# AN OVERVIEW OF THE BEHAVIOURAL SCIENCES

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# 1. THE BEHAVIOURAL SCIENCES

Perhaps one of the more fundamental questions tackled by social scientists related to the motivation behind human behavior is the processes used to make decision. Indeed, a large and sprawling literature on the Behavioural Sciences (sometimes referred to as Judgment and Decision Making [JDM] or Behavioural Economics [BE]) investigates these very questions and is the subject of the present paper. The present paper focuses on topics of interest to the Public Policy-Oriented Consumer Interest Research (PPOCIR) community, as part of an initiative to provide a survey of state of the art research in various PPOCIR sub-disciplines.

## 1.1 A Brief History:

The research on consumer judgment and decision making is thought to have been precipitated by the publication of a treatise in economics called the *Theory of Games and Economic Behavior* (von Neumann and Morgenstern 1944, 1947). In addition to launching the field of game theory, a discipline that understands strategic decision making, the book also provided a theorem for the measurement of utility. Broadly speaking, the book postulated that choice is driven by the motivation of utility maximization, and went on to specify a set of axioms – rules that "rational" decision-makers who exhibit a consistent pattern of choices must follow. Collectively, the axioms and the principles of utility maximization have been referred to as utility theory or expected utility theory. Over the years, these axioms provided a straw-man for researchers in JDM and there were three waves of responses. The first wave represented a series of empirical demonstrations that the axioms were often violated (e.g., Allais 1953, Coombs 1958, Ellsberg 1961, Kahneman and Tversky 1972) while the second represented process based arguments for why utility theory might not explain choices (for instance Simon 1955 argued that decision-making is rational under the constraints of a limited cognitive apparatus and introduced the notion of *bounded rationality*). A third, more substantial wave responded to the criticisms of utility theory by providing alternate models of decision making. One set of models incorporated new ways in which utility could be gained – for instance as a function of the sequence in which they saw options or the rank of the option (Karmarkar 1978, Luce 1990) or the value gained (or lost) was presented as a well-defined function (Prospect Theory, Kahneman and Tversky 1979). A second set of models introduced the notion of psychological representation; that it is essential to study the manner in which consumers frame decision problems in addition to studying how they make the choices. These psychological representations might include risk (Coombs and Beardslee 1954), regret (Bell 1983), ambiguity (Ellsberg 1961), gain versus loss framing (Soman 2004) and mental accounting (Thaler 1999). A third set of models proposed decision strategies that were very different from utility theory. Examples included elimination by aspects (in which decision-makers eliminated options that failed to meet certain criteria till they were left with one option; Tversky 1969) or lexicographic decision–making in which the option that was the best on the most important consideration (attribute) was chosen. More recently, interest has shifted away from the processes and models underlying decision-making to the manner in which these insights can be harnessed to positively influence judgments and choice (Thaler and Sunstein 2008). The

reader interested in a more comprehensive historic perspective on the evolution of the behavioural sciences is referred to Goldstein and Hogarth (1997) for a thorough analysis.

It follows from the preceding paragraphs that decision-making can be studied from a number of different approaches. An understanding of the predominant four approaches is useful because it allows the reader of the behavioural sciences to interpret findings in the context of the larger theoretical frameworks.

### 1.2 Approach 1: The economic approach.

This approach treats decision making as an optimization problem in which the consumer maximizes utility through choice. Broadly speaking, the utility of an object or outcome refers to its usefulness; its ability to satisfy a particular need. In the economic approach, consumers are assumed to have the ability to assess the utility of various products (on various attributes) and to be able to compute the overall expected utility of an option. For instance, suppose a consumer is considering a lottery in which a coin flip determines whether she received $100 or nothing. Further, we assume that u($100) represents the utility of the money to this consumer. Then the expected utility of this gamble is .5 [the probability of receiving the money] x u($100). The expected utility theory posits that when consumers are faced with a choice between options, they choose the option that provides the highest expected utility.

In the expected utility theory, behavior should be consistent with a number of axioms (rules). While some of the axioms are required only for the mathematical tractability of the model, three axioms that appear logical have come under scrutiny:

> ***Completeness*** - In a choice between x and y, a decision-maker should be able to choose x over y, or y over x, or be perfectly indifferent between the two. In other words, a consumer must have a definite preference (or indifference) and they are not allowed to not know what they want.
>
> ***Transitivity*** – If a decision-maker chooses x over y, and y over z, they should choose x over z.
>
> ***Substitution*** - If a decision-maker is indifferent between x and y, they should also be indifferent between two gambles that offer x and y with the same probability. A corollary of this axiom is the so-called cancellation principle (Tversky and Kahneman 1986) which posits that the removal of an identical feature from two options should not change the relative preference between the two.

As discussed earlier, a large body of research demonstrated that these axioms are routinely violated and hence the original expected utility model has been revised and updated several times. The table in Appendix 1 provides a list of different types of variants of the model and the features of each variant. Each variant features a modification that allows the model to be more consistent with consumer behaviour. For instance the expected monetary value model assumes that consumers treat every dollar like every other dollar. However, the expected utility model allows for diminishing marginal utility. Similarly, the subjective expected utility and the prospect theory models allow for a nonlinear impact of probabilities on choices.

### 1.3 Approach 2: The cognitive approach.

The cognitive approach treats decision-making as a series of information processing operations. One of the lynchpins of the cognitive approaches to decision-making is a stream of work that is collectively referred to as Contingent Decision Making or *Adaptive Decision Making* (Payne, Bettman and Johnson 1993, Payne 1992). This theory acknowledges that consumers have two distinct motivations in making choices – accuracy and effort, and further acknowledges that choices that are high in accuracy will likely involve a high degree of effort.

Payne and colleagues identified a number of decision making strategies that ranged in the level of cognitive effort required to execute it. Consider a consumer choosing between Y alternatives that are each described on X attributes, and further assume that the consumer is able to assign a number that captures the relative importance of each attribute. Further, consider a situation in which the value of each alternative on each attribute can be expressed numerically. Payne, Bettman and Johnson (1993) identify the following decision strategies (there are additional variations of these basic strategies):

*Weighted additive decision rule (WADD):* In the most cognitively effortful strategy, consumers assign importance weights to each attribute and then compute an overall score for each alternative by summing up the product of the importance weight and the score of that alternative. The alternative with the highest overall score is chosen. From a computational perspective, this rule requires multiplication, addition and comparisons.

*The equal weight rule (EQW):* In this (simpler than WADD) strategy, the overall score is computed by simple adding the scores of each alternative across the attributes. This rule requires addition and comparisons.

*Satisficing (SAT):* This rule allows for the selection of any alternative that meets minimum criteria or aspiration levels (e.g., attains a minimum score on each attribute). This rule requires comparisons.

*Elimination by Aspects (EBA*) requires the consumer to identify the most important attribute, then eliminate options that do not meet the aspiration level on that attribute, proceed to the next important attribute and continue eliminating options till there is one alternative left. This rule requires several comparison processes.

*Lexicographic (LEX) rule*: This rule prescribes the selection of the alternative that has the highest score on the most important attribute. This rule requires two comparison processes – one to identify the most important attribute and the other one to identify the best alternative.

The cognitive resources required to complete each particular decision task using any one of these rules can be expressed in terms of EIP's – elementary information processes that each represent a unit of cognitive resource. The idea of contingent decision making suggests that a consumer first forms some judgment of how accurate she wants her choice to be. The required accuracy might be a function of many factors – for instance purchase frequency and price (accuracy matters

more for high priced infrequently purchased items like cars and condos than for chewing gum or soap), involvement (accuracy matters more for personally expressive products like clothes) or context (accuracy matters more when a choice needs to be justified, or when choice comes under the scrutiny of others). Once the consumer has a sense of the level of accuracy they seek, they then pick an appropriate decision strategy. This framework thus kicks up the research on decision making by one notch – consumers now not only explicitly need to make choices between products, but they also (sometimes implicitly) need to choose the manner in which they will make the choice.

The contingent decision making framework can also help explain the notion of bounded rationality (Simon 1955) as well as the adaptive use of decision shortcuts (Gigerenzer 1991, 2008; Kahneman 2003). This concept can best be explained by thinking about the human mind through the metaphor of a computer processing unit. Imagine that a user provides a computer with a task that requires a large volume of computational resources. In one of two situations, the computer will be unable to complete the ideal form of the computation and either a) return a sub-optimal outcome to the user or b) take a very long time to complete the computation. These situations occur when 1) the computational demands exceed the capacity of the computer [i.e., for an exceedingly complicated decision requiring a large number of EIPs] and 2) the computer is working on other tasks in parallel [e.g., when cognitive resources are somehow constrained or depleted by other decisions]. In the language of contingent decision making, the consumer might still optimize under the constraints of available resources, and choose simplifying decision-shortcuts because they are functional under adverse cognitive-capacity conditions (Hogarth 1981).

### 1.4 Approach 3: The social psychology approach.

Social psychology is a sub-discipline of psychology whose purpose is "to understand and explain how the thought, feeling and behavior of individuals are influenced by the actual, imagined or implied presence of other human beings" (Allport 1985, p. 3). While the field of social psychology is vast and studies a large number of variables, there is ample evidence that the decisions and judgments of individuals in a group are influenced by the decisions and judgments of other group members (see Levine and Moreland 1998). In a seminal experiment, Asch (1955) showed participants lines of different lengths and asked them for which one was longer. In one condition, a number of confederates provided the (obviously wrong) answer before the participant. Asch found high levels of social conformity despite the existence of a correct response to the task. His findings were later qualified by Deutsch and Gerard (1955), who attributed shifts in judgment or choice to an adherence to norms (normative social influence) or acceptance of persuasive arguments (informational social influence). Thereafter, the notion of normative and informational social influence has served as the primary paradigm guiding research on choice and judgment shifts (see, e.g., Burnkrant and Cousineau 1975; Herr, Kardes, and Kim 1991; Kaplan and Miller 1987; Levine and Moreland 1998; Moscovici 1985; Myers and Lamm 1976). Kaplan and Miller (1987) proposed that normative influence should predominate for "judgmental" tasks such as dish selection in a restaurant, while "informational influence" should dictate judgment or choice for intellective tasks, such as solving problems that have a single correct solution.

A large number of findings in the behavioural sciences demonstrate the effect of social others on choices. In his seminal work on reasons-based choice, Simonson (1987, 1989) proposed and demonstrated that consumers select options that are supported by the best reasons or justifications, rather than the options that maximize utility. An important corollary of this theorizing is that asking people for justification for their choices changes the choices they make.

A second set of findings has to do with the effect of one person's choices on other consumers in a group setting. Ariely and Levav (2000) proposed that consumers in a group setting need to balance between two kinds of goals – the goal to maximize their own wellbeing and a second set of goals triggered by the existence of the group (these may include self-presentation, increasing group variety or compliance resulting in group uniformity). The latter sometimes results in choices that undermine personal satisfaction and increase the potential for regret. For instance, in one of their studies, Ariely and Levev (2000) showed that real groups (tables) of lunch eaters at a cafeteria choose more varied dishes than would be expected by a random sampling of the population of all individual choices across all tables. Their results showed that in a group setting "people take the road less traveled and point to group variety seeking as a consistent and stable outcome when individuals order food and drinks in group settings" (Ariely and Levav 2000, p. 288).

Finally, in a separate set of findings Meier and his colleagues (Kast, Meier and Pomerantz 2012, Goette, Huffman and Meier (2006) found support for the idea that consequential decisions made by consumers changed in a group setting – these included decisions to cooperate, to save money and to be altruistic. Furthermore, these effects occurred even in situations in which the groups were randomly assigned and when the groups were minimal (i.e., groups that had been given an affiliation label).

### 1.5 Approach 4: Transformative Consumer Research and Choice Architecture.

Rather than being theoretical paradigms or process models of consumer decision making, both transformative consumer research (TCR) and choice architecture (CA) are recent movements in the field that aim to push the goal of the behavioral sciences away from being purely theoretical in nature to be applied and to improve the quality of consumers' lives. TCR is an initiative of the Association for Consumer Research and is a "movement within our association that seeks to encourage, support, and publicize research that benefits consumer welfare and quality of life for all beings affected by consumption across the world" (ACR 2014). TCR researchers have done research in a number of domains in which consumer welfare can be compromised. Domains of inquiry include unhealthy eating; credit card mismanagement; substance abuse (alcohol, tobacco, and pornography), sustainable products, marketplace discrimination; and ecological deterioration; as well as at-risk groups who are impoverished, impaired, or elderly (see Mick et al 2011 for a summary).

