from participants in the shared single ownership condition ($M_{SSO}$ = 6.97, $SD_{SSO}$ = 1.69, $t$(189) = 4.679, $p < .001$, *Cohen's d* = 0.83) and the joint ownership condition ($M_{JO}$ = 6.88, $SD_{JO}$ = 1.70, $t$(189) = 4.424, $p < .001$, *Cohen's d* = 0.78). Participants in the shared single ownership and joint ownership condition did not differ in

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[1] To compare the influence of different ownership arrangements, and to test whether ending use is driven by shared usage and/or ownership, we created two variables (usage and ownership) to identify the three types of ownership. Private ownership has single ownership (0) and single usage (0), shared single ownership has single ownership (0) and shared usage (1), and joint ownership has shared ownership (1) and shared usage (1).

their intention to replace the lawnmower ($t(189) = 0.272$, $p = .786$, *Cohen's d* = 0.05, see Figure 1).
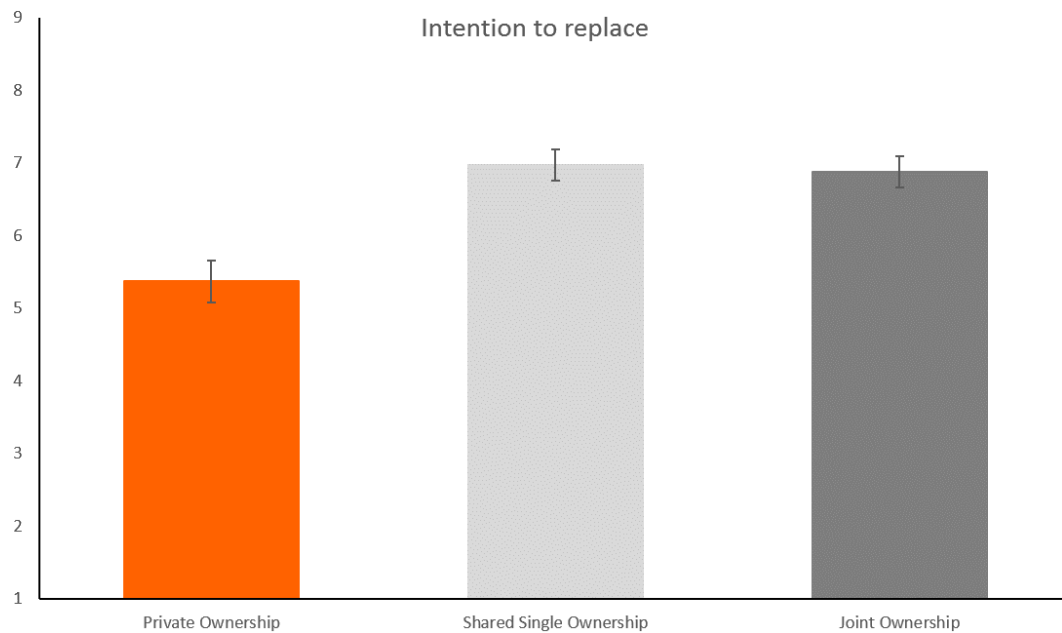
**Figure 1:** Intention to replace the lawn mower across conditions in Study 1. *Note:* Error bars represent ± 1 standard error.

The results confirmed our first hypothesis. Keeping usage frequency constant, an item is less likely to be replaced when it is owned and used by one person than when it is owned or used by multiple people. It is important to note that people are equally likely to replace a product when they privately own it but share it with others as when they jointly own and use it. This shows that shared usage, not shared ownership, is causing these effects, and a slightly looser attachment to a jointly purchased product does not play a role. If attachment strength did play a role, shared single ownership and joint ownership conditions would have differed.

## Study 2: Mountain Bike

In the second study, we aim to confirm the findings of Study 1, adding additional end-of-use measures (i.e. disposal of products and the resale price). Moreover, we test whether perceived contamination explains the difference in decisions regarding ending product use across ownership arrangements.

### Method

*Participants.* Two hundred and five American adults participated in a scenario study on Amazon Mechanical Turk (60.1% male, $M_{age}$ = 31.71, $SD_{age}$ = 9.90). Like Study 1, the participants were randomly assigned to one of three conditions (private ownership, shared single ownership or joint ownership) in a between-subjects design.

*Procedure.* Participants were asked to read a scenario indicating they had bought a mountain bike for $249 when they moved into a new apartment building a few years ago. Depending on the condition, they read that they were either the only owner and user of the mountain bike (private ownership condition), the only owner who shared the mountain bike with neighbours

(shared single ownership condition) or jointly owned and shared the mountain bike (joint ownership condition). In all conditions, the mountain bike was used 400 times in total.

After reading the scenario, participants were requested to fill out two questions measuring perceived contamination: "How do you perceive the mountain bike?" (1 = not contaminated at all, 7 = very contaminated) and "How would you categorise the condition of the mountain bike?" (1 = very bad condition, 7 = very good condition). The second item was recoded to compute an overall perceived contamination score ($\rho$ = 0.373, $p$ < .001). Next, participants indicated whether they would dispose of or replace the mountain bike in the next 12 months (1 = very unlikely, 7 = very likely). In addition, they also indicated the minimum price for which they would sell the mountain bike.

At the end of the questionnaire, participants answered the same attention checks as in Study 1. Forty-six participants incorrectly responded to one of them and were excluded from analysis. In addition, the scores of five participants were marked as outliers and excluded from the analysis.

### Results & Discussion

*Disposal, replacement and reselling.* Three two-way ANOVA's[1] of usage and ownership on intention to dispose, intention to replace and the minimum resale price confirmed our hypothesis and showed (marginally) that shared usage ($F's_{(1,151)}$ > 3.588, $p's$ < .060, *Cohen's d's* = 0.31), not ownership ($F's_{(1,151)}$ < 2.209, $p's$ > .139, *Cohen's d's* < 0.26), intensifies the end-of-use decision regarding the mountain bike. Participants in the private ownership condition were least likely to throw away or replace the mountain bike, and asked for the highest resale price compared to both shared single ownership ($t's_{(151)}$ > 1.894, $p's$ < .060, *Cohen's d* > 0.37) and joint ownership ($t's_{(151)}$ > 2.067, $p's$ < .040, *Cohen's d* > 0.40). Participants in the latter two conditions were equally likely to throw it away, replace it and named a similar price ($t's_{(151)}$ < 1.486, $p$ > .139, *Cohen's d* < 0.31). See Table 2, Figure 2 and Figure 3 for means and standard deviations across conditions for each measure.

| | Private ownership | Shared single ownership | Joint ownership |
|---|---|---|---|
| | M (SD) | M (SD) | M (SD) |
| Intention to dispose | 1.46 (0.85) | 2.89 (1.94) | 2.70 (1.69) |
| Intention to replace | 2.20 (1.25) | 3.72 (1.79) | 3.22 (1.92) |
| Minimum amount to resell ($) | 146.95 (55.02) | 126.47 (53.62) | 124.46 (58.66) |

**Table 2:** Means and standard deviations across conditions in Study 2.
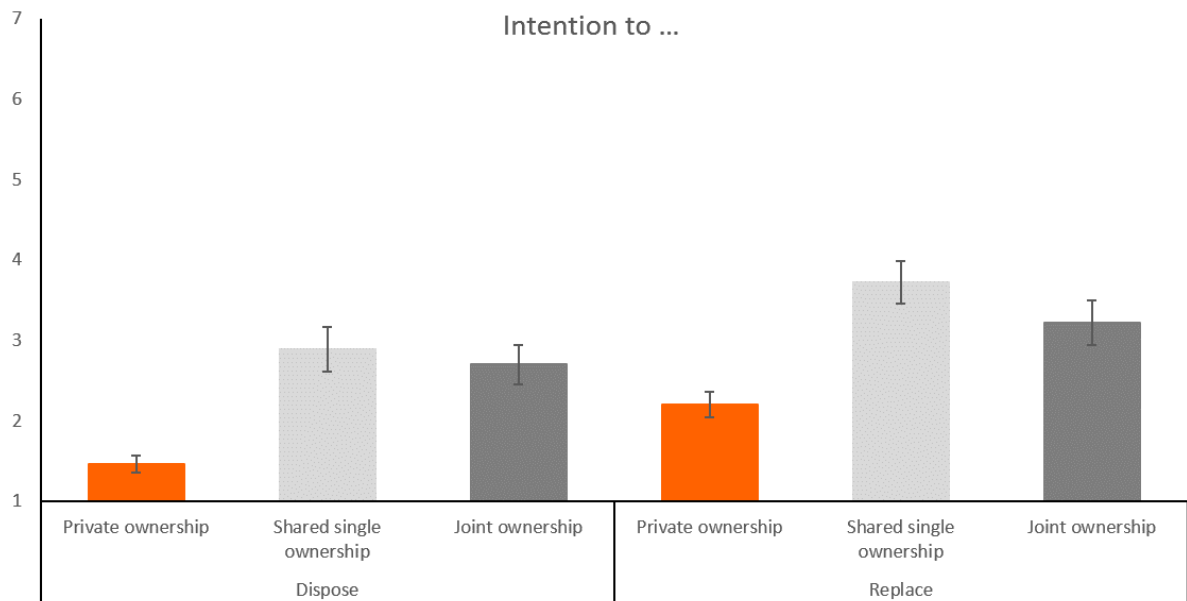
**Figure 2:** Intention to dispose and to replace across conditions in Study 2. *Note:* Error bars represent ± 1 standard error.
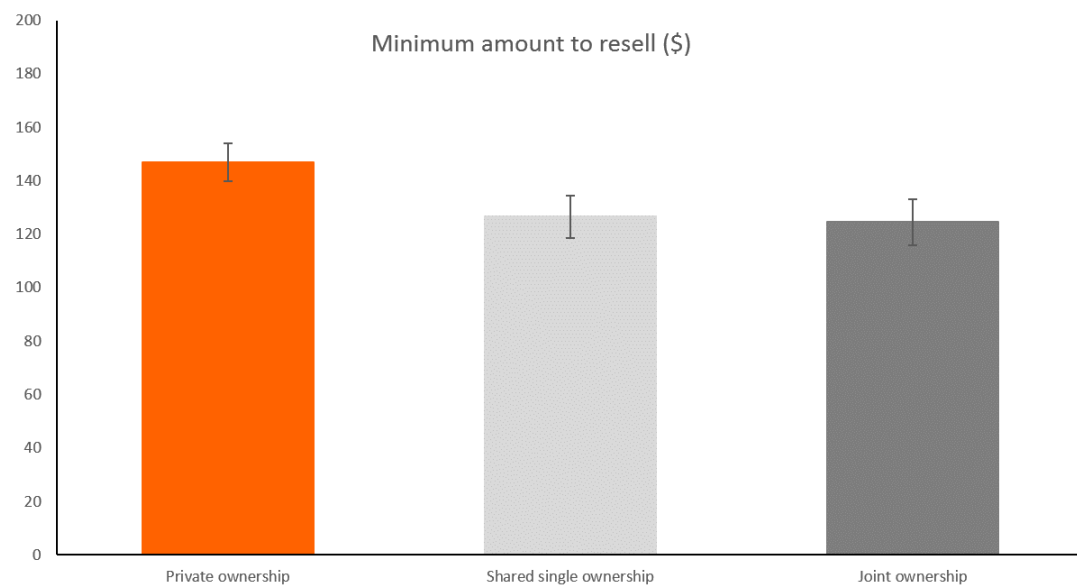


**Figure 3:** Minimum amount to resell ($) the mountain bike across conditions in Study 2. *Note:* Error bars represent ± 1 standard error.

*Perceived contamination.* A two-way ANOVA of usage and ownership on the perceived contamination of the mountain bike showed usage ($F(1,151) = 25.376$, $p < .001$, *Cohen's d* = 0.83) and not ownership ($F(1,151) = 0.197$, $p = .658$, *Cohen's d* = 0.08) influences participants' perceptions of contamination. Private ownership ($M_{PO} = 2.82$, $SD_{PO} = 1.30$) leads to the lowest level of perceived contamination and is significantly different from the perceived contamination in both shared single ownership ($M_{SSO} = 3.98$, $SD_{SSO} = 1.14$, $t(151) = 5.037$, $p < .001$, *Cohen's d* = 0.98) and joint ownership ($M_{JO} = 3.87$, $SD_{JO} = 1.06$, $t(151) = 4.535$, $p < .001$, *Cohen's d* = 0.89). Perceived contamination across shared single ownership and joint ownership did not differ ($t(151) = 0.444$, $p = .658$, *Cohen's d* = 0.09).

*Mediation.* Three 5,000-sample bootstrapping mediation analyses (Preacher & Hayes, 2008) tested whether perceived contamination of the mountain bike drives differences in the intention to dispose, intention to replace and the minimum resale price, due to single vs. shared usage. The mediation analysis controlled for ownership. As hypothesised, perceived contamination partially mediated the effect of usage on the intention to dispose ($b$ = 0.4785, 0.2196 < CI 95% < 0.8469) and replace ($b$ = 0.5172, 0.2031 < CI 95% < 0.9173) the mountain bike, and fully mediated the effect of usage on the minimum resale price ($b$ = -9.4206, -18.7822 < CI 95% < -1.0655, see Figure 4).

A.  *Intention to dispose*

$b$ = 0.4785, 0.2196 < CI 95% < 0.8469

B.  *Intention to replace*

$b$ = 0.5172, 0.2031 < CI 95% < 0.9173

C.  *Minimum reselling price*

$b$ = -9.4206, -18.7822 < CI 95% < -1.0655
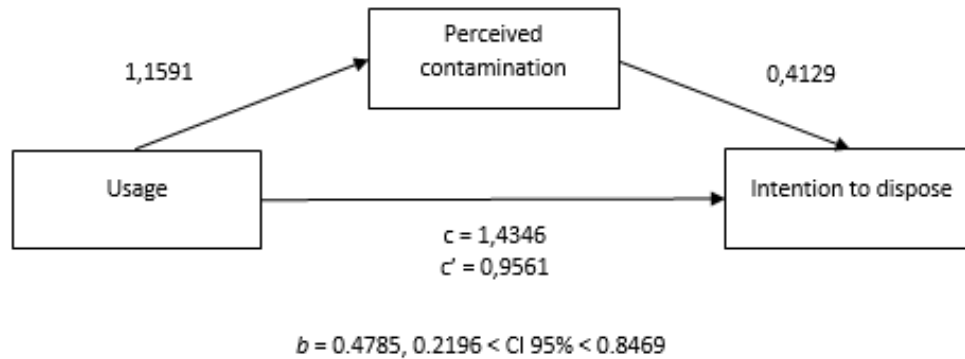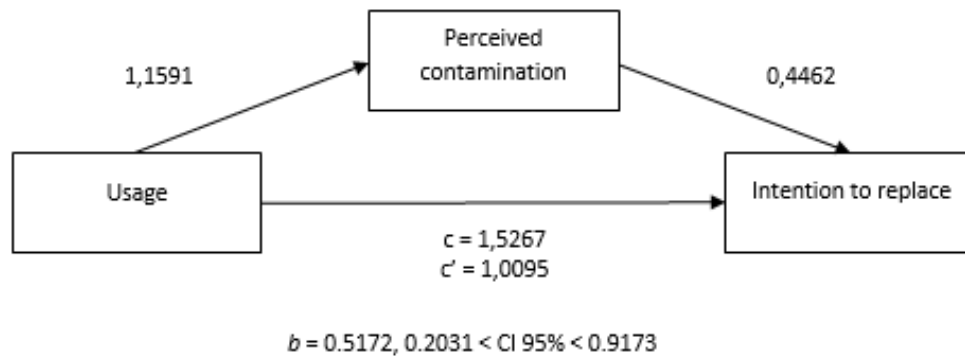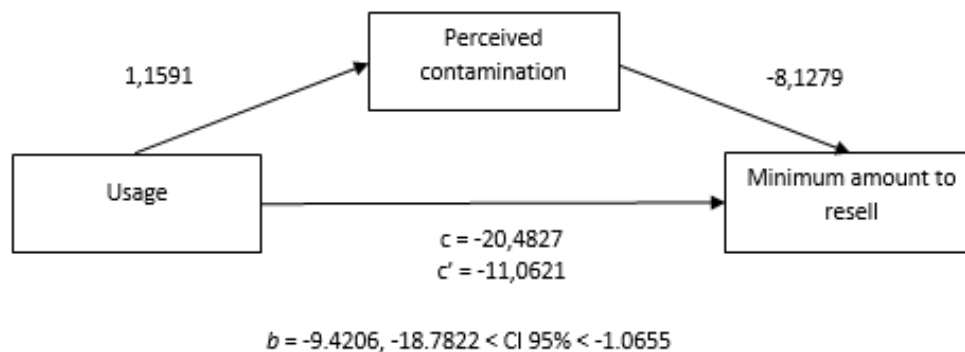
**Figure 4:** Mediating role of perceived contamination on the effect of usage on the intention to dispose (A), the intention to replace (B) and the minimum reselling price (C) of the mountain bike.

*Discussion.* The results of Study 2 are in line with the findings of the previous study and confirm our second hypothesis that the owner's perception of the product being contaminated changes his/her intention to dispose, replace or resell the product. Nonetheless, we found partial mediation, suggesting that there are more factors driving the effect.

## General Discussion

Although the nature of the sharing economy suggests that innovative C2C sharing-based ownership arrangements reduce environmental impact, motivating consumers to adopt them (Böckner & Meelen, 2017; Hamari et al., 2015), our research emphasises that this reduction may be smaller than anticipated and identifies drawbacks of shared single ownership and joint ownership. In support of our hypotheses, we found that owners who share the use of a privately-owned item (i.e. shared single ownership), or who jointly own and share an item with others (i.e. joint ownership), perceive the item as more contaminated than items which are privately owned and used. Consequently, owners who share their (joint) possessions are more likely to dispose, replace or resell (i.e. demanding a lower price) these items compared to private owners and users. This shows that both the increased perceived contamination and the increased intention to end the use of an item are determined by shared usage rather than shared ownership arrangements.

Besides the two studies presented here, we also tested our main hypothesis across another five experiments to confirm our ideas. A meta-analysis based on Winer's method of pooling t's (1971) of all seven studies validates the increased likelihood to dispose, replace and resell shared products. Overall, we find an effect of usage on the intention to dispose, replace or resell (z = 8.77, 0.3548 < CI 95% < 0.5893, see Figure 5). These findings suggest that although sharing-based ownership arrangements may be expected to reduce environmental impact in the short-term (e.g. reduce production of goods and raw material demand), in the long-term this anticipated reduction may be smaller than expected. This is because people end the use of shared products at a faster rate than those that are individually used.

This research is valuable both practically and theoretically. It enriches the sustainability discussion associated with new forms of ownership and usage, illustrating a flow-on effect of sharing products. Expectations of reduced total consumption, as one product can service multiple users, may be smaller than anticipated if those items are replaced or disposed of faster. This critical assessment is important to both policymakers and businesses in developing sharing-based initiatives, and consumers in adopting shared products. Although the prevalence of the sharing arrangements tested in this paper may differ across cultures and age groups, we believe that these are important (potential) aspects of the sharing economy, reflecting the true non-reciprocal nature of sharing.
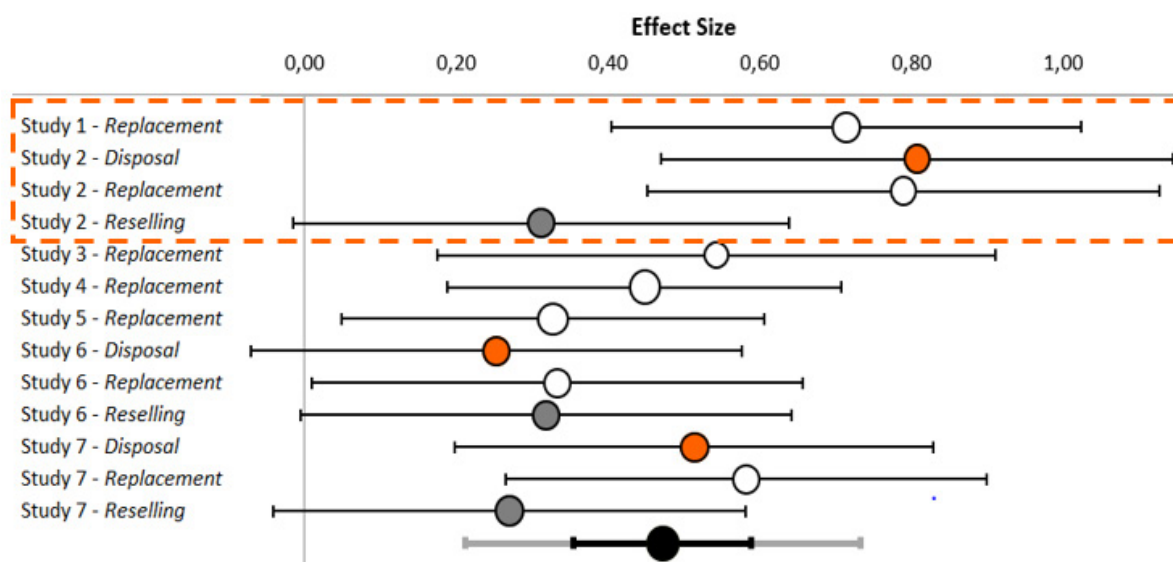
**Figure 5:** Meta-analysis of main effect across seven studies. *Note:* White dots reflect the intention to replace, orange dots the intention to dispose and grey dots the minimum reselling amount. The black dot displays the overall estimated effect size. The dotted line highlights the measures reported in the paper.

