Consumer Research

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Financial Services Authority

Financial Capability: A Behavioural Economics Perspective

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Financial Services Authority
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July 2008

FSA®

FSA Foreword

Background

The Financial Services Authority (FSA) leads the National Strategy for Financial Capability in partnership with Government, the financial services industry and the third sector. The strategy aims to improve the financial capability of the UK population. The results of the FSA's major financial capability survey[1] showed that in 2005, many UK consumers lacked the confidence and capability to make effective decisions about their money.

The FSA launched a seven-point programme[2] in March 2006 to improve significantly people's levels of financial capability and, together with partners, has focused on delivering these priority initiatives. In March 2008, following recommendations of the independent Thoresen Review of Generic Financial Advice[3], HM Treasury announced that the FSA will also lead a two-year "Pathfinder" programme to set up a service offering free, impartial information and guidance on money matters.

Over time, improving people's financial capability will not only benefit them directly, but also enable them to exert a stronger influence in the retail markets, creating more effective and efficient markets and reducing the need for regulatory intervention.

Measuring success – the challenge of evaluation

The FSA financial capability survey measured different types of financial behaviour and attitudes in five key areas: making ends meet, keeping track of money, planning ahead, choosing products, and staying informed across the UK population. This survey is due to be repeated in 2010 and every four to five years thereafter.

Improvements in the level of financial capability require a long-term change in attitudes, habits and behaviour towards money. The National Audit Office has recognised that measuring those changes is inherently difficult. In a recent report4, the NAO suggested "*The FSA may be able to build on its successful record of consumer research by using sophisticated methodologies to demonstrate a clearer link between improved outcomes and its own work". (Section 5.18 National Audit Office Review 2007).*

This was also discussed at the Treasury Select Committee, where representatives outlined the need to be able to understand not only how the National Strategy impacts on outcomes and behaviour but also the effectiveness of different 'types' of intervention.

With these challenges in mind, and in order to inform further evaluation of financial capability initiatives, the FSA commissioned two academic literature reviews: a review of evidence from policy evaluation of financial capability initiatives around the world; and a review of behavioural economics literature on the likely impact of financial capability

[1] *Levels of Financial Capability in the UK: Results of a baseline survey*, FSA March 2006. *Financial Capability in the UK Establishing a Baseline*, FSA, March 2006
[2] *Financial Capability in the UK: Delivering Change*, FSA
[3] *Thoresen Review of Generic Financial Advice: Final Report*, HM Treasury, March 2008
[4] *Review of the Financial Services Authority*, National Audit Office, April 2007.

initiatives on behaviour. These reviews confirm the importance and the unresolved challenges of evaluating robustly the effectiveness of initiatives to improve financial capability.

"Evidence of Impact": Review of policy evaluation literature by Adele Atkinson of the Personal Finance Research Centre, University of Bristol

The FSA commissioned Adele Atkinson to review past evaluations of the effectiveness of financial capability initiatives and financial education more broadly, both in the UK and other countries. This was intended to deliver the following:

- An overview of the evidence on the incremental impact of financial capability interventions on people's behaviour and attitudes – i.e. what is the difference compared with the world if initiatives had not been introduced?
- Summaries from the available evidence on the likely impact of different types of financial capability initiative - e.g. school-based learning, one-off seminars, provision of printed information, or advertising via TV/newspapers/radio - and the likely impact on different target groups.

Adele's work has largely confirmed that, not only has there been relatively little work in the past on financial capability in the UK or other countries, but also that rigorous, credible policy evaluation showing the incremental impact of financial capability work is difficult to find.

She therefore offered a useful summary of areas where problems have occurred, and what good practice would be to overcome these, which the FSA will take into account in designing future evaluation of financial capability initiatives:

- Clear objectives of the project and the evaluation
- Good quality data, including administrative records.
- A sample that is broadly representative of the target population
- Careful consideration of the sample size, taking into account the analysis that will be needed to understand the outcomes
- Well designed data collection instruments that are appropriate to the target group and to the initiative under evaluation
- A benchmark measure of knowledge, attitude and behaviour (before the initiative) and a follow up measure to identify change (after the initiative)
- A ‘control’ group to show the normal changes that take place in the absence of such an initiative
- Consideration of the time period necessary to identify change, balanced with consideration of the likelihood of collecting reliable data over extended periods of time.

"Financial Capability: A Behavioural Economics Perspective": Review of behavioural economics literature by Professor David de Meza, Dr Bernd Irlenbusch, and Professor Diane Reyniers (London School of Economics)

The FSA commissioned Professor de Meza, Professor Reyniers and Dr Irlenbusch to conduct a review of the behavioural economics literature, examining what this literature has to say about consumer behaviour when making financial management and/or choosing financial products, and in particular, the likely impact of financial capability initiatives, or other information provided to consumers with the intention of encouraging better choices about financial products.

Drawing on a large and wide-ranging literature on consumer behaviour, this report argues that psychological rather than informational differences may explain much of the variation in financial capability reported in the FSA's financial capability survey, and that people's financial behaviour may primarily depend on their intrinsic psychological attributes rather than information or skills or how they choose to deploy them. In this context, the authors conclude that financial capability initiatives which are designed to inform and educate should be expected to have a positive but modest impact.

The FSA recognises that achieving widespread behavioural change will be a long process due to deep seated behavioural biases, and will take the findings of Professor de Meza et al into account in using conservative estimates for the likely behavioural impact of financial capability initiatives in ex ante assessments of cost-effectiveness (e.g. cost-benefit analysis).

Professor de Meza draws attention to recent literature which indicates that, in the context of widespread behavioural biases, two modes of financial capability work appear to be the most promising. These are the use of 'norms', which means directing people to a particular action such as higher saving, and the use of active intervention by a councillor and/or individualised advice, rather than passive information or education.

The FSA and government's Money Guidance Pathfinder programme will include individualised advice both face to face and over the phone, and evaluation of this programme will provide useful new evidence on these promising modes of delivery.

Financial Capability: A Behavioural Economics Perspective

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Executive Summary

- Financial capability involves knowledge and skills, but attempts to improve these may not lead to better outcomes. What people choose to know and what they do with their knowledge may primarily depend on their intrinsic psychological attributes.

- Behavioural economics has identified a collection of deep seated cognitive biases that influence decisions in both financial and non-financial contexts. There is considerable evidence that these factors are present, though how widespread they are remains controversial. The empirical work is often situated in contexts other than personal finance but there is no reason to think the biases are domain specific.

- Psychological rather than informational differences may explain much of the variation in financial capability reported in the FSA (2006) Baseline Survey. This applies both to differences between individuals and across competence dimensions. The Baseline Survey indicates that in most capability categories, scores improve with age and the level of general education. This is consistent with the importance of attitudes rather than teachable specific knowledge.

- If poor financial capability is mainly a matter of psychology, the information-based approach of the National Strategy for Financial Capability is likely to have only a modest effect in improving outcomes.