The concept of choice architecture was made popular by a recent book by Thaler and Sunstein (2008) entitled *Nudge*. Reinforcing the empirical generalization from the behavioural sciences that choice is influenced by the context in which it is made, these authors suggest that policymakers and others interested in delivering consumer welfare could design contexts that

would suitably nudge consumers to making better choices. A richer discussion on choice architecture is provided later in this paper.

### 1.6 The Methods of the Behavioural Scientist

Irrespective of the theoretical paradigm that is used as the foundation for any given research project, most behavioural scientists use experiments to generate empirical evidence in support of their theory. A behavioural experiment typically randomly assigns a participant to one of many conditions (control condition or treatment conditions) and studies their choices as well as other measures of interest as a function of the condition they are in. The specific type of experiment could vary as a function of the nature of the task, the participants, the setting of the experiment and the level of control versus realism in the experiment. Table 1 provides a brief description of the different types of empirical studies.

Table 1: *A Typology of Empirical Studies in the Behavioural Sciences*

| | Type of Study | Setting | Task | Decisions / Data | Participants |
|---|---|---|---|---|---|
| **1** | Laboratory Experiment (conditions created by researcher) | In a lab | Hypothetical | Recorded by researcher | Typically students |
| **2** | Laboratory Experiment with real choices | In a lab | Artificial but with real consequences | Recorded by researcher | Students or Real consumers |
| **3** | Natural Experiments (conditions occur naturally) | In the real world | Real | Recorded by researcher | Real consumers |
| **4** | Archived datasets (conditions occur naturally) | In the real world | Real | Archived elsewhere | Real consumers |
| **5** | Field experiments (conditions created by researcher) | In the real world | Real | Recorded by researcher | Real consumers |
| **6** | Randomized controlled trials (RCTs). Field experiments with very large number of conditions | In the real world | Real | Recorded by researcher | Real consumers |

The difference between field experiments and RCT's are best illustrated through an example. Suppose a researcher has developed a smartphone app that helps people make better choices, and wants to test its efficacy relative to other approaches (e.g., decision-making guides). To run a field experiment, he could create three groups of consumers – a control group (no decision help), a treatment group (that have an app) and a comparison group (that have a guide). After a period of time, he could measure decision quality and compare the three groups. Now suppose he was interested in testing various features of the app – say the visual layout, the complexity of the graphics, the font sizes, the content and the number of screens and had three alternatives for each

of these. This would require 3 x 3 x 3 x 3 x 3 (=243) possible combinations. The researcher would achieve this through a randomized controlled trial where each participant was randomly assigned to one of three options on each variable.

## 2. KEY ISSUES IN THE FIELD AND EMPIRICAL GENERALIZATIONS

After the overview of the key theoretical approaches and paradigms in the field of the Behavioural Sciences, the obvious next question is – what are the major findings and what sort of empirical generalizations can be made on the basis of these findings. This section covers the key theoretical issues and empirical generalizations in the behavioural sciences as they pertain to consumer behaviour. This section will cover broad empirical generalizations and a more detailed set of behavioural phenomena are described in Appendix 4 (see also Ireland 2013). Note that the phenomena covered in Appendix 4 are specific instantiations of the following broad generalizations, and their relationship to the topics covered here is highlighted in the appendix.

### *2.1 Decisions by Heuristics and Resulting Biases*:

This stream of research pioneered by the work of Daniel Kahneman and Amos Tversky (see Kahneman and Tversky 2000) identifies a number of decision-making "shortcuts" that consumers typically use to make decisions. This stream of research was initially developed to counter the utility theory model of decision making but has subsequently evolved as a legitimate field of research in itself.

Perhaps the most famous demonstrations of the use of heuristics (and resulting biases) were the representativeness heuristic, the availability heuristic and anchoring and adjustment. Suppose the following question was posed to you (Tversky and Kahneman 1973); suppose you picked up a word at random from an English language text. Is it more likely that it begins with the letter K or that it has K as the third letter? In fact, there are many more words that have K as the third letter than those that begin with K, yet most respondents believe that they are likelier to encounter a word beginning with K. The authors argue that this happens because it is easy to think of words that begin with K but not as easy to think of words with K in the third place – the former are more accessible to memory. Similarly people (incorrectly) believe that there are more deaths causes that are more likely to occur in news reports and hence more available (e.g. fires, natural disasters and accidents) than more mundane causes (e.g., illnesses and disease).

Consider next the following scenario from Tversky and Kahneman (1983):

> *Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.*
> Which is more probable?
> 1. Linda is a bank teller.
> 2. Linda is a bank teller and is active in the feminist movement.

While any student of probability (and indeed most logical thinkers) would point out that a more general outcome (#1) is more likely than a more specific subset of that outcome (#2), results suggested that the majority chose #2 as more likely. The authors argued that most respondents used the representative heuristic – Linda seemed more representative of a teller who was a feminist rather than just an average bank teller.

Tversky and Kahneman (1974) asked two groups of participants to estimate the answer to an identical problem. One group was asked to estimate the answer to 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 x 9 x 10 and came up with a median estimate of 512. A second group estimated 10 x 9 x 8 …..x 1 and their median estimate was 2250. These estimates are significantly different from each other (and from the correct answer 40,320) and are explained by the anchoring and adjustment heuristic – the common human tendency to rely too heavily on the first piece of information offered (the "anchor") when making decisions.

These heuristic shortcuts are adaptive in many cases because they make decision-making more efficient, however, as illustrated in the examples above, they could sometimes result in systematic biases. The three biases reported above can have significant consequences in consumer contexts. Both the availability heuristic and the representativeness heuristic result in mis-assessment of probabilities and can be damaging in situations where consumers need to assess risks (e.g., financial decision-making or health risks). For instance, Barber and Odean (2007) test and confirm the hypothesis that investors are more likely to purchase attention grabbing stocks (those that have been in the news) because their availability makes them more likely to get selected and because the alternate decision strategy – to process a very large set of information on thousands of stocks is cognitively too demanding. The anchoring heuristic posits – and evidence exists to confirm - that the asking price for property in a real estate market (presumably not a true indicator of the value of the property) influences the final transaction price (Northcraft and Neale 1987). Further, Simonsohn and Loewenstein (2006) predicted and found that movers arriving from more expensive cities would rent pricier apartments than those arriving from cheaper cities. And in unrelated domains, Ariely, Lowenstein and Prelec (2003) showed that consumers' willingness to pay for products might be affected by seemingly irrelevant anchors that they might encounter in the environment.

Choosing by heuristics is fundamentally very different from choosing by systematic information processing. Kahneman (2011) differentiated between the two styles of processing more, initially calling them intuition and reasoning. Intuition (or system 1) was determined to be fast and automatic, usually with strong emotional bonds included in the reasoning process. Kahneman said that this kind of reasoning was based on formed habits and was very difficult to change or manipulate. Reasoning (or system 2) was driven by conscious judgments and attitudes and hence was slower. A simple test to devise the extent to which individuals use System 2 processing and the ability or disposition to reflect on a question and resist reporting the first response that comes to mind was developed recently by Frederick (2005). The Cognitive Reflection Task (CRT) includes three questions, the most famous one of which is "*A bat and a ball cost $1.10 in total. The bat costs a dollar more than the ball. How much does the ball cost?"* A majority of respondents fail to get the correct answer (5 cents) and instead report a "system 1" answer of 10

cents. Frederick's research shows that those who do well on the cognitive reflection test tend to be more patient in decisions between smaller sooner rewards and larger later rewards. They are also more willing to gamble in financial domains.

### *2.2 Framing and Mental Accounting*:

When a consumer is presented with a set of choice alternatives and needs to choose, two distinct types of psychological processes occur. In the first process, the consumer first absorbs all of the information presented to them and then forms a mental representation of the problem. As an example, a choice between two options A and B could be represented as "which one of these should I select?" or "which one should I reject?" based on the information at hand (Shafir 1993). In the second process, the consumer actually engages in a series of computations or rules to determine the outcome (see Soman 2004). While much of the theory that has been discussed thus far in this paper focused on the second process, the area of framing and mental accounting typically focuses on the first process.

The term "frame" is used to mean a mental model (Johnson-Laird 1983) of a decision problem and contains information about the elements of the decision problem (e.g., relevant information) as well as relevant elements from the context. Frames are the result of perception (in which the consumer received information from the environment), encoding (in which the stimulus is represented as data) and structure and organization (in which these data are mentally presented in a particular form). Differences in any of these [for example, changes in perception due to differing levels of attention] could mean that the exact same decision problem is represented differently by different consumers, or by the same consumer at different times.

The research in framing looks at three different types of framing (see Soman 2004 for a detailed discussion). In *outcome framing*, the consumer sees outcomes of a choice framed in different ways. For instance, the price of a product could be framed as "a dollar a day" or as "$365" (Gourville 1998) or a packaged food could be described as "25% Fat" versus "75% fat-free" (Wertenbroch 1998). Typical methods of outcome framing include framing the outcome as a) a gain versus a loss, b) as aggregate versus disaggregate quantities and c) in different scales (e.g., different currencies, volume and weight measures). A second form of framing is *structure framing* in which the size and arrangement of the consumers' view of the decision problem is varied. This can be accomplished by a) presenting data in an aggregate or disaggregate manner (which prompts the consumer to consider the outcome of each decision narrowly or the broader outcome of a family of decisions) or b) presenting a series of decisions as a set of sequential or simultaneous decisions. Third, *task framing* changes the description of the objective of a choice task (e.g., choosing versus rejecting).

The field of mental accounting could be considered as an application of the concept of framing to the manner in which consumers manage their money. Mental accounting is the process whereby people code, categorize and evaluate economic outcomes (see Thaler 1999 and Soman and Ahn 2011 for reviews). In contrast to the assumption from economics that money is fungible (i.e., any unit of money can be replaced by any other unit without any

consequence), this research shows that people spend money as a function of how, when and in what physical form it is earned. Consider the following scenarios adapted from Thaler (1999)

> Version A: Imagine you just arrived at a theater and as you reach into your pocket to pull out the $100 ticket you purchased in advance, you discover that it's missing. Would you spend another $10 to see the show?
>
> In Version B of the scenario, there is no advance purchase but "when you arrive at the theater, you discover you have lost $100 in cash on the way. Would you still buy a show ticket?

Results show that while a vast majority of respondents say they would purchase a ticket in B, only a small minority do so in Version A. From a fungibility perspective, these results are puzzling. In both scenarios, the protagonist has carelessly lost a piece of paper worth $100. The mental accounting model has a simple explanation. The moment the consumer decides to spend $100 on a ticket, she sets up a mental account entitled "Theater" with a budget of $100. When she loses a ticket, she has no more theater funds left. However, when she loses cash, that loss is posted to the "general expenses" account and she still has a surplus in her theater account. The act of labeling money by its uses can change the manner in which the money is spent. This principle appears in many walks of life. Waiters and waitresses spend their tips on "fun activities" and their salaries on paying bills (O'Curry 2001), parents are reluctant to break into their children's education fund money to finance a home repair (Soman and Ahn 2011) and labourers who physically earmarked money as savings are more likely to save it that those who did not earmark (Soman and Cheema 2011).

The mechanics of mental accounting as described in the theater ticket example are simple and comprise three steps. First, an account with a suitable label is set up; this could be done at the level of an individual expense or as a category of expenses. Second, the benefits and costs associated with that expense needs to be booked (noticed) and posted (assigned) to the appropriate mental account (Health and Soll 1996). Third, there needs to be a tight coupling – or association - between the cost and benefit. This model results in some interesting consequences for consumption behaviour, the first of which is the so-called sunk cost effect. When a consumer opens an account with a prepayment and the account is narrowly defined, it can only be satisfactorily closed by consuming the product or service, even in situations where it does not make sense to do so. Consider the following scenario from Arkes and Blumer (1985):

> Assume that you have spent $100 on a ticket for a weekend ski trip to Michigan. Several weeks later you buy a $50 ticket for a weekend ski trip to Wisconsin. You think you will enjoy the Wisconsin ski trip more than the Michigan ski trip. As you are putting your just-purchased Wisconsin ski trip ticket in your wallet, you notice that the Michigan ski trip and the Wisconsin ski trip are for the same weekend! It's

> too late to sell either ticket, and you cannot return either one. You must use one ticket and not the other. Which ski trip will you go on?