We also extend sharing economy theory. First, our research studies the treatment of products shared between consumers (C2C), as opposed to more extensively investigated business to consumer (B2C) arrangements (e.g. Lamberton & Rose, 2012; Ozanne & Ozanne, 2011). These B2C interactions often rely on an interactive platform and a large user base to coordinate product access. Looking at products shared between neighbours, we demonstrate that the perceived state of an item is affected by shared usage at an individual level.

Still, there is more to learn about the broader impact of the sharing economy. Perceived contamination was found to partially explain the increased tendency to dispose of or replace a shared possession, leaving room for additional complementary explanations. Future research should investigate what other factors play a role in ending the use of possessions, providing a fuller understanding of how the sharing economy impacts product lifecycles.

Additionally, it is relevant to investigate moderators of the effect of shared usage on end-of-use decisions. For example, one might test how the strength of relationships between users and owners influences trust and care taken when using products. One could expect that in close relationships, owners believe their product is less contaminated, as it is treated carefully.

Another factor to test is deterioration visibility. Some products have cues of deterioration (e.g. the meter on a car clocking up miles), while on others it is difficult to spot. In our research, we intentionally employed durable goods without clear contamination signs. However, obvious signs of deterioration could strengthen perceived contamination.

Overall, we believe that our research contributes to a better understanding of the consequences of sharing-based ownership arrangements and the sharing economy as a whole. Although sharing your possessions may indeed have great benefits, sustainable outcomes might be limited in the long run, highlighting a double-edged effect.

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# Innovating With Users in Mind

## Applying Behavioural Science to Innovation

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Looking back over the past few years of the annual *Behavioral Economics Guide* is fascinating. Since the first edition in 2014, it is evident that the discipline has grown rapidly, and it is now a widely accepted function in many sectors, especially in finance, consumer marketing and the public sector. In the 2018 Guide, Robert Cialdini explored why 'the world is turning to behavioural science'. He proposed several reasons for behavioural science becoming more popular. First is the rigour of the approach, in that major societal institutions now favour interventions rooted in evidence. Second, in terms of the cost-benefit analysis, behavioural science approaches often produce 'oversized outcomes for undersized outlays.' And finally, the increasing communication of its relevance indicates that behavioural scientists have become much more willing to talk about their work (Cialdini, 2018).

However, the Guide has not discussed how behavioural science is being used in innovation. This seems surprising, as most businesses and organisations need to innovate to survive, and the success of their innovations depends as much on the willingness of people to engage with the innovation as it does on the technology. To quote Kurt Vonnegut, 'If it weren't for the people, the god-damn people... always getting tangled up in the machinery. If it weren't for them, the world would be an engineer's paradise' (Vonnegut, 1952).

Vonnegut had a point: many innovations, especially technological ones, are used incorrectly or in such a way that people are unable to get the most out of them, and sometimes they are bought and not used at all! This is because people don't behave in the way the inventors predicted. But before I discuss how behavioural science can improve this situation, let us explore the process of innovation.

## The Process of Innovation

Six years ago, I set up a behavioural science team at Innovia Technology, an innovation consultancy based in Cambridge, England. When I started, I learned that innovation teams aim to solve the biggest hurdle first. The biggest hurdle – the most difficult and complex challenge – is often a technical one. Innovators have to go through a series of "gates" as they develop their ideas, and at each gate they are directed to "stop" or "go" (Cooper, 1990). In my experience, if they do not consider human behaviour early enough, they may find that an unconsidered hurdle remains.

Even when organisations claim to consider the user when innovating, they often only think about the "human factors" that determine what is needed to make a new product ergonomic and efficient to use; they do not always take into account the psychological, emotional and social barriers until much later in the process. Moreover, these barriers may turn out to be the biggest hurdles, and when not taken into account early enough, innovations may fail. For example, we have seen a case where the product was well-designed and had gone through a series of concept and usage tests where consumers claimed that they liked the product and would buy it. However, when launched, the product did not perform as well as expected, because peers were not supportive and because people fell back on old habits. Little thought had thus been given to the social context or how to disrupt habitual behaviour.

Considering the wide range of factors that influence human behaviour as early as possible in the innovation process helps to avoid wasting time and money on innovations that will never be adopted. Furthermore, it gives stakeholders more confidence to make the right investments, and it ensures that people will actually use the products and services developed.

## Why Does Behavioural Science Facilitate Innovation?

Behavioural science is good for understanding *how people respond* to new ideas and technologies and *why they respond in the way they do*. In addition, it highlights *the factors that really matter in driving behaviour* and, finally, it can *prevent innovators from getting fixated on features* that are at best irrelevant, and at worst could cause an innovation to fail.

By *applying the scientific method* to human behaviour, behavioural science seeks to provide evidence for how people interact with new products and services. It *reduces any uncertainty about the effectiveness of different solutions* so that organisations have more confidence in where to place their bets. Additionally, it investigates the complex interaction of capabilities, motivations and the general environment that determine whether an individual will engage with an innovation; consequently, it goes far beyond a standard consideration of human factors.

Behavioural science cannot work miracles. It cannot predict accurately what people want in the future, and it is no better than any other discipline at imagining how people will want to live their lives in ten years' time. Nevertheless, it can provide new insights into how people make decisions, and into how they buy and use products that go beyond traditional consumer insight techniques.

The limitations of many traditional 'consumer insight' approaches have been well documented (Rubinstein, 2018, p. 28). People cannot easily articulate what they want, and they appear to say one thing and do another. If you had asked people in 1880 to describe the transport solution they needed, they would have asked for a "faster horse." For this reason, many innovators prefer observational techniques rather than asking people directly what they want – they assume that it is not worth doing so, because they can't envision the future. Moreover, innovators worry that conducting behavioural research early in the process might kill genuinely innovative ideas, but this is not borne out by the evidence, since the innovation process itself is just as likely to kill good ideas (Ingerslev, 2014).

So how does behavioural science help?

## How Does Behavioural Science Facilitate Innovation?

There are four points in the innovation process where behavioural science is especially useful (Rubinstein 2018, p73-88): when defining the problem, when describing the solution space, when generating ideas and when testing the ideas.

*1. Problem definition:* behavioural science can clarify the problem definition by identifying the target behaviour(s) needed for the innovation to succeed

*2. The context:* behavioural science can diagnose the barriers to and promoters of performing the target behaviour (s) in different contexts so innovators know how to recognise good ideas

*3. Ideas:* behavioural science can give guidance on how best to change behaviour, given the barriers and promoters, thus helping innovators to generate good ideas

*4. Testing:* behavioural science can evaluate and test solutions to explore whether they meet the needs of users as well as the business.

Let us now explore each point in turn.

**Problem Definition**

To solve a problem, we need to define the problem clearly. In innovation (as with all decision-making), this is critical, because if the problem statement is wrong, everything that follows will also be wrong. It is therefore worth taking the time to create a detailed definition of the dilemma, which includes defining the behavioural challenge, namely the "target behaviour" that needs to change.

A few years ago, we worked with a company that wanted to create a device to help women understand their skin health, diagnose problems and choose skincare products to resolve them. There was clearly an opportunity here. At this early stage, the company did not know who might use the device, nor what it might look like. The only specification was that the desired target behaviours should be to a) use the device to diagnose skin conditions and b) order products directly from the device. In situations like this, companies often focus on the technical challenge, i.e. what is needed to create the device. At that point, the only consumer behaviour they can consider is whether or not people will buy what they have produced.

However, this company wanted to take a different approach: they wanted to be sure that the device they were making was the one that people needed most, and so they needed to consider user behaviour alongside the technical specifications. In practice, this meant that behavioural scientists, material scientists, technologists and designers worked together right from the outset.

The behavioural scientists investigated consumer expectations and used a model of behaviour loosely based on the Common-sense Model of Illness Representations (Leventhal et al., 1980) to frame their thinking about what the device had to do to meet these expectations. This model takes into account people's lay beliefs about their condition, and it proposes that illness representations are guided by three sources of information: the lay knowledge that people have, information from external sources and their current experience of the condition. Furthermore, there is parallel processing of the information: a cognitive stream, where people *think* about the causes of their condition, and an emotional stream, where they *feel and experience* it. The representations that people have of their condition filter how they respond and guide their actions, and they also influence how they choose to cope. Finally, people appraise their coping strategies to see if they worked, and this new knowledge is then fed back into the system.

This model was useful when working out what the device had to do. It had to be able to recognise conscious responses (such as condition recognition or solution options), and it also had to acknowledge the automatic, emotional responses (such as the need for trust or reassurance). Finally, it was important that it was also able to provide opportunities for appraisal and be able to give feedback (Figure 1).

**User expectations map**



Based on Commonsense Model of Illness Representation, Leventhal 1980
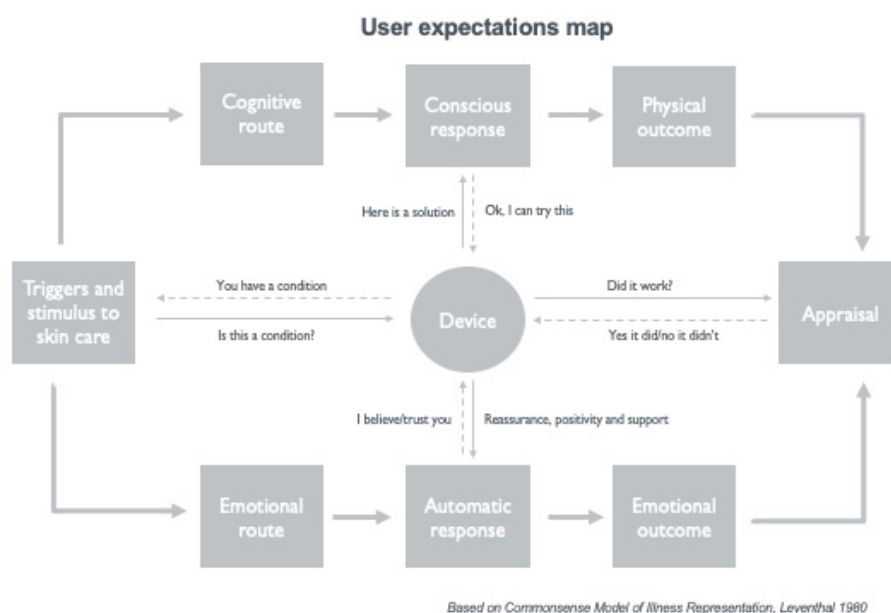
**Figure 1:** Behavioural model used to map user needs.

Having mapped out what the device needed to do psychologically, the technical team used it to design the process flows and specify what the technology needed to do to influence the target behaviour and to meet user needs (Figure 2).

**Technical requirements map**



Based on Commonsense Model of Illness Representation, Leventhal 1980
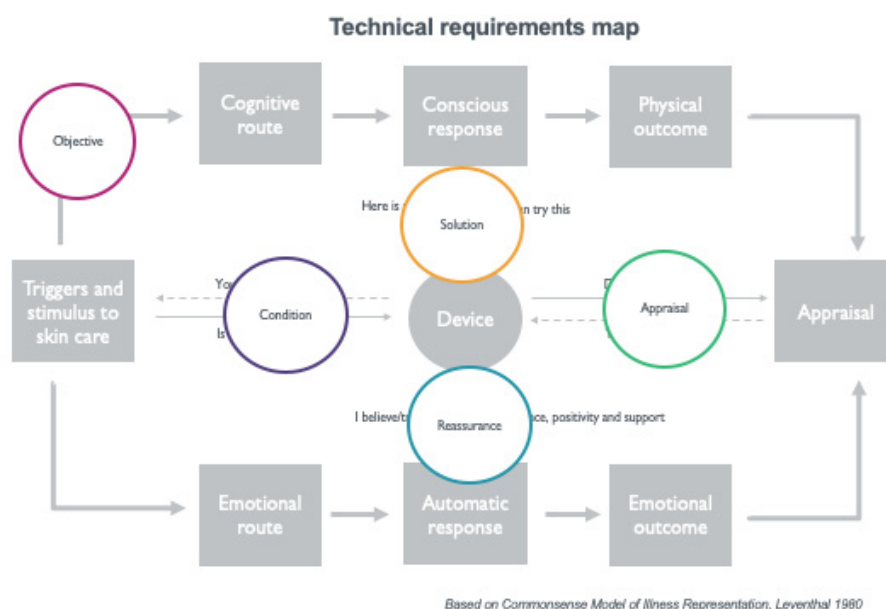
**Figure 2:** Same behavioural model used to map technical requirements for the device.

As shown in the diagram, the device had to allow users to state their objective (such as clear up acne), be able to recognise the condition (this is acne), provide a solution to the problem (use this cream), provide reassurance that the product would work (for example, "as recommended by doctors") and finally provide feedback to the user (the product has cleared your acne). This helped the team to explore specific technologies that would be included in the device and which could achieve these aims.

When a behavioural model can be used by both behavioural and technical teams, it gives the overall project a common language, thus making the process more efficient, because the problem can be defined in user and technical terms at the same time. Validated models provide reassurance of effectiveness, and they help teams to prioritise relevant factors and avoid being distracted by interesting but irrelevant factors.

There are many ways to use behavioural science to help deconstruct a problem, but no matter which option is chosen, the problem needs to be clearly defined for both efficiency and likelihood of success.

**The Context**

Innovation is a risky business. According to common wisdom, between 40 and 90% of new products will fail (Anderson et al., 2015; Cierpicki et al., 2000), which is a startlingly high number. The reasons for these failures are manifold and well documented (Gourville, 2005), and so companies know that they need to think about their consumers; they try hard to do so, and yet many products still fail.

Using behavioural science, however, may help to increase the likelihood of success, because it uses evidence and theory to guide decisions. In the previous section, we explained the innovation value of describing a target behaviour. Once the target behaviour is identified, behavioural scientists can explore what might encourage or discourage it. The barriers to and promoters of the target behaviour may have little to do with the innovation itself, but if there are social barriers to its use, for example, it can still fail. Innovators sometimes forget that even great products can fail if the user does not have the skill or the knowledge to use them correctly.

Behavioural science can help to map out systematically these barriers and promoters in advance. For example, we often conduct a behavioural diagnostic, using a framework such as the COM-B, to understand comprehensively what will prevent or encourage a desired behaviour (Michie et al., 2011). This relatively well-known diagnostic model proposes that there are three conditions for any behaviour to occur: the person must be capable of performing it (the C in the model), they must have the opportunity to perform it (the O in the model) and the need to be motivated to perform it (the M in the model).

An example of using this model concerns a company that wanted to improve the experience of buying and using contact lenses. Before considering what type of new products or services to develop, it was essential to know what behaviours contributed to a positive or negative experience. The team used primary research and data supplied by the company to identify comprehensively several behaviours ranging from compliance with instructions to attending check-ups. For each behaviour, a behavioural diagnostic was conducted into what would prevent or encourage the target behaviour.

For the contact lens innovation challenge, a wide range of company research reports and academic literature was used to conduct the diagnostic. Mapping out all the barriers and promoters enabled the creation of problem statements – these are summaries of the main barriers and promoters that must be addressed by the innovation for it to succeed. For example, there were several problem statements concerning the visit to the eye care professional (ECP). Understanding the difficulties concerning the experience of visiting the ECP meant that it was possible to design innovations focusing on different ways to engage with the patient, such as creating tools and demonstrators, prompts and reminders, along with better ECP training.

Using a behavioural science process helps to ensure that products address a real user need and that they improve the user's capability, opportunity or motivation to use said product. Furthermore, it ensures that the innovator thinks about what a person needs to do to start using the product, which in turn increases the chance that the product will not join the ranks of failed innovations and instead might actually succeed.

## Ideas

When people think of innovation, they often think about generating ideas. As we have seen, a lot of research and analysis needs to be performed before we are ready to come up with ideas for a new product or service.

The process of generating ideas, sometimes referred to as "ideation"[1] is the part of the in- novation process that people generally enjoy, because it is a creative activity often done in multi-functional teams. However, any ideation activity must be structured and remain focused on the challenge at hand. A knowledge of human psychology enables behavioural scientists to help teams focus on factors that drive the target behaviour and on ideas that solve the problem for the user and overcome the biggest barriers to usage or engagement.

The generation of ideas for new products or services is an iterative process. The evidence sug- gests that stereotypical brainstorm sessions, with frantic scribbling and Post-it notes, are often unproductive and produce fewer ideas than achieved by individuals working alone (Gallupe et al., 1991). However, incorporating more perspectives typically leads to more robust ideas.

Behavioural scientists can help to structure an ideation process, in order to yield better target- ed solutions, thus providing stimulus to the innovation team in the following ways:

- create problem statements, hence guiding the group towards solutions that address a par- ticular barrier or promoter

- use a behavioural model to help innovators see how they could influence the main drivers of the behaviour

- map out a behavioural archetype (a description of the users) to ensure that ideas address their greatest needs at different points on the user journey.

In behaviour-led innovation, we ensure that the interventions that are ultimately selected have a defined mechanism of action and use behaviour change techniques. In this way, we have greater confidence that they can influence the target behaviour (Bartholomew et al., 1998; Campbell et al., 2000; French et al., 2012; Michie et al., 2014).

We recently devised a behaviour-change programme to reduce drink-driving for Heineken's "When You Drive, Never Drink" campaign. During this process, we used problem statements and behavioural archetypes as stimuli. Our approach yielded dozens of possible ideas, which we prioritised according to the relevant barriers and promoters. The solutions that were eventually selected for testing were chosen because they directly addressed the key factors in drink-driving: having a goal and making a commitment, the availability of non-alcoholic substi-

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[1] In psychology, ideation is used to mean the process of forming and relating ideas or images. It is commonly used in the innovation domain to mean the formation of ideas or concepts for products and services.

tutes, the need for social affirmation and incentives and rewards to promote good behaviour (Innovia Technology, 2017).

## Testing

Both behavioural scientists and innovators (for example, engineers, research scientists and industrial designers) know the importance of evaluating interventions. In the early stages of innovation, typical behavioural questions are: "Does the concept work?" "Do users find it acceptable and useful?" And "Are people likely to pay for it?" In the later stages of development, typical behavioural questions are: "Do users find it easy and intuitive to use?" "Can we make it cost-effective?" And "How much will people pay for it?"

Answering these questions usually requires experimentation in the form of testing ideas at different stages of the process. This often involves a Minimum Viable Proposition (MVP) – a concept or a version of a product with just enough features to satisfy early customers and provide feedback for future product development. Using an MVP helps a company reduce the risk by quickly learning and adapting before progressing to a more concrete product or service.

Behavioural scientists can influence how the testing and evaluation stage is conducted. They may use behavioural models, such as the Technology Acceptance Model (Davis, 1989), as a framework for the study. This model has gone through several iterations, but it centres on the idea that the acceptance and usage of technology are influenced by two factors, namely perceived usefulness and perceived ease of use. The former is the person's beliefs about whether or not the technology will improve their performance, whilst perceived ease of use is the person's beliefs about the amount of effort required to use the technology. Hence, this model is particularly useful when trying to work out the factors that will encourage the uptake of a new technical product or service.

Behavioural scientists know a wide range of evaluation techniques and understand the importance of rigorous analysis. We helped an organisation, called The Ray, to test solutions for a solar-powered road stud that improved driver behaviour. The Ray is a not-for-profit organisation that manages an 18-mile stretch of highway in Georgia, a 'living lab for innovative ideas and technologies that can set a new standard for roadways around the world'.

To develop this concept, our behavioural scientists worked with physicists, product designers and transport designers. In order to design the solar studs, the behavioural scientists investigated the major sources of accidents and identified what solar studs had to do to make driving safer. The physicists identified the technologies needed to create the stud, whilst the designers and behavioural scientists created an MVP for testing with different types of road users. The role of the behavioural scientists at the evaluation stage was to design a series of experiments to evaluate the effectiveness of the studs in reducing tailgating and speeding, and improving hazard awareness (Innovia Technology, 2016). The initial experiments simulated the studs on the road. Different types of drivers participated in the experiments, the aim of which was to establish whether they changed their behaviour in response to the solar road studs. For example, we could see whether they slowed down or reduced the distance between their car and the car in front as a result of a series of timed signals. The team was able to demonstrate that solar-stud signalling was intuitive and capable of reducing accidents. Since then, The Ray has made a prototype stud and applied for patents.

## Conclusion

Innovation and behavioural science are perfect partners. Technical innovators are familiar with the scientific method, since behavioural science gives them an evidence-based approach to understanding human behaviour and a common language to talk about the implications. Critically, taking human behaviour into account as early as possible in the innovation process can help to reduce the inevitable uncertainty around the introduction of new products and services. When user behaviour is considered at every stage of the innovation process, the resultant products and services will be ones that people want and will actually use. Behavioural science thus increases the chances of an innovation's success.