- Two links must hold for conventional financial education to be effective. Education must improve relevant knowledge and understanding (financial literacy) and better knowledge must change behaviour. Unscrambling causality from correlation is hard. The best empirical work finds that financial education is not likely to have major lasting effects on knowledge and especially on behaviour. Psychology may be the main driver of what people actually do.

- Some of the principal cognitive biases potentially relevant to the FSA agenda are procrastination, regret and loss aversion, mental accounting, status quo bias and information overload.

- Procrastination is captured by the tendency of many people to have high short-term discount rates but lower long-term discount rates (hyperbolic discounting). Postponing a cost, even one that generates high future benefits, is therefore attractive. So too is advancing a benefit to the present, even if this implies high future costs. This leads to outcomes such as credit card borrowing at high interest rates and unwillingness to engage in painful activities such as financial planning. Nevertheless, people with such preferences might be happy to make a binding commitment, for example to save more in the future. In the absence of commitment opportunities, such intentions will not be realised.

- Procrastination is potentially relevant to all five FSA capability categories and to whether many of the facilities proposed in the National Strategy are widely accessed. There is limited evidence that awareness of the procrastination problem is an effective antidote at the individual level. Many behavioural economists take the view that the best response is not informing consumers of the problem or trying to change them but institutional design and regulation that recognises the psychology. An example is externally set deadlines for pension choice with sensible default options built in.

- People are concerned not only with what they have but how it compares to what they used to have and with what they might have had. That is, loss aversion and regret aversion matter. For example, whether people sell shares is influenced by what they paid for them and some choices may be avoided if it easy to determine subsequently whether a mistake has been made. These considerations have an impact on the choice of financial products and the inclination to stay informed about financial matters.

- Mental accounting is the common tendency to create artificial budgets covering different categories of spending and saving. People use this technique to evaluate and keep track of their finances but it can lead to seemingly irrational decisions such as saving at low interest rates whilst simultaneously borrowing at high rates.

- Status quo bias is the tendency for people to stick with their prior choices. It is therefore relevant to the selection of financial products and the incentive to stay informed. The surprisingly powerful influence of default options is consistent with this bias.

- There is a set of biases involving incorrect information processing that we group under the heading 'curse of knowledge'. People draw incorrect inferences, focus on inappropriate or unimportant data, are distracted by too much information and choice, may over-deliberate and otherwise misuse information. Unjustified optimism is rife. These errors may affect decision making in all the FSA capability domains. It is though unclear whether people can be educated out of their errors, whether education may sometimes exacerbate problems, or whether the best response is regulation of how information is presented.

- Behavioural economics has been directed more to explaining choices than to changing them. Even if there is a sense in which people can be shown to be making poor decisions it is of course debatable whether it is appropriate to try to intervene. A relatively small literature has looked at remedies for various cognitive biases. Little of this is specifically applied to personal finance.

- A number of the debiasing techniques in the literature involve encouraging thinking that is more critical. "Consider the opposite" encourages people to think why they may be wrong. This counteracts general tendencies to be overconfident and to suppress disconfirming evidence.

- Accountability accentuates the need to think about all aspects of a decision by making people imagine they have to explain their choice to others or really having them explain their choice to others. This has elements of a Weightwatchers or Alcoholics Anonymous approach. It has not been directly tested in the financial domain.

- Training in decision making, whether relatively abstract or applied has had some success, though the extent to which effects endure and are transferable to the financial domain is not known.

- Overall, there is a lack of direct evidence that the National Strategy for Financial Capability will substantially improve long-term financial decision making. The indirect evidence from behavioural economics is that low financial capability is more to do with psychology than with knowledge. Institutional design and regulation are probably far more effective than education, though crisis counselling may be helpful. More research is needed on whether cognitive biases can be overcome in the personal finance domain.

1) Introduction

To promote their long-term interests, people need to identify crucial financial choices and deal with them in a timely, knowledgeable and coherent fashion. The FSA (2006) pinpoints five dimensions of financial capability and provides a comprehensive snapshot of their distribution in the UK population.[1] In the light of these findings, a National Financial Capability Strategy has been formulated to improve decisions. Our paper aims to draw lessons relevant to this endeavour from the flourishing field of behavioural economics.

There is no doubt that many people are poorly informed about basic issues in personal finance and take decisions that are difficult to interpret as rational. For example, some 9% of tenants buy buildings insurance on the property they live in despite the fact that only landlords can claim (FSA, 2006). Just as strikingly, the Skipton Building Society reports that winning the National Lottery is a significant part of the financial planning of one in seven Yorkshire residents (http://business.timesonline.co.uk/tol/business/money/article3510234.ece). It is tempting to assume that the remedy is more and better financial education. This does not follow. Even highly educated finance specialists make errors.

MBA students at the top ranked Wharton Business School were the subjects in an experiment by Choi, Laibson, and Madrian (2006). Elementary mistakes were common in choosing between index-tracking funds that differed only in their administration expenses. In making their choice, all sorts of irrelevant aspects of the presentation materials were influential with the subjects. Redesigns of the explanatory materials that emphasised costs still failed to elicit the strictly dominant choice for many subjects, despite the experiment providing significant incentives to make correct decisions. If even

[1] There is one reasonably similar question in the financial literacy quiz in the US HRS survey (Lusardi and Mitchell, 2007) and the UK survey (FSA, 2006). This concerns the distinction between real and nominal interest rates. Despite the very different education systems in the two countries, about 75% of answers were correct in both places. This could be a pointer to the irrelevance of education. A different US survey of personal finance information is described by Hilgert and Hogarth (2003).

the most financially sophisticated individuals do not take sensible decisions when confronted with apparently simple choices, the problems may not primarily be due to financial ignorance and lack of financial education.[2]

Further food for thought along these lines is provided by an expert in the provision of financial literacy courses in US high schools:

Perhaps more distressing than low levels of financial literacy is the consistent finding that those who have taken a high school class designed to improve financial literacy tend to do no better or little better than those who have not had such a course (Mandell, 2004). We do not doubt that the vast majority of students who take such a course attend classes, read the textbook and cram successfully for the final. Nor do we doubt that the teachers are dedicated and educated. We just find no connection between education and financial literacy, measured, in most cases, within a year after taking such a course. (Mandell, 2006, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=923557)

Similarly disquieting evidence is provided by Benartzi & Thaler, (2007):

Many employers have tried to educate their employees to make better decisions or supplied tools to help them improve their choices. The empirical evidence does not suggest that these methods are, in and of themselves, adequate solutions to the problems. The same large employer discussed above that offered its employees the chance to switch from a defined benefit to a defined contribution plan offered its employees a financial education program free of charge. The employer measured the effectiveness of this education by administering a before-and-after test of financial literacy. The quiz used a True/False format, so random answers would receive, on average, a score of 50 percent.

[2] FSA (2006) finds that financial capability tends to increase in the level of general education and in age. The former indicates that ability and attitude matter but does not imply that more education would help and has no message regarding the importance of specifically financial education. The age effect may indicate generational effects, that experience is the best teacher, or that older people have more settled financial lives.