Results show that a majority of respondents choose the less preferred (but more expensive) trip, and this result can be attributed to the sunk cost effect. More generally, consumers can be motivated to consume a product a service if they are reminded of the payment they have made for the right to consume.

The strength of the sunk cost effect can be weakened by reducing the strength of the coupling between the benefits and gains. For instance, Gourville and Soman (1998) showed that members of a fitness facility attend regularly right after making payments, but their attendance gradually declines over time because the "pain" of payment dwindles. Likewise, Soman and Gourville (2001) studied consumers who had purchased a 4-day ski season ticket in one of two forms – a card valid for all four days or a series of four coupons, one for each day. In a situation where these consumers faced poor skiing weather on the fourth day, results showed that consumers whose tickets were in the form of one card were happy to forego skiing they had prepaid for, while those who still had a coupon were still determined to extract some value from that coupon. More generally, a weak sunk cost effect has one of two consequences – for physical goods, it might result in increased consumption (hence consumers who purchase in bulk display a greater consumption in some categories) while for products that can't be inventoried, it might result in a greater tendency to forego consumption (hence health club members stop attending with time and health plan members might forego an annual checkup if its cost is not made explicit).

Other implications of mental accounting include a) the fact that consumers have difficulty in spending in different currencies, and b) that spending changes as a function of the manner in which payments are made. The latter is a particularly important finding and suggests that the further away one gets from cash in terms of its salience and ease of measurability as a trading currency, the greater the difficulty consumers have in managing their money. In the extreme, one implication of a society in which cash is gradually replaced with electronic and mobile payment methods is the need to help consumers better meter and manage their money (Liu and Zhuo 2012).

### *2.3 Role of Context in Decision Making*

One implication of the economic approach to decision making is the idea that the choice between two alternatives should be independent of the presence of other alternatives in the choice context. However, a large stream of literature has shown that this is not the case. Context could affect both the perceptual apparatus by changing the way in which a problem is framed or the evaluative apparatus by providing the consumer with information that could change preferences.

Perhaps the earliest demonstration of context effects was done by Huber, Payne and Puto (1982). These researchers studied choices between two alternatives that varied on two attributes. Assume that Option A is better on attribute 1 (say quality) while option B is better on attribute 2 (say, price). The choice between these options would depend on the relative importance that any given consumer puts on these two attributes. Now imagine that a third option is made available – B* that is worse than B on both attributes, but better that A on price and worse than A on quality. B* is dominated by B and not by A, and hence this situation is referred to as asymmetric dominance. The result of adding B* are intriguing – not too many people choose B* (after all, B dominates it on all dimensions) but the relative choice between A and B now shifts towards B. This occurs because now there is a compelling reason to choose B while there is no such reason to choose A (the *attraction* effect), and the new entrant B* is referred to as a decoy product because it simply serves to make one of the existing products look more attractive.

A second well-demonstrated finding is the *compromise effect* (Simonson 1989) which states that objects that are priced in the middle of choice sets – or are generally in the middle of a three-item choice set on multiple attributes - are looked on more favorably. The middle choice seems like a good compromise between choices that may be viewed as too extreme. As an example, the most popular size of coffee is the medium size irrespective of the actual volume of coffee in the medium size.

In both the attraction and compromise effects, the presence of other products in the choice set provides additional information and potentially changes the encoding of the stimulus. Indeed, a more provocative claim first made by Prelec, Wernerfeld and Zettlemeyer (1997) posits that consumers actually infer what they want from what is available – that preferences are ill formed and labile enough that the context can actually help the consumer construct their preferences. For example, the presence of a larger number of options in, say laptop computers versus desktop computers could result in an inference that laptops are generally more preferred than desktops and hence a preference for laptops. Indeed, many researchers now believe that inferences made by consumers on seeing a) retail displays, b) informational displays and c) popularity ratings of different products can actually influence their own choices significantly. With mobile technology, this information is easier to share and hence might have significant implications for preference structures in markets.

More recently, researchers in this area have begun studying the effects of overchoice – what happens when consumers are faced with a large number of alternatives. Perhaps the most famous demonstration was done by Iyengar and Lepper (2000), who conducted an experiment in a supermarket where they set up tasting tables for jams. They found that when shoppers are given the option of choosing among smaller and larger assortments of jam, they show more interest in the larger assortment. But when it comes time to choose one, they are significantly more likely to make a purchase if they choose among six rather than among 24 flavors of jam. Further evidence was provided by Gourville and Soman (2005) who found that under some conditions, offering people additional choices creates confusion and cognitive overload. As a result, people were more likely to switch to brands that offered a small number of branded variants because it was easier to choose within that smaller set.

The consequences of overchoice extend far and wide. Cronqvist and Thaler (2004) studied the Swedish social security system introduced by the Swedish government at the turn of the century

that allowed participants to form their own portfolios by selecting up to five funds from an approved list. Funds were allowed to advertise themselves and to determine their own fee structure, individuals were encouraged to make their own choices, and any fund meeting certain fiduciary requirements was allowed to enter the market. In the end, individuals had a list of 456 approved funds from which they could choose. Free entry, unfettered competition and the right of individuals to choose were all consistent with the principle of libertarianism and freedom of choice. However, the researchers found that participants consistently made sub-optimal choices, and that they tended to choose default options. Further, their analysis revealed that people who made active choices for themselves did not necessarily end up with portfolios that did very well.

Likewise, Iyengar, Huberman and Jiang (2004) analyzed retirement-fund choices ranging from packages of two to 59 choices among more than 800,000 employees at 647 companies. These so-called 401(k) plans give people incentives to participate through tax shelters and employer matches. A thoughtful economic analysis on the part of individuals should suggest that the option of participating in these plans dominates the option of not-participating. Results showed that more options led people to act like the jam buyers; when given two choices, 75 percent participated in a 401(k) plan, but when given 59 choices, only 60 percent did. The analysis also suggests a parallel with the restaurant study: when faced with many options, investors tended to be a lot more cautious in their investment strategy.

### *2.4 Dual Process Models and Intertemporal Choice*:

Consumers often need to make choices between options that will occur at different points in time. Empirical research shows that consumers are myopic [i.e., they value present outcomes disproportionately] and inconsistent [their choices change as they get closer to one of the options]. As a result, consumers often need to exert self-control (see Soman et al 2005).

Some of the toughest decisions made by consumers are so-called '*should* vs. *want'* decisions. For instance, a consumer should be saving money for the future, but the temptation of a hot cup of cappuccino creates a *want* that distracts him from his savings goal. A second consumer knows that she should be exercising at the gym, but she would rather spend the time with her friends at the movies. And yet another consumer knows that he should be eating the healthy granola for breakfast, but his desire for a meat-lovers omelet gets the best of him. These are just a few examples of the kind of decisions that have long challenged individuals and intrigued researchers. Most consumers know what they *should* be doing; yet they simply behave in a seemingly irrational manner when faced with a tempting consumption opportunity.

Researchers in the behavioural sciences have proposed numerous theoretical accounts to explain such behaviour. One such account is the Dual Processing Model, exemplified by the work of Thaler and Shefrin (1981). These authors propose that each individual is actually an 'organization' consisting of two entities, the 'planner' and the 'doer'. The planner is foresighted, realizes the consequences of current decisions and hence charts out an optimal path for the individual. The doer, on the other hand, lives in the moment and is myopic, and pushes the individual to pick the alternative that gives them the greatest value in the present. In Thaler and Shefrin's model, the planner controls the doer's desire through willpower. In general, the model

suggests that when people are asked about their preferences, their *planner* comes forth and they respond with a *should* option. However, when they are faced with a tempting opportunity, the *doer* comes forth and pushes the individual towards the *want* option.

A second theoretical account that has often been used to explain how individuals make *should* vs. *want* choices is the Theory of Hyperbolic Discounting (see Soman et al 2005 for a review). At the heart of this theory is the idea that people pervasively de-value the future and tend to prefer a 'smaller/sooner' reward (SS) over a 'larger/later' one (LL). In particular, the value of future outcomes is discounted very steeply very close in time to the outcome, but more gently further away. As a result, when an individual sees a choice between SS and LL options in the future, they are both discounted greatly and hence the present value of LL appears greater than the present value of SS. And that is why people who view the two options from the present choose the LL reward over the SS reward. However, when one gets *very* close in time to SS, the perceived value of SS is now larger than the perceived value of LL and choices reverse. This phenomenon is referred to as dynamic inconsistency (Strotz 1955).

Hyperbolic discounting has implications for the manner in which consumers evaluate what Soman (1998) called "delayed incentives." These are incentives which promise the consumer a cash benefit (say a refund, or a reduced price) in the future in exchange for the performance of some effort (say, accumulating information or points, or filling in forms) both of which happen in the future. Since the rate of hyperbolic discounting is steeper for effort than for money (i.e., consumers underestimate future effort drastically) these transactions look attractive when they are in the future but not when it comes time to actually perform the effort. This explains the extremely low redemption rates of mail-in rebates or delayed benefit programs.

Note that the concept of SS and LL rewards is a handy metaphor for understanding *should* vs. *want* options more generally. For instance, in the domain of eating, SS might represent a tempting chocolate cake while LL might represent better long-term health. Consumption of indulgences in moderation is good for our well-being; the trick is to keep the consumption in moderation. A flurry of research activity has recently addressed the question of how to do this through effective self-control devices. Examples of self-control include the imposition of a cost of future actions, or employing a peer or family member as a monitor to ensure that the consumer sticks to his plan (see Hoch and Loewenstein 1991 for a conceptual framework).

### *2.5 Group and Agent Decision Making and Advice Seeking:*

Group decision-making refers to a situation in which a collection of consumers make a choice. The decision is then no longer attributable to any single member of the group. The decisions made by groups are often different from those made by individuals. The most common use of group decision making in a consumer context occurs when families make decisions for their collective consumption needs (housing, automobiles, appliances and vacations), yet family decision making has been strangely understudied in the field of the behavioural sciences. In a relatively recent article, Belch and Willis (2002) argued that the state of the art on research in family decision making is heavily reliant on studies conducted in the 1970s and 1980s. Since that

time, there have been profound changes in the structure and composition of families all across the world. Unfortunately, their call for newer research on family decision making has not yet been responded to with any degree of enthusiasm.

That said, the literature in organizational behaviour is replete with research showing that groups choose differently from individual consumers in a number of significant ways. Group polarization is the phenomenon by which groups tend to make decisions that are more extreme than those of its individual members, in the direction of the individual inclinations (Aronson 2010). Groups high in cohesion have been noted to have a negative effect on group decision-making and hence on group effectiveness (Janis 1972). Research also shows that when individuals make decisions as part of a group, there is a tendency to exhibit a bias towards discussing information that has been shared across group members (i.e. shared information bias), as opposed to unshared and unique information (Forsyth 2009).

Of particular interest to consumer behaviour, there has been a surge of recent interest in the fields of agent decision making in which an expert agent makes decisions on behalf of a client (e.g., a doctor making choices for their patient or a wealth manager for their client) and in advice seeking more generally (Mannes, Soll and Larrick 2014, Soll and Larrick 2009). When consumers seek advice for more sophisticated products and services, they transfer decision rights and responsibility to their advisor and therefore, rely on them to act in their best interests. Clients typically place their utmost trust and confidence on their advisor to perform what is known as *fiduciary duty*. However, fiduciary duty has its challenges and conflicts of interest are inevitable in such advisor-client relationships. This issue has been an important topic among policymakers and regulators in the financial services industry, who often respond by enforcing disclosure as a way to minimize conflicts of interest (Sah, Loewenstein and Cain 2013, Sah and Loewenstein 2014).