## The Author

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# Reframing the Loneliness Epidemic

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The *"loneliness epidemic"* was a hot topic before Coronavirus hit, but it is even more top of mind now. Loneliness has a UK government department solely devoted to it, whilst nonprofits everywhere are submitting grants for programs designed to prevent it. The subject captures the research imagination because, most likely, we've all experienced it ourselves. And—at risk of sounding too technical—it sucks.

What exactly is loneliness? It is the feeling that your social relationships are not as satisfying as you need them to be (Piquero & Jennings, 2016).

This may look like:

- *Before Coronavirus:* You're at home on a Friday night because you couldn't find someone to go out with. You see on social media that your friends have been hanging out without you.

- *During Coronavirus:* You're social distancing with frequent Zoom calls, but you do not really feel supported. You have a bad day and do not have anyone to talk to about it.

These feelings hit a majority of us at some point, and 60% of Americans say they've been lonely in the last year. Sadly, loneliness affects some more than others, with 20% of people saying they have no close friends at all (Ballard, 2019). And it matters, since it is likely to increase your risk of death by 29% (Holt-Lunstad & Smith, 2015).

For all the talk about loneliness, research and solutions are lacking.

- Masi et al. (2010) conducted a meta-analysis of 20 randomized studies designed to reduce loneliness; it revealed a small effect size.

- Dickens et al. (2011) reviewed 32 studies on loneliness and concluded 'there is a need for well-conducted studies to improve the evidence base'.

- Gardiner et al. (2018) looked at 38 studies on older populations and isolation, and they concluded 'the quality of the evidence base is weak, and further research is required to provide more robust data'.

This is all shorthand for: We know the loneliness epidemic is important, but we cannot find any remedies that work on a meaningful, reliable basis.

Is documenting the severity of this problem really the best we can do? Why are we not finding more solutions to this problem?

It is possible that we are not finding ways to combat loneliness because much of it is deep, structural, and difficult to change. For example, some of the largest causes fall into the "hard-to-change" category:

1) *Genetics:* The estimate of genetic contributions to variation in adult loneliness is 48% (Boomsma & Willemsen, 2005).

2) *Demographics:* Age is inversely associated with loneliness (Schnittker, 2007), in that people tend to become lonelier as they get older. Also, females tend to be more lonely than males.

3)  *Life Circumstances:* Having a healthy marriage helps (Olson & Wong, 2001) (Schnittker, 2007), but retirement hurts (Hansson & Briggs, 1990), and so does unemployment (Viney, 1985).

4)  *Cyclical:* Lonely people expect rejection, and in so doing, they ruminate on social and interpersonal information to the degree that they feel social anxiety and do not reach out.  This becomes a negative feedback loop that's very hard to get out of (Gardner & Pickett, 2005).

When it comes to loneliness, often all of these factors play a role, and all of them are difficult—some impossible—to change. However, we would like to propose a way to reframe the problem and perhaps come up with some effective remedies.

What is the change in framing that we would like to propose? The current framing of the problem is "How can we reduce loneliness?" which helps focus efforts on the group with the highest acute need—typically the elderly—and designs solutions to make them less lonely. For example, the AARP Foundation has million-dollar grant programs for helping lonely seniors. Venture capital is also getting into the game with a reported $25M in the last year invested in startups aimed at engaging older populations. The UK has even asked mailmen to knock on the doors of the elderly to increase social interaction. And obviously these directions are important to explore, because they approach the problem where it is the most acute.

Nonetheless, in the same way that it is easier to prevent cancer than to cure it, here too it may be more productive to focus on loneliness prevention rather than on trying to cure those who suffer the most. If we really want to make a dent in loneliness, maybe the question we should be asking is: "How do we *prevent* people from becoming lonely in the first place?" As an analogy, if we wanted to decrease the number of people who are obese, we might be tempted to try to help those who are already obese, but a more promising approach would be to deal with the population as a whole to prevent obesity initially. The benefit of prevention in terms of effectiveness is rather obvious, and the benefit becomes even greater when the condition in question, such as loneliness, is a negative aspect of so many people's lives.

Once we state that our goal is prevention, we can ask how a population gets into trouble in the first place (Morenga & Mallard, 2013). The solution seems simple: The opposite of loneliness is making (and keeping!) friends. From this perspective *it is not a **loneliness epidemic** but a **lack-of-friendship epidemic***, and the solution will have to involve creating high-quality relationships. While this may seem an oversimplification, friendship is a key factor in resolving loneliness.

## How Can We Increase Friendship?

To understand friendship, we began by studying conversations, the lifeblood of relationships. Conversations have always been the main building block of friendship, but these days they are more important than ever. In a world full of physical distancing precautions, conversations have become the most crucial ingredient in friendship.

In Aron et al.'s seminal "36 Questions" study, it only took 45 minutes of vulnerable conversation between strangers to make them feel as close as the average relationship in their life (Aron & Melinat, 1997). The ability of such short conversations to have such an impact on the feeling of closeness has to be one of the most amazing improvements of any social science

intervention ever—and one of the best social ROIs for 45 minutes. The key for the large impact of this intervention is that the questions were not all of the "small talk" variety but instead were designed for mutual disclosure—when each person reveals something personal, it encourages closeness.

However, this well-known study was published in the New York Times in 2006, which begs the question: Why are we not, by now, overwhelmed with close companions? If the recipe for closeness is so well known, why are we not all using it?

The answer lies in our general approach to risk. As humans, we work very hard to avoid risk in many areas of life, including in our social relationships. Vulnerable conversations, especially with people we do not know well, carry with them a high social risk, and so one must figure out if they should engage and, if so, how to engage. What is acceptable to discuss? What are the power dynamics in a room? What are the cultural norms? Is social status an issue? Research from Nicholas Eply's lab (Epley & Schroeder, 2014) supports this assertion by demonstrating that one reason why people do not engage in conversation with strangers is because we fear that the other person will not enjoy it and will reject us.

How can we become close with someone if we're scared to dive deeper than the latest sporting score or the weather? This is the challenge we need to solve.

## Our Studies: How Can We Prompt Deeper Conversations?

We began our investigation with the following hypothesis: In the normal state of affairs, in our regular day-to-day life, if we go too deep and too quickly into a conversation, we break a social norm. To avoid the risk of being that "weirdo" who asks inappropriate questions (the risk), we adopt a strategy of keeping to the lowest common denominator of conversation—small talk—and take no risk, but in return we also receive scant reward. Our team wanted to try to change the paradigm by making deep, less superficial conversation the new normal.

To test this notion, we conducted two experiments in contexts that could not be more different.

### Study 1

Irrational Labs, in collaboration with Maritz Global Events, facilitated a series of networking events for one of their client companies, a financial services firm. Imagine six separate groups of about 50 financial advisors each (mostly men, and mostly in suits) sitting down at 9 am to kick off a conference. At this point, our team gets on stage and provides each group with instructions on how to have networking conversations. Each group then gets started and has conversations according to our rules for the next 45 minutes.

- *Just Network:* In two of the groups we asked attendees to spend the time networking as they normally would with other attendees.

- *Low Guidance:* In two of the groups we asked attendees to avoid small talk, but we gave no clear guidance on what they should talk about.

- *Strong Rules:* For two of the groups we provided conversational cards with probing questions like: "What life experience made you grow the most?" and "What is a compliment you wished you received more?" These groups were required to use these cards to direct their conversation.



**Figure 1:** Picture from the networking event.
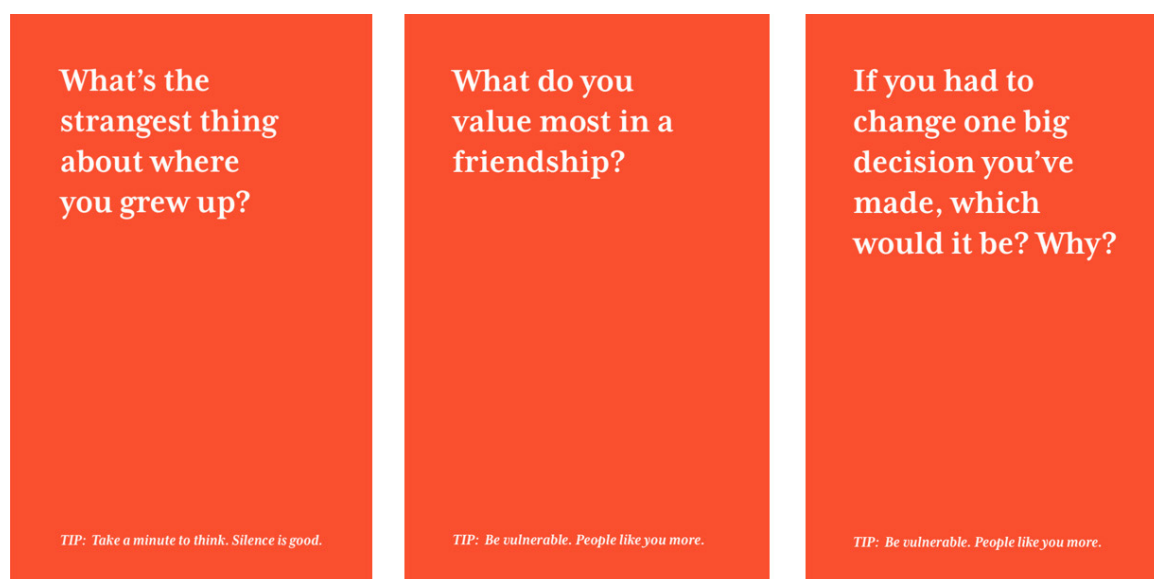


**Figure 2:** Example of some cards that were used in the "Strong Rules" condition.

What happened?

To get a handle on the effect of these different approaches, we surveyed the financial professionals three times: First, at the start of the conference, second, after the networking activity, and then again at the end of the conference. We discovered people *did not like* two things: They did not like taking three surveys in a relatively short period of time, but more than surveys, they disliked NOT having clear guidance.

In the standard networking groups and in the groups with the conversational cards, the instructions were clear. In the standard networking groups, people knew what to do, because

business people have a particularly good mental model for what is expected of them in a networking session. In the groups with the cards, the participants did not have strong prior knowledge about how to avoid small talk, but the cards and the instructions created a very clear script for what they were expected to do.

However, people in the groups where the only instructions were "not to make small talk" had no script, and so they were left on their own to figure out what to do to break the vulnerability barrier. The end result for this group was more discomfort, lower enjoyment, and fewer new friends.

What implications can we take away from this first finding? People prefer when social norms are clear, and social norms reduce the cognitive effort of figuring out the appropriate behavior. At a time like the present, when the norms for interaction are in flux, we have an opportunity to create environments that make it clear how people should or should not behave. For example, if we want to create and improve social bonds in these complex Coronavirus times, we could create new scripts and social norms to encourage more meaningful disclosure in the digital environments.

We also discovered that groups with the conversational cards discussed more topics (on average three more topics) compared to the other groups, and they also discussed themes that are generally considered deeper, like one's childhood, relationships, plans for the future, or religion. Yet, somewhat to our disappointment, when we looked at our main outcome of interest, namely, the "likelihood to hang out after the conference," we did not find any increase in the desire for sustained interaction as a consequence of these more meaningful discussions. While disappointing, we were not yet ready to toss out the conversational prompts as a possible way to increase friendship. We started this experiment with the full recognition that it might be tough to engage conference attendees fully at 9:00 am as the first agenda item of their financial conference. People came for business purposes, not to make new friends. They were also, to some degree, competitors. Not the ideal place to try to create friendship.

With this in mind, our next experiment was set within a social space (i.e. happy hour) where the mode, context, and expectations were more in line with social exchanges and friendship.

## Study 2

Now, picture the laid-back setting of Study 2: Our team hosted six Friday night events, each with about 40 people for a total of 247 attendees. The attendees were recruited from the 20,000 person Meetup group "I want to do that - just not alone." These were people who, unlike the group in Study 1, were explicitly hoping to meet others and came with the expectation that the evening would include an activity to move their social agenda forward.

This time, we changed not only the people and the setting, but also the focus of the study. We decided to try to learn which conversation topics worked best to drive connection. We assigned attendees to one of three conversation categories:

- *Conversations About the Future:* Question prompts that asked about one's future, e.g. "Where do you see yourself in 5 years?"

- *Conversations About the Past:* Question prompts that asked about one's past, e.g. "What is something surprising about your childhood?"

- *Activity:* A control 30-minute icebreaker activity, without any conversational prompts. The icebreaker activities were interactive but did not focus on conversation depth. They included short games like blind wine tasting and a challenge to "draw a bicycle" (Lawson, 2006).

Our hypothesis was that talking about your past would increase self-disclosure and, in turn, the likelihood of making a connection. Once again, we found that it is especially useful to test our intuition, because again we were wrong (this is why we do experiments). We found that it did not matter if people discussed their future plans or their past experiences. What did matter was if there were conversational prompts to guide the discussion. Although all participants came to the event hoping to increase social connections, the control group was not as successful as their prompt-receiving counterparts.

We found that with both types of conversation prompts, people revealed more about themselves, felt others revealed more, and talked about more new things than in the control condition. In turn, this mutual disclosure had the intended effect on bonding. On average, people talked to 1.6 more new people and had a higher likelihood of wanting to hang out afterwards in the conversational prompt conditions than in the control condition. Offering a script and setting up a norm for deeper conversation fostered new connections.

## Conclusion

What we have on our hands is not a loneliness epidemic but a friendship epidemic.

To fix it, we need to figure out how to help people make (and sustain) quality friendships before they become lonely. While there are many possible ways to encourage friendships, we know at least one path that can help: Having deeper conversations. Our findings? Instead of allowing people to fall back on the lowest common denominator of conversation, we changed the norms and steered them away from small talk by giving them topics to talk about. Doing this took pressure off the individual, putting the hard task of being vulnerable on the shared social infrastructure, and with it they also got a high return of social dividends. We should strive for a world with communities, schools, bars, and neighbors that are designed from the ground up to make it easy and enjoyable to connect. Ideally, the individual never has to feel like they are taking a social risk, and instead they can follow the pre-existing conversational norm.

Of course, there is still much more research to do on creating socially productive bonds once a norm is set and learning how to strengthen these bonds over time so that they can become real buffers for loneliness. We need to figure out what kinds of people can benefit more and less from this conversational approach to kickstarting friendships. And, where possible, we still want to establish ways to get people to take more social risks on their own, without conversational prompts. Despite all of these open questions, we end this first step of research with optimism. It is clear that more effort should be invested in preventing loneliness before it starts and that preventing loneliness is a promising direction for both research and for society.

As a final note, we hope all readers take this lesson to heart, by risking a bit more in conversations and reaping the benefits of meaningful social bonds. If you would like to adhere to the research and start with a script and norm-setting, we are very happy to offer our No Small Talk conversation cards at cost with the coupon code ATCOST here.

## The Authors

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# How to Sell Sprouts

## Lessons in Digital Persuasion From the Life Insurance Industry

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It is easy to sell candy. Candy tastes nice. It is full of sugar that our bodies crave, and we have to use our willpower to stop ourselves from overindulging.

If you want to sell me more candy, you just need to make it easy to buy and hard to avoid. You can ensure the packaging is bright, bold, and colorful so that it grabs my attention and makes it hard to ignore my cravings. You can place the candy by the supermarket checkout so that it tempts me while I am waiting to be served.

It is much harder to sell sprouts. Although they are good for us, sprouts just do not taste good to most people. We will not sell many more sprouts simply by making them easier to buy. Wrapping them in beautifully colored packaging and placing them by the supermarket checkout is unlikely to lead to a dramatic increase in sales. Few people would find themselves unable to resist impulse buying a pack of sprouts.

As behavioral scientists, most of us are sprout sellers. Saving for a pension, exercising, dieting, driving less, eating less meat: These behaviors are good for us, but unfortunately, for most people, they just don't taste very nice.

Life insurance is the ultimate sprout. It provides money to families when they need it the most. But we know people are disproportionately motivated by immediate, certain, and personal gains – the exact opposite of what life insurance offers. Yet life insurance has been sold successfully for over 150 years and at its peak in the 1960s, almost three-quarters of U.S. households had it (Lyons & Demaster, 2015).

We argue that the success of the industry has been understudied by behavioral scientists. Lessons from its history in understanding context and preparing consumers to engage with a message – concepts Robert Cialdini has recently termed 'pre-suasion' (Cialdini, 2016) – could help us change other low-motivation behaviors.

Furthermore, we argue that the challenges the life insurance industry is facing selling polices online highlight the problem for other digital behavior change initiatives. Too often, when digital solutions are created, we assume sprout-like behaviors will suddenly become candy-like: that making it easy to perform the behavior will suddenly create engagement.

We believe that for many sprout-like products and behaviors, ease is by no means enough for engaging consumers. "Nudge" techniques, such as making beneficial behaviors the default, have proved effective in fields like pension saving (Benartzi & Thaler, 2013). But, here, we focus on what behavioral science can tell us about effective persuasion – tools that can be used without requiring system or policy changes. We argue that we need to learn how to better apply pre-suasion techniques – considering how context and timing can make communications more effective online.

## Sprouts Are Sold, Not Bought – Changing Low-Motivation Behaviors

If you asked a behavioral scientist to design a product that pushed against many of our psychological quirks, they would probably design something like life insurance.

We know behavior and decisions don't necessarily result from weighing benefits and risks like statisticians; rather, we often use heuristics that can lead to errors (Tversky & Kahneman, 1974). We overweigh immediate pleasure and pain – the present bias (O'Donoghue & Rabin,

2015). We can be over-optimistic about realistic risks, like getting cancer – the optimism bias (Sharot, 2011a) – and under-weigh contrary evidence (Sharot, 2011b). We might avoid information altogether if we think it will be unpleasant (Sharot & Sunstein, 2020).

This presents a problem for marketers. Life insurance requires consumers to think about their own mortality (not pleasant or easy) and promises a payoff that is far in the future (hopefully), not always certain (some products are designed to cover a fixed period of time, such as the length of a mortgage), and will not even go to the purchaser. This is not an obviously attractive product, which has given rise the industry adage: "Life insurance is sold, not bought."

But the problem is not that life insurance doesn't have intrinsic value. In fact, it solves problems that many have: paying a mortgage, funeral costs, and securing financial stability for the family after an income unexpectedly stops. Many people are underinsured, and their families would struggle if an income stopped. The protection gap – the difference between the amount of insurance held and the amount needed to sustain surviving families – was estimated to be $25 trillion in 2016 in the U.S. alone (Swiss Re Institute, 2018).

Important behavior change theories, such as Michie's COM-B model (Michie, van Stralen, & West, 2011) and the theory of planned behavior (Ajzen, 1991), give a leading role to motivation. But unfortunately, it's clear that despite its potential value, consumers' motivation to think about and purchase life insurance is low.

Life insurance may well be the ultimate sprout, but many positive behaviors, like pension saving, eating more vegetables, and going regularly to the gym, suffer from the same behavioral biases. They may have genuine value, but it is often realized in the long term, requiring short-term sacrifices. Present-biased people often have to be nudged to engage with these ideas.

Given that the life insurance industry has so successfully sold a low-motivation product for over a century, are there persuasion lessons we can learn and apply elsewhere?

## Engaging Consumers: Learning From Life Insurance

For most of its history, life insurance has been sold face-to-face by salespeople and financial advisers. Even now, this channel accounts for the vast majority of sales.

Salespeople are experts in persuasion. Tversky himself said his work on heuristics and biases was a formalization of what advertisers and salesmen already knew (Stanford University, 1996), and Cialdini's popular book *Influence* (Cialdini, 1984) was based mainly on observations of salespeople. Arguably, persuasion made life insurance viable, historically (Rotman Zelizer, 1979). Salespeople were able to engage consumers with the solutions insurance offered for their real, but distant, problems.

Salespeople became experts in what Cialdini calls pre-suasion – the techniques that communicators use to create the right state of mind in their audience to make persuasion more successful (Cialdini, 2016). That means salespeople, before introducing their message, arranged to make the audience sympathetic to it. Pre-suasion techniques take many forms, but life insurance salespeople focused their attention on two in particular.

The key technique involved awakening a potential customer's need for life insurance. Typically, this was achieved by asking people difficult questions like "how will your family pay the mortgage if you die?" (Thomson, 1969).

This kind of persuasion relies on creating emotional and cognitive representation of the problem that, for many people, normally exists out of sight and out of mind. If the answer to the question is "my family would be fine, we have hundreds of thousands of dollars savings," then there is no need for life insurance and the salesperson moves on. But if the answer is "I don't know?" or "they wouldn't be able to pay it," then the salesperson has made them aware of a problem they have and might need to solve. They have increased the salience – a selective attention phenomenon long discussed by psychologists (Taylor & Fiske, 1978).

Silicon Valley venture capitalists often say they are looking for start-up products that are pain-killers ("need to have") rather than vitamins ("nice to have"). Successful life insurance salespeople awakened a need, a pain, so that life insurance moved from a "nice to have" to a "must have."

Salespeople also recognized that context matters when awakening a need. There is a reason life insurance is sold by mortgage advisors – their audience is primed to make decisions about financial risk, and with committing to buying a house, the exact content of what they could lose is salient.

Life insurance companies looked for ways to create the right context to awaken needs. A little-known piece of musical history highlights this perfectly. Life insurance can credibly claim a significant role in the development of the U.S. country music scene.

