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# The impact of DC (defined contribution) scheme structure and communication policies: a bounded rationality framework

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## Abstract

Concepts from bounded rationality, particularly biases, are frequently used to explain the successes and the failures of pension scheme defaults. This research suggests that pension literature has focused on pension scheme structure, like defaults, with little attention paid to pension scheme communication designed to persuade and inform. A bounded rationality framework is developed to conceptualise the impact of both structure and communication policies on organisational outcomes, specifically pension participation rates and average contribution rates. It identifies three communication policies to be investigated in future empirical research including individualisation, segmentation and savings rate targets.

## 1. Introduction

Weiner and Doescher (2008) discussed two general approaches to promoting pensions savings: structure and communications. Structural approaches emphasise the financial conditions surrounding the retirement savings decision that can be altered by both governments and employers, including tax relief, defaults and employer matching arrangements. They describe communication approaches as focusing “...on changing both workers’ knowledge and their perceptions.” (Weiner and Doescher 2008, p. 137). Communication, they suggest, can be used to educate and persuade.

However, subsequent research focused, almost exclusively, on pension structure. Case study research conducted by Madrian and Shea (2001) and Choi et al (2002, 2004a) investigated the impact of changes to occupational pension scheme structure, specifically automatic enrolment, on pension participation and contribution rates. Other research considered the impact of other structural features such as employer matching (Benartzi and Thaler 2007; Choi et al 2014b), the number of investment funds (Cronqvist and Thaler 2004; Benartzi and Thaler 2001; Huberman and Jiang 2006; Papke and Poterba 1995), Quick Enrollment (Choi et al 2009) and automatic escalation (VanDerhei 2007; Benartzi and Thaler 2007; Choi et al 2004b; Thaler and Benartzi 2004). Choi et al (2004b, p. 295) reported the results of research conducted in the U.S. on several design features and observed, “The results clearly indicate that plan design affects many important facets of 401(k) savings behaviour.”

In the case studies, little information is given about pension communication policies used by the organisations where these structural features were implemented. Because most of the organisations are large, it is likely that there was significant communication with employees about their pay and benefits, specifically their occupational pension scheme. While the evidence suggests that changes to structure significantly impacts individual pension savings behaviour, the contribution of pension communications may be an important but ignored part of that change. Pension communications may also make an independent contribution if it can be used to educate current and potential members about pensions, persuade them about the importance of saving for retirement and inform them about new opportunities to save, as a result, for example, of changes to legislation or receiving a pay increase among other reasons.

Bounded rationality is used to “...designate rational choice that takes into account the cognitive limitations of the decision-maker—limitations of both knowledge and computational capacity” (Simon, 2008, p. 893). This term and concepts that were subsequently developed by Kahneman and Tversky (1984, 1979) and others to explain individual decision making are used to explain individual pension savings behaviour. I will suggest that bounded rationality concepts are also useful in analysing the potential impact of pension communication on pension savings behaviour. I will present a single framework to demonstrate the impact, both positive and negative, of structural and communication

policies on organisational pension benchmarks, specifically the participation rate and the average contribution rate.

The framework incorporates the concepts associated with bounded rationality. Kahneman and Frederick (2002) identified two cognitive systems; System 1 judgments are intuitive and System 2 judgments are reasoned. Kahneman (2003b, p. 1450) differentiated between the two stating, "Reasoning is done deliberately and effortfully, but intuitive thoughts seem to come spontaneously to mind, without conscious search or computation, and without effort." Heuristics are psychological mechanisms identified by Tversky and Kahneman (1973, 1974, 1981) that support intuitive decision making. Using these mental short-cuts, decisions are often biased, with serious and systematic errors. Based on empirical research, Kahneman and Frederick (2002) identified intelligence and statistical sophistication as characteristics that are likely to reduce bias and to improve the quality of System 2 decision making. I will propose a number of additional characteristics, gathered from pension research, that are associated with pension participation, contribution and accumulation. These are categorised as personal, socio-demographic and employment-related. I will argue that pension policies effect pension savings behaviour in some cases, because System 2 endorses the intuitions of System 1 and in other cases because System 2 overrides System 1. Propositions will be presented that can be investigated through future research.

This research contributes to the literature because it facilitates the evaluation of the two major policy levers, pension structure and communication, using a single framework. It will help those who are developing policies to recognise the affective and cognitive mechanisms that lead to behavioural change. It will assist those who are evaluating policy to systematically consider its impact, particularly when the outcomes differ from expectations. It also identifies a number of communication policies that I will investigate in future research to evaluate their effectiveness in influencing organisational benchmarks.

This research concentrates on the organisation as the unit of analysis defined by Fletcher and Plakoyiannaki 2011, p. 173) as "...the major entity analysed in the study" not to be confused with "...the empirical unit of observation, that is, the unit(s) from which the researcher collects data". It is the organisation, operating within a legislated and regulatory framework, that determines the structure and communication of pension policies. The pension savings behaviour of employees is influenced by organisational pension policies as well as their individual characteristics.

This is the structure of this paper. Following this introduction, section two will describe the two most common forms of occupational pensions, propose two benchmarks that can be used to evaluate pension policy effectiveness and outline two approaches used by organisations offering occupational pension schemes. Section 3, will develop a bounded rationality framework proposed to explain the cognitive processes that intervene between policy structural policy design and benchmark outcomes. Section 4 is an application that explains the impact of defaults, an example of structural policies, within the bounded

rationality framework, suggesting that defaults appeal to System 1 heuristics leading System 2 to endorse judgments that encourage pension participation but at contributions rates that are too low for pension adequacy. Section 5 describes three communication policies within a bounded rationality framework, proposing that communication framing can challenge System 1 leading to less biased System 2 choices that could lead to pension participation at contribution rates that could result in pension adequacy. Section 6 is a brief conclusion.

## **2. Pension definitions, benchmarks and approaches**

### **Defined benefit (DB) and defined contribution (DC) schemes defined**

Defined benefit schemes were the most common form of occupational pension schemes offered in the private sector. Fully funded DB schemes provide secure pension income for retired employees, usually based on a predetermined formula applied to years of service and earnings from retirement until death. DB schemes are relatively simple from the perspective of the pension scheme member. If employees contribute, the employer specifies the percentage of income and automatically deducts that amount from wages. Employees know the amount of income that they will receive until death in advance of their retirement. However, the combination of investment volatility, retiree longevity and changes to the accounting standards and funding requirements led many organisations to either wind up their DB schemes entirely, replacing it with a defined contribution scheme or to offer a DC scheme to new entrants.

The replacement of DB schemes with DC schemes has become an international trend. A recent OECD (2012, p. 11) report explained the implications stating, "...pensions are much more likely to be of the defined-contribution type, meaning that individuals are more directly exposed to investment risk and bear themselves the pension cost of living longer."

For the individual saver, DC schemes are complex. Most organisations require employees to join their pension scheme by 'standard' or 'voluntary' enrolment meaning that employees must 'opt in' deciding how much to contribute and choose one or a combination of investment funds from different risk options. Ideally, the accumulated retirement savings should provide sufficient income from retirement until death though the duration of this time period is unknown at the time that decisions are made. The decisions are risky and complicated for non-professional investors.

### **Benchmarks to evaluate national and organisational pension policies**

At the national level, the success of pension policies is measured using two related benchmarks: pension coverage and pension adequacy. *Pension coverage* refers to the percentage of people in employment contributing to an occupational or personal pension scheme. In the U.S. and Ireland, where employer and employee pension contributions are voluntary, pension coverage is estimated at about 50% (for the U.S. see Munnell and Bleckman 2014; for Ireland see Ireland. Central Statistics Office 2011). *The Report of the*

*Second Pensions Commission* reported that in the U.K., “In 2003/4, 46% of those in work were not contributing to a private pension” (U.K. Pensions Commission 2005, p. 48).

*Pension adequacy* refers to a level of income required to maintain an individual’s pre-retirement lifestyle. It is generally expressed as a percentage of income earned at the end of a person’s career. Most countries establish a target replacement rate as shown for Ireland, the U.S. and U.K. in Table 1.

**Table 1: Target replacement rates for retirement savers**

	<b>Ireland</b>	<b>U.K.</b>	<b>U.S.</b>
Low		80%	80%
Middle/median		67%	71%
Top/high		50%	67%
All/average	50%		73%

Source: Ireland. The Pension Board 1998; U.K. Pension Commission (2004); Munnell et al 2014.

Benchmarks also can be calculated at the organisational level. *Participation rate* refers to the percentage of an organisation’s workforce that is contributing to its occupational pension scheme. This measure is used by Madrian and Shea (2001), Choi et al (2002, 2004a, 2004b) and Beshears et al (2010) to evaluate differences before and after the implementation of pension policies.

The contribution rate refers to the amount that an individual is contributing to her pension, generally presented as a percentage of her salary. As a benchmark for an organisation, the *average contribution rate* can be aggregated from the contribution rates of individual members. The ‘average participation contribution rate’ is a measure calculated by Vanguard, using recordkeeping statistics from organisations that use their services, to compare the impact of automatic enrolment with and without automatic escalation (Clark, Utkus and Young 2015). In their *How America Saves* series, Vanguard uses both an ‘average deferral rate’ and a ‘median deferral rate’ to look at aggregate changes to the contribution rate over time.

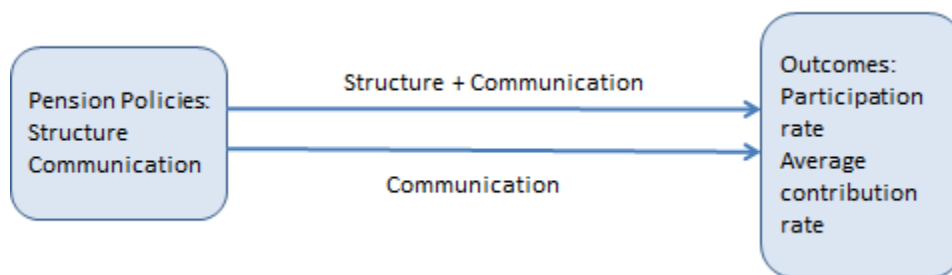
These benchmarks are not perfect and do not tell the full story concerning the likelihood that individuals will save enough to achieve pension adequacy as defined above. This would require more information about account balances and other individual savings sources. However, the participation rate and average participation contribution rate should be relatively easy to compute using administrative data from organisations and/or their pension providers. Pension policy changes to structure and communication can be evaluated based on their impact, either positive or negative, on these benchmarks. For the purposes of this research, they can be used to analyse differences between organisations using different pension policies.

## Organisational approaches to pension

Weiner and Doescher (2008) suggest that there are two organisational approaches to promote pension participation and adequacy through sufficient contributions. They are the structural approach and the communication approach. This section will discuss each of these approaches separately before suggesting that structural policies cannot be separated from communication policies but communication policies can be separated from structure. Further, both 'structure + communication' and 'communication' policies can impact on the organisational benchmark outcomes of pension participation and average contribution rates.

The initial building blocks of the bounded rationality framework are shown in Figure 1.

**Figure 1: Bounded rationality framework, policies and outcomes**



### Structural approach

Weiner and Doescher (2008) describe the two approaches. They state, "Structural approaches attempt to change the conditions under which people save" (Weiner and Doescher 2008, p. 138). From the occupational pension perspective, this includes pension scheme characteristics like defaults, the number of investment funds and matched employer contributions.