Before the education, the average score of the employees was 54; after the education, the average score jumped to 55. As professors know, teaching is hard'

From a policy perspective, it is crucial to identify whether the reason people behave as they do is primarily the result of lack of knowledge and mastery of relevant financial management techniques, or whether it reflects fundamental aspects of human nature. Only in the former case is conventional financial education an appropriate remedy. Such education might include topics such as the benefits of diversification, the nature of compound interest, the implications of tax incentives, pension planning, the management of credit cards and so forth. At all events, if it is established that the basic problem is insufficient knowledge, the question is when, where and how to deliver the information. Is it best to provide formal courses at school, at work, or through evening classes? Are impartial websites effective? Would television advertising convey information more efficiently? What is the most helpful way to represent the level of risk implicit in different financial instruments?

The big challenge though is to show that education does make a difference to how people behave. Asking people at the end of a seminar whether they will do things differently is weak evidence. What people say they will do is known to diverge from what they actually do. *"Good resolutions are useless attempts to interfere with scientific laws. Their origin is pure vanity. The result is absolutely nil."* (Oscar Wilde, The Picture of Dorian Gray) As we shall note, Choi et al (2006) find Wilde's dictum is certainly true of pension planning.

Making people better informed is hard and expensive and is of minimal value if it has no effect on behaviour. This would be the case if low financial capability is more to do with psychological factors than lack of knowledge. For example, many people think they should save more than they do and borrow less. Why this does not happen may be more to do with the psychology of self control, procrastination and immediate gratification than ignorance of the relevant opportunities. Benton, Meir and Sprenger (2007) provide some preliminary evidence that this is indeed the case. If what really matters in financial capability are personal attributes, the policy implications are major. Perhaps cognitive behavioural therapy could help, but this approach is very different to most programmes of financial education. Behavioural economics even suggests that it will be hard to get people to attend courses if they are voluntary, or pay attention to them if they are compulsory. The costs are immediate, the benefits deferred. The hyperbolic discounting that may explain why saving rates are low may also explain failure to invest in education.

Rather than educating people out of error, a more effective approach may be to take the biases into account when designing policy. A now well known example is to change defaults, as advocated by Choi et al (2003). Saving rates are much higher if employees are enrolled in savings schemes from which they can easily opt out than if there is no automatic deduction but an easy opportunity to opt in. The design of Personal Account Pensions due to be rolled out in the UK in 2012 has been much influenced by David Laibson's work on defaults.

In contrast to the behavioural perspective, the Thoresen Report (2008, http://www.hm-treasury.gov.uk/media/8/3/thoresenreview_final.pdf) is implicitly based on the view that poor financial decisions are to a significant extent due to remediable ignorance. It advocates that the Government should fund the widespread provision of generic financial advice (GFA). If this leads to significant changes in behaviour, the benefits would greatly exceed the costs. According to the Report, the net present value of the gain is of the order of £15bn. The costs of providing GFA are between £780m and £1.67bn. What is much more problematic is putting figures on the benefits, especially to consumers. Even if there were evidence of substantial changes in behaviour (say with respect to saving rate) converting these into a net benefit would not be straightforward. In fact there are no reliable predictions of effectiveness. The Deloitte cost-benefit analysis appears to pluck the key number for the consumer gains from generic financial advice from the air. The raw data from the FSA Baseline Survey indicates that despite having higher incomes, those in receipt of professional financial advice do not have higher wealth (see Figure 1). On the face of it, advice discourages saving or leads to worse investments. Of course, the effect may disappear if a full set of controls were included. It would be easy enough to analyse this data further and doing so should be an urgent priority. Another reason for not reading too much into Figure 1 is that reverse causality might be present. It could be that people most in distress may be the ones to seek advice. This though seems unlikely given that the advisers are not crisis counsellors. So even though the evidence cannot be taken as it stands, it does not provide much basis for expecting gains. As GFA will to some extent be directed to those in distress it is of course possible that its effects may be more positive.[3] Nevertheless, the benefits claimed by Thoresen are not evidence based.

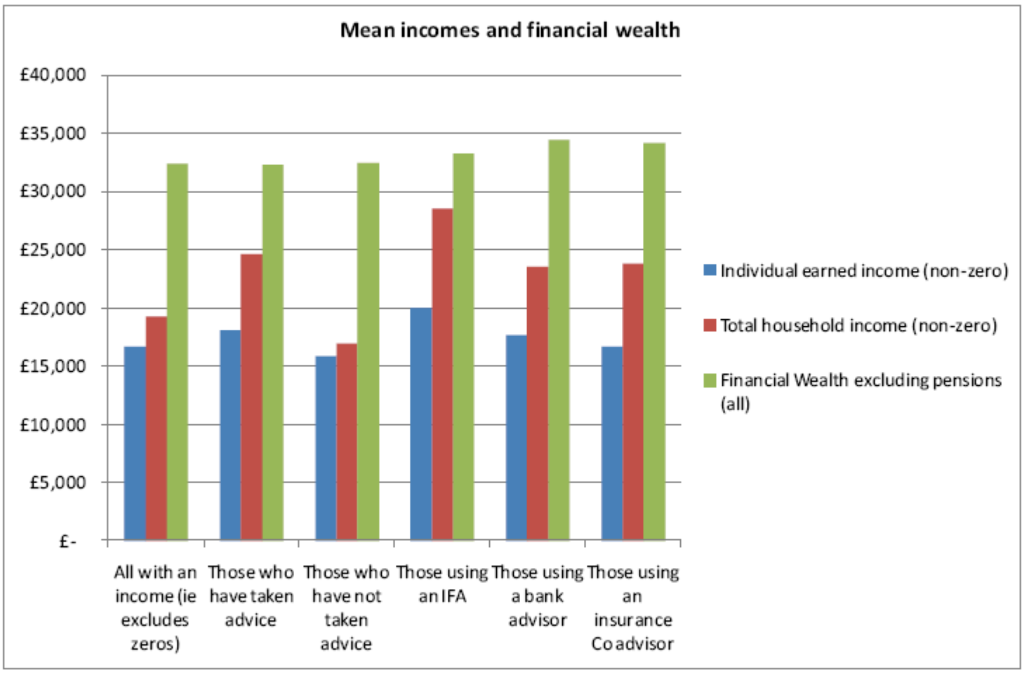

Figure 1

Our survey aims to cover research regarding the determinants of personal financial decisions and whether and how they can be influenced. It provides an overview of what is currently known about the nature versus nurture explanations of financial capability, what more needs to be known, and the implications for policy. It should be read in conjunction

3 Collins (2005 http://www.policylabconsulting.com/documents/FMF_2005614%20-%20Collins_Paper4_LitReviewCounseling_6_05.pdf) concludes that the effectiveness of counseling is largely unproven though some recent studies suggest it is helpful.

with Willis (2008a, 2008b) who forcibly and effectively argues that there is little convincing evidence that financial literacy education has a beneficial effect.

The plan of the paper is that evidence on the effect of financial education and literacy is first surveyed. Some of the behavioural biases most relevant to financial markets are then identified and implications for policy are considered. A fuller taxonomy of extant biases is provided in the Appendix. Finally, debiasing strategies appearing in the literature are discussed. Unfortunately, there is little work that directly considers whether biases can be eliminated by appropriate training, especially in a financial context. There is a clear need for more research in this area.