WSM is a country music station based in Nashville that has been on air since 1925. It is home to a famous show called "The Grand Ole Opry," or "the show that made country music famous" (Grand Ole Opry, 2020). The Grand Ole Opry has hosted performances from country superstars including Johnny Cash, Dolly Parton, and Willie Nelson. But surprisingly, WSM was invented by The National Accident and Life Insurance Company. Their motto "We Shield Millions" gave the station its name and still adorns its microphones. Inventively, WSM created a loyal captive audience to whom to advertise.

Salesmen would wander the neighborhoods looking for people who were tuned in to WSM and call the following Monday to try to sell policies. They would bring with them free Grand Ole Opry gifts and memorabilia. But also, country music drips with nostalgia and emotion, and explores themes of relationships, loss, and community: arguably an excellent prime for connections with people you love.

WSM's example demonstrates the idea of finding (or creating) the appropriate context to engage people with a difficult subject and applying persuasive techniques to awaken and boost the salience of consumers' needs for life insurance.

Using context effectively and awakening needs may play a role in changing many other behaviors as well. Most people realize the logical case for saving more or eating more healthily, but they do not have the emotional need that might help them to engage with the problem. To change attitudes and intentions, we need to focus on awakening this need and find the right context in which to do so.

But how do we do this digitally? This question is particularly pertinent for the life insurance industry. In most developed markets, the number of financial advisers and life insurance sales-people is falling, while the average age of those remaining keeps increasing (World Economic Forum, 2017). Partly this is a result of increased costs and regulation placed on advisers. But it perhaps also reflects the difficulty and unpopularity of the job. Selling life insurance is hard and far from glamourous.

This is one reason why life insurance, like many industries, is moving toward a digital distribution model. But the question remains, can persuasion techniques be replicated (or recreated) online? Can sprouts be sold digitally?

## Challenges of Selling Sprouts Digitally

This year marks the 30th anniversary of the first web browser built by Sir Tim Berners-Lee. It would be difficult to overstate the scale and impact of innovation in the years since, as digital has become a major channel through which organizations interface with consumers.

Digital native brands like Amazon, Google, and Netflix are now ubiquitous, and a significant foundation of their appeal is the convenience and ease they offer consumers.

Much is said in the UX and behavioral science communities about the value of making things easy – it is a pillar of the U.K. Behavioral Insights Team's influential EAST framework (Service, et al., 2015). Accordingly, the benchmark digital successes have made it very quick and easy for us to do things that we want and need to do. Amazon makes it easy to buy things; Spotify and Netflix give us easy ways to consume entertainment; and social media makes it easy for us to compare and present ourselves to our social groups.

But by focusing on the seamless consumer experience we might come to the wrong conclusion about drivers of consumer behavior online. More than making things easy, the success stories use product design, digital marketing, and user experience expertise to amplify our existing desires and needs that linger just beneath the surface. They respond to, and enable, our hedonistic tendencies, like experimenters leaving tasty marshmallows in a laboratory for disinhibited children (Mischel, Ebbesen, & Raskoff Zeiss, 1972).

The role of persuasion in engaging difficult subjects may well be the biggest casualty of digitization. Digital advertising settings give consumers more choice about what information they want to pay attention to; it is likely that the less hedonic topics will be the first to be ignored. Traditionally, persuasive process is applied to captive audiences by experts. If investment in persuasion is reduced in favor of offering easy access to products online, consumers are unlikely to realize their needs for utilitarian products and services, and engagement is likely to suffer.

Life insurance is experiencing just that. Millions of dollars have been spent building very simple purchasing journeys and now it can take less time to buy life insurance than to book a flight. But digitization has not sent people into a life insurance-buying frenzy. In fact, the proportion of the U.S. population who held life insurance in 2016 has substantially dropped since the 1960s (Bloomberg, 2018).

The facets of how we (mis)understand the economic arguments for insurance present a significant challenge for digital marketers trying to attract consumer engagement. The tendency to

focus on short-term rewards, avoid punishing information, and misjudge personal risk means consumers are unlikely to spare attention for insurance-related subjects in busy digital settings.

Life insurers are realizing that the digital environment is not always the best context for their messages. People do not want to be asked difficult questions that make them think about their mortality and the impact it would have on others,  especially in the middle of checking out the photos from their friend's latest holiday or posting an update about what they are eating for lunch. However, our own research suggests that softer messages that focus on the benefits of life insurance do not cut through.

Even consumer brands are starting to realize that digital is more often a converter of customers, not a creator. Adidas recently suggested that they have over-invested in digital advertising at the expense of building a desirable brand (Vizard, 2019). They had focused metrics on understanding customers' last actions before purchasing. But when an outage in an SEO campaign was unexpectedly inconsequential, Adidas concluded the reason people bought their products had deeper roots than being easy to find on a search engine. Consequently, they have stepped up their investment in brand building. Adidas' case shows an understanding of the value of amplifying the deeper psychological underpinnings that made their products viable in the first place.

The same is being experienced in many digital solutions for sprout-type behaviors. For example, digital health applications promise to offer consumers a range of benefits, like self-monitoring, easy access to resources, and structured behavior-change programs. There are over 400,000 health apps available in app stores, but this does not necessarily indicate success – most of the apps have been downloaded less than 10,000 times (Georgiou, 2020). Despite the huge and often acknowledged potential of these services for consumers, the promise of making them available and easy through digitization clearly does not necessarily result in take-up and later use.

For health maintenance, insurance purchasing, and likely many other useful but unattractive behaviors, digitization per se is unlikely to present the benefits it unlocks for more hedonic propositions. If we charge down the path of digitization without understanding motivation (and the lack thereof), engagement will suffer.

## Lessons From Behavioral Science: Digital Targeting and Availability

In the absence of any hedonistic pull, behaviors like buying insurance or living healthily require awakening consumers' needs and desires. Like riding a skateboard down a hill, removing friction makes for a smoother, more successful journey; but without some initial force, the journey won't start.

"Nudge" techniques could be applied on digital channels. For example, making desirable behaviors default options has proven successful in encouraging retirement saving (Benartzi & Thaler, 2013). These techniques could improve user journeys if applied conscientiously, or even provide consumers with insurance by default. But the latter would require significant systemic changes.

How about marketers? What can they learn from behavioral science to make digital persuasion more effective?

So far, we have talked about salespeople proactively awakening the need for life insurance, but often events can do this naturally. The availability heuristic (Tversky & Kahneman, 1973) plays a strong part in insurance purchases. Consumers judge events that are easy to imagine happening, or that they remember happening previously, as more likely to happen in the future. This may be why we see evidence that insurance purchasing increases after well-publicized floods, even in non-flooded areas (Gallagher, 2014). The underlying risks have not changed, but the availability of the risk has.

The same phenomenon happens in life insurance. Awareness of the need for life insurance often increases in an individual who has seen a friend or family member die young and witnessed the financial impact it had on the family (McKinsey, 2017). Supporting this, a peak in searches for life insurance in the U.S., and reports of increased insurance applications, coincided with the death of NBA superstar Kobe Bryant on January 26, 2020 (Herron, 2020). Bryant's death didn't increase anyone else's actual underlying risk, but it certainly increased the salience of death at a young age and leaving children behind. Research demonstrates that considering the similarities between current and future perceptions of ourselves can encourage effective long-term decision making (Hershfield, 2011). It's plausible that events in the environment like widely reported deaths could make our future needs more salient, and stimulate consumer interest.

The future for digital distribution may lie not in awakening needs, but in reaching people at moments in time when circumstances have awoken their needs for them. The life insurance industry is attempting creative ways of doing this. For example, insurance used to be sold in vending machines at airports. In this context, your own mortality and the financial needs of your loved ones may be more salient, awakening the need for insurance (Kunreuther & Pauly, 2006). Some companies have now begun using geolocation to identify when people are at airports and target advertisements more effectively. Also leveraging digital channels, crowd-funding platforms have become a popular way in many countries to raise money for families who have lost a key breadwinner and are struggling. Messages can be targeted at those who donated to these causes in the past and are, in that moment, likely to be aware of their own mortality and the impact it could have on loved ones.

It is quite possible that the other sprout sellers may find the same context effects useful – harnessing context, or creating it with subtle cues that prime people's goals (Papies & Hamstra, 2010), to engage consumers when their needs are salient. Some good examples already exist: In 2019, the BBC launched a digital well-being app for children called "Own It" that uses AI to reduce online bullying (BBC, 2019). The app monitors a user's messages as they write them and asks, "Are you sure you want to post this?" if they contain words such as stupid, fat, or ugly. Interrupting impulsive behavior at exactly the right time and in the real context prompts users to reconsider their words before posting.

Good examples of sprout sellers creating their own context are charities that offer, and heavily market, free will-writing services. People are often persuadable of the merits for leaving a charitable donation in their will – the bigger challenge has been that not enough people write wills. According to the creators of "Free Wills Month" in the U.K., 7.3% of wills typically contain a legacy charity gift, compared to 58% of those created through the free wills service (Institute of Fundraising, 2015).

Similar opportunities must exist to maximize context and timing to promote other positive behaviors. For example, the popularity of beach body diets suggest that an upcoming vacation can trigger motivation to lose weight, but how many holistic health and wellness interventions are built into the purchase of a vacation or beachwear?

## Sprouts for Everyone

Behavior change is much easier when it accesses pre-existing motivations in easier ways. But we run into difficulties when we try to apply the same techniques to low-motivation behaviors. Often, we become blinded by what we believe someone's motivation should be or even what they think it is. The problem is people do not often want to change behavior or adopt new habits.

When it comes to selling life insurance, expert use of persuasion has historically been successful at engaging consumers with difficult topics by boosting the salience of their long-term goals. If we rely on the power of digital channels to create frictionless experiences alone, we are in danger of losing these persuasive tools.

But context can prepare consumers to receive a message and make persuasion more effective. Digital technology, when used alongside data and behavioral science, can help reach consumers in those times and contexts where they might be receptive to sprout-like topics. This may be a fruitful avenue for the future of reaching and persuading consumers online.

As we move deeper into the digital era, consideration of consumers' psychology can help unlock the value of utilitarian products. Digitization *per se* certainly isn't enough to create engagement with sprout-like behaviors. We must remember the lessons of the pre-digital past – context and persuasive technique will be as important as ever for meaningfully engaging consumers.

## The Authors

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Prior to joining RGA, Matt was with the communications firm Hill+Knowlton Strategies for more than a decade. Most recently, he was Managing Director and head of the behavioral science team, working with a wide range of organizations to implement behavior change strategies to help meet diverse business goals, such as improving financial decision-making, increasing recycling, and encouraging healthier lifestyles.

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# RESOURCES

# 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**).

## 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 decisions, 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 hand hygiene (Li et al., 2018).

## 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 height-

ened 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** 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**

## 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)

# 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).

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

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## 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 **precommitment**, 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):

|  | GAINS | LOSSES |
|---|---|---|
| **HIGH PROBABILITY** *(Certainty Effect)* | 95% chance to win $10,000 / Fear of disappointment / RISK-AVERSE | 95% chance to lose $10,000 / Hope to avoid loss / RISK-SEEKING |
| **LOW PROBABILITY** *(Possibility Effect)* | 5% chance to win $10,000 / Hope of large gain / RISK-SEEKING | 5% chance to lose $10,000 / Fear of large loss / RISK-AVERSE |

Prospect theory has been applied in diverse economic settings, such as consumption choice, labor supply, and insurance (Barberis, 2013).

# 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** 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

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## 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).

## 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).

## 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 hyper-

bolic 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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# Postgraduate Programs

## (Taught in English)

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# Explore the mind of the consumer though The Chicago School's Behavioral Economics Program

With a foundation in advanced psychology, an M.A. in Behavioral Economics from The Chicago School of Professional Psychology provides students an alternative to the traditional M.B.A. by providing skills that are rooted in understanding and influencing consumer behavior.

Our M.A. in Behavioral Economics program blends elements of consumer, social, and cognitive psychology to provide a psychological perspective of consumer behavior.

Graduates are prepared to deliver professional services, perform research, excel as leaders and policy advisors, and to sensitively and inclusively serve diverse populations in business, marketing, and politics.

## ABOUT THE CHICAGO SCHOOL:

The Chicago School of Professional Psychology is a nonprofit, regionally accredited institution with over 4,300 students at campuses across the country (Chicago, Southern California, Washington, D.C. and Online). The Chicago School has been an innovator in the field of Psychology and related behavioral science since 1979. The Chicago School offers over 20 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 (B.E.), 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 M.B.A 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 is a unique program that utilizes a competency-based model grounded in: consumer, social, cognitive and consulting psychology and political science and infuses multicultural perspectives from a diversity of 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 advisors, 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 B.E.

• Upon successful completion of the online M.A. in Behavioral Economics program, students who meet admissions requirements will be prepared to enter TCSPP's Business Psychology Ph.D. program, allowing them to pursue additional post-graduate and career opportunities.

# CAREER OUTCOMES:

Graduates can consider careers in some of the following fields:

- **Consulting**
- **Public Service**
- **Marketing**
- **Public Relations**
- **Healthcare**
- **Higher Education**
- **Human Resources**
- **Nonprofit**
- **Government**

## 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.

## STUDENT EXPERIENCE:

The MA 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 MA Behavioral Economics 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, audio and video recordings. Synchronous learning includes the use of live chat sessions and GoToMeeting live virtual meetings.

**Student Services:** Online students have access to a range of students support services provided by TCSPP including: Access to TCSPP 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.

# EXECUTIVE MSc BEHAVIOURAL SCIENCE

## UNCOVER THE SCIENCE BEHIND BEHAVIOUR

An increasing number of organisations now apply behavioural insights to their challenges. Companies, charities and public bodies all recognise the power of testing their products and policies in real world environments.

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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.

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# UNCOVER THE SCIENCE BEHIND BEHAVIOUR

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 week and can therefore continue to live and work outside of London and the UK. Between teaching sessions you will have various assessments to complete. After the April session, you work on your dissertation 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

## OUR STUDENTS

Our students come from a wide range of academic and professional backgrounds from all over the world. This diversity is incredibly valuable as it allows you to consider issues from a variety of different perspectives. You are likely to choose this EMSc for two reasons; because behavioural science is an area directly related to your current professional role, or because you wish to pursue it for your own personal and career development. The programme provides you with the opportunity to study alongside your employment to enhance and support your professional development.

# WHAT OUR ALUMNI HAVE TO SAY ABOUT THE PROGRAMME

"     The Executive MSc of Behavioural Science exceeded my expectation on every level. It was a transformative experience intellectually, professionally and personally. Intellectually, every course stretched and challenged my thinking in a very different, positive and fulfilling way.  "

**Ladan Niami, 2017/18 cohort**

"     My understanding of  the way people think, act and decide changed so much from what I learned, I now think about my contributions (at work and in general) as pre and post LSE MSc in Behavioural Science.  "

**Ellen Raim, 2016/17 cohort**

For further information, please visit

**lse.ac.uk/EMScBehaviouralScience**

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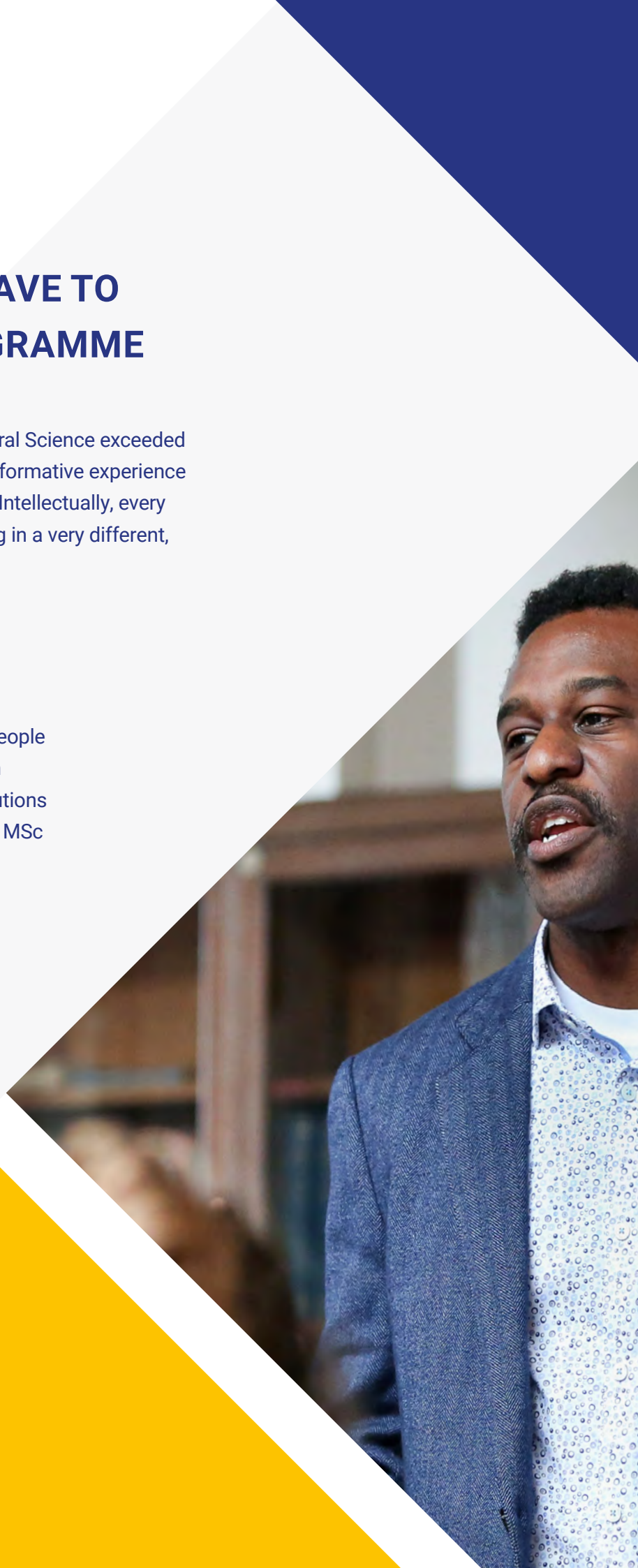
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- Establish theoretical, quantitative, and methodological foundations in the field
- Learn to model how individuals and groups make decisions
- Train at the forefront of nudge theory and social norms research
- Design lab and field experiments to test hypotheses
- Apply knowledge to real-world case challenges, internships, and capstone research
- Work with faculty experts in fields such as policy, education, law, business, and medicine
- Select elective courses from disciplines and schools across Penn
- Participate in professional development and networking opportunities with leading employers

Get program details:

## www.upenn.edu/mbds

# Meet the Master of Behavioral and Decision Sciences program's founding director



## 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*

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.

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

-Cristina Bicchieri

# MBDS 2019 Program Facts

| | | |
|---|---|---|
| **48%** | **46%** | **75%** |
| Percentage of international students in the 2019 cohort, representing 9 countries | Percentage of students matriculating directly from the workplace | Students enrolled full-time |

To learn more about the MBDS program's world-renowned faculty and researchers, visit:

# www.upenn.edu/mbds
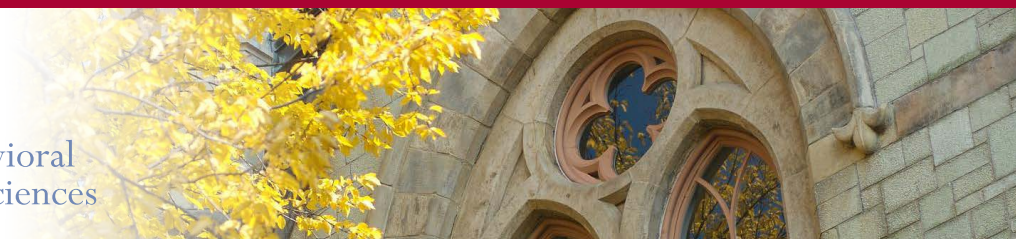
# Unparalleled connections

A defining feature of the University of Pennsylvania's Master of Behavioral and Decision Sciences (MBDS) program is its network of outstanding industry and research partners. We collaborate with some of the most influential organizations in the world to bring students exceptional networking experiences, such as internships, design challenges, and other employer-driven projects. Additionally, MBDS students can pursue independent, cross-disciplinary research at over a dozen schools, centers, and institutions at Penn.

**Anu worked with Ipsos for the 2019 MBDS Design Challenge and deepened the collaboration for her capstone:**

"I wanted to do a design challenge so that I could apply what I was learning in a real-world context. I formed a really good relationship with the industry partners and eventually collaborated with them for my capstone project. Having a sound understanding of behavioral science has benefited me in my current role at every stage, from forming research questions to shaping a story from the data."

**Anu Raghuram,** MBDS '19
*Data Scientist, JPMorgan Chase Institute*

**Upon graduating, Alex collaborated with current MBDS students on research for the US Army:**

"I value the opportunity for MBDS alumni to stay connected to the program and work with current students to solve important organizational challenges. As a client for the Consulting in Behavioral Science course, I worked with a team of five very impressive students with diverse skill sets and industry experience. They helped us understand why some individuals who want to join the Army sign contracts to join but end up dropping out before basic training."

**Alex Willard,** MBDS '19
*Marketing Strategist, US Army Enterprise Marketing Office*

**Lorena received University funding for her interdisciplinary research with Penn's Graduate School of Education (GSE):**

"I did my electives at GSE because my work is focused on education and children. The MBDS program team was always open to my ideas and helped me excel. I think the world needs more people who understand the academic side and the practical side and can build bridges between the two, and the MBDS program is great at that. You learn how to apply evidence-based theories in the real world."