Willis (2013, pp. 1157) defines defaults as "...settings or rules about the way products, policies, or legal relationships function that apply unless users, affected citizens, or parties take action to change them." Carroll et al (2009p. 1640) explain the popularity of defaults as a policy option, "Because defaults powerfully influence outcomes without restricting choices, the intentional use of defaults as a policy lever has become increasingly common."

Employers are responsible for determining defaults. This is often done in through a consultation process with trustees, pension providers and/or pension fund administrators and consulting relevant government legislation or guidelines (discussed below). Four of the most common pension defaults are described in Table 2.

**Table 2: Common Occupation Pension Scheme Defaults and Descriptions**

Default	Description
<b>Automatic enrolment</b>	Employees, often at the time that they join an organisation or after a short vesting period, become members of the occupational pension scheme. In some cases, employees can ‘opt out’ of the pension scheme; in other cases they cannot.
<b>Contribution rate</b>	This is the percentage of income contribution that is deducted from pay at the time of enrolment. For most schemes, employees can increase their contribution rate. In some schemes, they can decrease or temporarily suspend contributions depending on their financial situation.
<b>Investment fund choice</b>	At the time of enrolment, the employees’ savings are invested in a fund chosen by their employer. Employees can switch to funds that more accurately reflect their risk preferences.
<b>Automatic escalation</b>	The percentage of income saved increases incrementally, generally at a rate of 1-2% per year, often timed in sequence with pay raises. Employees can change this rate depending on their financial situation. It may be capped when the combined contribution of employer and employee reaches a maximum percentage of income. <sup>1</sup>

If an organisation decides to automatically enrol employees into a pension scheme, they must decide the contribution rate and investment fund choice for those employees unwilling or unable to choose. Automatic escalation need not be linked to the other defaults but is more likely to be a feature of pension schemes with automatic enrolment. As will be discussed below, automatic escalation was added to increase contributions in a way that minimally impacts on the member’s lifestyle. Because the pension contribution increase is part of a wage increase, members do not have to adjust to a decrease in their take-home pay.

#### **Communication approach**

The second approach described by Weiner and Doescher (2008, pp. 137-138) is the communication approach which centres “...on workers’ knowledge and their perceptions. The former occurs through education (e.g. teaching the fundamentals of investing); the latter

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<sup>1</sup> Vangaurd recommends that “...plan sponsors set the cap at a level where participants are saving 12% to 15% or more factoring in employer contributions (Utkus and Young, 2015, p. 26).



occurs through persuasion (e.g. creating normative pressures or enhancing the perceived importance of one's retirement years)."

Weiner and Doescher (2008) suggest that the communications approach can be used to improve cognitive functioning and the decision making capacity through financial education. Lusardi and Mitchell (2014, p. 6) describe financial literacy as "...peoples' ability to process economic information about financial planning, wealth accumulation, debt and pensions." Calling for financial education in the workplace, Mitchell and Lusardi (2015, p. 9) observe, "...workers are increasingly being asked to make decision about their retirement savings, how much to contribute to their accounts, how to invest their retirement savings, and how to draw down their wealth during retirement. Our work has shown that financial literacy can influence all of these decisions."

Pension communications can also persuade employees of the importance of pensions. Weiner and Doescher (2008) suggests that persuasive messages can reinforce person's subjective assessment of their performance sending an optimistic message that sufficient retirement savings is achievable. A market strategy for pensions can focus on a descriptive norm specifically "...the belief that one should imitate the behaviour of others" (Weiner and Doescher (2008, p. 148). A segmented marketing strategy can be used to highlight how others, 'just like you', are saving for their retirement.

Pension communications can also inform. Assuming that pension information is directed to pension scheme members (described as 'insured'), Larsson et al (2008, p. 135) define pension information as "...timely data on the effect of a course of events or action/inaction by an insured on the expected size of the pension benefit and the contribution. They identified three types of content conveyed through a number of sources including governments, employers and pension providers, suggesting that comprehensive information from all pension sources is best so that worker have a full picture of their benefits at retirement. According to Larsson et al (2008,138), *accounting information* is the most basic information on coverage, "...participants need to know whether or not they are covered by a pension plan and how much they have contributed" along with information about employer matching arrangements, rates of return on investment and costs. Though basic, administrative information is important because it "...helps to make a pension system transparent which can contribute to trust in the system" (Larsson et al 2009, p. 135).

*Action/course of event information* is the next level of information. Larsson et al 2009, p. 138) explain that "...participants need to know how various actions and events affect future pension benefit." This information explains the expected pension benefits that will be received at a choice of retirement ages and influences decisions about changing savings rates and possible retirement dates. This is quite difficult information to convey for DCschemes because there are so many sources of uncertainty including the total amount contributed, the rate of return on investment and the method of drawing down pension benefits at retirement to name but a few.

*Uncertainty (risk) information* is especially important for DC schemes because individuals bear the risk of their investment choices requiring "...knowledge about financial markets and how to balance risk and return..." (Larsson et al 2009, p. 141). The most complicated of all information content, it needs to convey how future benefits can vary depending on the risk of investment fund choices.

Weiner and Doescher (2008) do not discuss the combination of the structural and communication approach although in fact, pension policies, no matter what their structure, must be communicated to employees. Employers offer pensions as a benefit to their employees, often to attract, motivate and retain the calibre of employees required for success in their industry. According to McGill et al (2005, p. 355) "The prevalence of retirement plans being offered by large employers makes it virtually imperative for all employers competing in this market place to offer some form of retirement program." This can also put pressure on small and medium-sized employers operating in the same geographic market to offer pensions as a benefit.

Employers' motives for communicating about pensions are broader than conveying pension information. Using their reward system to attract, motivate and retain, the outcome that employers' seek is employee satisfaction with their reward system. They want employees to value pensions and other benefits because, especially for large organisations, they comprise a large percentage of labour costs. Caruth and Handlogten (2001, p. 170) recognise that "Simply having an attractive benefits package is not enough for any organisation. Employees must have ample knowledge of all benefits available and the value of those benefits." Benefits are notoriously difficult to communicate. According to Milkovich et al (2014, p. 444), although organisations have devised innovative ways "...to communicate employee benefit packages, failure to understand benefit components and their value is still one of the root causes of employee dissatisfaction with a benefit package."

Maloney and Morris (2010) identified 10 different media used by a multinational organisation operating in the medical devices industry to communicate to employees about their pension. Information originated from the HR department, a tied financial advisor, the pension providers and the trustee. Information from the employer can also serve other, less weighty purposes than described by Larsson et al (2009). It can explain changes to tax rules. It can remind employees at the time that they receive their pay increase that they can increase their pension contribution. It can notify employees reaching significant ages that they can gain tax relief on a larger percentage of their income. This suggests that although some employers may not communicate effectively, they may communicate frequently about pensions to employees, to promote employee satisfaction with this costly benefit.

There are also nationally legislated requirements for pension sponsors to inform and communicate with pension scheme members. For example, the trustees of pension funds in Ireland must provide the following general information: "...legal documents; basic scheme

information; individual **member** information; details of your investment fund choices, if any; and reports on the running of the scheme and its financial position” (Ireland. The Pensions Authority 2015, p. 13). Each year, a member is entitled to receive an annual benefit statement with information that includes the value of the pension fund and the benefits that will be payable at the normal retirement age.

While research on structural pension policy changes indicates that they significantly impact the pension participation rate, some researchers suggest that they will not guarantee pension adequacy (Beeferman and Becker 2010, Muller and Turner 2013, Wu and Ruthledge 2014). For people who do not begin saving until they are middle aged, for those in precarious employment who move in and out of the workforce and for women whose careers are interrupted by caring activities, changing the structural features of pension schemes may not be enough to ensure pension adequacy.

Both Oehler and Werner (2008) and Lusardi (2008) suggest that education could supplement institutional arrangements like automatic enrolment. Lusardi (2008, p. 33) stated that “...defaults and financial education programs are not necessarily substitutes. In fact, they complement each other well.” Lusardi and Mitchell (2014, p. 35) suggest that an unresolved issue is “...which sorts of problems are best suited to remedying through financial education, versus removing choice options from consumers’ menus altogether or simplifying the options that people face.” They suggest that structure alone will not be enough stating “The human capital approach to financial literacy suggests that there will be substantial heterogeneity in both financial knowledge and economic behaviour, so that it is unlikely that any one default rate or environment will enhance well-being for everyone” (Lusardi and Mitchell 2014, p. 35).

There is considerable debate about the efficacy of each approach. Some researchers believe that the structural approach, specifically defaults, is the “...main alternative to education as a method of influencing decisions about retirement savings plans to choose the features of the retirement saving plan in a way that will promote the desired objectives” (Benartzi and Thaler 2007). On the other hand, according to Benartzi and Thaler (2007) the limited empirical research on the communications approach is not conclusive about its contribution to either the pension participation or contribution rate.

In the U.K., the Institute for Government (2014) described on their website as “...the UK’s leading independent charity and think tank promoting more effective government” published a report called *MINDSPACE* that focused on “...the more automatic or context-based drivers of behaviour, including the surrounding ‘choice environment’” (Dolan et al 2010, p 15). They argued that trying to change the way that people think, through communication, is costly but has little impact on individual behaviour. On the other hand, ‘...apparently minor alterations to the choices and environment in which people act’ can have significant impact (Dolan et al 2010, p. 16). Dolan et al (2010, p. 16) believe that “...changing the context, rather than people’s minds, may be more cost-effective.”

However, Lusardi and Mitchell (2014) suggest that the cost of financial illiteracy is high and impacts financial decisions throughout an individual's life. Mitchell and Lusardi (2015) recommend financial education during high school and at the workplace. Directing their attention to the workplace, Mitchell and Lusardi (2015, p. 9) state, "...workers are increasingly being asked to make decision about their retirement savings, how much to contribute to their accounts, how to invest their retirement savings, and how to draw down their wealth during retirement. Our work has shown that financial literacy can influence all of these decisions."

Oehler and Werner (2008) described the range of financial education initiatives available in Germany and the UK. Evaluations of the initiatives "...carried out primarily in England but as well to a smaller extent in Germany shows that financial education in the form of advice and training can be effective in the sense of inducing behavioural change" (Oehler and Werner 2008, p. 278). Evaluation of financial education programmes is not as common in the US. Lusardi (2008, p. 32) stated that "Almost no study provides an evaluation of the costs of financial education and, without that information, it is not possible to establish a return on financial education programs." Further, she reflected that a problem with program evaluation is that "...knowledge may work through long periods of time and should be evaluated in the long-run rather than a few months or years after a program is offered" (Lusardi 2008, p. 33).

Proponents of financial education agree with opponents that it is costly. Oehler and Werner (2008) concur with Lusardi (2008) that financial education should be free and targeted those who are the most in need because it is costly and time consuming.

Proponents of both structural and communication approaches agree that there is a need for more evaluation. Lusardi and Mitchell (2014, p. 37) acknowledge that "...analysts and policymakers have much to learn about the most cost-effective ways to build financial knowledge in the population at large." Dolan et al (2010) and Sunstein (2013) explain the importance of evaluation to assess the impact of policy because it can change behaviour in unanticipated or unexpected ways.

To summarise, Weiner and Doescher (2008) suggest two approaches to promoting retirement savings: structural and communications. The structural approach has been widely investigated. There has been some research conducted to evaluate financial education initiatives but no research has been found to date that evaluates the communication used to persuade or to inform about pensions. No research has been located that looks at the impact of both structure and communication on participation rates and average contribution rates although communication is a necessary element in the provision of pensions as a benefit. However, while structure must be communicated to employees, other communication policies may be independent of structure. They may improve general financial literacy, inform about legislation that impacts on pension savings

or remind pension scheme members to increase their contribution rate following a pay increase. This discussion provides the background to the opening proposition.