One of the key questions addressed by the research of Soll and Larrick is the question of how one should aggregate the opinion of two experts, or how one should aggregate the opinion of an expert with one's own opinion. As a metaphor for a task that consumers need some advice on, imagine that they are asked to determine the number of coins in a jar, and that the correct answer is 40. The consumer seeks advice from two experts, one of them says that there are 50 coins and the other 60. Both judges have over predicted, and their average prediction is 55 - better than one expert but not as good as the other expert. In a second situation, their predictions are 50 and 28. The average of 39 is more accurate than either expert. This suggests that in many real world cases, averaging the opinion of two experts is often better than any one of those experts. However, Soll and Larrick's research shows that consumers do not believe in averaging and in fact prefer to identify the "better" expert and follow their advice.

### *2.6 Rationality and Irrationality*:

Due to the success of popular behavioural science books like Ariely's *Predictably Irrational* (2008) and Gladwell's *Blink* (2005), the notion of irrational consumer behavior has caught the fancy of managers, policymakers and the general public alike. But just what is irrational behaviour and what are the implications of irrationality?

Given its roots in the field of economics and in particular the notion of utility theory, early researchers in the behavioural sciences used the term "irrationality" to refer to a pattern of

behaviour that deviates from utility theory and the axioms of choice. For instance, making decisions by using one of the well documented heuristics of choice was considered irrational because of the implication that the consumer was not using all the available information in computing the utility of the alternatives. Similarly, context effects, mental accounting and framing were all considered to be irrational behaviours since they violated the assumptions or axioms of economic theory. In those days, the behavioural sciences were a normative theory and studied how people should make decisions; any deviations were considered irrational.

Over time as the focus moved away from utility theory and more to cognitive approaches, researchers chose to use the term "irrationality" with increasing caution. If consumers were using variables that were economically irrelevant but psychologically meaningful, the use of the term irrational to describe such choices was considered harsh and loaded with a negative connotation.

More recently, a new form of irrationality has emerged – the discrepancy between what people want to do and what they actually do. As discussed in the section on intertemporal choice, a large number of consumers who want to save money, to exercise and eat health foods and to work end up not saving, not exercising and procrastinate. This discrepancy between what people say they will do and what they actually do represents a new view of irrationality that the field will continue to explore.

## 3. APPLICATIONS AND POLICY AND WELFARE IMPLICATIONS

Having covered the broad theoretical paradigms and the broad empirical generalizations on the field, we next think about broad areas of applications.

### 3.1 Choice Architecture and Nudging:

The concept of choice architecture and nudging is best illustrated by the following example adapted from Thaler and Sunstein (2008) by Ly et al. (2013):

> Consider two cafeterias that want to help students consume less junk food. One cafeteria decides to attack the problem by placing a "tax" on junk foods or by banning the sale of junk foods altogether. The other cafeteria decides to change their food display so that junk foods will less likely be chosen. Junk foods will be placed on higher, harder-to-reach shelves while healthy foods will be placed at eye level and within arm's reach. Both cafeterias are trying to influence the behaviour but are using two entirely different methods. The first cafeteria is influencing behaviour by either financially incentivizing students to choose healthier options or restricting their options and thus, their freedom of choice altogether[i]. The second cafeteria does neither but uses a nudging strategy.

Nudges influence behaviour by changing the context in which choices are made. While a significant change in economic outcome or incentives is not a nudge, a nudge may serve to highlight an economic incentive. As an example, members of a gym may be nudged to exercise more frequently by framing their $600 annual membership fee as $50 a month or approximately $12 a week.

In many countries, potential organ donors need to sign up to be an organ donor at the department of vehicles and licensing, but the responsibility of initiating that process rests with the potential donor. In a "prompted choice" system, applicants for licenses are actively asked whether they would like to donate organs. This simple nudge has increased organ donation rates from 38% to 60% in the U.S. state of Illinois (Ly et al 2013). Another example of a nudge involves the compromise effect. If a wine company would like to sell more of a particular brand of wine, they can surround the wine with higher-end and lower-end options to increase sales of the particular brand.

Recent research has shown the effectiveness of a choice architecture strategy in improving consumer welfare. Soman and Cheema (2011) show that the use of a simple paper envelope to earmark savings increases the likelihood of the cash being saved. And Mazar and her colleagues (Shu et al. 2012) showed that an insurance form in which a claimant signed at the top prior to making claims increased their honesty in reporting. Both these nudges share properties of effective nudging – they are simple, quick and inexpensive to execute, they do not provide any economic incentives, their effects are easy to document and they typically are more efficient that economic and persuasion approaches. Indeed, a recent paper in the domain of retirement savings compares a nudging strategy (automatic contributions) with a more active incentive (tax subsidies) and concludes that the former is significantly more effective than the latter (Chetty et al 2012).

### 3.2 Decision Support and Decision Engineering:

In addition to being *normative* (how should consumers make choices) and *descriptive* (how do consumers make choices) in its approach, the findings from the behavioural sciences also allow it to be a *prescriptive* (what can we recommend to help consumers make better choices) science.

Decision support refers to any strategy that help people make better choices. There are five strategies that the behavioural sciences have shown to improve decision making. The simplest cognitive crutch one can provide is data or feedback. For many behaviour that consumers routinely engage in (spending, garbage production, energy consumption), there is very little feedback they get on a day by day basis on consumption levels. Prior research shows that simply providing people with feedback on their consumption allows them to better monitor consumption (Soman 2001). A second decision aid is advice. Sources of advice include experts, peers or even models.

The third strategy to improve decisions is to provide cases or databases of other similar situations in the past that might help predict what the outcome will be. Consider a loan officer or a university admissions officer who is reviewing applications. One effective strategy in reviewing an application is to find a past application that looked very much like the present one, anchor on it and adjust for differences in making a judgment (Hoch and Schkade 1997).

The fourth strategy is to offer a structured model. This model would be based on the WADD model of decision making in which the consumer is called to provide importance weights for each attribute (Blattberg and Hoch 1990). It is relatively easy to provide such linear models on a web or mobile platform. And the fifth strategy is to provide consumers with a *consumption vocabulary* – a set of attributes that allows them to better develop a framework to make a

decision (West, Brown and Hoch 1996). Objects of art, bottles of wine, fine quilts and classical music are all difficult to evaluate because consumers don't know the right attributes. Providing them with the vocabulary to evaluate and give weight to each of those attributes will actually improve the quality of their decision making.

### 3.3 Consumer Protection and Disclosures

In a very large number of domains, it seems logical to expect that disclosing information pertinent to products and services is a sound strategy. For instance, governments might require pharmaceutical companies and sellers of financial products to disclose risks, real estate developers might disclose their rights to change fees and responsibilities, and product manufacturers might need to disclose ingredients, terms and conditions for refunds, or issues that might be considered ethical in nature (for instance whether the product was produced in a plastic-free facility or not). While the disclosing of information is, in principle, a good idea, recent research suggests that increasing the level of disclosure might increase the likelihood that people ignore it altogether (Thaler and Tucker 2013).

A particularly interesting form of disclosure from a behavioural perspective is the disclosure of conflicts of interest. Suppose that an agent got a commission for recommending product A, but Product B was the superior product in most conditions. Suppose further that the agent disclosed the fact that they were getting a commission from A and then recommended A. Research by Sah and Loewenstein (2013) shows that this form of disclosure had a perverse effect such that consumers were more likely to choose the worse product. Their results are intriguing and point to the need for a more nuanced discussion on the role of disclosures in influencing consumer choice.

More generally, there has been a fair bit of recent debate and discussion on the role of the behavioural sciences in policy (Ireland and Koffler 2013, *Policy Options* 2013). While the need for a behaviourally informed approach to policy is obvious, experts and academics differ on what the best method of embedding behavioural principles in policy making is (Ly and Soman 2013). Further, there have been concerns voiced about the a) the potentially manipulative nature of choice architecture approaches and b) what the best combination of nudging and more traditional policy approaches (restrictions, incentives) should be.

### 3.4 Financial decision-making and financial wellbeing

The fact that households have recently been in financial turmoil in the US, and to a lesser extent in Canada are beyond dispute. The December 2010 report of the Task Force on Financial Literacy noted that financial literacy is critical to the well-being of Canadians. The task force broadly defined it as "the knowledge, skills, and confidence to make responsible financial decisions". While not disagreeing with the importance of financial literacy, Soman and Mazar (2012) content that "financial literacy is not enough." Pointing to the research that shows that consumers are poor at converting intention into action, these authors posit that financial literacy alone can help improve intentions and make better financial plans. But this may not be enough to trigger suitable action. "Financial well-being is a three-legged stool, with knowledge, numeracy,

and behavioural facilitation as the three legs. Behavioural facilitation includes financial and social incentives and a deep insight into human psychology to design environments in which people are nudged towards making responsible choices" (Soman and Mazar 2012, p. 25).

### 3.5 Behaviourally Informed Innovation

Data suggests that the vast majority of new products and services fail to succeed in the marketplace. While there are many reasons for these failures, Soman, Stein and Wong (2014) argue that the primary reason is that innovators are not behaviourally informed and that they lack empathy for the typical consumer. These authors make a number of recommendations for how innovations can be more behaviourally informed – these include the need to craft precise value proposition statements, use choice architecture, focus on consumption in addition to adoption and developing innovations bottom-up from the field.

As is evident from the preceding discussion, the domain of inquiry of the Behavioural Sciences is beginning to intersect with a number of other areas beyond the social sciences. Table 2 provides a summary of these newer areas of intersections.

Table 2: *Behavioural Sciences and Areas of overlap with Other Disciplines*

| | **Academic Area** | **Overlap with the Behavioural Sciences** |
|---|---|---|
| **1** | Public Policy | Choice architecture, Behaviourally Informed Policy, Evidence Based Policy, Behaviour Change |
| **2** | Law | Consumer Protection, Disclosures, Jury Decision Making, Consumer Privacy |
| **3** | Computer Sciences and Decision Analysis | Decision Support Systems, Decision Aides and App Development |
| **4** | Design and New Product Development | Consumer Insights, Behaviourally Informed Innovation, Innovation Policy |
| **5** | Political Sciences | Voter decision-making |
| **6** | Accounting and Corporate Governance | Auditor decision making |
| **7** | Welfare and development Economics | Choice architecture and behaviour change |
| **8** | Healthcare Management and Health Economics | Models of physician behaviour, expert systems for clinical diagnosis, Health behaviour changes, demand for healthcare |

## 4. LOOKING FORWARD

In comparing the field of Behavioural Sciences today to what it used to be in the 1970s, a number of differences emerge. The field today draws on a larger number of theoretical foundations than it did in the past, and its scholars work in a wider array of substantive areas than they did in the past. Many of the changes in the field have been a function of broader

changes in the world, and these changes will continue in the future resulting in changes to both the lines of inquiry as well as the methods used by the behavioural scientist.

1) ***Data***: Both the consumer and the researcher today have access to unprecedented volume of data. In the past, consumers had to search for information by visiting stores and there was a real cost to their search efforts. Today, much of this information can be accessed from the privacy of one's home or through the mobility of a smartphone. This not only reduces the cost of search, but also allows the consumer the ability to organize the information in a manner that is most useful in their choice task. The ability of the consumer to reframe available information and hence the potential reduction in the ability of the marketer to manipulate a decision frame are interesting areas for the investigation.

   A second source of data available to the modern consumer is the preference of other consumers. Whether it is the "bestseller" list or product popularity ranking at an online retailer or simply a posting on a social media site what one's friends purchased, it is relatively easy to get a sense of what others are choosing. Access to this information can have a dramatic impact on choices, since a consumer can simply infer what they will like by seeing what others choose. This raises a number of important research questions on the role of others' choices on decision-making. One particular question is – relative to a brick and mortar world, will the distribution of preferences across the population continue to normally distribute, or are we likely to see a greater variation in preferences?

   The access to data also makes it easier for the behavioural scientist to conduct research online and to use archived datasets to empirically test emerging ideas about decision making.