**Lorena Levano,** MBDS '19
*Consultant – Behavioral Sciences, The World Bank*

To learn more about how to impact and influence behavior for social change, visit:

**www.upenn.edu/mbds**

# MSc in Behavioural and Economic Science

The Departments of Psychology and Economics at the University of Warwick offer innovative new courses in the growing area of decision science and behavioural economics. The MSc draws on the excellent, ground-breaking research being undertaken in the departments of Psychology, Economics and the Warwick Business School.

The MSc will suit those with a quantitive background (e.g. maths, sciences, economics, psychology).

**Further Details:**
Email: **PsychologyPG@warwick.ac.uk**     Tel: **+44 (0)24 7657 5527**

**www.warwick.ac.uk/bes**
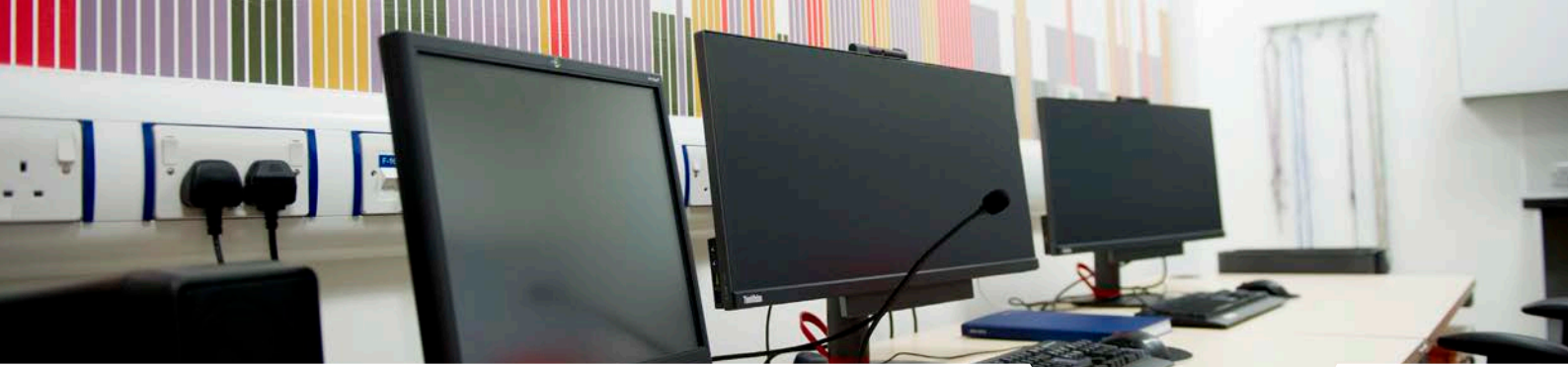
# WARWICK
## THE UNIVERSITY OF WARWICK

## MSc in Behavioural and Economic Science

# Why should I take this course?

This inter-disciplinary course emphasises both theoretical foundations and real-world applications of Behavioural Science, and is aimed at those intending to work in business, public policy implementation or research.

### Modules will include

▶ A thorough grounding covering both the theory and real-world application, in behavioural economics and the cognitive science of judgement and decision making.

▶ Modules on the design, conduction and analysis of behavioural experiments and the analysis of large-scale datasets.

▶ An empirical research project.

Our previous students have gone on to take positions at The Busara Center for Behavioral Economics, The UK Behavioural Insights Team, Google, Frontier Economics, Facebook, Ogilvy Change and more.

### Further Details:
Email: **PsychologyPG@warwick.ac.uk**     Tel: **+44 (0)24 7657 5527**

## www.warwick.ac.uk/bes

# Why Warwick?

**You will be taught by leading researchers from the Departments of Psychology and Economics and Warwick Business School.**

**Three leading departments in this area of research.**

Warwick has been ranked top of the specialist subject table for Economics in The Times and the Sunday Times University League Tables for 2020. Behavioural Science was identified as an area of significant academic achievement in the Research Excellence Framework.

Warwick is a global community. Our students come from all over the world, including South America, Asia, Europe, USA and the Middle East and from many backgrounds including undergraduate study, industry and the public sector.

Find out more about Postgraduate Study at Warwick
**www.warwick.ac.uk/study/postgraduate**

**Further Details:**
Email: **PsychologyPG@warwick.ac.uk**     Tel: **+44 (0)24 7657 5527**

**www.warwick.ac.uk/bes**

| University | School/Department | Program |
|---|---|---|

## United States

| University | School/Department | Program |
|---|---|---|
| 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. 196-198** |
| 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) |
| | | (see also Cornell Center for Behavioral Economics in Child Nutrition Programs) |

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|---|---|---|
| Duke University | The Fuqua School of Business | MBA and PhD in Business Administration (Marketing or Decision Sciences track) |
| Franklin University | College of Arts, Sciences & Technology | Master's in Business Psychology |
| Georgetown University | McDonough School of Business | MBA and Executive MBA<br><br>(see also Behavioral Research Laboratory) |
| Georgia State University | Andrew Young School of Policy Studies | PhD in Economics<br><br>MA in Economics<br><br>(see also Experimental Economics Center) |
| Harvard University | Department of Economics<br>School of Public Health | PhD in Economics<br><br>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<br><br>MIT Sloan School of Management | PhD in Brain and Cognitive Sciences<br><br>Masters in Management, Analytics, Applied Economics<br><br>(see also MIT Sloan Neuroeconomics Laboratory) |
| New York University | Graduate School of Arts & Science | MAs and PhDs in Economics, Politics and Psychology<br><br>(see also Center for Experimental Social Science)<br><br>(see also Institute for the Study of Decision Making) |
| Ohio State University | Department of Psychology | PhD in Psychology (Decision Psychology)<br><br>(see also Decision Sciences Collaborative) |
| Stanford University | Department of Economics | PhD in Economics<br><br>(see also Institute for Economic Policy Research)<br><br>(see also Experimental/Behavioral Seminar) |

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|---|---|---|
| Texas A&M University | Department of Economics | PhD in Economics<br><br>(see also Economic Research Laboratory) |
| University of Arizona | Eller College of Management | PhD in Economics<br><br>(see also Institute for Behavioral Economics) |
| University of California, Berkeley | Haas School of Business<br><br>Department of Psychology<br><br>Department of Economics | PhDs in Marketing, Psychology and Economics<br><br>(see also Initiative for Behavioral Economics & Finance)<br><br>(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<br><br>(see also Atkinson Behavioral Research Lab) |
| University of California, Santa Barbara | College of Letters & Science | PhD in Economics<br><br>(see also Experimental and Behavioral Economics Laboratory) |
| University of Chicago | Booth School of Business | MBA<br><br>PhD in Behavioral Science<br><br>(see also Center for Decision Research) |
| University of Kansas | College of Liberal Arts and Sciences | MA in Applied Behavioral Science<br><br>PhD in Behavioral Psychology<br><br>(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<br><br>Lundquist College of Business | MA and PhD in Psychology<br><br>PhD in Economics<br><br>PhD in Marketing<br><br>(see also Institute of Cognitive and Decision Sciences) |

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|---|---|---|
| University of Pennsylvania | School of Arts & Sciences | **Master of Behavioral and Decision Sciences**<br><br>**See pp. 199-201** |
| | | (see also Behavioral Ethics Lab)<br><br>(see also Social Norms Group) |
| University of Pittsburgh | Katz Graduate School of Business | PhD in Marketing |
| | Dietrich School of Arts & Sciences | PhD in Economics |
| University of Southern California | Dana and David Dornsife College of Letters, Arts, and Sciences | PhD in Economics<br><br>(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<br><br>(see also Behavioral Research Insights Through Experiments Lab) |
| Washington University in St. Louis | School of Arts and Sciences | PhD in Behavior, Brain and Cognition<br><br>(see also Behavioral Economics Laboratory) |
| Yale University | Yale School of Management | Doctoral Programs in Financial Economics, Marketing, and Organizations and Management<br><br>(See also Yale-Ipsos Consumer Marketing & Behavioral Economics Think Tank) |

## United Kingdom

| | | |
|---|---|---|
| Bangor University | | MA Business with Consumer Psychology |
| City University London | Interdisciplinary | MSc in Behavioural Economics |
| | School of Arts and Social Sciences | PhDs in Economics and Psychology<br><br>(see also Decision Making and Behavioural Economics Research Group) |
| Durham University | Department of Psychology | MSc in Behavioural Science |
| | Durham Business School | MSc in Experimental Economics |

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|---|---|---|
| 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<br><br>Executive MSc in Behavioural Science<br><br>**See pp. 202-204** |
| | Departments of Management, Social Policy, Economics and Psychological and Behavioural Science | PhDs in Management (Marketing), Social Policy, Economics and Psycho-logical and Behavioural Science<br><br>(see also LSE Behavioural Lab for Teaching and Research) |
| Middlesex University | Business School | MSc in Behavioural Economics in Action |
| Queen Mary University of London | School of Economics and Finance | MSc in Behavioural Finance |
| University College London | Division of Psychology And Language Sciences | Executive Programme in Behavioural Science |
| | Division of Psychology And Language Sciences | MSc in Cognitive and Decision Sciences<br><br>PhD in Experimental Psychology |
| | School of Management and the Behavioural Insights Team | 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<br><br>(see also Cambridge Experimental and Behavioural Economics Group) |
| University of East Anglia | Department of Economics | MSc in Behavioural and Experimental Economics<br><br>(see also Centre for Behavioural and Experimental Social Science) |
| University of Essex | Department of Economics | MSc in Behavioural Economics |
| University of Exeter | School of Business | MSc in Behavioural Economics and Finance |
| University of Huddersfield | | MSc in Behavioural Economics and Decision Science |

| University of Leeds | Leeds University Business School | MSc in Business Analytics and Decision Sciences |
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| | | (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 Reading | Henley Business School | MSc Behavioural Finance |
| University of Stirling | Stirling Management School and Behavioural Science Centre | MSc in Behavioural Decision Making for Finance |
| | | MSc in Behavioural Science for Management |
| | | (see also Behavioural Science Centre) |
| University of Warwick (Warwick Business School) | Interdisciplinary | MSc in Behavioural and Economic Science |
| | | **See pp. 205-207** |
| | Department of Psychology | MSc Behavioural and Data Science |
| | | PhD in Psychology |
| | | (see also Behavioural Science Group) |

## 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 |

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|---|---|---|
| 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 | Master in Social Psychology (Economic Psychology track) |
| | School of Social and Behavioral Sciences | Research Master in Social and Behavioural Sciences |
| | Tilburg University Graduate Schools | Research Master and PhDs in Economics, Business (Marketing track) and Social & Behavioural Sciences |
| | | (see also Tilburg Institute for Behavioural Economics Research) |
| University of Amsterdam (Amsterdam Business School / School of Economics) | Business School and School of Economics | Master and PhD in Economics |
| | | (Research Priority Area Behavioural Economics) |
| 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) |

## Germany

| | | |
|---|---|---|
| Friedrich-Schiller University Jena | Jena Graduate School | PhD in Human Behaviour in Social and Economic Change |
| Applied University at Hamm-Lippstadt | | Intercultural Business Psychology Masters  (Economic Psychology concentration) |
| 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 | Faculty of Business and Economics | Master of Applied Economics and Econometrics |
|---|---|---|
| | School of Business, Monash University Malaysia. | PhDs in Business and Economics |
| | | (see also Monash Laboratory for Experimental Economics) |
| | | (see also Monash Business Behavioural Laboratory) |
| 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

| University of Vienna | Faculty of Business, Economics, and Statistics | PhD in Economics |
|---|---|---|
| | | MSc in Economics |
| | | (see also Vienna Center for Experimental Economics) |
| Sigmund Freud University | | Master in Psychology (Economic Psychology specialization) |

### 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) |

### 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

| 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) |
| University Bourgogne Franche-Comté (UBFC) | | MSc in Behavioral and Digital Economics for Effective Management |
| University of Paris Panthéon-Sorbonne / University Paris Descrates | | Master in Economics & Psychology |

## India

| Christ University | | Master of Science in Behavioral Science |

## Ireland

| Trinity College Dublin | | MSc Applied Behaviour Analysis |
| University College Dublin | School of Economics | MSc Behavioural Economics |

## Israel

| Hebrew University of Jerusalem | The Federmann Center for the Study of Rationality | PhDs at the Federman Center for the Study of Rationality (interdisciplinary) |
| IDC Herzliya | Raphael Recanati International School | MA Behavioral Economics |

## Italy

| Bocconi University in Milan | | Bocconi Experimental Laboratory for the Social Sciences |

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|---|---|---|
| Catholic University of the Sacred Heart, Milan | PhD School in Economics and Finance | PhD Economics and Finance |
| | | (see also Behavioral and Experimental Economics Research Group) |
| LUISS (Libera Università Internazionale degli Studi Sociali Guido Carli) | LUISS School Of European Political Economy | Master in Behavioral Science and Administration |
| University of Chieti-Pescara | School of Advanced Studies | PhD in Business and Behavioural Sciences |
| | | Master in Behavioral Economics & Neuromarketing |
| University of Trento | Doctoral School of Sciences | PhD in Economics and Management (Behavioural Economics) |

## Norway

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|---|---|---|
| Norwegian School of Economics | | PhD in Business and Management Science |
| | | (see also the Choice Lab) |

## Portugal

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|---|---|---|
| Universidade Catolica Portuguesa | | Master in Psychology in Business and Economics |

## Russia

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| National Research University Higher School of Economics | | Master in Applied Social Psychology |

## Singapore

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|---|---|---|
| National University of Singapore | NUS Business School | MBA and PhDs in Management, Decision Sciences and Economics |
| | | (see also Centre for Behavioural Economics) |

## Sweden

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|---|---|---|
| University of Gothenburg | School of Business, Economics, and Law | PhD in Economics (Behavioral Economics concentration) |

## Switzerland

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|---|---|---|
| Conférence Universitaire de Suisse Occidentale | | PhD in Behavioral Economics and Experimental Research |
| University of Zurich (Zurich Graduate School of Economics) | Department of Economics | PhD in Economics and Neuroeconomics |
| | | (see also Laboratory for Experimental and Behavioral Economics) |

# Popular Behavioral Science Books

## Popular Books (By Publication Year)

| Title | Author(s) | Pub. Year | Average (Mean) Rating* | Number of Ratings* |
|---|---|---|---|---|
| The Blindspots Between Us: How to Overcome Unconscious Cognitive Bias and Build Better Relationships | Tsipursky, Gleb & David McRaney | 2020 | 4.96 | 25 |
| The Economics of Violence: How Behavioral Science Can Transform our View of Crime, Insurgency, and Terrorism | Shiffman, Gary M. | 2020 | 0.00 | 0 |
| Radical Uncertainty: Decision-making for an unknowable future | King, Mervyn & John Kay | 2020 | 4.20 | 15 |
| Ripple: The Big Effects of Small Behaviour Changes in Business | Groom, Jez & April Vellacott | 2020 | 0.00 | 0 |
| Experimentation Works: The Surprising Power of Business Experiments | Thomke, Stefan H. | 2020 | 3.67 | 12 |
| The Power of Experiments: Decision Making in a Data-Driven World | Luca, Michael & Max H. Bazerman | 2020 | 4.00 | 2 |
| Hello World: Being Human in the Age of Algorithms | Fry, Hannah | 2019 | 4.14 | 4548 |
| Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do | Eberhardt, Jennifer L. | 2019 | 4.27 | 1430 |
| Conformity: The Power of Social Influences | Sunstein, Cass | 2019 | 3.28 | 119 |
| Priced to Influence, Sell & Satisfy: Lessons from Behavioral Economics for Pricing Success | Dholakia, Utpal | 2019 | 4.67 | 3 |
| Understanding Behavioral BIA$: A Guide to Improving Financial Decision-Making | Krawczyk, Daniel C. & George H. Baxter | 2019 | 5.00 | 2 |
| Trusting Nudges: Toward A Bill of Rights for Nudging | Sunstein, Cass R. & Lucia A. Reisch | 2019 | 0.00 | 0 |
| I Love You, Now Read This Book. (It's About Human Decision Making and Behavioral Economics.) | Weinschenk, Guthrie & Susan Weinschenk | 2019 | 4.00 | 1 |
| Alchemy: The Surprising Power of Ideas That Don't Make Sense | Sutherland, Rory | 2019 | 4.29 | 1012 |
| How Change Happens | Sunstein, Cass | 2019 | 3.82 | 123 |
| An Economist Walks into a Brothel: And Other Unexpected Places to Understand Risk | Schrager, Allison | 2019 | 3.57 | 882 |
| The Age of Addiction: How Bad Habits Became Big Business | Courtwright, David | 2019 | 3.65 | 171 |

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|---|---|---|---|---|
| Mind in Motion: How Action Shapes Thought | Tversky, Barbara | 2019 | 3.68 | 90 |
| Messengers: Who We Listen To, Who We Don't, And Why | Martin, Stephen & Joseph Marks | 2019 | 3.76 | 160 |
| Indistractable: How to Control Your Attention and Choose Your Life | Eyal, Nir | 2019 | 3.81 | 4501 |
| Narrative Economics: How Stories Go Viral and Drive Major Economic Events | Shiller, Robert J. | 2019 | 3.62 | 398 |
| Why We're Wrong About Nearly Everything: A Theory of Human Misunderstanding | Duffy, Bobby | 2019 | 3.45 | 55 |
| Behavioral Economics: Moving Forward | Ghisellini, Fabrizio & Beryl Y. Chang | 2018 | 2.75 | 4 |
| Thinking in Bets: Making Smarter Decisions When You Don't Have All the Facts | Duke, Annie | 2018 | 3.84 | 6289 |
| The Choice Factory: 25 Behavioral Biases that Influence What We Buy | Shotton, Richard | 2018 | 4.18 | 428 |
| Randomistas: How Radical Researcher Are Changing Our World | Leigh, Andrew | 2018 | 3.70 | 113 |
| Behavioral Economics: The Basics | Corr, Philip & Anke Plagnol | 2018 | 3.75 | 20 |
| The Misguided Mind: Correct Everyday Thinking Errors, Be Less Irrational, And Improve Your Decision Making | Schuster, Steven | 2018 | 4.60 | 5 |
| Factfulness: Ten Reasons We're Wrong About the World… and Why Things Are Better Than You Think | Rosling, Hans, Ola Rosling & Anna Rosling Rönnlund | 2018 | 4.37 | 74906 |
| The Book of Why: The New Science of Cause and Effect | Pearl, Judea & Dana Mackenzie | 2018 | 3.95 | 2102 |
| When: The Scientific Secrets of Perfect Timing | Pink, Daniel H. | 2018 | 3.79 | 17436 |
| Farsighted: How We Make the Decisions That Matter the Most | Johnson, Steven | 2018 | 3.53 | 1162 |
| The Behavioral Investor | Crosby, Daniel | 2018 | 4.20 | 189 |
| Cents and Sensibility: What Economics Can Learn from the Humanities | Morson, Gary Saul & Morton Schapiro | 2017 | 3.91 | 76 |
| Behavioural Economics: A Very Short Introduction | Baddeley, Michelle | 2017 | 3.72 | 82 |
| Honours versus Money: The Economics of Awards | Frey, Bruno S. & Jana Gallus | 2017 | 3.00 | 4 |

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|---|---|---|---|---|
| Who Can You Trust?: How Technology Brought Us Together… and Why It Could Drive Us Apart | Botsman, Rachel | 2017 | 4.16 | 496 |
| Dollars and Sense: How We Misthink Money and How to Spend Smarter | Ariely, Dan & Jeff Kreisler | 2017 | 3.73 | 2703 |
| Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked | Alter, Adam | 2017 | 3.85 | 5932 |
| The Enigma of Reason | Mercier, Hugo & Dan Sperber | 2017 | 4.13 | 520 |
| The Knowledge Illusion: Why We Never Think Alone | Sloman, Steven & Philip Fernbach | 2017 | 3.84 | 1293 |
| Invisible Influence: The Hidden Forces that Shape Behavior | Berger, Jonah | 2016 | 3.66 | 2037 |
| Algorithms To Live By: The Computer Science of Human Decisions | Christian, Brian & Tom Griffiths | 2016 | 4.15 | 16440 |
| The Ethics of Influence: Government in the Age of Behavioral Science | Sunstein, Cass | 2016 | 3.85 | 39 |
| How to Have a Good Day: Harness the Power of Behavioral Science to Transform Your Working Life | Webb, Caroline | 2016 | 4.02 | 1929 |
| Mind over Money: The Psychology of Money and How to Use It Better | Hammond, Claudia | 2016 | 3.47 | 414 |
| Payoff: The Hidden Logic that Shapes our Motivations | Ariely, Dan | 2016 | 3.70 | 3423 |
| What Works: Gender Equality by Design | Bohnet, Iris | 2016 | 4.20 | 452 |
| Pre-Suasion: A Revolutionary Way to Influence and Persuade | Cialdini, Robert | 2016 | 4.05 | 5085 |
| Smarter Faster Better: The Secrets Of Being Productive In Life And Business | Duhigg, Charles | 2016 | 3.93 | 23875 |
| On Being Human: Why Mind Matters | Kagan, Jerome | 2016 | 3.83 | 29 |
| The Undoing Project: A Friendship That Changed Our Minds | Lewis, Michael | 2016 | 3.98 | 40721 |
| Superforecasting: The Art and Science of Prediction | Tetlock, Philip & Dan Gardner | 2016 | 4.09 | 12048 |
| The Mind Club: Who Thinks, What Feels, And Why It Matters | Wegner, Daniel & Kurt Gray | 2016 | 3.90 | 512 |
| Inside Nudging: Navigating Behavioral Science Applications | Shu, Steve | 2015 | 3.00 | 3 |
| Irrationally yours : On Missing Socks, Pick-up Lines and Other Existential Puzzles | Ariely, Dan & Haefeli William | 2015 | 3.47 | 1777 |