Proposition 1: Pension communication policies can affect the organizational benchmark outcomes in combination with structural features or independently.

### 3. A Bounded Rationality Framework to Develop and Evaluate Organisational Pension Policy

#### Bounded Rationality

Simon (2008, p. 893) stated that, “The term ‘bounded rationality’ is used to designate rational choice that takes into account the cognitive limitations of the decision-maker—limitations of both knowledge and computational capacity.” Simon observed that the search for alternatives is seldom complete; it is a sub-set of all possible alternatives. Cognitive and computational limitations mean that decision makers seldom make the ‘best’ decision. Decisions ‘satisfice’ rather than optimise. Kahneman and Tversky built on Simon’s work. Kahneman (2003a, p. 1449) stated, “Our research attempted to obtain a map of bounded rationality, by exploring the systematic biases that separate the beliefs that people have and the choices they make from optimal beliefs and choices...”

Much of Simon’s work was based on improving organisational performance. Simon (1955, 1968) noted environments can be adapted in ways that can improve the rationality of individual decisions. While it was difficult for a single, isolated individual to make rational decisions, “...the environment of choice itself can be chosen and deliberately modified” (Simon 1968, p. 79). Simon (1968, p. 79) stated, “One function that an organization performs is to place the organization members in a psychological environment that will adapt their decisions to the organization objectives, and will provide them with the information needed to make these decisions”. Kahneman (2011, p. 411) agreed stating “Although Humans are not irrational, they often need help to make more accurate judgements and better decisions, and in some cases policies and institutions can provide that help.”

Saving for retirement challenges the cognitive and computational capacity of most people. Behavioural economists, using insights gained from research on bounded rationality, argue in favour organisational and government intervention in those situations where individuals are systematically known to err and those errors impact on their wellbeing. Thaler and Sunstein (2009, pp. 5-6) observe, based on social science research “...that in many cases, individuals make pretty bad decisions—decisions they would not have made if they paid full attention and possessed complete information, unlimited cognitive abilities, and complete self-control”. These situations are classified by Sunstein (2013, p. 1826) as “...*behavioral market failures*, understood as a set of market failures that complement the standard economic account and stem from human error.” He states that “...*choice architecture*,

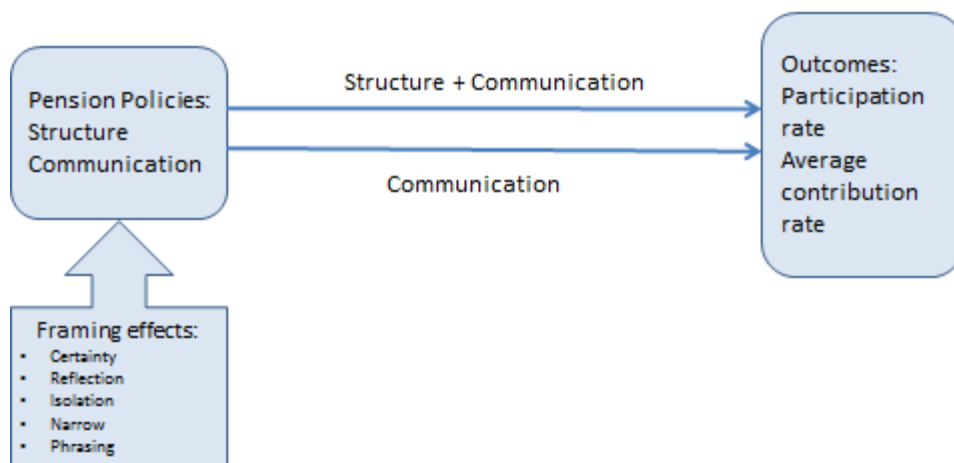
understood as the social background against which choices are made” can be used to improve human welfare (Sunstein 2013, p. 1826). Using the language of Simon, choice architecture modifies the environment in which employees make their decisions.

Thaler and Sunstein (2009, p.3) argue that there is no such thing as neutral design, “...small and apparently insignificant details can have major impacts on people’s behaviour.” The key is to choose designs that “...influence choices in a way that will make chooser better off, as judged by themselves” (Thaler and Sunstein 2009, p. 5). Sunstein (2013), Thaler and Sunstein (2003), Choi et al (2004a) and Erickson (2002) among others argue that once an organisation decides to offer a pension policy it must make choices about how to structure the policy and communicate about it to their employees. The decisions the organisation makes are not neutral. Regardless of how the policy is structured and communicated to employees, it will affect employees’ choices. They favour organisational pension policies that modify pension savings behaviour so that pension scheme members begin saving earlier, at higher rates of contribution.

### Framing effects

Framing effects are manipulations to pension structure and communication policies. They can be the result of conscious decisions made by the choice architect in order to impact pension outcomes. Framing effects can also be unintentional leading to unintended outcomes. Figure 2 adds framing effects to the bounded rational framework.

**Figure 2: Bounded rationality framework, framing effects**



Simon (1968) discussed the importance of communication is influencing individual action, viewing it as the tool used by an organisation to achieve its purpose. He posed and answered the following question, “The question to be asked for any administrative process is: How does it influence the decisions of these individuals? Without communication, the answer must always be: It does not influence them at all” (Simon, 1968,p. 108). His work was aimed at developing communications systems that enhanced the decision making capacity of organizational members.

Kahneman and Tversky, on the other hand, examined the way that language could be used to ‘frame’ decisions. Tversky and Kahneman (1981, p. 453) described the perspective of the decision maker as the “decision frame” referring “...to the decision-maker’s conception of the acts, outcomes, and contingencies associated with a particular choice. The frame that a decision-maker adopts is controlled partly by the formulation of the problem and partly by the norms, habits, and personal characteristics of the decision-maker.” In some cases, the decision maker herself will develop the decision options. In other cases, for example pension information, the options will be presented to the decision maker. Empirical research indicated that the presentation or framing of information can alter a decision maker’s choice although this is moderated by individual characteristics (discussed below). Many authors speak of ‘framing effects’ in this general sense, rather than specifying a particular type of framing.

Like heuristics, inconsistencies of human preferences were identified using empirical research asking a wide variety of research subjects to evaluate choices that were generally identical but framed differently. Many were based on simple gambles that can result in different outcomes dependent on probabilities “...in the hope that these simple problems will reveal basic attitudes toward risk and value” (Kahneman and Tversky 1984, p. 341). These experiments demonstrated classifications of framing effects, specifically certainty, reflection and isolation that described systematic deviations from rationality. These three framing effects along with ‘narrow framing’ discussed by Kahneman (2003b) and ‘phrasing effects’ identified by Weiner and Doescher (2008) are described in Table 3.

**Table 3: Framing effects**

<b>Framing effect</b>	<b>Description</b>
<b>Certainty</b>	“...people overweight outcomes that are considered certain, relative to outcomes which are merely probable” (Kahneman and Tversky 1979, p. 267). This is risk averse behaviour.
<b>Reflection effect</b>	Respondents faced with two negative outcomes prefer a probable loss to a certain loss, even if the expected value of the probable loss is higher. This is risk seeking behaviour.
<b>Isolation effect</b>	“This approach to choice problems may produce inconsistent preferences, because the pair of prospects can be decomposed into common and distinctive components in more than one way, and different decompositions sometimes lead to different preferences” (Kahneman and Tversky 1979, p. 269).
<b>Narrow framing</b>	“The decision of whether or not to accept a gamble is normally considered as a response to a single opportunity, not as an occasion to

	apply a general policy.” Kahneman (2003a, p. 1459)
<b>Phrasing effects</b>	“If an outcome is labeled as a loss, a person will think of it as a loss...” (Weiner and Doescher 2008, p. 157)

Both the certainty and the reflection effects demonstrate that “The same psychological principle—the overweighting of certainty—favors risk aversion in the domain of gains and risk seeking in the domain of losses” (Kahneman and Tversky 1979, p. 269). However, certainty is not always desirable, “Rather, it appears that certainty increases the aversiveness of losses as well as the desirability of gains” (Kahneman and Tversky 1979, p. 269).

When faced with two sets of choices to be decided concurrently, phrased positively and negatively, the decisions often differ. This suggests that the decisions are made in isolation; the decision maker is responding to the language used displaying inconsistent preferences. Kahneman (2003a) added more detail about how the decisions are made but agreed with Simon (1956) that people make choices one at a time, as the situation arises. He stated, “The problem at hand and the immediate consequences of the choice will be far more accessible than all other considerations, and as a result decision problems will be framed far more narrowly than the rational model assumes” (Kahneman 2003a, p. 1460).

Rationality suggests that the employee decision to join an occupational pension scheme should not be affected by the framing of the choice. However, according to Choi et al (2004a, p. 81) “Seemingly minor changes in the way a choice is framed to a decision maker can generate dramatic changes in behavior.” Research by Madrian and Shea (2001), Choi et al (2002, 2004a, 2004b) and Beshears (2010) for example, demonstrated that participation rates increased resulting from a minor structural change requiring employees to opt out of a pension scheme rather than voluntarily joining the scheme. According to Madrian and Shea (2001) framing effect is one behavioral explanation for the higher participation rates following automatic enrolment.

Weiner and Doescher (2008, p. 157) explain that in some organisations, “...401(k) participants are asked to sign up for a “salary reduction plan.” Because this phrasing forces them to think of the contribution as a loss, they will be less likely to participate.” Weiner and Doescher (2008) do not state if this use of language was intentional but suggested that pension plan communication should be expressed using positive or neutral language for greater participation and contribution rates.

In these examples, the framing of policies impacts on the benchmark outcomes. These can be used consciously by choice architects to achieve desired organisational outcomes. Framing effects can also be unintended leading to undesired outcomes. These ideas are captured in Proposition 2.

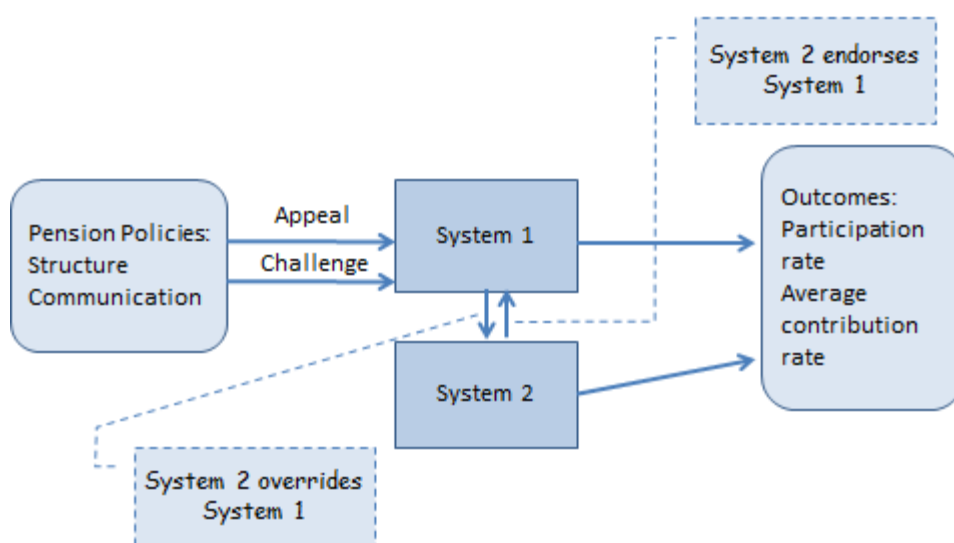


Proposition 2: Framing effects can be used in pension policy structure and communication, impacting on the organisation’s benchmark outcomes.