2) ***Decision Support***: Given the reach of the web and mobile technologies, it is relatively easy for corporations and other organizations to make available to consumers calculators and apps that will help them make choices more systematically. For instance, banks often offer mortgage calculators and retirement planners, and online retailers provide choice engines that allow consumers to enter their preferences and to receive recommendations in exchange. Imagine a world in which every consumer has access to a calculator that can perform all the cognitive functions required to make choices. In this world, the consumer is simply left with the task of specifying her preferences (or, in the language of decision strategies, specifying the importance weight she places on each of the attributes). Will this tendency reduce the reliance on heuristics and result in decisions that are closer to what utility theory would predict?
3) ***Variety in the Marketplace***: Whether it be the local supermarket, the number of mortgage options or the size of the menu in the local coffee shop, it is evident that the number of alternatives that the modern day consumer has to choose between has increased dramatically. Given the research on overchoice and the potential benefits of decision aids, it is likely that choice strategy might evolve in the years to come. One evolution could be a multiple stage choice process in which the consumer first uses a heuristic for narrowing down to a small list of considered products and then uses a decision aid to make a final choice. A second strategy might involve the use of expert opinions – by crowdsourcing

opinions using online forums. In either case, there will be the need for a more nuanced theory of decision making that could handle these changes.

4) ***Privacy***: In parallel with the growth of data and social connectedness, the next few years will see an increase in the calls to safeguard consumer privacy and to ensure that consumer information is well protected. However, there is absolutely no research in the behavioural sciences on the concept of privacy of information. Under the utility theory framework, this issue can be studied by thinking of the tradeoff between the cost of privacy and the benefits of getting better service and information from the marketplace. However the research reviewed here would suggest that there are many more forces at play. There is a large role for the behavioural sciences to conceptualize privacy and identify its theoretical antecedents and consequences.
5) ***Helping people help themselves***: As discussed in the section on rationality, it is becoming abundantly clear that here is a large gap between intentions and actions, and hence any interventions that help consumers close this gap would result in increased consumer welfare. Choice architecture and transformative consumer research (TCR) are only now beginning to emerge as serious academic paradigms that have great relevance to consumer wellbeing and both are expected to evolve in the years to come.
6) ***Risks of Misuse***: While the behavioural sciences offer interesting insights to welfare and policy organizations in their quest to help make the work a better place for consumers, there are potential risks. First, there is the risk that a broader dissemination of the insights into how people make decisions might result in the greater incidence of its use for commercial purposes. For instance, might sellers of junk food and harmful substances get smarter and nudge people into purchasing products that are not good for them, and more generally can an increase in nudging result in overconsumption and reduced savings? Second, will the prevalence of large datasets on consumer behavior make it more likely that online advertisers and sellers get smarter about when and how to target consumers, and hence increase the insidious nature of communication? Third, will an increase in the data also result in a greater likelihood of data breaches and accompanying violations of privacy? These issues are also central to the discussion on TCR, and warrant further academic research.

In sum, as the field evolves, there will likely be significant changes in the theoretical, substantive and methodological foundations in the years to come.

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# Appendix 1:

## Economic Approaches: Variants of the Expected Utility Model adapted from Schoemaker (1982)

| | Model | What drives choice | Reference |
|---|---|---|---|
| **1** | Expected Monetary Value | The sum of dollar value x probability of getting each amount | Schoemaker (1982) |
| **2** | Expected Utility | The sum of utility of dollar value x probability of getting each amount | von Neumann and Morgenstern (1947) |
| **3** | Subjective Expected Utility | The sum of utility of dollar value x subjective probability of getting each amount | Edwards (1955) |
| **4** | Prospect Theory | The sum of dollar value x subjective probability of getting each amount | Kahneman and Tversky (1979) |

# Appendix 2: Leading Researchers

Dan Ariely

James Bettman

Colin F. Camerer

Hillel Einhorn (late)

Craig Fox

Robin Hogarth

Daniel Kahneman

George Lowenstein

Sendhil Mullainathan

Drazen Prelec

Eldar Shafir

Richard Thaler

Amos Tversky (late)

## Dan Ariely

| | |
|---|---|
| Institution | Duke University<br>• Fuqua School of Business<br>• Department of Economics<br>• The Center for Cognitive Neuroscience,<br>• School of Medicine |
| Education | Ph.D. Duke University, The Fuqua School of Business<br>*Business Administration, August 1998*<br>Ph.D. University of North Carolina<br>*Cognitive Psychology, August 1996* |
| Major Books/Talks | • Ariely, D. (2009). *Predictably irrational, revised and expanded edition: The hidden forces that shape our decisions*. HarperCollins.<br>• Ariely, D., & Jones, S. (2010). *The upside of irrationality: the unexpected benefits of defying logic at work and at home* (Vol. 159). New York, NY: Harper.<br>• Ariely, D. (2012). *The (honest) truth about dishonesty: How we lie to everyone–especially ourselves*. HarperCollins UK. |
| Major Articles | • Ariely, Dan, George Loewenstein, and Drazen Prelec. "“Coherent arbitrariness”: Stable demand curves without stable preferences." *The Quarterly Journal of Economics* 118.1 (2003): 73-106.<br>• Ariely, D., Loewenstein, G., & Prelec, D. (2006). Tom Sawyer and the construction of value. *Journal of Economic Behavior & Organization*, *60*(1), 1-10.<br>• Mazar, N., Amir, O., & Ariely, D. (2008). The dishonesty of honest people: A theory of self-concept maintenance. *Journal of marketing research*, *45*(6), 633-644. |
| Relevant URL’s | Curriculum Vitae:<br>http://people.duke.edu/~dandan/webfiles/arielycv.pdf<br>Links to major articles:<br>http://journals.ama.org/doi/abs/10.1509/jmkr.45.6.633 http://qje.oxfordjournals.org/content/118/1/73.full.pdf<br>Coursera Mooc:<br>http://www.mooc-list.com/course/beginners-guide-irrational-behavior-coursera |

## James Bettman

| | |
|---|---|
| Institution | Duke University<br>• Fuqua School of Business |
| Education | Ph.D. Yale University<br>*Administrative Sciences* |
| Major Books/Talks | • Payne, J. W., Bettman, J. R., & Johnson, E. J. (1993). *The adaptive decision maker*. Cambridge University Press.<br>• Bettman, J. R. (1979). *Information processing theory of consumer choice*. Addison-Wesley Pub. Co. |
| Major Articles | • Bettman, J. R., Luce, M. F., & Payne, J. W. (1998). Constructive consumer choice processes. *Journal of consumer research*, *25*(3), 187-217.<br>• Bettman, J. R., & Park, C. W. (1980). Effects of prior knowledge and experience and phase of the choice process on consumer decision processes: A protocol analysis. *Journal of Consumer Research*, *7*(3), 234. |
| Relevant URL’s | Curriculum Vitae:<br>http://www.fuqua.duke.edu/faculty_research/faculty_directory/bettman/<br>Links to major articles:<br>http://www.jstor.org/discover/10.1086/209535?uid=3739448&uid=2&uid=3737720&uid=4&sid=21103853635853<br>https://faculty.fuqua.duke.edu/~jrb12/bio/Jim/24.pdf |

## Colin F. Camerer

| | |
|---|---|
| Institution | California Institute of Technology (CALTECH)<br>• Division of Humanities and Social Sciences<br>• Behavioral Economics |
| Education | Ph.D. University of Chicago<br>*Graduate School of Business-Behavioral Decision Theory, 1981*<br>MBA University of Chicago<br>. *Graduate School of Business-Finance, 1979* |
| Major Books/Talks | • Behavioral Game Theory: Experiments on Strategic Interaction. Princeton: Princeton University Press, 2003. (Chinese translation by China People's University Press).<br>• Henrich, Joseph, et al. *Foundations of human sociality: Economic experiments and ethnographic evidence from fifteen small-scale societies*. Oxford University Press, 2004. |
| Major Articles | • Rousseau, Denise M., et al. "Not so different after all: A cross-discipline view of trust." *Academy of management review* 23.3 (1998): 393-404.<br>• Henrich, Joseph, et al. "In search of homo economicus: behavioral experiments in 15 small-scale societies." *The American Economic Review* 91.2 (2001): 73-78.<br>• "Individual decision making" in J. Kagel and A. Roth (Eds.), Handbook of Experimental Economics,<br>• Princeton, NJ: Princeton University Press, 1995. |
| Relevant URL's | Curriculum Vitae:<br>http://www.hss.caltech.edu/~camerer/CamerervitaJuly31_2013.pdf<br>Links to major articles:<br>http://portal.psychology.uoguelph.ca/coursenotes/gill/7140/WEEK_3_Jan.25/Rousseau,%20Sitkin,%20Burt,%20%26%20Camerer_AMR1998.pdf |

## Hillel Einhorn (Late)

| | |
|---|---|
| Institution | University of Chicago<br>• Graduate School of Business |
| Education | Ph.D. *Wayne State University* |
| Major Books/Talks | • Einhorn, H. J., & Hogarth, R. M. (Eds.). (1990). *Insights in decision making: A tribute to Hillel J. Einhorn*. University of Chicago Press. |
| Major Articles | • Einhorn, H. J., & Hogarth, R. M. (1981). Behavioral decision theory: Processes of judgment and choice. *Journal of Accounting Research*, *19*(1), 1-31.<br>• Einhorn, H. J., & Hogarth, R. M. (1978). Confidence in judgment: Persistence of the illusion of validity. *Psychological review*, *85*(5), 395.<br>• Hogarth, R. M., & Einhorn, H. J. (1992). Order effects in belief updating: The belief-adjustment model. *Cognitive psychology*, *24*(1), 1-55. |
| Relevant URL's | Links to major articles:<br>http://www.jstor.org/stable/2490959<br>http://implab.hu/wiki/images/e/ed/Einhorn_Hogarth_1978.pdf |

## Craig Fox

| | |
|---|---|
| Institution | University of California, Los Angeles<br>• Anderson School of Management |
| Education | Ph.D., Stanford University<br>M.A *Psychology, 1994* |
| Major Books/Talks | • Fox, C.R., and Poldrack, R.A. (2014). Prospect theory and the brain. Chapter in Glimcher, P., Fehr, E. (Eds).<br>• Cornelius, W. A., Craig, A. L., & Fox, J. (Eds.). (1994). *Transforming state-society relations in Mexico: The national solidarity strategy*. La Jolla, CA: Center for US-Mexican Studies, University of California, San Diego.. |
| Major Articles | • Tversky, A., and Fox, C.R. (1995). Weighing risk and uncertainty. Psychological Review, 102, 269-283.<br>• Fox, C.R., and Weber, M. (2002). Ambiguity aversion, comparative ignorance, and decision context. Organizational<br>• Behavior and Human Decision Processes, 88, 476-498.<br>• Tom, S., Fox, C.R., Trepel, C. and Poldrack, R.A. (2007). The neural basis of loss aversion in decision making under risk. Science, 315, 515-518 |
| Relevant URL's | Curriculum Vitae:<br>http://fox-lab.org/wp-content/uploads/2013/09/FoxCV_8-13.pdf<br>Links to major articles:<br>http://people.duke.edu/~dandan/webfiles/arielycv.pdf<br>http://www.sciencemag.org/content/315/5811/515.full |

## Robin Hogarth

| | |
|---|---|
| Institution | Universitat Pompeu Fabra<br>• Department of Economics & Business<br>• Barcelona Graduate School of Business |
| Education | Ph.D. University of Chicago, Graduate School of Business<br>Psychology & Statistics, 1972<br>MBA INSEAD (European Institute of Business Administration), 1968 |
| Major Books/Talks | • Hogarth, R. M. (2001). *Educating intuition*. University of Chicago Press.<br>• Hogarth, R. M. (1987). Judgement and choice: The psychology of decision. (2nd edition). Chichester, England: John Wiley & Sons. |
| Major Articles | • Behavioral decision theory: Processes of judgment and choice<br>HJ Einhorn, RM Hogarth Journal of Accounting Research 19 (1), 1-31<br>• The effects of financial incentives in experiments: A review and capital-labor-production framework CF Camerer, RM Hogarth Journal of risk and uncertainty 19 (1-3), 7-<br>• Confidence in judgment: Persistence of the illusion of validity. HJ Einhorn, RM Hogarth Psychological review 85 (5), 395 |
| Relevant URL's | Curriculum Vitae:<br>http://www.econ.upf.edu/docs/cvs/p2047.pdf<br>Links to major articles:<br>http://implab.hu/wiki/images/e/ed/Einhorn_Hogarth_1978.pdf |