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|---|---|---|---|---|
| Phishing for Phools: The Economics of Manipulation and Deception | Akerlof, George & Robert Shiller | 2015 | 3.42 | 1502 |
| The Smarter Screen: Surprising Ways to Influence and Improve Online Behavior | Benartzi, Shlomo & Jonah Lehrer | 2015 | 3.97 | 233 |
| Work Rules!: Insights from Inside Google That Will Transform How You Live and Lead | Bock, Laszlo | 2015 | 4.17 | 10825 |
| Inside the Nudge Unit: How Small Changes Can Make a Big Difference | Halpern, David | 2015 | 4.00 | 521 |
| When to Rob a Bank | Levitt, Steven & Stephen Dubner | 2015 | 3.50 | 11445 |
| Mindware: Tools for Smart Thinking | Nisbett, Richard | 2015 | 3.77 | 1266 |
| Social Physics: How Social Networks Can Make Us Smarter | Pentland, Alex | 2015 | 3.54 | 1036 |
| The Last Mile: Creating Social and Economic Value from Behavioral Insights | Soman, Dilip | 2015 | 4.03 | 29 |
| Choosing Not to Choose: Understanding the Value of Choice | Sunstein, Cass | 2015 | 3.56 | 43 |
| Why Nudge? The Politics of Libertarian Paternalism | Sunstein, Cass | 2015 | 3.47 | 148 |
| Misbehaving: The Making of Behavioral Economics | Thaler, Richard | 2015 | 4.18 | 12386 |
| Happiness by Design: Change What You Do, Not How You Think | Dolan, Paul | 2014 | 3.58 | 1723 |
| Feeling Smart: Why Our Emotions Are More Rational Than We Think | Winter, Eyal | 2014 | 3.50 | 107 |
| Improving Employee Benefits: Why employees fail to use their benefits and how behavioral economics can help | Wendel, Stephen | 2014 | 3.50 | 2 |
| Everything I Ever Needed to Know about Economics I Learned from Online Dating | Oyer, Paul | 2014 | 3.63 | 289 |
| Wiser: Getting Beyond Groupthink to Make Groups Smarter | Sunstein, Cass & Reid Hastie | 2014 | 3.59 | 344 |
| Hooked: How to Build Habit-Forming Products | Eyal, Nir | 2014 | 4.08 | 21258 |
| Webs of Influence: The Psychology of Online Persuasion | Nahai, Nathalie | 2013 | 3.79 | 218 |
| Decoded: The Science Behind Why We Buy | Barden, Phil | 2013 | 4.21 | 666 |
| Make Your Brain Work: How to Maximize Your Efficiency, Productivity and ... | Brann, Amy & Kogan Page | 2013 | 3.43 | 65 |

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|---|---|---|---|---|
| Thinking: The New Science of Decision-Making, Problem-Solving and Prediction | Brockman, John | 2013 | 3.72 | 749 |
| The Art of Thinking Clearly: Better Thinking, Better Decisions | Dobelli, Rolf | 2013 | 3.84 | 18905 |
| Risk Savvy: How to Make Good Decisions | Gigerenzer, Gerd | 2013 | 4.02 | 1060 |
| The Why Axis: Hidden Motives and the Undiscovered Economics of Everyday Life | Gneezy, Uri & John List | 2013 | 3.65 | 912 |
| Focus: Use Different Ways of Seeing the World for Success and Influence | Grant Halvorson, Heidi & Tory Higgins | 2013 | 4.03 | 994 |
| Decisive: How to Make Better Choices in Life and Work | Heath, Chip & Dan Heath | 2013 | 3.99 | 12085 |
| The Rational Animal: How Evolution Made Us Smarter Than We Think | Kenrick, Douglas & Vladas Griskevicius | 2013 | 3.88 | 321 |
| You Are Now Less Dumb: How to Conquer Mob Mentality, How to Buy Happiness, and ... | McRaney, David | 2013 | 3.94 | 3665 |
| Scarcity Why Having Too Little Means So Much | Mullainathan, Sendhil & Shafir, Eldar | 2013 | 3.92 | 4118 |
| Designing for Behavior Change: Applying Psychology and Behavioral Economics | Wendel, Stephen | 2013 | 4.14 | 251 |
| The Honest Truth About Dishonesty: How We Lie to Everyone — Especially Ourselves | Ariely, Dan | 2012 | 3.93 | 12829 |
| Save More Tomorrow: Practical Behavioral Finance Solutions to Improve 401(k) Plans | Benartzi, Shlomo | 2012 | 4.03 | 36 |
| The Psychology of Price: How to use price to increase demand, profit and customer satisfaction | Caldwell, Leigh | 2012 | 4.00 | 60 |
| The Signal and the Noise: Why So Many Predictions Fail — but Some Don't | Silver, Nate | 2012 | 3.98 | 40250 |
| Willpower: Rediscovering the Greatest Human Strength | Baumeister, Roy & John Tierney | 2011 | 3.97 | 16583 |
| The Social Animal: The Hidden Sources of Love, Character, and Achievement | Brooks, David | 2011 | 3.86 | 20624 |
| The Power of Habit: Why We Do What We Do in Life and Business | Duhigg, Charles | 2011 | 4.10 | 298406 |
| The Willpower Instinct: How Self-Control Works, Why It Matters, and What You Can Do to Get More of It | McGonigal, Kelly | 2011 | 4.14 | 24876 |
| Incognito: The Secret Lives of the Brain | Eagleman, David | 2011 | 4.05 | 25037 |
| Adapt: Why Success Always Starts with Failure | Harford, Tim | 2011 | 3.88 | 3543 |

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|---|---|---|---|---|
| Thinking, Fast and Slow | Kahneman, Daniel | 2011 | 4.15 | 262215 |
| You Are Not So Smart: Why You Have Too Many Friends on Facebook, Why Your … | McRaney, David | 2011 | 3.87 | 28572 |
| Grand Pursuit: The Story of Economic Genius | Nasar, Sylvia | 2011 | 3.82 | 1504 |
| Everything is Obvious: Once You Know the Answer | Watts, Duncan | 2011 | 3.82 | 4271 |
| Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being | Akerlof, George & Rachel Kranton | 2010 | 3.51 | 437 |
| The Upside of Irrationality: The Unexpected Benefits of Defying Logic at Work and at Home | Ariely, Dan | 2010 | 4.03 | 31421 |
| Switch: How to Change Things When Change Is Hard | Heath, Chip & Dan Heath | 2010 | 4.04 | 39751 |
| Carrots and Sticks: Unlock the Power of Incentives to Get Things Done | Ayres, Ian | 2010 | 3.21 | 356 |
| The Invisible Gorilla: How Our Intuitions Deceive Us | Chabris, Christopher & Daniel Simons | 2010 | 3.90 | 13201 |
| Secrets of the Moneylab: How Behavioral Economics Can Improve Your Business | Chen, Kay-Yut & Marina Krakovsky | 2010 | 3.63 | 52 |
| The Art of Choosing | Iyengar, Sheena | 2010 | 3.83 | 5640 |
| The Little Book of Behavioral Investing: How Not to be Your Own Worst Enemy | Montier, James | 2010 | 4.11 | 1563 |
| Priceless: The Myth of Fair Value | Poundstone, William | 2010 | 3.84 | 1598 |
| The Buying Brain: Secrets for Selling to the Subconscious Mind | Pradeep, A. K. | 2010 | 3.68 | 308 |
| Cognitive Surplus: Creativity and Generosity in a Connected Age | Shirky, Clay | 2010 | 3.81 | 5500 |
| Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism | Akerlof, George & Robert Shiller | 2009 | 3.77 | 4208 |
| The Age of the Infovore: Succeeding in the Information Economy | Cowen, Tyler | 2009 | 3.38 | 691 |
| Herd: How to Change Mass Behaviour by Harnessing Our True Nature | Earls, Mark | 2009 | 3.74 | 313 |
| Bozo Sapiens: Why to Err is Human | Kaplan, Michael & Ellen Kaplan | 2009 | 3.35 | 254 |
| Emotionomics: Leveraging Emotions for Business Success | Hill, Dan | 2009 | 3.44 | 106 |

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| How We Decide | Lehrer, Jonah | 2009 | 3.83 | 37479 |
| SuperFreakonomics: Global Cooling, Patriotic Prostitutes And Why Suicide Bombers Should Buy Life Insurance | Levitt, Steven & Stephen Dubner | 2009 | 3.99 | 116868 |
| Predictably Irrational: The Hidden Forces That Shape Our Decisions | Ariely, Dan | 2008 | 4.13 | 92840 |
| Sway: The Irresistible Pull of Irrational Behavior | Brafman, Ori & Rom Brafman | 2008 | 3.78 | 18433 |
| The Logic of Life: The Rational Economics of an Irrational World | Harford, Tim | 2008 | 3.81 | 5257 |
| Yes!: 50 Scientifically Proven Ways to Be Persuasive | Goldstein, Noah J., Robert B. Cialdini & Steve J. Martin | 2008 | 4.00 | 10574 |
| The Science of Fear: How the Culture of Fear Manipulates Your Brain | Gardner, Daniel | 2008 | 3.98 | 5172 |
| Buyology: Truth and Lies about Why We Buy | Lindstrom, Martin | 2008 | 3.76 | 10321 |
| Why Popcorn Costs So Much at the Movies: And Other Pricing Puzzles | McKenzie, Richard | 2008 | 3.29 | 161 |
| The Drunkard's Walk: How Randomness Rules Our Lives | Mlodinow, Leonard | 2008 | 3.92 | 18790 |
| Drive: The Surprising Truth about What Motivates Us | Pink, Daniel | 2008 | 3.95 | 87345 |
| Nudge: Improving Decisions About Health, Wealth, and Happiness | Thaler, Richard & Cass Sunstein | 2008 | 3.84 | 55365 |
| More Sex Is Safer Sex: The Unconventional Wisdom of Economics | Landsburg, Steven | 2007 | 3.49 | 1210 |
| Stumbling on Happiness | Gilbert, Daniel T. | 2007 | 3.83 | 50145 |
| Mistakes Were Made (But Not by Me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts | Tavris, Carol & Elliot Aronson | 2007 | 4.02 | 21350 |
| The Myth of the Rational Voter: Why Democracies Choose Bad Policies | Caplan, Bryan | 2007 | 3.94 | 1513 |
| More Than You Know: Finding Financial Wisdom in Unconventional Places | Mauboussin, Michael | 2007 | 4.10 | 1599 |
| The Black Swan: The Impact of the Highly Improbable | Taleb, Nassim Nicholas | 2007 | 3.92 | 77204 |
| The Laws of Simplicity (Simplicity: Design, Technology, Business, Life) | Maeda, John | 2006 | 3.93 | 5559 |

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|---|---|---|---|---|
| A Mind of Its Own: How Your Brain Distorts and Deceives | Fine, Cordelia | 2006 | 3.86 | 2490 |
| Changing Minds: The Art And Science of Changing Our Own And Other People's Minds | Gardner, Howard | 2006 | 3.62 | 553 |
| The Undercover Economist | Harford, Tim | 2005 | 3.81 | 23.372 |
| Freakonomics: A Rogue Economist Explores the Hidden Side of Everything | Levitt, Steven & Stephen Dubner | 2005 | 3.97 | 665878 |
| The Paradox of Choice: Why More Is Less | Schwartz, Barry | 2004 | 3.85 | 26995 |
| The Luck Factor | Wiseman, Richard | 2003 | 3.81 | 1194 |
| Blink: The Power of Thinking Without Thinking | Gladwell, Malcolm | 2001 | 3.93 | 457581 |
| Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets | Taleb, Nassim Nicholas | 2001 | 4.06 | 44262 |
| Why Smart People Make Big Money Mistakes and How to Correct Them: … | Belsky, Gary & Thomas Gilovich | 2000 | 3.98 | 1337 |
| Irrational Exuberance | Shiller, Robert | 2000 | 3.98 | 6298 |
| Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing | Shefrin, Hersh | 1999 | 3.75 | 224 |
| Why We Buy: The Science of Shopping | Underhill, Paco | 1999 | 3.90 | 11759 |
| The Emotional Brain: The Mysterious Underpinnings of Emotional Life | LeDoux, Joseph | 1998 | 4.09 | 2674 |
| Management of the Absurd | Farson, Richard | 1996 | 3.81 | 248 |
| The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization | Senge, Peter; Kleiner, Art & Charlotte Roberts | 1994 | 4.13 | 1849 |
| Influence: The Psychology of Persuasion | Cialdini, Robert | 1993 | 4.19 | 88225 |
| Irrationality | Sutherland, Stuart | 1992 | 3.91 | 1365 |
| How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life | Gilovich, Thomas | 1991 | 3.96 | 2840 |

*** Ratings retrieved in April 2020**

## Popular Books (By Average Rating)

| Title | Author(s) | Pub. Year | Average (Mean) Rating* | Number of Ratings* |
|---|---|---|---|---|
| Understanding Behavioral BIA$: A Guide to Improving Financial Decision-Making | Krawczyk, Daniel C. & George H. Baxter | 2019 | 5.00 | 2 |
| The Blindspots Between Us: How to Overcome Unconscious Cognitive Bias and Build Better Relationships | Tsipursky, Gleb & David McRaney | 2020 | 4.96 | 25 |
| Priced to Influence, Sell & Satisfy: Lessons from Behavioral Economics for Pricing Success | Dholakia, Utpal | 2019 | 4.67 | 3 |
| The Misguided Mind: Correct Everyday Thinking Errors, Be Less Irrational, And Improve Your Decision Making | Schuster, Steven | 2018 | 4.60 | 5 |
| Factfulness: Ten Reasons We're Wrong About the World... and Why Things Are Better Than You Think | Rosling, Hans, Ola Rosling & Anna Rosling Rönnlund | 2018 | 4.37 | 74906 |
| Alchemy: The Surprising Power of Ideas That Don't Make Sense | Sutherland, Rory | 2019 | 4.29 | 1012 |
| Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do | Eberhardt, Jennifer L. | 2019 | 4.27 | 1430 |
| Decoded: The Science Behind Why We Buy | Barden, Phil | 2013 | 4.21 | 666 |
| Radical Uncertainty: Decision-making for an unknowable future | King, Mervyn & John Kay | 2020 | 4.20 | 15 |
| The Behavioral Investor | Crosby, Daniel | 2018 | 4.20 | 189 |
| What Works: Gender Equality by Design | Bohnet, Iris | 2016 | 4.20 | 452 |
| Influence: The Psychology of Persuasion | Cialdini, Robert | 1993 | 4.19 | 88225 |
| The Choice Factory: 25 Behavioral Biases that Influence What We Buy | Shotton, Richard | 2018 | 4.18 | 428 |
| Misbehaving: The Making of Behavioral Economics | Thaler, Richard | 2015 | 4.18 | 12386 |
| Work Rules!: Insights from Inside Google That Will Transform How You Live and Lead | Bock, Laszlo | 2015 | 4.17 | 10825 |
| Who Can You Trust?: How Technology Brought Us Together... and Why It Could Drive Us Apart | Botsman, Rachel | 2017 | 4.16 | 496 |

| Title | Author | Year | Rating | Ratings |
|---|---|---|---|---|
| Algorithms To Live By: The Computer Science of Human Decisions | Christian, Brian & Tom Griffiths | 2016 | 4.15 | 16440 |
| Thinking, Fast and Slow | Kahneman, Daniel | 2011 | 4.15 | 262215 |
| Hello World: Being Human in the Age of Algorithms | Fry, Hannah | 2019 | 4.14 | 4548 |
| Designing for Behavior Change: Applying Psychology and Behavioral Economics | Wendel, Stephen | 2013 | 4.14 | 251 |
| The Willpower Instinct: How Self-Control Works, Why It Matters, and What You Can Do to Get More of It | McGonigal, Kelly | 2011 | 4.14 | 24876 |
| The Enigma of Reason | Mercier, Hugo & Dan Sperber | 2017 | 4.13 | 520 |
| Predictably Irrational: The Hidden Forces That Shape Our Decisions | Ariely, Dan | 2008 | 4.13 | 92840 |
| The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization | Senge, Peter; Kleiner, Art & Charlotte Roberts | 1994 | 4.13 | 1849 |
| The Little Book of Behavioral Investing: How Not to be Your Own Worst Enemy | Montier, James | 2010 | 4.11 | 1563 |
| The Power of Habit: Why We Do What We Do in Life and Business | Duhigg, Charles | 2011 | 4.10 | 298406 |
| More Than You Know: Finding Financial Wisdom in Unconventional Places | Mauboussin, Michael | 2007 | 4.10 | 1599 |
| Superforecasting: The Art and Science of Prediction | Tetlock, Philip & Dan Gardner | 2016 | 4.09 | 12048 |
| The Emotional Brain: The Mysterious Underpinnings of Emotional Life | LeDoux, Joseph | 1998 | 4.09 | 2674 |
| Hooked: How to Build Habit-Forming Products | Eyal, Nir | 2014 | 4.08 | 21258 |
| Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets | Taleb, Nassim Nicholas | 2001 | 4.06 | 44262 |
| Pre-Suasion: A Revolutionary Way to Influence and Persuade | Cialdini, Robert | 2016 | 4.05 | 5085 |
| Incognito: The Secret Lives of the Brain | Eagleman, David | 2011 | 4.05 | 25037 |
| Switch: How to Change Things When Change Is Hard | Heath, Chip & Dan Heath | 2010 | 4.04 | 39751 |
| The Last Mile: Creating Social and Economic Value from Behavioral Insights | Soman, Dilip | 2015 | 4.03 | 29 |

| Title | Author | Year | Rating | Ratings |
|---|---|---|---|---|
| Focus: Use Different Ways of Seeing the World for Success and Influence | Grant Halvorson, Heidi & E. Tory Higgins | 2013 | 4.03 | 994 |
| Save More Tomorrow: Practical Behavioral Finance Solutions to Improve 401(k) Plans | Benartzi, Shlomo | 2012 | 4.03 | 36 |
| The Upside of Irrationality: The Unexpected Benefits of Defying Logic at Work and at Home | Ariely, Dan | 2010 | 4.03 | 31421 |
| How to Have a Good Day: Harness the Power of Behavioral Science to Transform Your Working Life | Webb, Caroline | 2016 | 4.02 | 1929 |
| Risk Savvy: How to Make Good Decisions | Gigerenzer, Gerd | 2013 | 4.02 | 1060 |
| Mistakes Were Made (But Not by Me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts | Tavris, Carol & Elliot Aronson | 2007 | 4.02 | 21350 |
| The Power of Experiments: Decision Making in a Data-Driven World | Luca, Michael & Max H. Bazerman | 2020 | 4.00 | 2 |
| I Love You, Now Read This Book. (It's About Human Decision Making and Behavioral Economics.) | Weinschenk, Guthrie & Susan Weinschenk | 2019 | 4.00 | 1 |
| Inside the Nudge Unit: How Small Changes Can Make a Big Difference | Halpern, David | 2015 | 4.00 | 521 |
| The Psychology of Price: How to use price to increase demand, profit and customer satisfaction | Caldwell, Leigh | 2012 | 4.00 | 60 |
| Yes!: 50 Scientifically Proven Ways to Be Persuasive | Goldstein, Noah J., Robert B. Cialdini & Steve J. Martin | 2008 | 4.00 | 10574 |
| Decisive: How to Make Better Choices in Life and Work | Heath, Chip & Dan Heath | 2013 | 3.99 | 12085 |
| SuperFreakonomics: Global Cooling, Patriotic Prostitutes And Why Suicide Bombers Should Buy Life Insurance | Levitt, Steven & Stephen Dubner | 2009 | 3.99 | 116868 |
| The Undoing Project: A Friendship That Changed Our Minds | Lewis, Michael | 2016 | 3.98 | 40721 |
| The Signal and the Noise: Why So Many Predictions Fail — but Some Don't | Silver, Nate | 2012 | 3.98 | 40250 |
| The Science of Fear: How the Culture of Fear Manipulates Your Brain | Gardner, Daniel | 2008 | 3.98 | 5172 |
| Why Smart People Make Big Money Mistakes and How to Correct Them: ... | Belsky, Gary & Thomas Gilovich | 2000 | 3.98 | 1337 |
| Irrational Exuberance | Shiller, Robert | 2000 | 3.98 | 6298 |
| The Smarter Screen: Surprising Ways to Influence and Improve Online Behavior | Benartzi, Shlomo & Jonah Lehrer | 2015 | 3.97 | 233 |