### System 1 and System 2 judgments

Kahneman and Frederick (2002) describe two cognitive systems that impact on pension policy decision. System 2, in its monitoring role, can endorse the intuitive judgment of System 1 relating to a pension policy. Alternatively, a policy can present a challenge to System 1. This will lead System 2, in its monitoring role to override System 1. Either can impact behaviour positively, or negatively from the perspective of the institution or the individual. These processes are illustrated in Figure 3 then described in greater detail.

**Figure 3: Bounded rationality framework, Systems 1 & 2**



Designing organisational policies to influence human behaviour, requires some understanding of the cognitive processes that impact on decisions. Kahneman and Frederick (2002) identified two cognitive systems; System 1 judgments are intuitive and System 2 judgments are reasoned. Kahneman (2003b, p. 1450) differentiated between the two stating, “Reasoning is done deliberately and effortfully, but intuitive thoughts seem to come spontaneously to mind, without conscious search or computation, and without effort.”

Sunstein (2013, p. 1926) states, “System 1 works fast. Much of the time it is on automatic pilot. It is driven by habits. It can be emotional and intuitive.” Kahneman (2003a, p. 1451) uses the following adjectives to describe System 1: fast, parallel, automatic, effortless, associative, slow-learning, emotional. There is no sense of voluntary control. He describes the capabilities of System 1 stating, “System 1 detects simple relations (“they are alike,” “the son is much taller than the father”) and excels at integrating information about one

thing, but does not deal with multiple distinct topics at once, nor is it adept at using purely statistical information” (Kahneman 2011, p 36).

According to Sunstein (2013, p. 1838) System 2 “...is deliberative. It calculates... It thinks about probability, carefully though sometimes slowly... It insists on the importance of self-control. It is a planner more than a doer.” Kahneman (2003a, p. 1451) uses the following adjectives to describe System 2: slow, serial, controlled, effortful, rule-governed, flexible, neutral. According to Kahneman (2011, p 36), “System 2 is the only one that can follow rules, compare objects on several attributes, and make deliberate choices between options.”

System 1 and System 2 are related. It is assumed that “System 1 quickly proposes intuitive answers to judgment problems as they arise, and System 2 monitors the quality of these proposals, which it may endorse, correct, or override” (Kahneman and Frederick 2002, p. 51). Thaler and Sunstein (2009, p. 25) refer to this as “...the interplay between the Automatic System and the Reflective System.” System 2 will override System 1 if recognises that the intuitive judgment is biased. However, Kahneman and Fredrick (2002) speculated that most judgments are made intuitively and are not modified by System 2. The reliance on intuition is because, “... people are not accustomed to thinking hard, and are often content to trust a plausible judgment that quickly comes to mind” (Kahneman 2003a, p. 1450).

Deviations from rationality were detected using empirical research that found both naïve and sophisticated subjects were likely to demonstrate bias in their decisions. Levi (1985, p. 331) emphasized the potential for a negative impact on individual decision making stating “Because the use of the techniques are part of the agent’s unreflective repertoire of reasoning practices, she or he exercises no critical control over their use and so relies on them without a moment’s thought even in contexts where they go badly wrong.” When decisions are based on biases, uncorrected by conscious decision making, it is failure of both intuition (System 1) and reasoning (System 2) (Kahneman and Frederick 2002).

Sometimes, “...intuitive thinking can also be powerful and accurate” particularly when it is a result of high skill and prolonged practice (Kahneman 2003a, p. 1451). Generally, those who can rely on their intuition are experts in their fields. Thaler and Sunstein (2009, p. 23) observed, “Accomplished chess players and professional athletes have pretty fancy intuitions; their Automatic Systems allow them to size up complex situations rapidly and to respond with both amazing accuracy and exceptional speed.”

Sunstein and Thaler (2009) define the choice architect as the person who “...has responsibility for organizing the context in which people make decisions.” A ‘nudge’ is described as “...any aspect of the choice architecture that alters people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives” (Thaler and Sunstein 2009, p. 6). If options are well-designed, an unreflective

endorsement by System 2 can result in positive outcomes for the individual and the institution.

This discussion suggests that organisational pension policies can impact on judgment in two ways, influencing the outcomes of pension participation and average contribution rates. They are outlined in Proposition 3.

Proposition 3: Organisational policies can lead to changes in pension participation and contribution rates by:

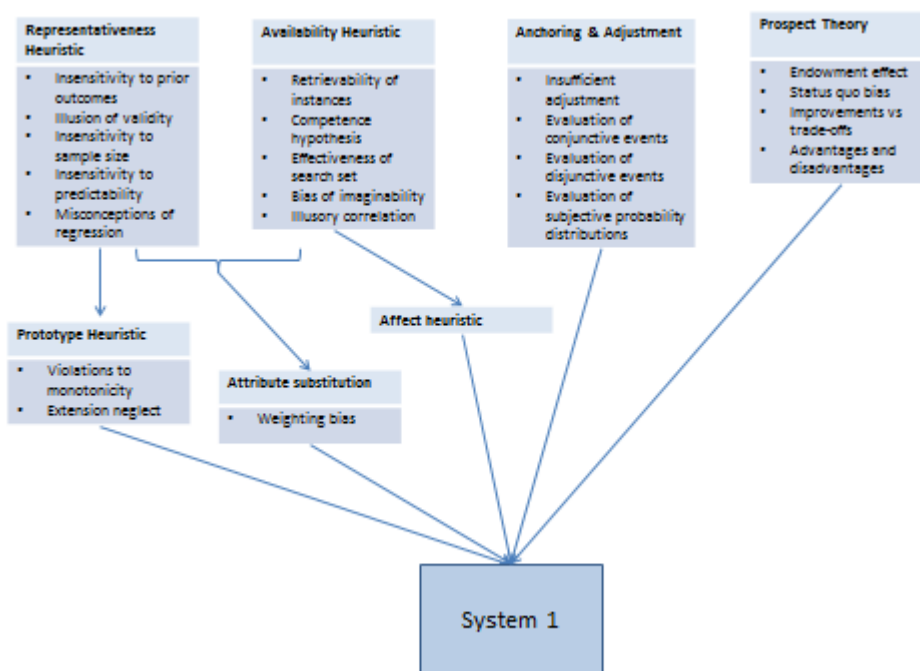
- a. Appealing to System 1, encouraging System 2 to endorse an intuitive judgment
- b. Challenging System 1 and triggering a response from System 2 that corrects or overrides an intuitive judgment.

### System 1: Heuristics, biases and prospect theory

Heuristics are psychological mechanisms identified by Tversky and Kahneman (1973, 1974) that support intuitive decision making. Tversky and Kahneman (1974, p. 1124) speculated that “...people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations.” ‘Rules of thumb’ or estimation can lead to poor decisions because of biases “...that sometimes lead to severe and systematic errors” (Tversky and Kahneman (1974, p. 1124).

Figure 4 identifies heuristics and systematic biases that influence the fast, effortless, emotional judgment of System 1. This illustration is limited to the contributions by Tversky, Kahneman and Frederick.

Figure 4: Bounded rationality framework, Heuristics and biases that influence System 1



In early works, Tversky and Kahneman (1973, 1974) identified three heuristics, representativeness, availability and anchoring. The heuristics, "...were described at various times as principles, as processes, or as sources of cues for judgment" (Kahneman 2003b, p. 707).

The *representativeness heuristic* helps individuals to cope with judgments that are computationally challenging. Individuals attempt to match an event with a mental prototype based on a comparison of characteristics, looking for similarities. This is used when "...observers expect the statistics of a sample to closely resemble (or "represent") the corresponding population parameter, even when the sample is small" (Kahneman and Frederick 2002, p. 49). Kahneman and Frederick (2002) later reflected that 'similarity' may have been a better descriptor.

The *availability heuristic* considers the sources of information that are used by people and the errors that result from its use. This heuristic is another mental shortcut used to estimate probability whereby "...a person could estimate the numerosity of a class, the likelihood of an event, or the frequency of co-occurrences by assessing the ease with which the relevant mental operation of retrieval, construction, or association can be carried out (Tversky and Kahneman 1973, p. 208). The outcomes that are brought most quickly to mind (meaning they are 'available') are thought to be more numerous than others leading to an overestimation of the probability of those outcomes occurring in the future. According to Kuran (2007, p. 685), the availability heuristic is considered by cognitive psychologists "...to be a key determinant in individual judgment and perception." There are several biases associated with the availability heuristic.

An *anchor* refers to an initial estimate or starting point. Epley and Gilovich (2006, p. 311) explain that "In the original formulation, the starting information, or anchor, tends to exert drag on the subsequent adjustment process, leaving final estimates too close to the original anchor". The initial estimate "...may be suggested by the formulation of the problem, or it may be the result of a partial computation" (Tversky and Kahneman, 1974, p. 1128). Adjustments are made from the initial anchoring point. There are several biases associated with the anchoring and adjustment heuristic.

Kahneman and Frederick (2002, p. 50) suggest that representativeness is situated "...within a broad family of *prototype heuristics*, in which properties of a prototypical exemplar dominate judgment concerning an entire set." A prototype is substituted for a category, a representative held in memory "...of one or more "normal" members..." of the category of refrigerators, horses or NYPD police officers (Kahneman 2011, p. 168). According to Kahneman (201, p. 169) "...stereotypes, both correct and false, are how we think of categories." While prototype information is highly accessible, sums and other calculations that should form part of the judgment are not. Overemphasis on accessible information while ignoring less accessible information leads to biased decisions. There are two biases associated with the prototype heuristic.

In later work by Kahneman, Tversky and others, the generic heuristics or generic heuristic process were introduced. These comprise the prototype heuristic, attribute substitution and the affect heuristic.

Representativeness and availability were originally described as separate processes. Kahneman and Frederick (2002 p. 54) observed that "...the restriction to particular heuristics and to a specific context is largely arbitrary". They identified a generic heuristic process called *attribute substitution*. This includes both representativeness and availability in a single judgment heuristic. Kahneman (2003b, p. 707) summarized the process stating "A judgment is said to be mediated by a heuristic when the individual assesses a specified *target attribute* of a judgment object by substituting a related *heuristic attribute* that comes more readily to mind." Instead of answering a hard question, the subject substitutes an easier one. The weighting bias is associated with attribute substitution.

Slovic et al (2007 p. 1335) proposed that "...people use an *affect heuristic*<sup>2</sup> to make judgments." Kahneman (2003b (p. 710) states, "There is compelling evidence for the proposition that every stimulus evokes an affective evaluation, which is not always conscious." Affective reactions are often the automatic first reaction and guide judgment. Slovic et al (2007, p. 1334) state, "Although analysis is certainly important in some decision-making circumstances, reliance on affect and emotion is a quicker, easier and more efficient way to navigate in a complex, uncertain, and sometimes dangerous world." Feelings can be positive, acting as the impetus to reproduce the feeling or negative, prompting action that avoids the feelings. Kahneman (2011, p. 139) suggests that the affect heuristic "...is an instance of substitution, in which the answer to an easy question (How do I feel about it?) serves as an answer to a much harder question (What do I think about it?)."