2) Does financial education deliver?

Providing convincing evidence on the effects of financial education is no easy task. The most straightforward but least reliable method is to ask people attending a seminar whether it was useful and whether participation will change their behaviour.[4] There are three main problems. Attendance is self-selected. Those motivated to turn up may have the greatest interest in financial matters and may already be contemplating making a change in their finances. That is, as treatment is not random it does not follow that attending the seminar is the real reason for differences in the behaviour between attendees and non attendees.

Secondly, self-reports of usefulness and of intentions may not be accurate. Most people prefer to think they have not wasted their time. So there is a predisposition to want to value the experience even if it is of little real benefit. Moreover, although participants may come away from a seminar resolved to act, the proportion actually doing so may be very low.[5] The road to financial ruin is paved with good intentions. Concluding that

[4] For example Kratzer et al. (1998); HR Focus (2000); DeVaney et al. (1995); McCarthy and McWhirter (2000); Jacobius (2000).

[5] See Madrian and Shea (2001), O'Donoghue and Rabin (1999); Diamond and Koszegi (2003); Laibson, Repetto and Tobacman (1998).

education is effective because participants say it will change their financial life may simply be wishful thinking.

Finally, if there are effects, it is important to know whether they are lasting. Providing financial education to schoolchildren is pointless unless their adult behaviour changes. Questionnaires administered immediately after a lesson cannot address the key issue.

Fortunately, there are a few studies sufficiently well designed to minimise these problems. All find evidence that the effects of financial education on behaviour are positive but modest. Unfortunately, all the studies relate to the US. There is no particular reason to think the effect on UK consumers would be different, but there do not appear to be comparable studies.[6] The first set of studies looks at whether financial education raises saving, wealth and pension plan enrolment. The second set tests whether financial literacy improves outcomes but does not examine how far financial literacy can be raised by financial education.

Bernheim, Garrett and Maki (2001) examine the long-term effects of school financial education on saving behaviour and asset accumulation. This is possible because between 1957 and 1985, different states have adopted compulsory consumer and financial education at different times and some not at all. A national survey of some 2,000 individuals collected details of personal characteristics, including location of schooling, current income, wealth, and saving rates. Although the latter three magnitudes may be biased, this will not distort the results on the effectiveness of financial education unless the errors with which saving rates are reported themselves depend on financial education. The main finding is that compared to states that never enacted a mandate, self-reported saving rates were 1.5% higher for students in states in which financial education has been compulsory for five years. The difference is statistically significant. It seems that mandates become more effective the longer they have been in force. This may reflect that it takes time to develop appropriate curricula and the skills with which to deliver them.

[6] FSA (http://www.hm-treasury.gov.uk/documents/financial_services/financial_capability/fin_cap_fsastrategy.cfm) describes the various initiatives planned and underway but does not examine effectiveness.

Experience is apparently still building at least seven years after compulsion is introduced. This is a long period to be learning, bearing in mind that some changes were almost certainly made in anticipation of enactment. It could be that it is not mandates that are responsible for the changes but that they are proxying for some other change.

One possibility is that states in which saving rates are highest introduced mandatory education earlier than others did. The main defence is that a dummy in the individual savings regression for whether the state ever imposed compulsory education is not significant. The interpretation of this observation is that states that imposed mandatory education do not have different intrinsic saving rates relative to the others. This is only partially convincing in countering the argument that what might matter is not whether a mandate was imposed but when it was. Perhaps the timing of mandates is correlated with prior saving rates. In that case financial education is proxying for something else. This is particularly relevant as fewer than one third of states ever had a mandate. The most obvious procedure is to use state dummies. When this is done, the effect of the financial education parameter is only significant at the 7% level. Were state dummies and year dummies interacted, a 'years since mandate' variable might not be significant at all.

A complementary study by Peng et al (2007) is based on an online survey of alumni of a large mid-western university. It investigates whether those who have taken financial education courses at school and at university behave differently. Investment knowledge is found to increase saving but only university courses increases investment knowledge. There are controls for current income, inheritance and so forth, but there is an obvious self selection issue. People choose whether to enrol for a university finance course because they have more interest in financial matters and such types may have a higher saving propensity.

The remaining studies involve the effects of workplace financial education. Choi et al (2006) report on the effects of seminars run by a large US company. For both attendees and non-attendees, data was available on financial choices before and after the seminar.

For the attendees it is possible to compare intentions and actions. Attendance appears to have some effect on behaviour. Table 1 summarises the results. Although eight out of every 100 attendees increased their pension contributions, so did five out of every 100 non-attendees. Even this small difference may overestimate the effect of the seminar due to self-selection bias. What is most striking is the low proportion of plans actually carried out. Of seminar attendees intending to start a 401(k) plan only 14% did.

	Seminar attendees		Non-attendees
	% planning to make change	**% actually made change**	**% actually made change**
Those not in 401(k)			
Enrol in 401(k) Plan	**100%**	**14%**	**7%**
Those already in 401(k)			
Increase contribution rate	**28%**	**8%**	**5%**
Change fund selection	**47%**	**15%**	**10%**
Change asset allocation	**36%**	**10%**	**6%**

Table 1

Duflo and Saez (2003) provide interesting further light on findings of this sort. Their experiment involved non-faculty employees of a large US university. All were encouraged to attend financial information sessions ("benefit fairs") but the experiment offered $20 to some employees as an extra incentive. The choice of departments to which this offer applied was random and within the chosen departments, it was random which employees received the invitation. This randomisation of treatment should circumvent selection effects. Though set low, attendance pay had a large effect on attendance. This was true both of those actually in receipt of the offer and colleagues in the same department who did not have the incentive. Five to eleven months after the fair, there was a statistically significant increase in enrolment in targeted pension plans, both for attendees and non-attendees. Attendance at the fair was some 17% higher in treated departments and the fraction of employees enrolled in the pension plan was about 1.25% higher. This is evidence that the information provided by the fairs had an effect on behaviour, though not a large one. Effects on overall saving were close to negligible. Interestingly, within treated departments, enrolment rates were no different for those offered incentives and those who were not. This suggests that there may be social effects in spreading information or peer group effects in decision-making. It is also possible that those paid to attend are less motivated to act or that the payment makes them more suspicious of the information. At all events, there is evidence here that even controlling for selection effects, information affects decisions and perhaps that education has spillover effects. It helps not only the direct recipients but their peers too.