## Daniel Kahneman

| | |
|---|---|
| Institution | Princeton University<br>• Woodrow Wilson School |
| Education | Ph.D. University of California, Berkeley<br>*Psychology, 1961* |
| Best Known for | • Nobel Memorial Prize in Economics Sciences |
| Major Books/Talks | • Kahneman, D. (1973). Attention and effort.<br>• Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan. |
| Major Articles | • Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American psychologist*, *39*(4), 341.<br>• Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society*, 263-291.<br>• Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, *185*(4157), 1124-1131.<br>• Advances in prospect theory: Cumulative representation of uncertainty (1992)- Journal of Risk and uncertainty |
| Relevant URL's | Links to major articles:<br>http://www.princeton.edu/%7Ekahneman/docs/Publications/prospect_theory.pdf<br>http://www.sciencemag.org/content/185/4157/1124.full.pdf?keytype=ref&siteid=sci&ijkey=dJhbByXCo4oDM<br>http://www.princeton.edu/~kahneman/docs/DKahnemanCV.pdf |

## George Lowenstein

| | |
|---|---|
| Institution | Carnegie Mellon University<br>• Department of Social and Decision Sciences |
| Education | Ph.D. Yale University<br>*Economics* |
| Major Books/Talks | ▪ Camerer, C. F., Loewenstein, G., & Rabin, M. (Eds.). (2011). *Advances in behavioral economics*. Princeton University Press.<br>▪ Loewenstein, G., Read, D., & Baumeister, R. F. (Eds.). (2003). *Time and decision: Economic and psychological perspectives on intertemporal choice*. Russell Sage Foundation.<br>Loewenstein, G., & Elster, J. (Eds.). (1992). *Choice over time*. Russell Sage Foundation. |
| Major Articles | ▪ Strahilevitz, M., & Loewenstein, G. (1998). The effect of ownership history on the valuation of objects. *Journal of Consumer Research*, *25*(3)<br>▪ Camerer, C. F., Loewenstein, G., & Prelec, D. (2004). Neuroeconomics: Why economics needs brains. *The Scandinavian Journal of Economics*, *106*(3), 555-579.<br>▪ Ubel, P. A., Loewenstein, G., & Jepson, C. (2003). Whose quality of life? A commentary exploring discrepancies between health state evaluations of patients and the general public. *Quality of Life Research*, *12*(6), 599-607.. |
| Relevant URL's | Links to major articles:<br>http://www.jstor.org/stable/10.1086/209539<br>http://www.jstor.org/stable/3441124<br>http://download.springer.com/static/pdf/158/art%253A10.1023%252FA%253A1025119931010.pdf?auth66=1391650755_44606c1d886e560ce205a344cf489a5d&ext=.pdf |

## Sendhil Mullainathan

| | |
|---|---|
| Institution | Harvard University<br>• Department of Economics |
| Education | Ph.D. Harvard University<br>*Economics, 1998* |
| Major Books/Talks | • Mullainathan, S., & Shafir, E. (2013). *Scarcity: Why having too little means so much*. Macmillan.<br>• Kling, J. R., Congdon, W. J., & Mullainathan, S. (2011). *Policy and choice: public finance through the lens of behavioral economics*. Brookings Institution Press.<br>• TED Talk: Solving Social Problems with a Nudge |
| Major Articles | • Allcott, H., Mullainathan, S., & Taubinsky, D. (2012). *Externalities, internalities, and the targeting of energy policy*. National Bureau of Economic Research.<br>• "How Much Should We Trust Difference-in-Difference Estimates?" joint with Marianne Bertrand & Esther Duflo, The Quarterly Journal of Economics, 119(1), 2004: 249-275.<br>• "Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination," joint with Marianne Bertrand, American Economic Review, 94( 4), September 2004: 991-1013.<br>• "Are CEOs Rewarded for Luck? The Ones Without Principals Are," joint with Marianne Bertrand, The Quarterly Journal of Economics, 116(3), August 2001: 901-32 |
| Relevant URL's | Curriculum Vitae:<br>http://scholar.harvard.edu/files/mullainathan/files/mullainathan_2012_cv.pdf<br>Links to major articles:<br>http://qje.oxfordjournals.org/content/119/1/249.full.pdf<br>http://mail.nationalfairhousing.org/html/archives/Mit_Uchiago_study.pdf<br>TED Talk<br>http://www.ted.com/talks/sendhil_mullainathan |

## Drazen Prelec

| | |
|---|---|
| Institution | Massachusetts Institute of Technology (MIT)<br>• Department of Economics<br>• Department of Brain and Cognitive Sciences |
| Education | Ph.D. Harvard University<br>*Experimental Psychology, 1983* |
| Major Articles | • Loewenstein, George, and Drazen Prelec. "Anomalies in intertemporal choice: Evidence and an interpretation." *The Quarterly Journal of Economics* 107.2 (1992): 573-597.<br>• Camerer, Colin, George Loewenstein, and Drazen Prelec. "Neuroeconomics: How neuroscience can inform economics." *Journal of economic Literature*(2005): 9-64.<br>• Prelec, Drazen. "The probability weighting function." *Econometrica* (1998): 497-527.<br>• Prelec, D. (2000). Compound invariant weighting functions in prospect theory.*Choices, values, and frames*, 67-92. |
| Relevant URL's | Curriculum Vitae: http://economics.mit.edu/faculty/dprelec/cv |

## Eldar Shafir

| | |
|---|---|
| Institution | Princeton University<br>• Department of Psychology<br>• Woodrow Wilson School of Public and International Affairs |
| Education | Ph.D. Massachusetts Institute of Technology (MIT)<br>*Cognitive Science, 1988* |
| Major Books/Talks | • Mullainathan, S., & Shafir, E. 2013. *Scarcity: Why Having Too Little Means So Much*. NY: Henry Holt Times Books. |
| Major Articles | • Shafir, E., Simonson, I., & Tversky, A. 1993. Reason-based choice. *Cognition,49,* 2, 11-36.<br>• Tversky, Amos, and Eldar Shafir. "Choice under conflict: The dynamics of deferred decision." *Psychological science* 3.6 (1992): 358-361.<br>• Shafir, Eldar, Peter Diamond, and Amos Tversky. "Money illusion." *The Quarterly Journal of Economics* 112.2 (1997): 341-374.<br>• Shafir, E. (1993). Choosing versus rejecting: Why some options are both better and worse than others. *Memory & Cognition*, *21*(4), 546-556. |
| Relevant URL's | Curriculum Vitae:<br>http://psych.princeton.edu/psychology/research/shafir/publications.php<br>Links to Articles<br>http://qje.oxfordjournals.org/content/112/2/341.full.pdf<br>http://pss.sagepub.com/content/3/6/358.full.pdf<br>ftp://www.econ.bgu.ac.il/courses/Behavioral_Economics/Notes/Presentations/shafir_cognition93_reasonbasedchoice.pdf |

## Herbert A. Simon

| | |
|---|---|
| Institution | Cargeie Mellon University<br>University of California, Berkeley<br>Illinois Institute of Technology |
| Best Known for | Nobel Prize in Economics (1978), Economic Sciences (Bounded Rationality) |
| Education | Ph.D. University of Chicago |
| Major Books/Talks | • Simon, H. A. (1976). *Administrative behavior* (Vol. 3). New York: Free Press.<br>• Newell, A., & Simon, H. A. (1972). *Human problem solving* (Vol. 104, No. 9). Englewood Cliffs, NJ: Prentice-Hall.<br>• Simon, H. A. (1996). *The sciences of the artificial*. MIT press. |
| Major Articles | • March, J. G., & Simon, H. A. (1958). Organizations.<br>• Simon, H. A. (1955). A behavioral model of rational choice. *The quarterly journal of economics*, *69*(1), 99-118.<br>• Simon, H. A. (1982). *Models of bounded rationality: Empirically grounded economic reason* (Vol. 3). MIT press. |
| Relevant URL's | Nobel Prize Winner description<br>http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1978/simon-bio.html<br>Links to articles & books<br>http://qje.oxfordjournals.org/content/69/1/99.abstract<br>http://cumincad.scix.net/cgi-bin/works/Show&_id=caadria2010_000&sort=DEFAULT&search=series:caadria/Show?1d30 |

## Itamar Simonson

| | |
|---|---|
| Institution | Stanford University<br>• Marketing |
| Education | Ph.D. Duke University<br>*Marketing*<br>MBA University of California, Los Angeles |
| Major Books/Talks | • Mullainathan, S., & Shafir, E. 2013. Scarcity: Why Having Too Little Means So Much. NY: Henry Holt Times Books. |
| Major Articles | • Simonson, I., & Tversky, A. (1992). Choice in context: Tradeoff contrast and extremeness aversion. *Journal of Marketing Research (JMR)*, *29*(3).<br>• Shafir, E., Simonson, I., & Tversky, A. (1993). Reason-based choice. *Cognition*, *49*(1), 11-36.<br>• Simonson, I. (2007). Will I like a'medium'pillow? another look at constructed and inherent preferences. *Journal of Consumer Psychology, Forthcoming*. |
| Relevant URL's | Curriculum Vitae:<br>http://www.gsb.stanford.edu/users/itamars<br>Links to Articles<br>https://gsbapps.stanford.edu/researchpapers/library/RP1977.pdf<br>ftp://www.econ.bgu.ac.il/courses/Behavioral_Economics/Notes/Presentations/shafir_cognition93_reasonbasedchoice.pdf |

## Cass Sunstein

| | |
|---|---|
| Institution | Harvard University<br>• Law School<br>University of Chicago<br>• Law School & Department of Political Science |
| Education | J.D. Harvard Law School |
| Major Books/Talks | • Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. Yale University Press.<br>• Sunstein, C. R. (2013). *Simpler: the future of government*. Simon and Schuster.<br>• Sunstein, C. R. (2014). *Why Nudge?: The Politics of Libertarian Paternalism*. Yale University Press.<br>• Quasi-Rational Economics, Russell Sage Foundation, 1991. |
| Major Articles | • Sunstein, Cass R. "Empirically Informed Regulation," 78 *University of Chicago Law Review* 1349 (2011).<br>• Sunstein, Cass R. *Worst-Case Scenarios* (Harvard University Press 2007).<br>• Sunstein, Cass R. *Risk and Reason* (Cambridge University Press 2002). |
| Relevant URL's | Biography/Curriculum Vitae:<br>http://www.law.harvard.edu/faculty/directory/10871/Sunstein/<br>http://www.law.uchicago.edu/node/3552/cv |

## Richard Thaler

| | |
|---|---|
| Institution | University of Chicago<br>• Booth School of Business |
| Education | Ph.D. University of Rochester<br>M.A. University of Rochester |
| Major Books/Talks | • With Cass Sunstein, *Nudge: Improving Decisions about Health, Wealth and Happiness,* Yale University Press (2008).<br>• *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Free Press, 1991 (Princeton University Press paperback, 1993).<br>• *Quasi-Rational Economics*, Russell Sage Foundation, 1991. |
| Major Articles | • Bondt, W. F., & Thaler, R. (1985). Does the stock market overreact?. *The Journal of finance*, *40*(3), 793-805.<br>• Thaler, R. (1985). Mental accounting and consumer choice. *Marketing science*,*4*(3), 199-214.<br>• With Shlomo Benartzi, Post, T., Van den Assem, MJ., Baltussen, G and Thaler, Richard H. , "Deal or No Deal? Decision Making Under Risk in a Large-Payoff Game Show," *American Economic Review* 98 (1), 38-71 (2008). |
| Relevant URL's | Curriculum Vitae: http://faculty.chicagobooth.edu/Richard.Thaler/vitae/CV.pdf |