*Prospect theory* "...predicts that individuals tend to be risk averse in a domain of gains, or when things are going well, and relatively risk seeking in a domain of losses..." (McDermott 2001, p. 18). Kahneman and Tversky (1979, p. 263) proposed that "Decision making under risk can be viewed as a choice between prospects or gambles." The *reference point* is the status quo or the starting point from which the prospect is evaluated. Prospect theory was later applied by Kahneman and Tversky (1991) to explain riskless choice.

Prospect theory was proposed by Kahneman and Tversky (1979) as a descriptive model to replace expected utility theory rather than a heuristic. However, it is included in Figure 2 because, as stated by Tversky and Kahneman (1991), "Theories of choice are a best

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<sup>2</sup> Kahneman and Frederick (2002) argued that the anchoring heuristic should be subsumed into the generic affect heuristic. In a work published one year later, Kahneman (2003b, p. 710) stated, "In terms of scope of responses that it governs, the natural assessment of affect should join representativeness and availability in the list of general-purpose heuristic attributes." A few years later, Kahneman (2011, p. 138) described the work of Slovic, Lichtenstein and Fischhoff as the "...most influential studies of availability biases..." suggesting that because emotional events and examples attract our attention, the information available for decisions is biased by emotions. I made the decision to use the most recent reflection by Kahneman (2011) and show the affect heuristic subsuming the availability heuristic.

approximate and incomplete. One reason for this pessimistic assessment is that choice is a constructive and contingent process. When faced with a complex problem, people employ a variety of heuristic procedures in order to simplify the representation and the evaluation of the prospects.” In other words, mental short cuts and unreflective judgments form part of this model. Experiments used to examine loss aversion, serve as explanations for several types of commonly observed behaviour biases.

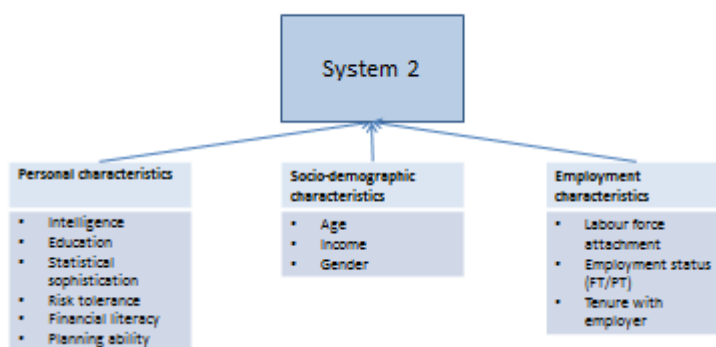
Figure 4 outlines many biases, but the list is far from complete. On-going experimental procedures continue to reveal more biases. Pension saving behaviour that systematically deviates from rationality is often attributed to biases. Some of the biases that relate to specific pension research, will be discussed in greater detail below.

### System 2 as a monitor

Ideally, System 2 should monitor the judgments resulting from System 1. Empirical research by Kahneman and Frederick (2002) identified intelligence and statistical sophistication as characteristics that are likely to reduce bias. International research has identified several characteristics of individuals who voluntarily<sup>3</sup> join a personal or occupational pension scheme. These characteristics may also indicate the individuals who are more likely to override System 1 judgments and rely on the reasoned judgments of System 2.

This section will identify the personal, socio-demographic and employment characteristics that singly and in combination are associated with membership to a pension scheme. The classifications and characteristics are illustrated in Figure 5.

**Figure 5: Bounded rationality framework, Personal, socio-demographic and employment characteristics that influence System 2**



<sup>3</sup> In some of the literature cited, it is not clear if pension scheme membership is voluntary. In Ireland, for example, employees can be automatically enrolled into a pension without the opportunity to opt-out as part of their terms and conditions of employment. In these situations, pension scheme participation cannot be attributed to either System 1 or System 2 judgments. Contribution may differ, however, if the structure allows scheme members to alter their contribution rate.

### Personal characteristics

Kahneman and Frederick (2002) observed that there is a negative correlation between *intelligence* and susceptibility to judgment bias. This is connected to the variable of statistical sophistication (discussed below) because "...intelligent people are more likely to possess the relevant logical rules and also to recognize the applicability of these rules in particular situation" (Kahneman and Frederick 2002, p. 68). They caution that avoiding the errors of intuition requires adequate information, however, even for intelligent people.

Pension research suggests that education, financial literacy and retirement planning are three related characteristics associated with pension participation, contribution and accumulation. *Education* is the most general; most research measures it by the qualification received. *Financial literacy* is defined by Behrman et al (2010, p. 1) as "...the ability to process economic information and make informed decisions about household finances, and wealth accumulation and pension contributions." Mitchell and Lusardi (2015, p. 2) proposed and tested three basic questions on compound interest, inflation and risk that has widely been used in the U.S. and internationally because they "...have the virtue of being simple, relevant, brief and good differentiators" of financial literacy. Two additional questions on tax relief and employer matching arrangements were added in research conducted by Clark et al (2014). *Retirement planning* is the most specific. Investopedia (2015) provide the following definition, "The process of determining retirement income goals and the actions and decisions necessary to achieve those goals. Retirement planning includes identifying sources of income, estimating expenses, implementing a savings program and managing assets. Future cash flows are estimated to determine if the retirement income goal will be achieved." It is a complicated process and potentially the most difficult to test. Clark et al (2009) used a questionnaire with 80 items to identify information about the respondents (socio-demographic, employment and geographic characteristics) and to evaluate their attitudes and approaches to retirement planning.

Research suggests that better educated people are more likely: to be pension scheme members (MacLeod et al 2012); to work for organisations offering a pension scheme as a benefit (Wu and Ruthledge 2014; O'Connell and Gash 2003); and to save more for retirement (Gough and Sozou 2005). Clark et al (2009) found that pension planning was positively and significantly associated with education.

Reviewing research and considering data available from the Organisation of Economic Co-operation and Development (OECD), Mitchell and Lusardi (2015) suggest that *financial literacy* is poor in the U.S. and internationally, even in countries with well-developed financial markets. Lusardi and Mitchell (2014) found that education and financial literacy were correlated. Lusardi et al (2010) found that financial literacy was strongly associated with cognitive ability (based on results from the Armed Services Vocational Aptitude Battery) and greater educational attainment, particularly when participants attended some college. Using a microeconomic data set collected from the Chilean Social Protection

Survey, Behrman et al (2010) demonstrated that “...financial literacy and schooling attainment are both positively and significantly correlated with wealth, pension contributions, and retirement planning...”

Although the research discussed above strongly suggests that there is a link between financial literacy and economic behaviour, the direction of the causality was addressed by Lusardi and Mitchell (2014). They state, “Though it is challenging to establish a causal link between financial literacy and economic behavior, both instrumental variables and experimental approaches suggest that financial literacy plays a role in influencing financial decision making, and the causality goes from knowledge to behaviour” (Lusardi and Mitchell 2014, p. 34).

Planning was “strongly correlated with financial and political literacy...” (Lusardi and Mitchell 2007, p 222). Lusardi and Mitchell (2007) considered the impact of planning on retirement wealth. Using data from the Health and Retirement Study, they compared attitudes to planning for two cohorts of people on the verge of retirement in 1992 and 2004. Over a quarter of each cohort had not thought about retirement. However, “...undertaking even a little planning is associated with sizeable wealth holdings, while non-planners display less wealth (Lusardi and Mitchell, 2007, p. 214) highlighting the relationship between financial literacy, planning and retirement outcomes.

Clark et al (2009) explain that planning is considered to be a human trait but “...people are not equally endowed with either the cognitive resources or the social resources to make good on intended actions and outcomes” (Clark et al 2009, p. 2499). They report on the findings from a survey of 80 questions from 937 respondents. Their findings suggest that people demonstrating risk tolerance “...were more likely to believe pension planning to be important, were prepared for pension planning, and had good or very good knowledge of annuities” concluding that “...financial *sophistication* may be a good precondition for deliberate pension planning” (Clark et al 2009, p. 2509).

Kahneman and Frederick (2002) observed that people with *statistical sophistication* were less susceptible to decision bias. This was attributed both to the research design (particularly the way that the information was communicated) and the expertise of the subjects who followed logic, rather than intuition. Pension research links statistical sophistication with pension decisions through the need to understand and evaluate risk, defined by Knight (1971) as measurable or probable uncertainty. Mitchell and Lusardi (2015) and Clark et al (2014) evaluate understanding risk as an important aspect of financial literacy. Clark et al (2014, p. 2) suggest that those who are able to accumulate sufficient assets for retirement have the financial knowledge to earn significantly better risk-adjusted investment return. Clark et al (2009) suggest that individuals who are best able to plan for retirement are risk tolerant.



### Socio-demographic characteristics

In countries like Ireland, the U.K. and the U.S. where pension coverage is voluntary, pension membership increases with *age* (Madrian and Shea 2001; Aizcorbe et al 2003; MacLeod et al 2012; Ireland. Central Statistics Office 2011; Ireland. Department of Social and Family Affairs 2007). Clark et al (2009) found that pension planning was positively and significantly associated with age. Clark and Strauss (2008) found a positive correlation between risk tolerance and age. Similar to Mitchell and Lusardi (2015), Lusardi et al (2010, p. 11) reported "... lack of financial knowledge is widespread among the young."

However, even age is nuanced. Mitchell and Lusardi (2015, p. 6) reported that "...a sizeable part of the variation in financial literacy is explained by student-socio-economic backgrounds. In other words, inequality in financial literacy is already apparent in high school, and these differences appear to increase later in life." Family financial sophistication (based on parents who owned equity shares either privately or through retirement funds) was also associated with the greater financial literacy. Lusardi et al (2010, p. 18) suggested that "...some financial knowledge may be passed on directly from parents to their children..."

Several studies suggest that pension scheme membership increases with *income* in the U.S. (Madrian and Shea 2001; Aizcorbe et al 2003; Wu and Rutledge 2014; Munnell et al 2012), the U.K. (Gough and Sozou 2005; MacLeod et al 2012) and Ireland (Moloney and Whelan 2009; Hughes 2003; Ireland. Department of Social and Family Affairs 2010). People on higher incomes may have more resources to divert into long term savings. In countries like the U.S., U.K., and Ireland where tax relief is related to income level, employees on higher pay receive a higher marginal rate of tax relief than lower paid employees which may act as an incentive to save through a pension. Wu and Rutledge (2014) report that in the U.S. most people on low earnings are not employed by organisations that offer pension schemes as a benefit. In some cases, however, pensions are offered to workers on low wages who do not participate. Aizcorbe et al (2003) reported that some workers who were eligible for pensions at their workplace did not join and this was also related to income. They state, "The choice to participate appears to be related strongly to income. Of heads of families in the lowest 20 percent of the distribution, 46.4 per-cent who were eligible declined to participate; in contrast, among heads of families with incomes in the highest 10 percent of the distribution, only 15.3 percent of eligible workers declined to participate" (Aizcorbe et al 2003, p 14). In research with both quantitative and qualitative dimensions, Gough and Nurallah (2009, p. 168) found that "...the higher the income the more likely the respondent was to be financially literate." Clark et al (2009) found that people in higher income were better at retirement planning.

*Gender* is also a complex characteristic because of the multiple relationships with other socio-demographic and employment characteristics. Women are less likely to be members of occupational pension schemes than men (Madrian and Shea 2001; Munnell et al 2012;

Wu and Rutledge 2014; O'Connell and Gash 2003; Hughes and Watson 2005; Gough 2001). In the U.K., MacLeod et al (2012) reported that this finding holds for older women. They state, "The percentage of men aged 45 or older having no resources for later life was lower in each age group compared with women of the same age and the percentage having a private pension was higher" (MacLeod et al 2012, p. 23). However, there are no differences found between women and men under 44 years of age.