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| Willpower: Rediscovering the Greatest Human Strength | Baumeister, Roy & John Tierney | 2011 | 3.97 | 16583 |
| Freakonomics: A Rogue Economist Explores the Hidden Side of Everything | Levitt, Steven & Stephen Dubner | 2005 | 3.97 | 665878 |
| How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life | Gilovich, Thomas | 1991 | 3.96 | 2840 |
| The Book of Why: The New Science of Cause and Effect | Pearl, Judea & Dana Mackenzie | 2018 | 3.95 | 2102 |
| Drive: The Surprising Truth about What Motivates Us | Pink, Daniel | 2008 | 3.95 | 87345 |
| You Are Now Less Dumb: How to Conquer Mob Mentality, How to Buy Happiness, and ... | McRaney, David | 2013 | 3.94 | 3665 |
| The Myth of the Rational Voter: Why Democracies Choose Bad Policies | Caplan, Bryan | 2007 | 3.94 | 1513 |
| Smarter Faster Better: The Secrets Of Being Productive In Life And Business | Duhigg, Charles | 2016 | 3.93 | 23875 |
| The Honest Truth About Dishonesty: How We Lie to Everyone — Especially Ourselves | Ariely, Dan | 2012 | 3.93 | 12829 |
| The Laws of Simplicity (Simplicity: Design, Technology, Business, Life) | Maeda, John | 2006 | 3.93 | 5559 |
| Blink: The Power of Thinking Without Thinking | Gladwell, Malcolm | 2001 | 3.93 | 457581 |
| Scarcity Why Having Too Little Means So Much | Mullainathan, Sendhil & Shafir, Eldar | 2013 | 3.92 | 4118 |
| The Drunkard's Walk: How Randomness Rules Our Lives | Mlodinow, Leonard | 2008 | 3.92 | 18790 |
| The Black Swan: The Impact of the Highly Improbable | Taleb, Nassim Nicholas | 2007 | 3.92 | 77204 |
| Cents and Sensibility: What Economics Can Learn from the Humanities | Morson, Gary Saul & Morton Schapiro | 2017 | 3.91 | 76 |
| Irrationality | Sutherland, Stuart | 1992 | 3.91 | 1365 |
| The Mind Club: Who Thinks, What Feels, And Why It Matters | Wegner, Daniel & Kurt Gray | 2016 | 3.90 | 512 |
| The Invisible Gorilla: How Our Intuitions Deceive Us | Chabris, Christopher & Daniel Simons | 2010 | 3.90 | 13201 |
| Why We Buy: The Science of Shopping | Underhill, Paco | 1999 | 3.90 | 11759 |

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| The Rational Animal: How Evolution Made Us Smarter Than We Think | Kenrick, Douglas & Vladas Griskevicius | 2013 | 3.88 | 321 |
| Adapt: Why Success Always Starts with Failure | Harford, Tim | 2011 | 3.88 | 3543 |
| You Are Not So Smart: Why You Have Too Many Friends on Facebook, Why Your ... | McRaney, David | 2011 | 3.87 | 28572 |
| The Social Animal: The Hidden Sources of Love, Character, and Achievement | Brooks, David | 2011 | 3.86 | 20624 |
| A Mind of Its Own: How Your Brain Distorts and Deceives | Fine, Cordelia | 2006 | 3.86 | 2490 |
| Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked | Alter, Adam | 2017 | 3.85 | 5932 |
| The Ethics of Influence: Government in the Age of Behavioral Science | Sunstein, Cass | 2016 | 3.85 | 39 |
| The Paradox of Choice: Why More Is Less | Schwartz, Barry | 2004 | 3.85 | 26995 |
| Thinking in Bets: Making Smarter Decisions When You Don't Have All the Facts | Duke, Annie | 2018 | 3.84 | 6289 |
| The Knowledge Illusion: Why We Never Think Alone | Sloman, Steven & Philip Fernbach | 2017 | 3.84 | 1293 |
| The Art of Thinking Clearly: Better Thinking, Better Decisions | Dobelli, Rolf | 2013 | 3.84 | 18905 |
| Priceless: The Myth of Fair Value | Poundstone, William | 2010 | 3.84 | 1598 |
| Nudge: Improving Decisions About Health, Wealth, and Happiness | Thaler, Richard & Cass Sunstein | 2008 | 3.84 | 55365 |
| On Being Human: Why Mind Matters | Kagan, Jerome | 2016 | 3.83 | 29 |
| The Art of Choosing | Iyengar, Sheena | 2010 | 3.83 | 5640 |
| How We Decide | Lehrer, Jonah | 2009 | 3.83 | 37479 |
| Stumbling on Happiness | Gilbert, Daniel T. | 2007 | 3.83 | 50145 |
| How Change Happens | Sunstein, Cass | 2019 | 3.82 | 123 |
| Grand Pursuit: The Story of Economic Genius | Nasar, Sylvia | 2011 | 3.82 | 1504 |

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|---|---|---|---|---|
| Everything is Obvious: Once You Know the Answer | Watts, Duncan | 2011 | 3.82 | 4271 |
| Indistractable: How to Control Your Attention and Choose Your Life | Eyal, Nir | 2019 | 3.81 | 4501 |
| Cognitive Surplus: Creativity and Generosity in a Connected Age | Shirky, Clay | 2010 | 3.81 | 5500 |
| The Logic of Life: The Rational Economics of an Irrational World | Harford, Tim | 2008 | 3.81 | 5257 |
| The Undercover Economist | Harford, Tim | 2005 | 3.81 | 23.372 |
| The Luck Factor | Wiseman, Richard | 2003 | 3.81 | 1194 |
| Management of the Absurd | Farson, Richard | 1996 | 3.81 | 248 |
| When: The Scientific Secrets of Perfect Timing | Pink, Daniel H. | 2018 | 3.79 | 17436 |
| Webs of Influence: The Psychology of Online Persuasion | Nahai, Nathalie | 2013 | 3.79 | 218 |
| Sway: The Irresistible Pull of Irrational Behavior | Brafman, Ori & Rom Brafman | 2008 | 3.78 | 18433 |
| Mindware: Tools for Smart Thinking | Nisbett, Richard | 2015 | 3.77 | 1266 |
| Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism | Akerlof, George & Robert Shiller | 2009 | 3.77 | 4208 |
| Messengers: Who We Listen To, Who We Don't, And Why | Martin, Stephen & Joseph Marks | 2019 | 3.76 | 160 |
| Buyology: Truth and Lies about Why We Buy | Lindstrom, Martin | 2008 | 3.76 | 10321 |
| Behavioral Economics: The Basics | Corr, Philip & Anke Plagnol | 2018 | 3.75 | 20 |
| Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing | Shefrin, Hersh | 1999 | 3.75 | 224 |
| Herd: How to Change Mass Behaviour by Harnessing Our True Nature | Earls, Mark | 2009 | 3.74 | 313 |
| Dollars and Sense: How We Misthink Money and How to Spend Smarter | Ariely, Dan & Jeff Kreisler | 2017 | 3.73 | 2703 |
| Behavioural Economics: A Very Short Introduction | Baddeley, Michelle | 2017 | 3.72 | 82 |
| Thinking: The New Science of Decision-Making, Problem-Solving and Prediction | Brockman, John | 2013 | 3.72 | 749 |

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|---|---|---|---|---|
| Randomistas: How Radical Researcher Are Changing Our World | Leigh, Andrew | 2018 | 3.70 | 113 |
| Payoff: The Hidden Logic that Shapes our Motivations | Ariely, Dan | 2016 | 3.70 | 3423 |
| Mind in Motion: How Action Shapes Thought | Tversky, Barbara | 2019 | 3.68 | 90 |
| The Buying Brain: Secrets for Selling to the Subconscious Mind | Pradeep, A. K. | 2010 | 3.68 | 308 |
| Experimentation Works: The Surprising Power of Business Experiments | Thomke, Stefan H. | 2020 | 3.67 | 12 |
| Invisible Influence: The Hidden Forces that Shape Behavior | Berger, Jonah | 2016 | 3.66 | 2037 |
| The Age of Addiction: How Bad Habits Became Big Business | Courtwright, David | 2019 | 3.65 | 171 |
| The Why Axis: Hidden Motives and the Undiscovered Economics of Everyday Life | Gneezy, Uri & John List | 2013 | 3.65 | 912 |
| Everything I Ever Needed to Know about Economics I Learned from Online Dating | Oyer, Paul | 2014 | 3.63 | 289 |
| Secrets of the Moneylab: How Behavioral Economics Can Improve Your Business | Chen, Kay-Yut & Marina Krakovsky | 2010 | 3.63 | 52 |
| Narrative Economics: How Stories Go Viral and Drive Major Economic Events | Shiller, Robert J. | 2019 | 3.62 | 398 |
| Changing Minds: The Art And Science of Changing Our Own And Other People's Minds | Gardner, Howard | 2006 | 3.62 | 553 |
| Wiser: Getting Beyond Groupthink to Make Groups Smarter | Sunstein, Cass & Reid Hastie | 2014 | 3.59 | 344 |
| Happiness by Design: Change What You Do, Not How You Think | Dolan, Paul | 2014 | 3.58 | 1723 |
| An Economist Walks into a Brothel: And Other Unexpected Places to Understand Risk | Schrager, Allison | 2019 | 3.57 | 882 |
| Choosing Not to Choose: Understanding the Value of Choice | Sunstein, Cass | 2015 | 3.56 | 43 |
| Social Physics: How Social Networks Can Make Us Smarter | Pentland, Alex | 2015 | 3.54 | 1036 |
| Farsighted: How We Make the Decisions That Matter the Most | Johnson, Steven | 2018 | 3.53 | 1162 |
| Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being | Akerlof, George & Rachel Kranton | 2010 | 3.51 | 437 |
| When to Rob a Bank | Levitt, Steven & Stephen Dubner | 2015 | 3.50 | 11445 |

| Title | Author | Year | Rating | Count |
|---|---|---|---|---|
| Feeling Smart: Why Our Emotions Are More Rational Than We Think | Winter, Eyal | 2014 | 3.50 | 107 |
| Improving Employee Benefits: Why employees fail to use their benefits and how behavioral economics can help | Wendel, Stephen | 2014 | 3.50 | 2 |
| More Sex Is Safer Sex: The Unconventional Wisdom of Economics | Landsburg, Steven | 2007 | 3.49 | 1210 |
| Mind over Money: The Psychology of Money and How to Use It Better | Hammond, Claudia | 2016 | 3.47 | 414 |
| Irrationally yours : On Missing Socks, Pick-up Lines and Other Existential Puzzles | Ariely, Dan & Haefeli William | 2015 | 3.47 | 1777 |
| Why Nudge? The Politics of Libertarian Paternalism | Sunstein, Cass | 2015 | 3.47 | 148 |
| Why We're Wrong About Nearly Everything: A Theory of Human Misunderstanding | Duffy, Bobby | 2019 | 3.45 | 55 |
| Emotionomics: Leveraging Emotions for Business Success | Hill, Dan | 2009 | 3.44 | 106 |
| Make Your Brain Work: How to Maximize Your Efficiency, Productivity and ... | Brann, Amy & Kogan Page | 2013 | 3.43 | 65 |
| Phishing for Phools: The Economics of Manipulation and Deception | Akerlof, George & Robert Shiller | 2015 | 3.42 | 1502 |
| The Age of the Infovore: Succeeding in the Information Economy | Cowen, Tyler | 2009 | 3.38 | 691 |
| Bozo Sapiens: Why to Err is Human | Kaplan, Michael & Ellen Kaplan | 2009 | 3.35 | 254 |
| Why Popcorn Costs So Much at the Movies: And Other Pricing Puzzles | McKenzie, Richard | 2008 | 3.29 | 161 |
| Conformity: The Power of Social Influences | Sunstein, Cass | 2019 | 3.28 | 119 |
| Carrots and Sticks: Unlock the Power of Incentives to Get Things Done | Ayres, Ian | 2010 | 3.21 | 356 |
| Honours versus Money: The Economics of Awards | Frey, Bruno S. & Jana Gallus | 2017 | 3.00 | 4 |
| Inside Nudging: Navigating Behavioral Science Applications | Shu, Steve | 2015 | 3.00 | 3 |
| Behavioral Economics: Moving Forward | Ghisellini, Fabrizio & Beryl Y. Chang | 2018 | 2.75 | 4 |
| The Economics of Violence: How Behavioral Science Can Transform our View of Crime, Insurgency, and Terrorism | Shiffman, Gary M. | 2020 | 0.00 | 0 |

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|---|---|---|---|---|
| Ripple: The Big Effects of Small Behaviour Changes in Business | Groom, Jez & April Vellacott | 2020 | 0.00 | 0 |
| Trusting Nudges: Toward A Bill of Rights for Nudging | Sunstein, Cass R. & Lucia A. Reisch | 2019 | 0.00 | 0 |

*** Ratings retrieved in April 2020**

## Popular Books (By Author)

| Title | Author(s) | Pub. Year | Average (Mean) Rating* | Number of Ratings* |
|---|---|---|---|---|
| Identity Economics: How Our Identities Shape Our Work, Wages, and Well-Being | Akerlof, George & Rachel Kranton | 2010 | 3.51 | 437 |
| Animal Spirits: How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism | Akerlof, George & Robert Shiller | 2009 | 3.77 | 4208 |
| Phishing for Phools: The Economics of Manipulation and Deception | Akerlof, George & Robert Shiller | 2015 | 3.42 | 1502 |
| Irresistible: The Rise of Addictive Technology and the Business of Keeping Us Hooked | Alter, Adam | 2017 | 3.85 | 5932 |
| Predictably Irrational: The Hidden Forces That Shape Our Decisions | Ariely, Dan | 2008 | 4.13 | 92840 |
| The Upside of Irrationality: The Unexpected Benefits of Defying Logic at Work and at Home | Ariely, Dan | 2010 | 4.03 | 31421 |
| The Honest Truth About Dishonesty: How We Lie to Everyone — Especially Ourselves | Ariely, Dan | 2012 | 3.93 | 12829 |
| Payoff: The Hidden Logic that Shapes our Motivations | Ariely, Dan | 2016 | 3.70 | 3423 |
| Irrationally yours : On Missing Socks, Pick-up Lines and Other Existential Puzzles | Ariely, Dan & Haefeli William | 2015 | 3.47 | 1777 |
| Dollars and Sense: How We Misthink Money and How to Spend Smarter | Ariely, Dan & Jeff Kreisler | 2017 | 3.73 | 2703 |
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| Decoded: The Science Behind Why We Buy | Barden, Phil | 2013 | 4.21 | 666 |
| Willpower: Rediscovering the Greatest Human Strength | Baumeister, Roy & John Tierney | 2011 | 3.97 | 16583 |
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| Save More Tomorrow: Practical Behavioral Finance Solutions to Improve 401(k) Plans | Benartzi, Shlomo | 2012 | 4.03 | 36 |
| The Smarter Screen: Surprising Ways to Influence and Improve Online Behavior | Benartzi, Shlomo & Jonah Lehrer | 2015 | 3.97 | 233 |
| Invisible Influence: The Hidden Forces that Shape Behavior | Berger, Jonah | 2016 | 3.66 | 2037 |

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| Work Rules!: Insights from Inside Google That Will Transform How You Live and Lead | Bock, Laszlo | 2015 | 4.17 | 10825 |
| What Works: Gender Equality by Design | Bohnet, Iris | 2016 | 4.20 | 452 |
| Who Can You Trust?: How Technology Brought Us Together… and Why It Could Drive Us Apart | Botsman, Rachel | 2017 | 4.16 | 496 |
| Sway: The Irresistible Pull of Irrational Behavior | Brafman, Ori & Rom Brafman | 2008 | 3.78 | 18433 |
| Make Your Brain Work: How to Maximize Your Efficiency, Productivity and … | Brann, Amy & Kogan Page | 2013 | 3.43 | 65 |
| Thinking: The New Science of Decision-Making, Problem-Solving and Prediction | Brockman, John | 2013 | 3.72 | 749 |
| The Social Animal: The Hidden Sources of Love, Character, and Achievement | Brooks, David | 2011 | 3.86 | 20624 |
| The Psychology of Price: How to use price to increase demand, profit and customer satisfaction | Caldwell, Leigh | 2012 | 4.00 | 60 |
| The Myth of the Rational Voter: Why Democracies Choose Bad Policies | Caplan, Bryan | 2007 | 3.94 | 1513 |
| The Invisible Gorilla: How Our Intuitions Deceive Us | Chabris, Christopher & Daniel Simons | 2010 | 3.90 | 13201 |
| Secrets of the Moneylab: How Behavioral Economics Can Improve Your Business | Chen, Kay-Yut & Marina Krakovsky | 2010 | 3.63 | 52 |
| Algorithms To Live By: The Computer Science of Human Decisions | Christian, Brian & Tom Griffiths | 2016 | 4.15 | 16440 |
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| Pre-Suasion: A Revolutionary Way to Influence and Persuade | Cialdini, Robert | 2016 | 4.05 | 5085 |
| Behavioral Economics: The Basics | Corr, Philip & Anke Plagnol | 2018 | 3.75 | 20 |
| The Age of Addiction: How Bad Habits Became Big Business | Courtwright, David | 2019 | 3.65 | 171 |
| The Age of the Infovore: Succeeding in the Information Economy | Cowen, Tyler | 2009 | 3.38 | 691 |
| The Behavioral Investor | Crosby, Daniel | 2018 | 4.20 | 189 |
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| Happiness by Design: Change What You Do, Not How You Think | Dolan, Paul | 2014 | 3.58 | 1723 |
| Why We're Wrong About Nearly Everything: A Theory of Human Misunderstanding | Duffy, Bobby | 2019 | 3.45 | 55 |
| The Power of Habit: Why We Do What We Do in Life and Business | Duhigg, Charles | 2011 | 4.10 | 298406 |
| Smarter Faster Better: The Secrets Of Being Productive In Life And Business | Duhigg, Charles | 2016 | 3.93 | 23875 |
| Thinking in Bets: Making Smarter Decisions When You Don't Have All the Facts | Duke, Annie | 2018 | 3.84 | 6289 |
| Incognito: The Secret Lives of the Brain | Eagleman, David | 2011 | 4.05 | 25037 |
| Herd: How to Change Mass Behaviour by Harnessing Our True Nature | Earls, Mark | 2009 | 3.74 | 313 |
| Biased: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do | Eberhardt, Jennifer L. | 2019 | 4.27 | 1430 |
| Hooked: How to Build Habit-Forming Products | Eyal, Nir | 2014 | 4.08 | 21258 |
| Indistractable: How to Control Your Attention and Choose Your Life | Eyal, Nir | 2019 | 3.81 | 4501 |
| Management of the Absurd | Farson, Richard | 1996 | 3.81 | 248 |
| A Mind of Its Own: How Your Brain Distorts and Deceives | Fine, Cordelia | 2006 | 3.86 | 2490 |
| Honours versus Money: The Economics of Awards | Frey, Bruno S. & Jana Gallus | 2017 | 3.00 | 4 |
| Hello World: Being Human in the Age of Algorithms | Fry, Hannah | 2019 | 4.14 | 4548 |
| The Science of Fear: How the Culture of Fear Manipulates Your Brain | Gardner, Daniel | 2008 | 3.98 | 5172 |
| Changing Minds: The Art And Science of Changing Our Own And Other People's Minds | Gardner, Howard | 2006 | 3.62 | 553 |
| Behavioral Economics: Moving Forward | Ghisellini, Fabrizio & Beryl Y. Chang | 2018 | 2.75 | 4 |
| Risk Savvy: How to Make Good Decisions | Gigerenzer, Gerd | 2013 | 4.02 | 1060 |
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| Blink: The Power of Thinking Without Thinking | Gladwell, Malcolm | 2001 | 3.93 | 457581 |
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| Focus: Use Different Ways of Seeing the World for Success and Influence | Grant Halvorson, Heidi & E. Tory Higgins | 2013 | 4.03 | 994 |
| Ripple: The Big Effects of Small Behaviour Changes in Business | Groom, Jez & April Vellacott | 2020 | 0.00 | 0 |
| Inside the Nudge Unit: How Small Changes Can Make a Big Difference | Halpern, David | 2015 | 4.00 | 521 |
| Mind over Money: The Psychology of Money and How to Use It Better | Hammond, Claudia | 2016 | 3.47 | 414 |
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| Adapt: Why Success Always Starts with Failure | Harford, Tim | 2011 | 3.88 | 3543 |
| The Logic of Life: The Rational Economics of an Irrational World | Harford, Tim | 2008 | 3.81 | 5257 |
| Switch: How to Change Things When Change Is Hard | Heath, Chip & Dan Heath | 2010 | 4.04 | 39751 |
| Decisive: How to Make Better Choices in Life and Work | Heath, Chip & Dan Heath | 2013 | 3.99 | 12085 |
| Emotionomics: Leveraging Emotions for Business Success | Hill, Dan | 2009 | 3.44 | 106 |
| The Art of Choosing | Iyengar, Sheena | 2010 | 3.83 | 5640 |
| Farsighted: How We Make the Decisions That Matter the Most | Johnson, Steven | 2018 | 3.53 | 1162 |
| On Being Human: Why Mind Matters | Kagan, Jerome | 2016 | 3.83 | 29 |
| Thinking, Fast and Slow | Kahneman, Daniel | 2011 | 4.15 | 262215 |
| Bozo Sapiens: Why to Err is Human | Kaplan, Michael & Ellen Kaplan | 2009 | 3.35 | 254 |