Bernheim and Garrett (2003) use cross-sectional data from a large telephone survey to provide evidence of the effects of workplace financial education. The basic finding is that when an employer offers financial education, self-reported saving rates rise from 5% to 6% for the median saver. For those already saving higher fractions of their income, perhaps not surprisingly, education does not appear to have any effect. The use of employer availability of education rather than take-up avoids the selection bias that those choosing to attend a courses are more disposed to save. However, it still allows for another potential selection bias. Firms do not randomly choose whether or not to offer financial education. Even if they did, employees with a "taste" for saving may find their way to employers who provide education. Indeed, employers in some sectors may find that savers are better employees and deliberately seek to attract them by providing financial education. One way to test for this is to find a proxy for saving proclivity. If self-selection imparts an upward bias to the estimate of the effect of education, the inclusion of this proxy should lower the effect of education on saving. Wealth can be argued to be a measure of taste for saving since it is increasing in past saving decisions. Including wealth in the regressions causes the estimated effect of educational availability on saving to rise. Perhaps this is because financial education is more often offered when employees have *low* financial competency. The implication of this interpretation is that financial education is remedial; the employees to whom it is offered have below average savings rates, controlling for many demographic and economic variables. If this is really what is happening, Bernheim and Garret underestimate the effects of education. It does though seem surprising that below average savers become above average on receiving education.

There is a puzzle in the findings. Though financial education appears to raise saving rates, there is no significant effect on wealth levels. As wealth depends on past saving, the expectation is that it would respond to education in the same direction as does saving. If, as argued earlier, education is provided as a remedy for low saving rates but has only recently been received by employees, savings might not have been high for long enough to counteract low wealth. In that case a negative effect of education on wealth might be expected. Another possibility is that saving is mismeasured. Borrowing is not netted out (no respondents recorded negative saving) or mortgage repayments are considered to be saving. If financial education is provided as a remedial measure it could be that those in receipt of it are more prone to these recording errors. This would question the earlier positive savings effect. Or it could be that wealth depends more on inheritance and random capital gains than on savings so there is too much noise to pick up an accumulated saving effect. However, wealth has a highly significant positive coefficient on saving suggesting these exogenous factors do not dominate. So the absence of a financial education effect on wealth remains something of a mystery, thereby casting some doubt on the savings effect.

Finally, Clancy, Grinstein-Weiss and Schreiner (2001) is of particular interest because it focuses on the effects of financial education on the poor. The study looks at the take-up of a government saving program designed for poor people. Different program strands vary in the hours of financial education offered. There is data on actual saving rates. So it is possible to estimate the effect of varying hours of education on savings. Effects appear large. Six extra hours of financial education are associated with a 25% increase in saving. In interpreting this result, note that not only are there self-selection effects into the program, but program managers direct people into strands according to background and need. Standard self-selection estimation techniques are applied but are unlikely to fully control for these non-random treatment effects. So the impact of education is likely to be exaggerated.

A related stream of work looks at whether financial literacy matters irrespective of how it is acquired. The links proposed are that financial literacy leads to better financial planning which in turn leads to more saving and wealth accumulation. If all these links are positive then, if financial education does improving financial literacy, it is justified to provide it (as long as the cost is not too high). This conclusion depends firstly on the direction of causality. If, for example, wealthier people have more incentives to plan and acquire financial literacy, the correlations do not of themselves justify educational provision. Secondly, the propensity to plan and to be financially literate may both reflect deeper aspects of personality or abilities. Perhaps those with high IQs are good at the quizzes that test financial literacy and may also tend to engage in planning. If so, there is no real basis for thinking that training in financial literacy would change behaviour.

The key published paper, incorporating some findings from their other research, is Lusardi and Mitchell (2007). The data is from a large-scale US survey, the Health and Retirement Survey. The self-reported propensity to plan is measured by 'having thought about retirement a little, some, or a lot'. The idea is that those who have thought about retirement are more likely to be planners.

Financial literacy is captured by score on the following quiz:

If the chance of getting a disease is 10%, how many people out of 1,000 would be expected to get the disease?

If five people all have the winning number in the lottery and the prize is 2 million dollars, how much will each of them get?

For respondents who give the correct answer to either the first or the second question, the following question is then asked:

Let's say you have 200 dollars in a savings account. The account earns 10% interest per year. How much would you have in the account at the end of two years?

Only the last of these questions appears to be specifically financial, raising questions whether what is measured is closer to numerical competence, general IQ or perhaps diligence or some other psychological attribute. In fact, Lusardi and Mitchell (2007) report that success at counting backward, and subtracting seven from 100 five times is highly correlated with the questions on financial literacy, casting some doubt on whether the variable really identifies what it is intended to. There is also a political literacy question. This asks the name of the US President and Vice President, a question of debatable direct relevance to financial literacy. Political literacy is though correlated with retirement planning and wealth. The lesson is surely not that teaching political literacy will improve financial decisions, but that people interested in current events are the type also likely to be interested in personal finance. The worry is that the same explanation may underlie the finding of a similar correlation between financial literacy and retirement planning, so changing the implied policy conclusions.

To defend against the criticism that the wealthy may be more inclined to plan rather than planning leads to higher wealth, a change in wealth that is clearly outside the individual's control is needed. If planning is not higher when wealth of this sort is high, the implication is that for other components of wealth the causality runs from planning to wealth and not the reverse. Changes in regional housing prices, plausibly an exogenous windfall, provide such an "instrument". Wealth is found to have no significant effect on planning. The confidence interval is wide though so it cannot be rejected that there is a large effect. It is also questionable whether people treat housing wealth as similar to other components of net wealth. It is not very likely that people react in the same way to knowing that the value of the house they live in rose by $10,000 last year as to winning the same amount in a lottery.

A further defence to the criticism that both financial literacy and planning are driven by the same underlying taste parameter is found in Lusardi and Mitchell (2007b). This paper uses a different (online) survey in which one of the questions asks about the individual's exposure to economics courses at high school, college or higher degree level. The underlying idea is that understanding economic principles highlights the need for retirement planning and improves individuals' ability to engage in it. If exposure to economics courses is random, and taking such courses is associated with greater retirement planning, this does indeed provide convincing evidence that planning is fostered by financial literacy.[7] Using the appropriate instrumental variable estimation techniques, financial literacy attributable to attending economics courses is found to be significantly related to retirement planning. The conclusion that self-selection problems are avoided is not completely persuasive. University students certainly elect their own courses, so self-selection bias continues to be an issue. Even at school there may be an element of choice. Moreover, the matching between students and schools that include economics in the curriculum is unlikely to be random. Finally, there could be recall bias. Those who know their financial knowledge is low may be biased against admitting they studied economics. Even in the absence of conscious suppression, only those for whom the courses had an impact are likely to remember them, resulting in the effectiveness of economic education being exaggerated.

Americs, Caplin and Leahy (2003) provide more evidence on the link between wealth and planning. Using a specially commissioned survey, the wording of the planning question is more directly relevant. Respondents are asked how far they agree (on a six point scale) with the statement "I have spent a great deal of time developing a financial plan". To provide instruments to test whether financial planning is a cause of wealth levels, the level of agreement to two questions are used. One is "Before going on a vacation, I spend a great deal of time examining where I would most like to go and what I would like to do." Answers to this question are positively correlated with financial

[7] Another qualification is that the content of most economics courses involves little practical financial literacy information.

planning at a high level of statistical significance. Holiday planning is not correlated with wealth but it is with the financial planning question. So it is a good instrument to test whether a planning mindset leads to higher wealth. Another statement, "I am highly confident in my mathematical skills," was also strongly correlated with financial planning.[8] This is more problematic as an instrument since, not surprisingly, mathematical ability does enhance earnings. Nevertheless, a number of other variables in the wealth equation might control for this effect.