## Amos Tversky (Late)

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|---|---|
| Institution | Stanford University<br>• Department of Psychology |
| Education | Ph.D. University of Michigan |
| Major Books/Talks | • Tversky, Amos, C. H. Coombs, and Robyn Dawes. 1970. *Mathematical psychology: An elementary Introduction*. Englewood Cliffs, NJ: Prentice-Hall.<br>• Kahneman, D., Slovic, P., & Tversky, A. (Eds.). (1982). *Judgment under uncertainty: Heuristics and biases*. Cambridge University Press. |
| Major Articles | • Tversky, Amos, and Daniel Kahneman. 1974. Judgment under uncertainty: Heuristics and biases. *Science* 185(4157): 1124-1131.<br>• Tversky, Amos, and Daniel Kahneman. 1979. Prospect theory: An analysis of decision making under risk. *Econometrica* 47(2): 263-292<br>• Tversky, Amos, and Daniel Kahneman. 1981. The framing of decisions and the psychology of choice |
| Relevant URL's | Judgment Under Uncertainty:<br>http://www.cog.brown.edu/courses/cg195/pdf_files/fall05/CG195TverskyKahn1974.pdf<br>Prospect Theory:<br>http://www.jstor.org/stable/1914185 |

# Appendix 3:

# List of Academic Journals & Further References

**American Economic Review**
- https://www.aeaweb.org/aer/

**Journal of Behavioural Decision Making**
- http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1099-0771

**Journal of Consumer Psychology**
- http://www.journals.elsevier.com/journal-of-consumer-psychology/

**Journal of Consumer Research**
- http://www.ejcr.org

**Journal of Marketing Research**
- http://journals.ama.org/loi/jmkg

**Management Science**
- http://pubsonline.informs.org/journal/mnsc

**OBHDP (Organizational Behavior and Human Decision Processes)**
- http://www.journals.elsevier.com/organizational-behavior-and-human-decision-processes/

**Psychological Bulletin**
- http://www.apa.org/pubs/journals/bul/index.aspx

**Psychological Sciences**
- http://www.psychologicalscience.org/index.php/publications/journals/psychological_science

**Quarterly Journal of Economics**
- http://qje.oxfordjournals.org

# Appendix 4:

# Phenomena & Empirical Generalization

Active Choice & Enhanced Active Choice
Anchoring
Asymmetric Dominance/Decoy
Automatic Enrolment
Channel Factors
Choosing vs. Rejecting
Compromise Effect
Construal Levels
Decision Points
Defaults: Opt-in vs. Opt-out
Earmarking
Framing: Gain vs. Loss (Loss Aversion)
Goal Visibility
Hedonic Editing
Mindset:
Choice vs. Evaluation
Deliberative vs. Implemental
Pain of Payment and Payment Transparency
Partitioning/Bracketing
Payment Depreciation
Peer Programs & Social Comparisons
Perceived Progress
Precommitment
Self-Awareness/Identity
Single stage vs. Multiple stage Decisions
Sunk Cost Effect
Temptation Bundling
Transaction Decoupling

These phenomena are specific instantiations of the empirical generalizations discussed in section 2 (see each entry below for a cross-reference to the relevant subsection)

| Term | Idea in Brief | Illustrative Examples |
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| ACTIVE CHOICE AND ENHANCED ACTIVE CHOICE<br><br>[Example of Decisions by Heuristics and Resulting Biases, §2.1] | Highlighting the fact that a decision needs to be made increases the attention paid to the decision-making process. This is especially useful for choices which are typically passive (e.g. Getting a flu shot, renewing a health club plan, donating organs). Enhanced active choice refers to the presentation of options that highlight the cost of making a "no" choice. | Rather than waiting for individuals to stop by a clinic to get a flu shot, they could be actively asked whether they intend to get one (active choice). Alternately, the could be presented with two options – a) yes, I will get a flu shot and protect me and my family, or b) no, I am willing to expose me and my family to the risk of disease. The likelihood of getting a flu shot should increase with active choice, and further increase with enhanced active choice. |
| *References* | Punam Anand Keller, Bari Harlam, George Loewenstein, Kevin G. Volpp, Enhanced active choice: A new method to motivate behavior change, Journal of Consumer Psychology, Volume 21, Issue 4, October 2011, Pages 376–383 | |
| ANCHORING<br><br>[Example of Decisions by Heuristics and Resulting Biases, §2.1] | Numerical judgments tend to be influenced by prominent numbers that are available in the context. These prominent numbers – called anchors – need not even be relevant to the judgment | Two groups of people were asked to estimate the population of Perth, Australia. Before estimating, one group was asked whether they thought the population was greater or less than 50,000. The second group was asked whether they thought the population was greater or less than 10,000,000. The actual estimates provided by the second group were significantly higher.<br>Similarly, shoppers who encounter high price items early in their shopping trip are more likely to purchase cheaper items later. |
| *References* | Tversky, A. & Kahneman, D. (1974). "Judgment under uncertainty: Heuristics and biases". Science, 185, 1124, 1128-1130. | |
| ASYMMETRIC DOMINANCE/ DECOY<br><br>[Example of Role of Context in Decision Making, §2.3] | Consider two options that vary on two attributes. A is better than B on attribute one, but not as good on attribute two. Adding s third option, B*, that is worse than B on both attributes shifts choices towards B. B* can be called a decoy because it is not really preferred, but shifts choices among the other two. | A consumer cannot choose between two headphones. A has a sound quality index of 100 and a comfort rating of 50. B has a sound quality index of 50 and a comfort rating of 100. The addition of a third headphone B* with 40 sound quality index and a 90 comfort rating will increase his likelihood of choosing B. |
| *References* | Tversky, A. & Kahneman, D. (1974). "Judgment under uncertainty: Heuristics and biases". Science, 185, 1124, 1128-1130. | |

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| AUTOMATIC ENROLMENT<br><br>[Example of Role of Context in Decision Making, §2.3] | Automatically enrolling people in benefit programs or provident funds but giving them the option of withdrawing increases the likelihood that they will continue to participate. | Company A requires all employees who want to participate in their benefits program to sign a form and send it to the human resources department. Company B automatically enrolls all employees into an identical benefits program, but allows them to withdraw with no penalties by signing a form and sending it to the human resources department. In the long run, company B has a significantly higher participation rate in its benefits programs. |
| *References* | The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior Brigitte C. Madrian and Dennis F. Shea NBER Working Paper No. 7682 May 2000 | |
| CHANNEL FACTORS<br><br>[Example of Role of Context in Decision Making, §2.3] | Features of the physical space and surroundings in a task oriented environment can either facilitate or hinder the achievement of the task. Eliminating features that hinder the task will increase the likelihood of completion. | Two groups of low-income consumers heard a (identical) seminar about the importance of opening bank accounts. At the end of the seminar, one group was given the forms needed to open bank accounts, while the second was given forms as well as a map and directions to the bank. Significantly more people from the second group opened bank accounts. |
| *References* | Mullainathan, S., & Shafir, E.(2009), "Savings Policy & Decision-Making in Low-Income Households," In Michael Barr and Rebecca Blank (Eds.), Insufficient Funds: Savings, Assets, Credit and Banking Among Low-Income Households. Russell Sage Foundation Press (pp. 121-145). | |
| CHOOSING VS. REJECTING<br><br>[Example of Framing and Mental Accounting, §2.2] | The manner in which people are asked to choose between two options can change the information they use in making the decision. In particular, asking people to choose between A and B results on their focusing on reasons to choose (positive aspects, while asking them to reject A or B results on them focusing on reasons to reject. (Negative aspects). | A manager is looking to hire one of two job candidates. Mr. A is average on all four relevant attributes, white Ms. B is outstanding on two and weak on the other two. When the manager chooses between the two, B tends to be preferred over A (there are more reasons to choose B). When the manager is rejecting one of the two, B tends to get rejected more often (there are more reasons to reject B). |
| *References* | SHAFIR, E. (1993). Choosing versus rejecting: Why some options are both better and worse than others.Memory & Cognition,21, 546–556. | |

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| COMPROMISE EFFECT<br><br>[Example of Role of Context in Decision Making, §2.3] | When people choose between three options that vary along two dimensions, the option in the middle (which is average on both dimensions) tends to get chosen more often. Conversely, the likelihood of choice of an option can be increased by making it the "compromise" option. This effect is particularly strong for options where it is difficult to evaluate quality. | 1) A gas station sold 89 and 91 octane petrol. The sales of 91 went up after they now introduced a 94 octane grade, because 91 now became the "compromise" option.<br><br>2) In most coffee shops offering three sizes of beverages, the medium is the most popular size. |
| *References* | Itamar Simonson (1989), "Choice Based on Reasons: The Case of Attraction and Compromise Effects," Journal of Consumer Research, 16 (September), 158-174. | |
| CONSTRUAL LEVELS<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | When events are to happen in the future, people view them in them of their higher level benefits. When the same event is to happen now, it is viewed in terms of concrete details. For events that have high levels of abstract benefits but involve a lot of concrete detail (effort), this results in a diminished attractiveness of the event as it comes closer in time. | Neel was intrigued by the possibility of learning a new language and enrolled for Japanese classes that would happen in two months. After two months passed, the inconvenience of taking public transit, purchasing books, and giving up on leisure activities seemed too much, and he decided to cancel his registration. |
| *References* | Trope Y, Liberman N. Temporal construal. Psychological Review. 2003;110:403–421. | |
| DECISION POINTS<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | People often start consumption episodes with a decision to consume, but then passively continue consumption 'till they hit a constraint. Inserting an opportunity to pause and think about the consumption in an active manner (a decision point) will increase vigilance and hence, the likelihood that consumption stops. Decision points could take the form of reminders, small transaction costs, or physical partitions. | Mr. X is given a large bucket of popcorn. Mr. Y has the same quantity of popcorn in four equal bags. Assuming that they are both conscious of the need to control consumption, Mr. Y will consume less than Mr. X. |
| *References* | Soman, Dilip, Jing Xu and Amar Cheema (2010), "A Theory of Decision Points," Rotman Magazine, Winter 2010. | |

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| DEFAULTS: OPT-IN VS. OPT-OUT<br><br>[Example of Role of Context in Decision Making, §2.3] | The default choice in any decision task refers to the outcome that would happen if the individual did not make a choice. If the likelihood that people will choose not to choose is high, making a desired outcome the default will increase the likelihood of it being chosen. | 1) In Canada, citizens wishing to donate organs must follow a procedure to get registered. Is France, the assumption is that everybody will donate organs, but citizens wishing to not donate can follow a procedure to get de-registered. Organ donation rates are significantly higher in France than in Canada.<br>2) In country A, credit card applicants must sign a consent allowing for their mailing address to be shared on a mailing list. In country B, applicants need to sign to prevent their addresses from being on a mailing list. The average citizen in country A receives a lot less junk mail than in country B. |
| *References* | E. Johnson and D. Goldstein (2003), "Do Defaults Save Lives?" Science 21 November 2003: Vol. 302 no. 5649 pp. 1338-1339 | |
| EARMARKING<br><br>[Example of Framing and Mental Accounting, §2.2] | Money that is designated toward a particular cause is more likely to be spent on that cause. Earmarking can be achieved by physically segregating money. | Labourers in India were given a savings target of Rs. 40 per pay period. Some of them were encouraged to earmark Rs. 40 by putting it in a separate envelope. These labourers were more likely to save. |
| *References* | Soman, Dilip and Amar Cheema (2011), "Earmarking and Partitioning: Increasing Saving by Low-income Households," Journal of Marketing Research, 48 (Special), S14-S22 | |
| FRAMING: GAIN VS. LOSS (LOSS AVERSION)<br><br>[Example of Framing and Mental Accounting, §2.2] | Presenting the same outcome as a loss has a greater psychological effect than presenting it as a gain. | 1) When a 3% credit surcharge was framed as a cash discount, the price difference between paying by credit cards and cash was seen as more acceptable.<br>2) In one neighbourhood, employees of a utility company tried to convince households to purchase energy—efficient appliances cy saying "If you use these appliances, you will save $10 per month." In a second neighbourhood, this statement was changed to "If you fail to use these appliances, you will lose $10 per month." The likelihood of purchasing was significantly greater in the second neighbourhood. |
| *References* | D. Kahneman and A. Tversky (1979), "Prospect Theory: An Analysis of Decision under Risk," Econometrica, 47(2), pp. 263-291. | |