Duvurry et al (2012) and Gough (2001) reported that women are likely to have weaker labour market attachments than men. In the U.K., Gough (2001, p. 332) found that "...the types of jobs that normally do not qualify for membership, such as temporary, seasonal and part-time work, are the categories with higher proportion of female workers." The situation changes when women are in stable employment. Munnell et al (2012, p. 2) reported that the data revealed, "...that pension participation among full-time, full-year workers is now equal for both men and women.

Mitchell and Lusardi (2015) found that men were generally more financially literate but also were more confident of their answers, even when those answers are wrong. More boys than girls "...perform at both the top and the bottom of the literacy scale" (Mitchell and Lusardi 2015, p. 6). Lusardi (2010) found a statistically significant difference between the financial literacy of women and men; women were less financially literate. Research conducted by Clark and Strauss (2008) suggests that gender impacts on risk tolerance; men were more risk tolerant than women.

### Employment characteristics

Low wages are also related to other employment characteristics, *specifically labour market attachment* as reported by Wu and Rutledge (2014) based on research conducted recently in the U.S. They state, "We find the substantial pension gap between higher- and lower-income individuals is driven primarily by lower-income individuals' weaker labor force attachment and by their lower pension offer rates among those who do work" (Wu and Rutledge 2014, p. 2). Weak labour force attachment was also identified by O'Connell and Gash (2003) and Duvurry et al (2012) as an impediment to retirement savings in Ireland. Workers in unstable employment, i.e. employed after periods of extended unemployment or intermittently unemployed were less likely to be offered a pension or to be members of pension schemes when compared to workers in stable employment.

Longer *tenure* with an employer, an important indicator of labour market attachment, is linked to pension scheme membership in the U.S. by Madrian and Shea (2001), Choi et al (2002) and Choi et al (2004a). This research was conducted in case study settings where the organisation offered an occupational pension scheme. When pension scheme membership was voluntary, the pension participation rate increased over time. Similar findings were also reported by Wu and Rutledge (2014) and O'Connell and Gash (2003) nationally representative data sets. In both studies, it was also reported that workers with longer tenure were more likely to be offered a pension as a benefit from their employers.

In research that investigated the pension gap observed for older workers, using longitudinal data from the Health and Retirement Study, Wu and Rutledge (2014, p. 12) found that employees working in organisations with a pension scheme have longer tenure and this “...group is also more likely to have had a pension prior to the current job... suggesting that some workers seek out jobs at pension-offering firm.” They highlight that it is impossible to infer causation. From the data, it cannot be determined if workers join pension schemes because of stable employment or if workers seek jobs in organisations with pensions. Though not reported in any research, participation rates that increase with tenure may be a result of repeated communication about occupational pension schemes or financial education in the workplace.

*Employment status* also impacts on pension scheme coverage. Full-time workers are more likely to be members of pension schemes than part-time workers in the U.S. (Munnell and Bleckman 2014; Wu and Rutledge 2014) and Ireland (O’Connell and Gash 2003; Ireland; Central Statistics Office 2011, 2005). Munnell and Bleckman (2014) report that employers are more likely to offer pension schemes to full-time workers and full-time workers are more likely to participate in the pension scheme than part-time workers. In the U.S., Wu et al (2014, p. 2) also report that “...part-time workers are less likely to be eligible for any type of plan”.

This discussion highlights that many of these characteristics are likely to be correlated. For regression analysis, if data is available for a number of related characteristics, techniques must be used to account for multi-collinearity. If data is not available for one characteristic (planning ability), another characteristic (education) may be used as a proxy. Also, most of the personal characteristics, with the exceptions of age and intelligence, may be both endogenous and exogenous. For example, an individual may join an organisation with a well-developed financial literacy capacity. The information or financial education training that they receive may improve this capacity.

These characteristics are likely to impact on organisational outcomes, independent of pension policies leading to proposition 4. *Ceteris paribus*, an organisation with an older, better educated workforce is more likely to have a higher participation rate and average contribution rate than an organisation with a younger, less educated workforce.

**Proposition 4:** *Ceteris paribus*, an organisation with an older, better educated workforce (or another set of characteristics) is more likely to have a higher participation rate and average contribution rate than an organisation with a younger, less educated workforce.

#### **4. Defaults as examples of a structural pension policy relying on System 1**

Madrian and Shea (2001) first reported on the use of defaults as a structural occupational pension policy introduced in a case study setting. Choi et al (2002, 2004a) and Beshears et al (2010) also conducted and reported on case study research following the implementation of

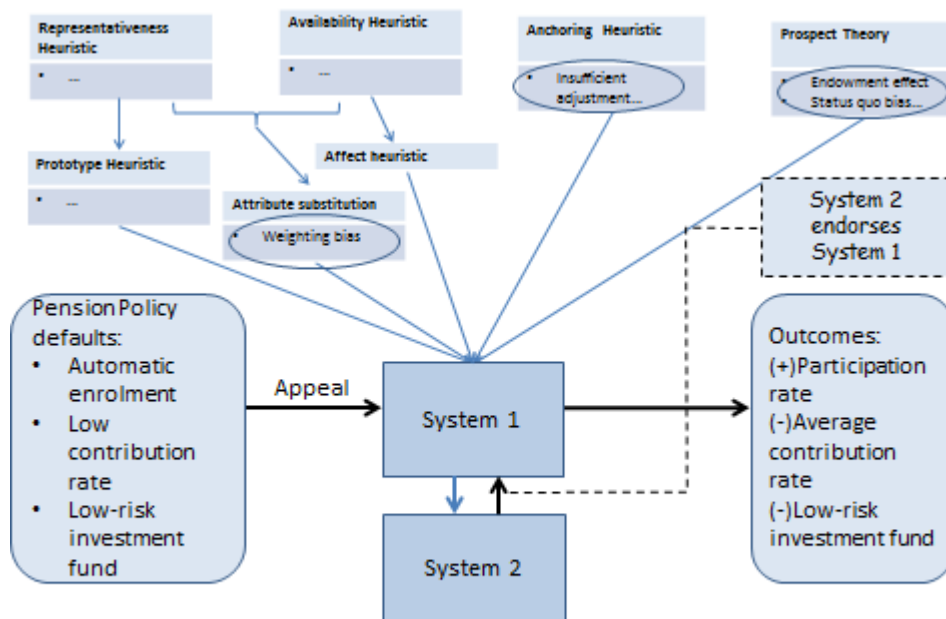
defaults in the U.S and the U.K. The Vanguard Group is an investment management company that provides full-service asset management and recordkeeping services for organisations operating DC schemes. The company compiles administrative data and compares participation rates, average contribution rates, investment fund choices and average asset accumulation comparing those organisations that use defaults versus those organisations that do not (See Utkus and Young 2015). All of the research strongly suggests that defaults impact on the pension participation rate and the average contribution rate.

This section will discuss the research findings and argue that for most pension scheme members, their judgment is based on System 1, endorsed by their System 2 monitor. Some of the of heuristics and biases used to explain the ‘default’ behaviour, will also be discussed.

### Impact of defaults on benchmark outcomes

In the research conducted by Madrian and Shea (2001) and Choi et al (2002, 2004a), the defaults typically included automatic enrolment at a low contribution rate (2-3%) in a low-risk investment fund. Figure 6 illustrates the impact of defaults, on the benchmark organisational outcomes.

**Figure 6: Bounded rationality framework, an example using structural pension policies (automatic enrolment with low contribution risks)**



Following the implementation of automatic enrolment, in the three case study organisations, participation rates increased but average contribution rates decreased. A large proportion of members’ savings remained in low-risk investment funds. The last two outcomes were considered negative because members were unlikely to achieve pension adequacy through their retirement savings if they remained within the defaults. The reliance on the defaults, even when inappropriate indicates that System 1 judgments were endorsed by System 2. The figure also shows four biases that are used to explain these outcomes.

These case studies suggested that inertia is powerful for employees who become pension scheme members by default and has a dramatic and positive impact on participation rates. Research indicated that automatic enrolment increased workforce coverage (Madrian and Shea 2001; Choi et al 2002, 2004a; Beshears et al 2010). Carroll et al (2009, p. 1640) summarised the research of Madrian and Shea (2001) and Choi et al (2002; 2004a) observing "...a participation default (automatic enrollment) can increase 401(k) participation rates among new hires by more than fifty percentage points..." Choi et al (2002, p. 78) also reported that, "...for previously hired employees..., automatic enrollment also substantially increases the 401(k) participation rate, although the increase in participation is slightly smaller than that seen for newly hired employees". Once enrolled, employees seldom withdrew from the pension scheme, although in both the U.S. and the U.K., the right to withdraw is protected through legislation.

Utkus and Young (2015) report that in 2014, 36% of all DC schemes under Vanguard's administration featured automatic enrolment. Because most of these schemes applying automatic enrolment were large (1000+ employees), 60% of participants were members of schemes with automatic enrolment. Automatic enrolment generally applies to new employees but some plan sponsors are enrolling nonparticipating employees. Utkus and Young (2015, p. 31) reported a significant difference in participation comparing schemes with different structures stating, "Employees subjected to an automatic enrollment feature have an overall participation rate of 89%, compared with a participation rate of only 61% for employees hired under plans with voluntary enrollment." In a Vanguard research report on defaults, Clark et al (2015, p. 4) found, "After three years, 89% of participants hired under automatic enrollment were still participating versus 51% of participants under voluntary enrollment who had chosen to join the plan."

However, the case study research also suggests that the impact on the average contribution rate is strong but negative in the sense that it decreased following the implementation of automatic enrolment. Choi et al (2004b, p 283) observed that not only do the majority of employees who became pension scheme members through automatic enrolment remain in the occupational pension scheme, they "...tend to stick with the default contribution rate and asset allocation chosen by their employer." Based on a review of empirical research, Carroll et al (2009) report that, "...about three-fourths of participants under automatic enrollment initially retain both the default contribution rate and the default asset allocation." This 'stickiness' is observed even if the default choices are inappropriate. Several studies (Madrian and Shea 2001; Choi et al 2002; 2004a) compare employee choices after defaults are implemented with previous cohorts of employees for the same companies that were required to make 'active decisions'. Although few employees chose the default investment fund and contribution rate before automatic enrolment, most employees remained in the default arrangements after automatic enrolment was implemented.

The U.K.-based organisation investigated by Beshears et al (2010) featured a default contribution rate of 12%. It was significantly higher than the contribution rates of the U.S.-based case study organisations and sub-optimal in the sense that it was too low to take advantage of the employer match for contributions between 12% and 18%. Only 25% of employees continued to save at the initial contribution rate while 66% remained in the default investment fund. Choi et al (2004) also found that employees tend to exhibit greater persistence in their attachment to the default fund allocation than to the default contribution rate. Beshears et al (2010, p. 9) suggest, "It is possible that the asset allocation default has a greater impact on outcomes than the contribution rate default

because individuals have some confidence in their ability to choose an appropriate savings rate but have little confidence in their ability to choose an appropriate asset allocation". Beshears et al (2010), Choi et al (2004a) and Madrian and Shea (2001) found that employees on low-income (System 2 characteristic) were most likely to persist with defaults, even if they were inappropriate.