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| The Rational Animal: How Evolution Made Us Smarter Than We Think | Kenrick, Douglas & Vladas Griskevicius | 2013 | 3.88 | 321 |
| Radical Uncertainty: Decision-making for an unknowable future | King, Mervyn & John Kay | 2020 | 4.20 | 15 |
| Understanding Behavioral BIA$: A Guide to Improving Financial Decision-Making | Krawczyk, Daniel C. & George H. Baxter | 2019 | 5.00 | 2 |
| More Sex Is Safer Sex: The Unconventional Wisdom of Economics | Landsburg, Steven | 2007 | 3.49 | 1210 |
| The Emotional Brain: The Mysterious Underpinnings of Emotional Life | LeDoux, Joseph | 1998 | 4.09 | 2674 |
| How We Decide | Lehrer, Jonah | 2009 | 3.83 | 37479 |
| Randomistas: How Radical Researcher Are Changing Our World | Leigh, Andrew | 2018 | 3.70 | 113 |
| SuperFreakonomics: Global Cooling, Patriotic Prostitutes And Why Suicide Bombers Should Buy Life Insurance | Levitt, Steven & Stephen Dubner | 2009 | 3.99 | 116868 |
| Freakonomics: A Rogue Economist Explores the Hidden Side of Everything | Levitt, Steven & Stephen Dubner | 2005 | 3.97 | 665878 |
| When to Rob a Bank | Levitt, Steven & Stephen Dubner | 2015 | 3.50 | 11445 |
| The Undoing Project: A Friendship That Changed Our Minds | Lewis, Michael | 2016 | 3.98 | 40721 |
| Buyology: Truth and Lies about Why We Buy | Lindstrom, Martin | 2008 | 3.76 | 10321 |
| The Power of Experiments: Decision Making in a Data-Driven World | Luca, Michael & Max H. Bazerman | 2020 | 4.00 | 2 |
| The Laws of Simplicity (Simplicity: Design, Technology, Business, Life) | Maeda, John | 2006 | 3.93 | 5559 |
| Messengers: Who We Listen To, Who We Don't, And Why | Martin, Stephen & Joseph Marks | 2019 | 3.76 | 160 |
| More Than You Know: Finding Financial Wisdom in Unconventional Places | Mauboussin, Michael | 2007 | 4.10 | 1599 |
| The Willpower Instinct: How Self-Control Works, Why It Matters, and What You Can Do to Get More of It | McGonigal, Kelly | 2011 | 4.14 | 24876 |
| Why Popcorn Costs So Much at the Movies: And Other Pricing Puzzles | McKenzie, Richard | 2008 | 3.29 | 161 |
| You Are Now Less Dumb: How to Conquer Mob Mentality, How to Buy Happiness, and … | McRaney, David | 2013 | 3.94 | 3665 |

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| You Are Not So Smart: Why You Have Too Many Friends on Facebook, Why Your ... | McRaney, David | 2011 | 3.87 | 28572 |
| The Enigma of Reason | Mercier, Hugo & Dan Sperber | 2017 | 4.13 | 520 |
| The Drunkard's Walk: How Randomness Rules Our Lives | Mlodinow, Leonard | 2008 | 3.92 | 18790 |
| The Little Book of Behavioral Investing: How Not to be Your Own Worst Enemy | Montier, James | 2010 | 4.11 | 1563 |
| Cents and Sensibility: What Economics Can Learn from the Humanities | Morson, Gary Saul & Morton Schapiro | 2017 | 3.91 | 76 |
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| Webs of Influence: The Psychology of Online Persuasion | Nahai, Nathalie | 2013 | 3.79 | 218 |
| Grand Pursuit: The Story of Economic Genius | Nasar, Sylvia | 2011 | 3.82 | 1504 |
| Mindware: Tools for Smart Thinking | Nisbett, Richard | 2015 | 3.77 | 1266 |
| Everything I Ever Needed to Know about Economics I Learned from Online Dating | Oyer, Paul | 2014 | 3.63 | 289 |
| The Book of Why: The New Science of Cause and Effect | Pearl, Judea & Dana Mackenzie | 2018 | 3.95 | 2102 |
| Social Physics: How Social Networks Can Make Us Smarter | Pentland, Alex | 2015 | 3.54 | 1036 |
| Drive: The Surprising Truth about What Motivates Us | Pink, Daniel | 2008 | 3.95 | 87345 |
| When: The Scientific Secrets of Perfect Timing | Pink, Daniel H. | 2018 | 3.79 | 17436 |
| Priceless: The Myth of Fair Value | Poundstone, William | 2010 | 3.84 | 1598 |
| The Buying Brain: Secrets for Selling to the Subconscious Mind | Pradeep, A. K. | 2010 | 3.68 | 308 |
| Factfulness: Ten Reasons We're Wrong About the World… and Why Things Are Better Than You Think | Rosling, Hans, Ola Rosling & Anna Rosling Rönnlund | 2018 | 4.37 | 74906 |
| An Economist Walks into a Brothel: And Other Unexpected Places to Understand Risk | Schrager, Allison | 2019 | 3.57 | 882 |
| The Misguided Mind: Correct Everyday Thinking Errors, Be Less Irrational, And Improve Your Decision Making | Schuster, Steven | 2018 | 4.60 | 5 |

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| The Paradox of Choice: Why More Is Less | Schwartz, Barry | 2004 | 3.85 | 26995 |
| The Fifth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization | Senge, Peter; Kleiner, Art & Charlotte Roberts | 1994 | 4.13 | 1849 |
| Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing | Shefrin, Hersh | 1999 | 3.75 | 224 |
| The Economics of Violence: How Behavioral Science Can Transform our View of Crime, Insurgency, and Terrorism | Shiffman, Gary M. | 2020 | 0.00 | 0 |
| Irrational Exuberance | Shiller, Robert | 2000 | 3.98 | 6298 |
| Narrative Economics: How Stories Go Viral and Drive Major Economic Events | Shiller, Robert J. | 2019 | 3.62 | 398 |
| Cognitive Surplus: Creativity and Generosity in a Connected Age | Shirky, Clay | 2010 | 3.81 | 5500 |
| The Choice Factory: 25 Behavioral Biases that Influence What We Buy | Shotton, Richard | 2018 | 4.18 | 428 |
| Inside Nudging: Navigating Behavioral Science Applications | Shu, Steve | 2015 | 3.00 | 3 |
| The Signal and the Noise: Why So Many Predictions Fail — but Some Don't | Silver, Nate | 2012 | 3.98 | 40250 |
| The Knowledge Illusion: Why We Never Think Alone | Sloman, Steven & Philip Fernbach | 2017 | 3.84 | 1293 |
| The Last Mile: Creating Social and Economic Value from Behavioral Insights | Soman, Dilip | 2015 | 4.03 | 29 |
| How Change Happens | Sunstein, Cass | 2019 | 3.82 | 123 |
| Choosing Not to Choose: Understanding the Value of Choice | Sunstein, Cass | 2015 | 3.56 | 43 |
| Why Nudge? The Politics of Libertarian Paternalism | Sunstein, Cass | 2015 | 3.47 | 148 |
| Conformity: The Power of Social Influences | Sunstein, Cass | 2019 | 3.28 | 119 |
| The Ethics of Influence: Government in the Age of Behavioral Science | Sunstein, Cass | 2016 | 3.85 | 39 |
| Wiser: Getting Beyond Groupthink to Make Groups Smarter | Sunstein, Cass & Reid Hastie | 2014 | 3.59 | 344 |
| Trusting Nudges: Toward A Bill of Rights for Nudging | Sunstein, Cass R. & Lucia A. Reisch | 2019 | 0.00 | 0 |

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| Alchemy: The Surprising Power of Ideas That Don't Make Sense | Sutherland, Rory | 2019 | 4.29 | 1012 |
| Irrationality | Sutherland, Stuart | 1992 | 3.91 | 1365 |
| Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets | Taleb, Nassim Nicholas | 2001 | 4.06 | 44262 |
| The Black Swan: The Impact of the Highly Improbable | Taleb, Nassim Nicholas | 2007 | 3.92 | 77204 |
| Mistakes Were Made (But Not by Me): Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts | Tavris, Carol & Elliot Aronson | 2007 | 4.02 | 21350 |
| Superforecasting: The Art and Science of Prediction | Tetlock, Philip & Dan Gardner | 2016 | 4.09 | 12048 |
| Misbehaving: The Making of Behavioral Economics | Thaler, Richard | 2015 | 4.18 | 12386 |
| Nudge: Improving Decisions About Health, Wealth, and Happiness | Thaler, Richard & Cass Sunstein | 2008 | 3.84 | 55365 |
| Experimentation Works: The Surprising Power of Business Experiments | Thomke, Stefan H. | 2020 | 3.67 | 12 |
| The Blindspots Between Us: How to Overcome Unconscious Cognitive Bias and Build Better Relationships | Tsipursky, Gleb & David McRaney | 2020 | 4.96 | 25 |
| Mind in Motion: How Action Shapes Thought | Tversky, Barbara | 2019 | 3.68 | 90 |
| Why We Buy: The Science of Shopping | Underhill, Paco | 1999 | 3.90 | 11759 |
| Everything is Obvious: Once You Know the Answer | Watts, Duncan | 2011 | 3.82 | 4271 |
| How to Have a Good Day: Harness the Power of Behavioral Science to Transform Your Working Life | Webb, Caroline | 2016 | 4.02 | 1929 |
| The Mind Club: Who Thinks, What Feels, And Why It Matters | Wegner, Daniel & Kurt Gray | 2016 | 3.90 | 512 |
| I Love You, Now Read This Book. (It's About Human Decision Making and Behavioral Economics.) | Weinschenk, Guthrie & Susan Weinschenk | 2019 | 4.00 | 1 |
| Designing for Behavior Change: Applying Psychology and Behavioral Economics | Wendel, Stephen | 2013 | 4.14 | 251 |
| Improving Employee Benefits: Why employees fail to use their benefits and how behavioral economics can help | Wendel, Stephen | 2014 | 3.50 | 2 |
| Feeling Smart: Why Our Emotions Are More Rational Than We Think | Winter, Eyal | 2014 | 3.50 | 107 |

| The Luck Factor | Wiseman, Richard | 2003 | 3.81 | 1194 |

*\* Ratings retrieved in April 2020*

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BehavioralEconomics.com

# APPENDIX

# Author Profiles

## 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.

Alain can be contacted at alain@behavioraleconomics.com.

## Colin Camerer (Introduction)



Colin Camerer is the Robert Kirby Professor of Behavioral Economics at the California Institute of Technology. He earned a PhD from the University of Chicago in 1981, worked at Northwestern, Penn, and Chicago, and came to Caltech in 1994. He was elected a Fellow of the Econometric Society in 1999 and named a MacArthur Fellow in 2013. Camerer's research group uses a wide variety of lab and field methods to study computations made in goal-directed economic and social decisions, including strategic interaction and market trading. fMRI projects have isolated self-control in choosing tempting foods, emotional regulation of financial losses, curiosity, and neural circuitry underlying disposition effects stock market bubbles. Their group have also used TMS to causally influence choice, eyetracking to measure attention, behavior of lesion patients, and competitive touchscreen experiments with chimpanzees. Besides creating lab experiments, Camerer's group tests theories from neuroscience and psychology using field data on sports betting, work decisions, strategic naivete among moviegoers, and habits in consumer choice.

## Elke U. Weber (Guest editorial)

Elke Weber is the Gerhard R. Andlinger Professor in Energy and the Environment and Professor of Psychology and Public Affairs at Princeton University. Her research models decision-making under uncertainty and time delay in financial and environmental contexts from a psychological and neuroscience perspective. Her expertise in the behavioral decision sciences has been sought out by advisory committees of the National Academy of Sciences on Human Dimensions in Global Change, an American Psychological Association Task Force that issued a report on the Interface between Psychology and Global Climate Change, and Working Group III for the 5th and 6th Assessment Report of the U.N. Intergovernmental Panel on Climate Change (IPCC). She is past president of the Society for Neuroeconomics, the Society for Judgment and Decision Making, and the Society for Mathematical Psychology. She is a fellow of the American Academy of Arts and Sciences, the American Association for the Advancement of Science, the American Psychological Association, the Association for Psychological Science, the Society for Risk Analysis, the Society for Experimental Psychology. She received the Distinguished Scientific Contribution Award from the Society for Risk Analysis and was also elected to the German National Academy of Sciences.

# Contributing Organizations

## Think Forward Initiative

*Empower People to Make Better Financial Decisions*

The Think Forward Initiative (TFI) is based on the belief that our society is better off when people make sound financial decisions. TFI's Research Hub does cutting-edge, data-driven research in social and behavioural sciences to learn more about people's decision-making. TFI's Accelerator Hub translates research insights into innovations. It scouts and selects start-ups and supports them to scale faster and helps people to change their behaviour and improve their financial well-being. Lastly, TFI's Community Hub promotes the activities of the other two hubs through our network of TFI community members, and it launches campaigns to ensure our work reaches the people that need it the most.

For more information, please visit www.thinkforwardinitiative.com.

## Affective Advisory

Affective Advisory is a Swiss advisory boutique specializing in behavioral science. We use the latest academic insights from experimental economics, social psychology and cognitive science to design revolutionary strategies for customer, employee and citizen engagement.

We support leading corporate, government and non-profit organizations in innovation and change management, organizational culture and development as well as marketing and communication projects, focusing throughout on human judgment and decision making.

We are locally rooted and globally connected. Based in Zurich, Switzerland, we draw on a global network of professional and academic experts with diverse industry experience to deliver the best possible solutions for our clients.

For more information, please visit www.affective-advisory.com.

## Behavior & Law

Behavior & Law is a Spanish company dedicated to research, scientific dissemination and teaching in behavioral sciences and forensic sciences. Since its foundation in 2008, it has specialized in the application of these sciences to the field of public and private security.

In the area of public security, it has stood out for its collaboration with police forces from different countries (Mexico, Colombia, Ecuador, USA, etc.), obtaining various national and international acknowledgements. Regarding private security, it has stood out for the creation of the SAVE meta-protocol for fraud management, a method for training teams within private companies to fight internal and external forms of fraud. In recent years, large insurance and financial companies have been trained in this method.

For the last two years, Behavior & Law has been intensifying its work in behavioral economics, currently focusing on several lines of research, one of them within the collaboration with the Welfare Economics group of the UNED. Our latest project is an App for smartphones that will

incorporate several economic decision-making games and cross the results with personality questionnaires that will be administrated to its users.

For more information, please visit www.behaviorandlaw.com.

## Center for Advanced Hindsight

The Center for Advanced Hindsight is Dan Ariely's applied behavioral science lab at Duke University that specializes in health and financial decision-making. Researchers at the Center for Advanced Hindsight study, design, test and implement behavioral interventions to help people become happier, healthier and wealthier. Bridging the gap between research and real world applications, the Center partners with a wide variety of organizations, from tech companies to governments to nonprofits. By partnering with sponsors in real-world settings, the Center for Advanced Hindsight is able to better scale its applied research and have a broader impact on the world.

For more information, please visit www.advanced-hindsight.com.

## Decision Technology

With roots in academia and close links to various research institutions, Decision Technology specialises in helping businesses and policymakers understand and manage customer decision-making with insight grounded in behavioural science and psychology.

We deliver highly differentiated insight and end-to-end services that merge financial analysis and business advice alongside field research and customer insight. This hybrid approach, developed with our co-founder Professor Nick Chater of Warwick Business School, marries a necessary focus on commercial results with a practical understanding of what drives human behaviour.

Decision Technology is a trusted advisor to some of the world's largest organisations in both the private and public sectors. We build long-term partnerships with our clients, whose markets span telecoms, utilities, retail, advertising, and finance. By employing a behavioural, experimental and statistical approach, our Brand practice helps our clients to navigate and leverage the relationship between customer decision-making and winning strategies.

For more information, please visit www.dectech.co.uk.

## Experientia

Experientia is an international, independent, award-winning UX research and service design agency with offices in Switzerland, Italy and Singapore.

We design cutting-edge solutions that align products and services with people's behaviors, actions and aspirations, making them work better for those who use them.

Experientia uses qualitative research to develop an in-depth understanding of people's behaviors, actions, pain points and aspirations in a given context to identify key decision-making moments, and then uses these insights to design solutions that improve the way people

engage with products and services, increase their sense of competence, improve collaboration and positively impact their decisions and behaviors.

Our multilingual, multidisciplinary team has combined expertise in business strategy, behavioral design and behavioral modeling, cognitive and social psychology, ethnography and behavioral economics, information architecture, prototyping, and usability assessment.

Our experience and domain expertise cover a wide range of industries including pharma & healthcare, finance & insurance, public sector & social innovation, urban development & architecture, transport, energy, FMCG, food, fashion, and technology.

For more information, please visit www.experientia.com.

## Frontier Economics

Frontier Economics is a consulting firm with over 200 economists across London, Berlin, Brussels, Cologne, Dublin, Madrid and Paris. We specialise in competition, regulation and strategy, across all major sectors and areas of economic analysis.

Our clients benefit from objective advice, clearly expressed, that helps to inform key decisions. To get to the heart of what matters, you need both analytical expertise and creative problem solving. Frontier Economics combines both to take on some of the biggest questions facing business and society.

We combine our expertise in economics with behavioural sciences to develop a richer picture of the present, helping us to advise our clients on the right decisions for them, for future success. We have one of the largest economic regulation practices in Europe - our behavioural economics work supports wider engagement with regulators and helps develop regulatory policy. Our work on customer strategy centres around understanding the actual behaviours of our clients' customers to help develop innovative customer-based solutions.

For more information, please visit www.frontier-economics.com.

## Gorilla Experiment Builder

We make powerful, flexible and intuitive software for pioneering behavioural science students, researchers and practitioners to help them run novel behavioural experiments on humans quickly, easily and cheaply.

Academics use our software to make discoveries about all aspects of the human mind (for instance memory, attention, language and emotions).

Students use our software to learn how to conduct online research methods and prepare for careers that value digital experimentation (such as market research and advertising).

Practitioners use our software to design and run behavioural experiments that provide their clients with behavioural insights.  The outcomes of these experiments deliver value to clients in a wide range of scenarios.

Providing behavioural scientists with the tools needed accelerate their research will liberate this community to creatively use their knowledge to discover behavioural insights that address a wide range of challenges in society.

For more information, please visit www.gorilla.sc.

## ING

ING is a global financial institution with a strong European base, offering banking services through its operating company ING Bank. The purpose of ING Bank is empowering people to stay a step ahead in life and in business. ING Bank's more than 52,000 employees offer retail and wholesale banking services to customers in over 40 countries.

Group Research supports ING's purpose by monitoring and applying lessons from behavioural science to personal finance through the open-access THINK platform and the ING International Survey. It is also a key supporter of the Think Forward Initiative. The consumer content on THINK explores how attitudes to money affect our lives, now and in the future. The ING International Survey is one of the biggest surveys of its type in Europe and delivers a better understanding of how people spend, save, invest and feel about money. The Think Forward Initiative is a multi-year movement bringing together experts representing governments, academics, consumers, and the financial and technology sectors with the aim of developing tools that can help people make conscious and informed choices about money.

For more information, please visit think.ing.com/consumer.

## Innovia Technology

Innovia Technology is a global innovation consultancy, based in Cambridge UK, specialising in the front end of innovation. We work with the best companies in the world on their biggest innovation challenges to create opportunities for growth. Innovation needs to work from every angle, so we work holistically to bring different perspectives together to ensure the best chance of success. In practice, this means we work in multi-disciplinary teams comprised of scientists, designers and business strategists who can combine creativity with structure. Innovia pioneered the use of behavioural science in innovation and it has become a critical component of many innovation programmes. The behavioural scientists at Innovia have worked on diverse challenges including smoking cessation, improving the experience of boarding planes, reducing drink-driving and improving animal welfare.

For more information, please visit www.innoviatech.com.

## Irrational Labs

Irrational Labs is a leading behavioral economics consulting firm. We help organizations design products and services that make their customers happier, healthier and wealthier. Our clients have included Google, Lyft, Fidelity, Microsoft, Kiva, Indeed and hundreds of other innovative organizations.  We use behavioral insights to design new products and improve existing ones, always finding the simple and low-cost route to improved customer and business outcomes.

For more information, please visit www.irrationallabs.com.

## Reinsurance Group of America (RGA)

Reinsurance Group of America, Incorporated (RGA), a Fortune 500 company, is among the leading global providers of life reinsurance and financial solutions, with approximately $3.5 trillion of life reinsurance in force and assets of $76.7 billion as of December 31, 2019. Founded in 1973, RGA is recognized for its deep technical expertise in risk and capital management, innovative solutions, and commitment to serving its clients. With headquarters in St. Louis, Missouri, and operations around the world, RGA specializes in individual life reinsurance, individual living benefits reinsurance, group reinsurance, health reinsurance, facultative underwriting, product development, and financial solutions.

For more information, please visit www.rgare.com.