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| FRAMING: PENNIES A DAY<br><br>[Example of Framing and Mental Accounting, §2.2] | Presenting a large dollar amount as an equivalent number of dollars per day could increase the acceptability of this expense. However, this effect reverses if the per day expense is very large. | A charity asked individuals to donate $350 towards a certain cause. Subsequently, they changed their request and framed the money as "less than a dollar a day". Donations increased significantly. |
| *References* | Gourville, J. T. "Pennies-a-Day: The Effect of Temporal Reframing on Transaction Evaluation." Journal of Consumer Research 24, no. 4 (March 1998): 395–408 | |
| GOAL VISIBILITY<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | When people are in the middle of a goal-oriented task, they work harder towards accomplishing the goal when it is in sight. Consequently, reminding people of their goal or making the goal more salient or visual increases motivation. | 1) Competitive swimmers swim faster on laps in which they face the end point of the race, and slower when they are swimming away from the endpoint.<br>2) Putting photographs of children on savings envelopes increased the saving rate of parents who were waving for their children's education. |
| *References* | Cheema, Amar and Rajesh Bagchi (2011), "Goal Visualization and Goal Pursuit: Implications for Individuals and Managers," Journal of Marketing, 75 (March), 109-23 | |
| HEDONIC EDITING<br><br>[Example of Framing and Mental Accounting, §2.2] | People either integrate or segregate monetary outcomes in order to maximize their psychological impact. In particular:<br>·A single loss is preferred to multiple losses.<br>·In situations where there is a large loss and a small gain, the gain should be separated from the loss (the silver lining principle) Multiple gains are preferred to a single gain. | A tire shop that charged $200 for tire replacement offered a $10 discount. This small benefit was lost in the context of the large price tag. A second tire shop instead mailed their patrons a $10 gift certificate two weeks after getting their tires replaced. By separating this small gain, they made its psychological value much higher. |
| *References* | Thaler, R. H. (1999). Mental accounting matters. Journal of Behavioral Decision Making, 12,183-206. | |

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| MINDSET: CHOICE VS. EVALUATION<br><br>[Example of Rationality and Irrationality, §2.6] | A mindset refers to the style with which the human brain processes information. When a person has made a large number of choices, they are more likely to view incoming (unrelated) information as a choice problem. | One group of people were asked "which of the following is more prototypical of birds?" by making choices between a large numbers of pairs of birds (e.g. "Crow or penguin?"). a second group was asked to evaluate (not choose) the prototypicality of a large number of birds on a scale. Both groups were shown purchase opportunities where they could choose Product A, product, or to not choose at all. People who had chosen amongst birds were more likely to choose, and hence make a purchase, than people who merely evaluated. |
| *References* | The Comparative Mind-set: From Animal Comparisons to Increased Purchase Intentions; Xu, Alison Jing and Robert S. Wyer, Jr.; Psychological Science; Issue: 19; 2008; Pages: 859-864 | |
| MINDSET: DELIBERATIVE VS. IMPLEMENTAL<br><br>[Example of Rationality and Irrationality, §2.6] | A mindset refers to the style with which the human brain processes information. When a person has approached a large number of events with a view to getting them done (rather than merely thinking about them), they are more likely to get the next event done. | Ms. A and Ms. B both faced a job that was due in three weeks and were asked when they planned to start working on it. Prior to this, Ms. A was asked about the value of five other jobs she had done, while Ms. B was asked how she accomplished five other jobs that she had done. Ms. B was more likely so start working on the new job sooner. |
| *References* | Gollwitzer, P. (1999), "Implementation Intentions: Strong Effects of Simple Plans," American Psychologist, 54 (July), 493-503 | |
| PAIN OF PAYMENT AND PAYMENT TRANSPARENCY<br><br>[Example of Framing and Mental Accounting, §2.2] | In addition to the negativity of paying a certain amount, the manner in which the payment is made can create further negativity. Certain methods of payment that are extremely transparent (e.g. Cash or cheque) feel more painful than others that are not as transparent (e.g. Electronic or direct debit). The pain of payment determines the willingness to spend. | 1) When a Laundromat shifted from accepting cash to accepting prepaid cards, the number of people running multiple loads of laundry increased.<br>2) When a cafeteria in Hong Kong moved from accepting cash to accepting the Octopus (a prepaid electronic card) the sales of desserts and beverages increased |
| *References* | Soman, Dilip (2001), "Effects of Payment Mechanism on Spending Behavior: The Role of Rehearsal and Immediacy of Payments," Journal of Consumer Research, 27 (March), 460–474 | |

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| PARTITIONING/ BRACKETING<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | Partitioning multiple objects into separate categories increases the nature of the choice process between those alternatives. | A mutual fund company sorted their offering of mutual funds along the country of origin. As a result, their customers diversified by trying to purchase funds from different countries. When the same set of mutual funds was sorted by the industry type, diversification by country decreased, while diversification by industry increased. |
| *References* | Fox, C.R., Ratner, R.K., & Lieb, D. (2005). "How Subjective Grouping of Options Influences Choice and Allocation: Diversification Bias and the Phenomenon of Partition Dependence," Journal of Experimental Psychology: General, 134 (4), 538-551. | |
| PAYMENT DEPRECIATION<br><br>[Example of Framing and Mental Accounting, §2.2] | The pain of payment decreases as time passes from the payment. As a result, the strength of the sunk cost effect (a pressure to consume events that have been prepaid for) decreases with time. | The attendance rates at a physical fitness centre gradually decline from the time of making n annual membership payment. On the other hand, patrons that make monthly payments show a more stable attendance rate as a function of time. |
| *References* | Gourville, John and Dilip Soman (1998), "Payment Depreciation: The Behavioral Effects of Temporally Separating Payments from Consumption," Journal of Consumer Research, 25(2), 160-174. | |
| PEER PROGRAMS AND SOCIAL COMPARISONS<br><br>[Example of Group / Agent Decision Making, §2.5] | Making a commitment in the presence of peers increases the likelihood that the commitment will be followed by appropriate action. Also, the presence of peers who have high levels of accomplishment increase the motivation to similarly increase accomplishment. | 1) Members of a self help group savings program increase their savings rate when their peers routinely met to discuss progress and outcomes.<br>2) Households in the UK were sent letters encouraging them to pay taxes on time. When these letters included a statement of peer performance (e.g. "9/10 people in the UK pay their takes on time") the letters were more effective. |
| *References* | F Kast, S Meier and D Pomerantz (2011), Under-Savers Anonymous: Evidence on Self-Help Groups and Peer Pressure as a Savings Commitment Device Working Paper (2011), Columbia University | |

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| PERCEIVED PROGRESS<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | People in a goal-oriented task are more motivated to accomplish the task when they receive feedback about the progress they have made. Their motivation is driven not only by actual levels of progress, but also by their perception of progress. | 1) People waiting in a long queue were more likely to continue waiting when the queue took the form of a line that moved as some people were being served, rather than a take-a-number-and-wait queue.<br>2) Two groups of people were given 400 lines of text to proofread. The first group received 20 pages of 20 lines each; the second group received 40 pages of 10 lines each. Members of the second group found themselves flipping through pages faster, had a greater perception of progress, and were hence more likely to finish the task. |
| *References* | Zhou, Rongrong and Dilip Soman (2003). "Looking Back: Exploring the Psychology of Queuing and the Effect of the Number of People Behind?" Journal of Consumer Research, 29 (March), 517-530 | |
| PRECOMMIT-MENT<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | When people view events that are in the future, they are more likely to be rational and wise about their choices. When the same events are in the present, people act impulsively and make foolish choices. Therefore, the best way of nudging people to make wise choices is to ask them to commit to making those choices for the future. | Employees in an organization were asked if they would like to increase their savings rate in the future. Most agreed, and committed to setting aside a proportion of their future salary increase into a separate savings account. These people who were asked to save more saved significantly more than people who worked with a traditional financial advisor. |
| *References* | Thaler, R. H., & Benartzi, S. (2004), "Save more tomorrow: Using behavioral economics to increase employee saving," Journal of Political Economy, 112, 164-187. | |
| SELF AWARENESS/ IDENTITY<br><br>[Example of Group / Agent Decision Making, §2.5] | Any intervention that increases one's identity as a virtuous person increases the likelihood that they will make virtuous choices. However, it is important that the intervention happens before the choices have to be made. | People often misreport (cheat) in domains ranging from tax forms to insurance claims. In most of these situations, people have to sign and declare that the contents of the form are true – but the declaration is made at the end of the form, after all the reporting has been done. When the declaration is made prior to the reporting, the extent of misreporting and cheating significantly declines. |
| *References* | Shu, Lisa L., Nina Mazar, Francesca Gino, Dan Ariely, and Max H. Bazerman (2012), "Signing at the beginning makes ethics salient and decreases dishonest self-reports in comparison to signing at the end," Proceedings of the National Academy of Sciences (PNAS); Issue: 109 (38); 2012; Pages: 15197-15200. | |

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| SINGLE STAGE VS. MULTIPLE STAGE DECISIONS<br><br>[Example of Framing and Mental Accounting, §2.2] | Presenting the same choice as a multiple stage decision rather than a single stage decision can change the outcome of the choice task. | 1) One group of people (A) were told they would play in a lottery which offered a 25% chance of going to the second round. At this round, they were asked to choose between:<br><br>Option 1A: Get $300 for sure<br>Option 2A: 80% chance of winning $450, else nothing<br><br>A second group (B) was offered a choice between two gambles:<br>Option 1B: 25% chance of winning $300, else nothing<br>Option 2B: 20% chance of winning $450, else nothing<br>Option 1A is identical to 1B, and 2A is identical to 2B. Yet people in group A prefer 1A over 2A (there is an illusion of certainty) while people in group B prefer 2B to 1A (now $450 appears larger than $300, while the difference between 20% and 25% doesn't seem as large). Hence, presenting a gamble as a two stage decision could create an illusion of certainty and change choice.<br><br>2) A group of friends are deciding which restaurant to go to for dinner. In one version, they are asked to choose between Chinese, Italian, or Thai cuisines. In a second version, they are first asked if they would like Chinese, and if not, whether they would like Thai or Italian. The likelihood of choosing Chinese is significantly greater in the second version. |
| *References* | D. Kahneman and A. Tversky (1979), "Prospect Theory: An Analysis of Decision under Risk," Econometrica, 47(2), pp. 263-291. | |

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| SUNK COST EFFECT<br><br>[Example of Framing and Mental Accounting, §2.2] | People who have prepaid for a consumption opportunity are driven to consume so that they can satisfactorily close their mental account without a loss. The drive to consume will be greater when the amount prepaid is higher. | Jack and Jill both had rink side seats for a basketball game. On the day of the game, there was a heavy snowstorm and the game was being shown on TV. Jill decided to stay home, while Jack braved the treacherous conditions to attend the game. Jill had received her ticket as a gift, while Jack had paid $100 for it. |
| *References* | Thaler, R. H. (1999). Mental accounting matters. Journal of Behavioral Decision Making, 12,183-206. | |
| TEMPTATION BUNDLING<br><br>[Example of Dual Process Models and Intertemporal Choice , §2.4] | Creating a mechanism where people can only consume an indulgence while they consume a virtuous product will increase the likelihood that the virtuous product is consumed. | Two groups of people were encouraged to exercise more often. One of the groups was allowed to watch their favourite TV show only in the gym room, while the other had no such constraint. People in the first group exercised more because they could bundle their temptation along with the exercise. |
| *References* | Milkman, K.L., J.A. Minson, and K.G.M. Volpp. "Holding the Hunger Games Hostage at the Gym: An Evaluation of Temptation Bundling." In press, Management Science. | |
| TRANSACTION DECOUPLING<br><br>[Example of Framing and Mental Accounting, §2.2] | The strength of the sunk cost effect can be weakened if the physical form of a transaction makes it difficult to associate a price tag with every unit of consumption. | Jack and Jill both had season tickets for their favourite basketball team. While they paid the same amount, the physical formats of the season tickets were different. Jack's tickets took the form of a booklet of coupons – one coupon for each game. Jill's ticket took the form of a membership card which she showed every time she entered the stadium. On the day of one of the games, there was a heavy snowstorm and the game was being shown on TV. Jill decided to stay home, while Jack braved the treacherous conditions to attend the game. The physical format of his ticket made it easier to realize that he would be "wasting" money by not attending. |
| *References* | Soman, Dilip and John Gourville (2001), "Transaction Decoupling: How Price Bundling Affects the Decision to Consume," Journal of Marketing Research, 38 (February), 30 - 44. | |