Madrian and Shea (2001) explained their concerns that automatic enrolment would lead to an improvement in the participation rate but inertia, combined with the defaults of a low savings rate and a low-risk investment fund, would mean that retirement savings would be inadequate. Choi et al (2004a p. 83) concur stating, "Thus, while automatic enrollment encourages 401(k) participation. ...a low default savings rate and a conservative default investment undercut accumulation." In 2000, the Vanguard Group started to gather information from clients implementing automatic enrolment. In relation to retirement security, Andersen et al (2001, p. 1) state, "Automatic enrollment... does not appear to offer a solution to the problem of long-term retirement security. Default savings rates are typically too low, and default investment options too conservatives, to assure adequate savings." Madrian and Shea (2001), Choi et al (2004a) and Carroll et al (2009) recognized that those employees who would have made active decisions before automatic enrolment were less well off after its implementation.

Following this research, a number of academics (Benzarti and Thaler 2007; Choi et al 2005) and pension providers (PriceWaterhouseCooper 2009) highlighted the importance of default choices and suggested that many people cannot identify the contribution rate and investment fund that best suits their preferences. Choi et al (2005) argued that sophisticated employers, making careful default choices could improve both pension scheme participation and retirement savings adequacy. Madrian and Shea (2001, p. 1185) recommended that the choice of defaults is key to what they describe as a 'win-win' situation requiring employers to move employees into "...higher contribution rates and more aggressive investment strategies." The Vanguard Group added to those recommendations stating that pension scheme sponsors should "...consider a new "automatic savings" or "Smart" feature, in which participant deferral rates automatically rise over time" (Andersen et al 2001, p. 1). In other words, the Vanguard Group recommended that automatic escalation should be added as a structural feature of occupational pension schemes.

The current advice of the Vanguard Group is "autopilot plan design" that has the following structure, "...individuals are automatically enrolled into the plan, their deferral rates are automatically increased each year, and their contributions are automatically invested in a balanced investment strategy<sup>4</sup>" (Utkus and Young 2015, p. 22). Adding automatic escalation appears to increase the average contribution rate. In a Vanguard report on automatic enrolment, Clark et al (2015, p. 9) reported that during the 37-42 months following automatic enrolment, a majority of pension scheme members (57%) who automatically enrolled into a pension scheme with an automatic escalation of 1% of income per year, remained at the annually increasing default savings rate. If the pension scheme structure did not include automatic escalation, the percentage of employees remaining at the default contribution rate was lower, but still a significant proportion at 46%. In

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<sup>4</sup> A balanced investment strategy includes both equities and safer assets like fixed income securities. The Vanguard Group reports that target-date funds are a popular choice within this strategy (Utkus and Young 2015). The composition of target-date funds includes riskier assets during at the beginning of a member's career but changes to safer assets as the member nears retirement.

both cases, most of the employees leaving the default, increased their contribution rate above the default rate.

The research strongly suggests that for a sizeable proportion of members in pension scheme featuring automatic enrolment, employee judgments concerning defaults are based on System 1 with System 2 acting as a monitor. Many pension scheme members remain at the default contribution rate even when it is too low to lead to pension adequacy and insufficient to take advantage of employer matching arrangements. With automatic escalation the default behaviour is the same but the default is better in the sense that the scheme members save higher percentages of their income. Those who are most likely to remain in defaults were identified in several pieces of research as on low pay, a socio-demographic characteristic associated with weak System 2 monitoring.

### **Explanations for 'default' behaviour related to framing effects, heuristics and biases**

Choi et al (2005) observed that occupational pension scheme members follow the 'path of least resistance'. For example, once they are automatically enrolled into a pension scheme, "Even though employees have the opportunity to opt out of such defaults, few actually do" (Choi et al 2005, p. 4). They call this behaviour by pension scheme members 'passive decision making' suggesting that System 2 is not engaged; it endorses the intuitive judgment of System 1. Inertia is the term used to describe pension savings behaviour both before and after automatic enrolment. Pre-automatic enrolment, it describes the behaviour of individuals who do not save for retirement. After automatic enrolment, it explains the 'passive' behaviour of remaining in the pension scheme at the default contribution rate with funds invested in the default investment fund. There are numerous explanations for this behaviour related to various heuristics and biases. Four will be presented below.

Willis (2013) argued that defaults are more likely to be sticky if the decision environment is confusing and if the individual's preferences are uncertain. Confusion occurs when, "...options are numerous, have many complex attributes, or are difficult to distinguish from one another" (Willis 2013, p. 1162). Preference uncertainty means that individual "...only poorly understand their preferences, hold those preferences weakly, or cannot perform the tradeoffs necessary when they have competing preferences" (Willis 2013, p. 1162). Most of the explanations for sticky pension defaults relate to these two background conditions.

Similar to Barr and Diamond (2009) discussed above, Madrian and Shea (2001) observe that pension decisions are complex and the transaction costs that are incurred to learn about different options are high. Madrian and Shea (2001) suggested that defaults reduce complexity and employees remain in pension schemes after automatic enrolment because, "The initial participation decision is simplified from one that involves evaluating a myriad of options to a simple comparison of two alternatives: non participation... versus a 3 percent contribution that is allocated entirely to a money market fund" (Madrian and Shea 2001, p. 1178). Choi et al (2009, p. 58) explain this more broadly stating, "Rather than evaluating all

possible contribution rates and asset allocation options, employees need only compare the automatic enrollment default with nonparticipation.”

The attribute *substitution heuristic process* involves substituting a difficult question, that is hard to answer, with an easier one. It is associated with the weighting bias which arises “...when cues available to the judge are given too much or too little weight” (Kahneman and Frederick 2002, p. 53). An explanation for inertia is that individuals are substituting a hard question, ‘What do I have to do to have enough money saved for retirement?’ with an easy question ‘Should I remain in the pension scheme or opt out?’ This heuristic process results in a weighting bias; the default contribution rate and investment fund choice are given too much weight, chosen by large numbers of pension scheme members who would have made heterogeneous choices in the absence of automatic enrolment.

There are a number of biases associated with the prospect theory. Most of these relate to movement from the reference point, the original starting point from which all decisions originate. The *status quo bias* is one explanation of why employees do not join their employer’s occupational pension scheme. It was argued that because pension fund returns are unpredictable, loss averse employees do not opt in because they dislike losing more than they like winning. From a reference point where they are not a pension scheme member, they choose to not act. Willis (2013) argued that defaults change the reference point stating, “To the extent that the default position is framed as the reference point, loss aversion biases the decision in favor of the default” (Willis 2013, p. 1166). This suggests that pension scheme defaults establish a new status quo that employees are reluctant to alter for fear of loss.

Another bias associated with prospect theory is the *endowment effect* which refers to an exchange asymmetry. Kahneman (2003b, p. 705) described it saying “...The maximum amount that people pay to acquire a good is commonly much less than the minimal amount they demand to part from it once they own it.” In other words, people place a higher value on a product or service when they own it than when they are considering its purchase. The ratio is estimated at 2:1; people require twice as much money to sell the product or service once they own it than to purchase the item if they do not (Kahneman 2011). Like the status quo bias, this relates to the reference point and loss aversion. The pension scheme default becomes the reference point from which decisions are made. The endowment effect suggests that the reference point is valued more highly than the position would have been had the member been in a position to voluntarily choose. Like the status quo bias, loss averse pension scheme members tend to remain at the reference point.

Default behaviour can also be explained as an example of the anchoring heuristic. The default contribution rate, inappropriate in all of the case studies discussed, serves as the anchor and all changes are made from that starting point. *Insufficient adjustment* refers to the bias towards the initial value that limits the range of adjustment because accessible information used to form the anchor is also used to confirm the anchor and/or, the anchor



“...serves as a judgmental heuristic by simplifying an otherwise complicated judgment, substituting a value that can be quickly adjusted in place of a more effortful assessment” (Epley and Gilovich 2006, p. 312). The pension scheme member remains at the default contribution rate and justifies that choice because the default is accessible. Any changes made are relatively small adjustments because attachment to the anchor; larger adjustments require significant effort from System 2 to determine an appropriate contribution rate and the budgetary adjustments required to decrease spending in order to save more.

The impact of defaults on pension savings behaviour has been demonstrated in case study research and through administrative data compiled by Vanguard. The reasons for the behaviour remain unclear. The four biases discussed above are not an exhaustive list. It is not known if one is responsible, if more than one operates at the same time or if one bias affects the behaviour of one person while another bias influences others.

### **Defaults, pension communication and framing effects**

Kahneman (2011) and Choi et al (2004a) refer to the choice to opt out, rather than a requirement to voluntarily join as a framing effect. No pension research has been found to date that examines if communication policies play any role in making pension defaults potent. It is worth considering the pension communication that supports defaults (increasing the participation rate) and perhaps leads to unintended consequences (lowering the average contribution rate).

Recent research by Willis (2013) provides examples of how organisations can make defaults ‘sticky’ through complex ‘opt-out’ procedures and framing effects. These require communication about the default. In an example of a phrasing effect (described in Table X), she states, “They advertise the benefits of the default, both to directly shape preferences and so that consumers will consider the benefits of the default before considering any alternatives...” (Willis 2013, p. Willis (2013, p. 1173) summarises the impact stating, “In affirmatively nurturing the conditions and mechanisms that push consumers towards the default, firms implicitly acknowledge that defaults, per se, are not necessarily all that powerful. It is the combination of a default, opt-out process, and framing that is collectively powerful.” The framing effect could appeal to System 2 in its monitoring role to endorse System 1, accepting the default through the attribute substitution process by highlighting the easy default option juxtaposed by the much more difficult decision of deciding to opt-out or to choose a different contribution rate and/or investment fund.

Kahneman (2003b, p. 711) suggests that although heuristics generate biases, “An intuitive judgment will be modified or overridden if System 2 identifies it as biased.” He suggests that it is possible to stimulate System 2 to search for biased judgments. The authors of the case study research suggest that default behaviour is passive behaviour, meaning that System 2 is endorsing System 1. Action to move away from the default requires System 2 to intervene. The communication of the ‘opt-out’ option with the package of defaults, that

does not notify the decision maker about the limitations of the defaults, potentially fails to activate System 2 to search for biases. Therefore, anchoring the contribution rate at the default rate may be a failure of communication, rather than a problem with the defaults.

This discussion about pension structure and communication lead to Proposition 5.

Proposition 5: Pension communication policies support default behaviour through:

- Framing effects that use positive language to highlight the default as better than the alternatives; and
- A lack of communication that challenges System 1 biases.

## 5. Pension communications policies promoting System 2 decisions

There is research that suggests pension communication policies to improve individual decision making. None of it is related to organisational pension outcomes. This discussion will focus on communication to persuade and inform rather than financial education initiatives designed to improve financial literacy because these topics have received little empirical investigation. I will consider three communication policies: individualisation, segmentation and a targeted savings rate. Using the bounded rationality framework, I will identify the way that these forms of communication can be used to trigger a challenge that leads to an active decision by an individual's System 2 to either join a pension scheme or to increase their contribution rate.

### Individualisation of pension communication

Research suggests that the highly individual nature of pension decisions requires information that is *individualised*. One organisation that reported increased uptake of staff contributions to their pension scheme, hired a pension advisor to assist with the internal communication plan and to advise employees about retirement savings based on their individual needs (Harrison 2008). Maloney (2011) reported that an organisation in the medical devices industry used fourteen one-way and two-way pension communication media. Based on qualitative data gathered through twenty-four semi-structured interviews, the on-site financial advisor was the most frequently mentioned media (14 employees) followed by the Personal Benefit Statement (8 employees).