The paper also makes some progress in controlling for tastes. There are questions that relate to the respondents' time preference and risk aversion. Answers to these are uncorrelated with the responses to the planning propensity question. This indicates that the correlation between wealth and planning is not proxying for a common dependence on these particular aspects of underlying preferences. Though these are two dimensions of tastes that are emphasised by neoclassical economic theory, there are many other dimensions of personality that are not tested for. So it could still be that planning matters because it reflects preferences (other than lack of self control) rather than mastery of a useful technique.

Overall, the instrumental variable estimate is that a one point increase in the numerical response to the planning statement leads to a 16-percent increase in net worth. Even if this can be taken at face value, note that the evidence relates to whether planners are better at accumulating wealth and not to whether planning skills can be effectively taught.

The stream of work reported here is certainly interesting, but as it stands does not provide highly convincing evidence on which to conclude that more financial education would result in better outcomes. To put it starkly, gardening knowledge may well be correlated with financial literacy and retirement planning. It would be hasty to draw the conclusion that the way to improve financial decision-making is to make horticulture compulsory in schools.

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[8] Rather surprisingly, whether the respondent kept a tidy workspace was not correlated with financial planning.

Most of the education programmes considered in this Section are closer to information provision than to training in cognitive skills. So a different type of education may be more effective. There is little evidence on this. Alternatively, if it is "flawed" psychology that is at fault the most cost effective remedies may be "mechanism design" i.e. considering behavioural biases in regulating the way financial products are marketed. It is to these issues we now turn, putting the spotlight on the most established of the behavioural biases.

3) The challenge of behavioural economics

According to standard economics, there is limited scope to improve financial decision-making. The theory supposes that individuals rationally process available information to make optimal saving, borrowing and insurance choices. If people take decisions that appear to be irrational, there are two reasons. One is that the cost of being rational is deceptively high. That is, it may take a lot of psychic effort to process rather boring information. Secondly, the information available to make the decision may be inadequate or false. So, if there is a role for policy, it is to provide better information in forms that are easy to work with. Education in how to understand and work with the data is possibly also justified. Even elimination of any bias (as opposed to falsehood) in what is reported by information providers should not be needed as rational consumers should not be fooled, what is left unsaid should speak volumes.

The effects reported in the previous section are largely those attributable to education conceived in the traditional information provision mode. The approach of behavioural economics is that psychology also matters. Even if people know and understand the facts, they may still take poor decisions due to lack of self-control and other personality characteristics. Moreover, there are ingrained methods of processing information that lead to systematic bias. These "heuristics" may be better adapted to life on the savannah than in Surbiton. It is not that people have no idea how to take some decisions. They think they know, but are “wrong” by the conventional standards of rationality. If they are to do better, they first have to see the error of their ways. Achieving this may not be an easy task. For the policy maker it is perhaps easier to require that choices are framed so as to avoid the deep seated biases. That means rules on marketing financial products that are sensitive to the psychology of the consumer in an attempt to offset the widespread use of psychology by sellers.

As an illustration of the kind of issue that may arise, consider the finding that the order in which items are presented matters for what is bought. For example, according to Whitney, Hubin, and Murphy (1965), *"The interesting thing is that even when a man enters a clothing store with the express purpose of purchasing a suit, he will almost always pay more for whatever accessories he buys if he buys them after the suit purchase than before."* Having spent a large amount on the suit, the consumer is desensitised to large outlays. A spending mood is created and a more expensive jumper will be bought. When the jumper is sold first and the customer agonises over a small absolute difference between the high and low quality item, they are going to be consistent by going for a cheap suit. This is a strategy well known to salesmen. It has been tested on the order in which car extras are sold. What is the relevance to financial products? A warranty on a consumer product is easy to sell as a secondary sale after the expensive basic item is bought. Similarly, overpriced mortgage protection insurance may be easily accepted once the commitment to major mortgage outlays is made. Firms may trade on this psychology by discounting the main product to entice the customer in to the office and earning more than the sacrificed primary profits on the secondary sale.

A possible remedy is to provide better information. For example, customers could be told that there are large savings to be made from shopping around for mortgage payment protection. This seems unlikely to be very effective. A message delivered a year or two earlier is likely to be forgotten and specific information provided at school is unlikely to be seen as relevant and if it is, to endure. Even were it remembered at the crucial time, the message might easily be countered by sales pressure. Moreover, the fraction of the population in the mortgage market at any one time is too low to justify a television campaign. Could a course that tried to explain the principle rather than the facts of the particular case be effective? There is no evidence on this that we know of. Such a course could be time consuming and even if it would ultimately work, it seems unlikely that many volunteers would enrol. The most obvious policy is not education but to increase competition at the point of sale. Mortgage providers could be required to offer a choice of insurance contracts from a variety of companies. An even more effective antidote to overpricing is to separate the primary and secondary sale by prohibiting the lender from selling insurance. These policies are far more interventionist than education but could well be more efficient.

Of course the basis for policy when people take systematically unwise decisions is controversial. Many behavioural economists think that the appropriate thing to do is to guide people in the direction they would want to bind themselves after taking expert advice. This is the agenda of libertarian paternalism (Sunstein and Thaler, 2003). *"Equipped with an understanding of behavioral findings of bounded rationality and bounded self-control, libertarian paternalists should attempt to steer people's choices in welfare-promoting directions without eliminating freedom of choice."*

With this in mind we now examine a series of behavioural biases and consider what can be hoped for from education and other policies that may achieve what education would ideally do but may not deliver or do so only at prohibitive financial and psychic cost.

4) Procrastination

Definition and evidence

We procrastinate when we delay taking an action in spite of being aware that prompt action would be better. Why does procrastination occur? Cognitive psychologists claim that present or immediate costs/benefits are unduly salient or vivid in comparison to future costs/benefits. This cognitive structure is not something most individuals are fully aware of, nor are they able to predict they will succumb to it. So, we end up postponing an unpleasant task until tomorrow, not anticipating that tomorrow we will find another excuse to postpone it again, only to regret by the end of tomorrow that we still have not finished (or started) the task. Scores on the FSA Baseline Survey capability 'planning ahead (for retirement and unexpected events)' are clearly affected by people's tendency to procrastinate.

Procrastination is characterised by preference reversal over time. Such preference reversals apply to rewards as well as costs: most people prefer £100 today to £110 tomorrow and at the same time prefer £110 in 31 days to £100 in 30 days. We have high discount rates for short horizons and low discount rates for long horizons. Far in advance of time period t, an individual prefers to be patient between t and t + 1 but when time period t arrives the individual is impatient. This gap between long-term goals and short-term behaviour was first mentioned by Strotz (1956).