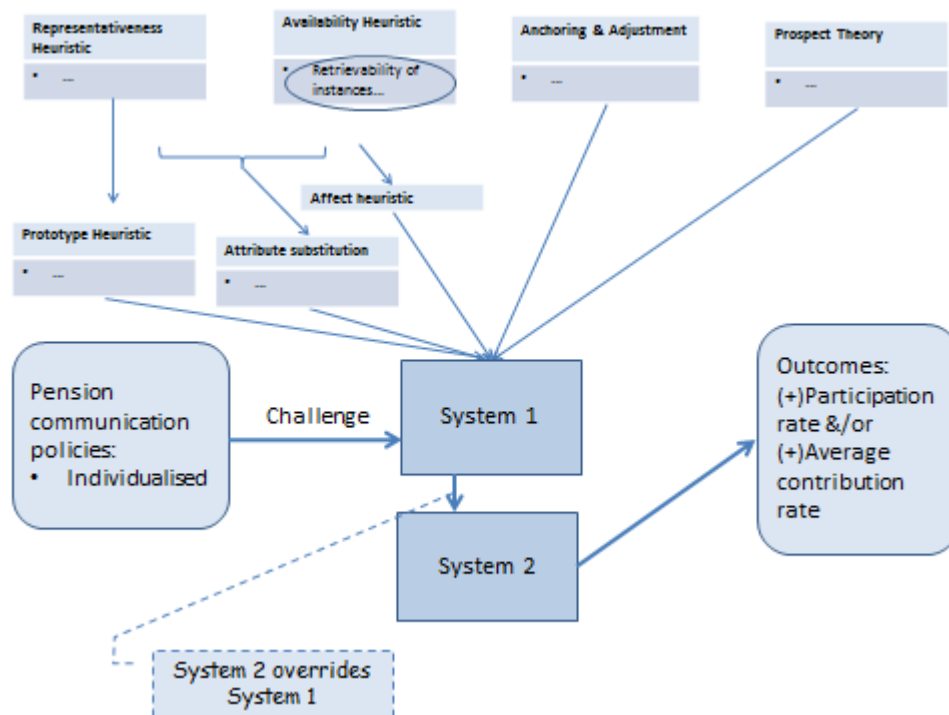
Using technology to convey individualised account information ‘...that is delivered in an engaging, easy-to-use format...’ promotes better saving behaviour (Sheridan 2006, p. 18). Larsson et al (2008, p. 160) following an examination of communication techniques used in different OECD countries outlined as ‘good practice’ that “...Individual statements should be provided to all participants annually...” complemented with additional online services providing tools to “...evaluate the level of income needed in retirement”.

Individualised information probably attracts the availability heuristic leading to *biases resulting from retrievability of instances*. This refers to a tendency to think that “...a class

whose instances are easily retrieved will appear more numerous than a class of equal frequency whose instances are less retrievable” (Tversky and Kahneman 1973, p. 1127). Instances are also more likely to be retrievable if they are salient. Salience refers to notability or importance and “...governs the level of attention paid to the issue at hand” (Clark et al 2012, p. 64). Often, the retrievable instances are considered by System 1 to be plausible and frequent, even if they are unlikely and rare.

Individualised communication provides information to the pension decision maker that is salient because it is personalised and easily retrievable. It presents a challenge to System 1 biases that could result in a System 2 decision to join a pension scheme or increase contributions based on relevant information. The process is illustrated in Figure 7.

**Figure 7: Bounded rationality framework, an example using an individualised pension communication policy**



### Segmentation of pension communication

Weiner and Doescher (2008, p. 59) recommend that “Segmentation should be used to identify both the messages that certain groups should and should not get.” Groups can be identified by demographic characteristics, their retirement savings status, or the structural features of their occupational pension scheme. According to Stevens and Van Asshe (2013, p. 20) “To make sure the receiver has understood the message, the tools and methods used should be tailored to target groups”. There are a number of possible segments that can be considered to challenge System 2 categorised by age, ability to plan and a combination of characteristics.

Information content can be modified to address the needs of different *age* groups. Montgomery et al (2011, p. 5) suggested that a different communication strategy is needed for young and old pension savers that is "...presented in a manner similar to how each are viewing retirement". They presented preliminary evidence that suggests that younger individuals prefer general information presenting retirement in an abstract way while workers who are closer to retirement prefer "...concrete ads that provide specific steps to saving for retirement" (Montgomery et al 2011, p. 17). They conclude that presenting age appropriate information may improve pension adequacy. Larsson et al (2008, p. 161) also suggest that "Information should be segmented by age group" with greater detail of savings projection focused on participants who are established in the labour market. Stevens and Van Asshe (2013, p. 21) referred to this a 'layering' and stated "...the older a person gets, the more detailed the information provided becomes." They suggest that the internet facilitates a simple overview but allows for greater detail for people who require a deeper look.

Current and potential pension scheme members can also be segmented by their ability to plan. Marconi and Utkus (2002, p. 2) suggested that "Employees can be classified into five money attitude segments." They argue that a successful pension communication strategy targets the media and the message that is appropriate to each classification (successful planners, up & coming planners, secure doers, stressed avoiders and live-for-today avoiders). Targeting communication to specific groups based on preferences, attitudes and behaviour is also helpful because channelling relevant information reduces the decision complexity (Sheridan 2006).

Case study research also suggests that a number of characteristics can be grouped together. Maloney (2011) provides an example from an interview respondent who described the way that segmented information worked in practice at her organisation. Medtronic arranged with an independent financial consulting company, to discuss a range of financial services, including pensions, with their employees. The interviewee stated, "...they do an e-mail... They'll state something like, 'If you're in this group and you have this earnings then you should contact us because of Y.' So it's normally easy to figure out whether it applies to you or not." This eliminated the need to pay attention to irrelevant information, reducing information overload and decision complexity.

Segmentation is also likely to operate through the availability heuristic, perhaps leading to the *bias resulting from the effectiveness of the search set*. If examples come easily to mind for one category, they are judged more numerous or frequent than another category causing an overestimation of one and an underestimation of the other. If asked to solve a problem, therefore, an individual is more likely to use available information rather than effectively searching for a set of relevant information. Segmentation helps the decision maker to identify an information set that is relevant to her decision. It presents a challenge

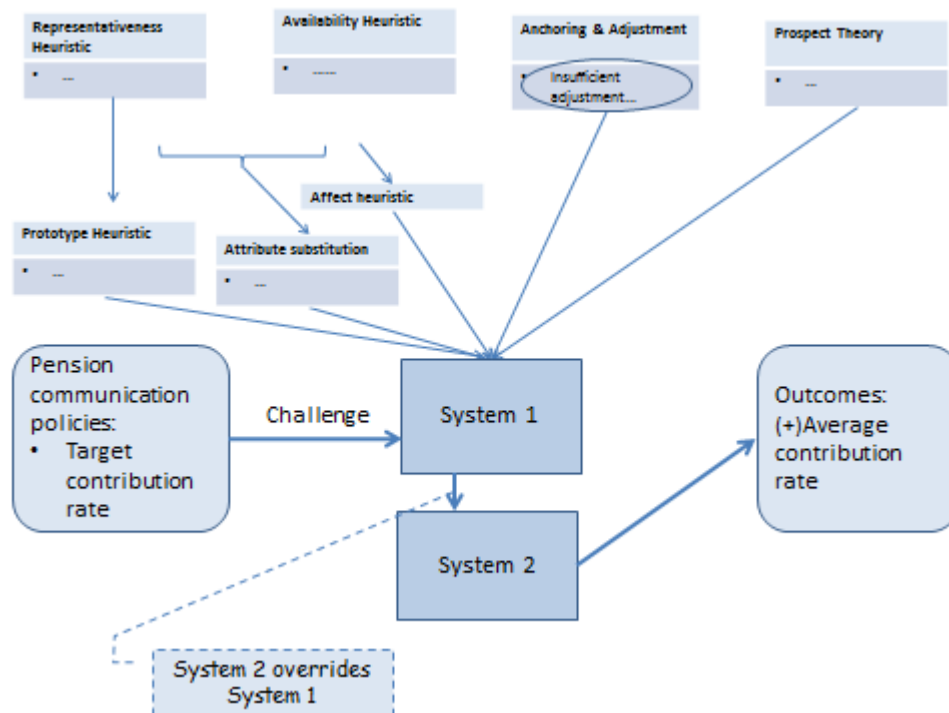
to System 1 biases that could result in a System 2 decision to join a pension scheme or increase contributions based on relevant information.

### Targeted contribution rate

The impact of anchoring was discussed in the context of default contribution rates that were too low to achieve pension adequacy, even for those pension scheme members who save during their entire career. For employees of large organisations, the structure is often a matching arrangement and the contribution rate generally has two components from the member and from their employer. These can vary but a typical matching arrangement in the U.S. is \$0.50 on the dollar for the first 6% of pay. For schemes structured in this way, 6% becomes the anchor for a member and the bias could lead to insufficient retirement savings.

This combined contribution rate could be compared to a target contribution rate providing a more accurate heuristic of the percentage of income that a person should save to achieve pension adequacy. For example, Utkus and Young (2015, p. 40) state, “Vanguard estimates that a typical participant should target a total contribution rate of 12% to 15% including both employee and employer contributions.” This target contribution would present a challenge to the System 1 bias that anchors either on the default contribution rate or the maximum matching contribution rate resulting in a System 2 decision to increase the contribution rate. This is illustrated in Figure 8.

**Figure 8: Bounded rationality framework, an example using a target contribution rate**



This discussion about pension communication policies that potentially encourage System 2 to override System 1 are the foundation of Proposition 6.

Proposition 6: Communications policies can highlight biases, resulting in System 2 judgments that impact on the organisational participation rate and average contribution rate.

## 6. Conclusion

In this paper, I have developed a bounded rationality framework. Building on the work of Simon, Kahneman and Tversky, I illustrated how pension scheme policies can be designed to either appeal or to challenge our intuitive and emotional System 1. Based on wide ranging international research, I identified a number of characteristics, grouped as socio-demographic and employment that impacts on the monitoring capacity of System 2, highlighting that many of these characteristics are correlated and some can be used as proxies for others. The model should help the 'choice architect' to think specifically about the cognitive processes involved for different pension policies allowing them to predict, and then evaluate if desired organisational outcomes have been achieved.

I applied the framework to explain outcomes found by Madrian and Shea (2001) and Choi et al (2002, 2004a) following the implementation of pension scheme defaults. Using findings from empirical research, I argued that defaults appeal to System 1 and the lack of challenge to System 2 resulted in passive decisions. A large proportion of pension scheme members entering through automatic enrolment remained in pension scheme over a two-to-four year period, but did not change their contribution rate or investment fund although both were considered in appropriate to achieve pension adequacy.

However, I suggested that these case studies did not discuss communication policies that accompanied the introduction of defaults. This omission may be part of the explanation of the subsequent inertia that resulted in organisational outcomes of increased participation rates but decreased average contribution rates when compared to the same organisations' employees who entered the pension scheme under conditions of voluntary enrolment. As Willis (2013) argued, the strength of defaults may be reinforced by communication. Communication policies have been ignored in most pension research and should be included in future research.

I argued that pension communication can be used to inform and persuade. Pension policies can impact on organisational outcomes, both in combination with structure and independently. I also identified three specific communication policies including individualisation, segmentation and savings rate targets that can be evaluated using the bounded rationality framework, suggesting that these challenge System 1. Future researchers could investigate changes, if any, to organisational outcomes, based on the introduction of one or more of these communication pension policies.

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