The behavioral economics literature often uses 'hyperbolic discounting utility', introduced by Phelps and Pollak (1986), to capture dynamically inconsistent preferences. The utility of a consumption stream $x = x_0, x_1, \ldots, x_t, \ldots$ is given by

$$U(x) = v(x_0) + \beta\, \Sigma_{t=1}\, \delta^t\, v(x_t) \qquad 0 < \delta < 1,\ 0 < \beta < 1$$

so that today (time t=0) takes on special significance. Animals, including humans, appear to have such hyperbolic discount functions (Ainslie, 1992, 2001). Numerous authors report on experiments and simulations supporting hyperbolic discounting. There are however some dissenters who do not argue against the existence of time inconsistency but suggest that the hyperbolic utility function is not the best mechanism to capture this phenomenon (see e.g. Rubinstein, 2003 and Read, 2001).

There is some evidence that actual UK household expenditure patterns are consistent with hyperbolic discounting. Huffman and Barenstein (2004), using Family Expenditure Survey data, observe that consumption declines between paydays for a sample of 15,000 households. They report large payday effects for spending on alcohol. It appears, however, that only cash spending declines; credit card spending is stable between paydays.

It is not difficult to see that procrastination fundamentally interferes with an individual's ability to engage in financial planning. O'Donoghue and Rabin (1998) model procrastination and show that it is likely to cause severe problems in personal investment decisions. The urge for instant gratification (consuming immediate benefits or avoiding immediate costs) leads people to make decisions and take actions (this includes the decision not to decide and non-action) which are not in their long-term interest such as overspending on credit cards. According to a survey for the Office of Fair Trading almost a third of adults said that they had felt pressurised to take up credit when buying goods or services (http://www.moneystuff.co.uk/debt_statistics.pl?search=2005) and almost 50% of people who arrange credit while out shopping had not intended to do so before they went (http://www.creditaction.org.uk/assets/PDF/stats/2005/DebtStatisticsMar05.pdf). It is not surprising that the growth of ATMs and immediate borrowing possibilities offered by credit cards and store cards in the last few decades has coincided with reduced saving and mounting debt. There is a psychological trap set by offering credit cards with no frontloading of charges, it appears costless to consumers who by and large do not anticipate that their desire for immediate gratification will result in penalty fees and debt repayment at high interest rates. Pursuit of immediate gratification regardless of the long term costs is likely to be a significant factor affecting scores in the FSA Baseline Survey capability 'living within one's means'.

Causes of procrastination

One of the main causes of procrastination is the availability of other activities which provide instant gratification – 'why fill out the tax return now when I could be watching one of my favourite TV shows?' This suggests that financial decision making is best organised by setting aside a specific time and location where there are no distractions or other demands. Rabin and O'Donoghue (1998) suggest financial education seminars in the workplace which are part of the normal workday. Of course this is not always possible and could only work where we want to encourage a decision or an action and not when we want to discourage actions (such as overspending).

Procrastination also results from the desire to avoid emotional distress. It is plausible that some people fear financial decision making or planning because they anticipate that it will be a painful experience. So, even when they are fully aware that it is in their interest to sort out their finances, at any given point in time they will always want to do it later. A rather extreme example is that of (UK) defined contribution plans which do not require any employee contributions and are fully paid for by the employer. They do require employees to take action to join the plan. Data on 25 of these plans shows that only half of the eligible employees signed up (Benartzi & Thaler, 2007).

We know from neuroscience (see references in Loewenstein & O'Donoghue, 2004) that both the affective (limbic) system and the cognitive regions of the brain are involved in intertemporal decision making. The limbic system is designed to ensure survival and (reproductive) fitness which is why our drives and emotions are inherently myopic. In normal individuals, the cognitive parts of the brain to some extent override the limbic system which allows for postponement of gratification. Patients with damage to the prefrontal regions, however, tend to behave myopically (Camerer et al, 2005). Psychiatrists who have studied the role of brain chemistry in compulsive behaviour treat compulsive shoppers with drugs (naltrexone) which block the operation of opiate receptors (McElroy et al, 1991).

Evidence of the connection between neurological processes and procrastination is provided by an experiment on intertemporal choice where some rewards are immediate and others are delayed. The immediate rewards activated mostly the limbic system whereas the delayed rewards activated the cortex (cognitive system). Greater activity in the limbic system was associated with more impatience i.e. choosing immediate rewards more often (McClure et al, 2004).

Why is procrastination a problem?

Economists usually take the view that what people decide to do is what's best for them – revealed preferences. Procrastination however almost always involves reversal of preferences – today I want to fill out my tax return tomorrow but when tomorrow comes I want to watch TV instead and by the end of tomorrow I regret not having done my tax return. Our preferences are time inconsistent. People save too little and many spend far more than they should or, in a sense, 'want' to. Of course this raises the issue of which preferences should be considered from a welfare maximising policy perspective. It is clear, however, that most people would like help in their attempts to achieve their long-term goals of saving more and borrowing less.

The ratio of savings, pensions and investments to income was 2.9% in 2007 for the UK, the lowest since records began in 1960, according to the Office of National Statistics. Without employer contributions to pension funds, the savings ratio for 2007 was negative.
(http://www.telegraph.co.uk/money/main.jhtml?view=DETAILS&grid=&xml=/money/2007/06/30/cnsave130.xml)

Average UK household debt, excluding mortgages, is over £7,500 of which over £4,000 consists of credit cards, motor and retail finance deals, overdrafts and unsecured personal loans (April 2005). Total credit card debt in the UK (July 2007) was over £53bn of which £39bn is bearing interest at 17% APR. (http://www.dcmmoney.co.uk/credit-card-debt/credit-card-debt-statistics.asp) According to Bannister (2004), in the US about 60% of active credit card accounts are not paid off monthly. Average credit card debt for American households is $8,400. A typical American family pays about $1,200 a year in credit card interest (at an average annual interest rate of about 19%). These are alarming numbers. Perhaps a dose of shame would help: Ariely (2008) proposes a scheme whereby a borrower can choose to have emails sent to all their friends when their credit card debt exceeds a specified threshold.

Clearly, the temptation of immediate gratification creates a gap between intentions and actions. In a 1997 (US) survey, 76% of respondents feel they should be saving more for retirement (Farkas & Johnson, 1997) and there is evidence that many pensioners regret not planning well for retirement (Loewenstein et al, 1998). In the UK, the Pensions Commission estimates that over 12 million people aged 25 and over and in work are not saving enough for retirement. Of these, 60% are not contributing to a private pension at all. British pensioners are poor; a third live on under £7,500 per year and nearly one in five goes back to work after retiring.
(http://www.creditaction.org.uk/assets/PDF/stats/2006/DebtStatisticsFeb2006.pdf)
Hancock et al. (2006) predict, for the period up to 2022, that 25% of older people (age 85+) in the UK will have zero or very low value financial assets.

What makes the procrastination problem worse is that it is subject to a cumulative effect; the procrastinator may change their self-conception to reduce cognitive dissonance (Andreou, 2007). Someone who repeatedly fails to save or continues to overspend may over time decide that they really don't want to get their finances under control by saving or curbing their spending. Moreover, people may be reluctant to take actions which, if they had taken them earlier, would have delivered large benefits. We don't like to admit our mistakes, even to ourselves.

Commitment devices

At least some of us are aware of our tendency to procrastinate or overspend and look for commitment devices which bind us to the 'right' course of action e.g. agreeing to give a conference presentation on a paper which is not yet written or saving in non-interest bearing Christmas clubs which do not allow withdrawals for a certain period (Wertenbroch, 1998). Ariely and Wertenbroch (2001) report that students are willing to self-impose costly deadlines to help them overcome procrastination. Another 'trick' we use is to have separate 'mental accounts' for example for 'money to spend' versus 'money to invest' (Shefrin & Thaler, 1988).

Ashraf et al (2004) conducted an experiment in the Philippines which shows that people are aware of their self-control problems (in the financial planning area) and when given an opportunity to solve these problems by binding themselves will do so. The first stage of the experiment involved a survey to identify people with time inconsistent preferences. Subjects were then randomly assigned to a control group or a treatment group. Everyone in the treatment group was offered a 'commitment saving product' with restricted access to funds. Those with time inconsistent preferences were significantly more likely to take up the offer. Subjects in the treatment group ended up saving 20% more than those in the control group and for those who opened a commitment account (25% of the treatment group) savings increased by 80%.

There is evidence that 'Rotating Savings and Credit Associations' (ROSCAS) can take on the role of commitment device. Saving in ROSCAS is particularly popular in Africa but is also found in developed economies such as Japan. Gugerty (2005) studies data on 70 ROSCAS in western Kenya and finds that participants do not always want to receive money sooner rather than later. The holiday season is the least favoured time to receive the 'pot' as participants worry that the money they receive at this time of year will be used up in celebrations. Many participants claim they join a ROSCA to give them the strength to save.

Thaler and Benartzi (2004) discuss the results of a 'Save more tomorrow' plan which allows employees to commit to increase their contribution (saving) rate in a 401(k) pension plan whenever they get a raise. The idea here is to delay the salient immediate cost of foregoing current consumption. After two years, participants in this scheme had nearly quadrupled their saving rate.

What can be done?

a) Simplification

Complexity and resulting confusion may lead people to passivity. If confusion were the only reason for procrastination then simplification of information on product attributes and financial education might be fruitful. However, most of us are less likely to be confused about materially relevant factors than we are to use 'confusion' as an excuse for procrastination.

Madrian and Shea (2001) provide evidence that people procrastinate when they have to make complex decisions. This finding is clearly relevant with regard to the FSA Baseline Survey capability 'shopping around'. Dealing with complexity and ambiguity is unpleasant. In certain situations, simplification (e.g. by setting a default) might therefore help. O'Donoghue and Rabin (2001) show that when an individual decides not to pursue a choice which improves his financial situation because there is a more attractive choice which requires (minimal) effort, it is likely that no choice is ever made. Hence, offering more options can induce procrastination.

Another argument for simplification is that less intelligent people, in addition to being handicapped by their relative inability to process complex information, are more likely to have self-control problems - time discounting correlates with IQ (Mischel & Metzner, 1962).

b) Financial education

The extent of financial illiteracy in the general population is staggering e.g. according to a Mori poll, nearly four out of five people do not know that APR refers to the interest and other costs of a loan. (http://www.credithelpline.net/personal_debt_stats.html)

There is certainly great scope for increasing knowledge of financial matters but could financial education alleviate procrastination? If procrastination in financial decision making is prevalent then education, disclosure and even financial incentives will not have strong effects on behaviour. This is partly because people will tend to procrastinate with respect to these remedies as well as with regard to their actual financial decisions; they will postpone acquiring and absorbing the information. One can always choose to find out about various choices of financial products later on. It is hard to imagine how financial education could change individuals' discount rates, so how could it work?

This not to say that there is no role for providing more information. However, the presentation of this information is crucial. There are ways of making the long term problems of debt more salient for example. We know that vivid and personal information is more effective than statistical information. One could imagine government sponsored commercials illustrating the dangers of overspending much like the ones warning against drunk driving or drugs.

c) Defaults

Most of the time maintaining the status quo does not involve (mental) activity and the easiest option is therefore to stick with the status quo and procrastinate, for example by keeping savings where they are. This is precisely why setting the 'right' default options, e.g. for pension plans, is such a powerful tool.

Defaults remove the immediate cost of mental anguish involved in decision making and it is therefore not surprising that they have significant effects on financial choices. When employees are by default enrolled in their 401(k) plan, only a very small proportion opt out. But when they have to make a choice to enrol, during their first year of employment less than half do (Madrian &Shea, 2001; Choi et al. 2002, 2003a).

Another area where defaults could be introduced is in credit-card payments. The default could be that the balance is automatically deducted from a current account. Customers could opt out of this arrangement at the cost of some minimal effort.

In some cases it may be difficult to decide what the ‘right’ default is (see e.g. Camerer et al, 2003); individuals may (if they could overcome their procrastination) choose to have different saving rates for example. In these circumstances it may still be welfare enhancing to choose a default and it may be even better to choose a ‘bad’, undesirable default which forces people to make a decision (Choi et al, 2003b).

A powerful remedy for procrastination is the elimination of the ‘no decision’ option and use active decision mechanisms. Choi et al (2005) document a scheme where employees had to check the participation or the non-participation box for a retirement plan. This led to participation rates almost 25% higher than the standard scheme with a non-enrolment default.

Commitment devices can help people overcome procrastination. Offering, as a default, a standard saving plan which transfers a set amount from a current account into a savings account could be the default option. So rather than incurring costs (in time and hassle) to set up a savings scheme, a customer would have to incur some costs or apply some effort to undo the default savings scheme.

d) Regulation

Procrastinators and overspenders appear to be in favour of regulation which protects them from themselves. Sixty percent of Americans say it is better to keep restrictions on withdrawing savings from retirement plans (Farkas & Johnson, 1997).

The constant pressure to abandon plans for self restraint and instead succumb to immediate gratification implied by hyperbolic discounting is facilitated by credit cards. Temptation could perhaps be held in check if credit card holders were offered the opportunity of a self imposed spending limit. Were the limit exceeded, the card would be refused, perhaps for a pre-specified period or until the balance is below the limit. It could be mandatory for credit card suppliers to offer this facility. Of course, the policy will only work for people who recognise their own weakness of will and want to do something about it. Such people do exist; witness those joining a Christmas club. Even more strikingly, in Illinois people can and do voluntarily sign an agreement that they will be arrested should they enter a casino (http://www.igb.state.il.us/whatsnew/sepchange060622.pdf).

Financial institutions clearly take advantage of people's tendency to procrastinate. Banks and credit card companies have recently had to face extensive litigation threats due to overcharging on current account overdrafts and penalties on credit cards which far exceed the cost of delayed payment. In the UK, during the first half of 2007, over 4m credit card bills were not paid on time at an average late payment penalty of £12. (http://www.dcmmoney.co.uk/credit-card-debt/credit-card-debt-statistics.asp) Minimum repayments on credit cards are now as low as 2%. (http://www.moneystuff.co.uk/debt_statistics.pl?search=2005)

Another area where banks exploit their customers' inertia and procrastination is in their provision of no (or very low) interest current accounts. Savings accounts pay interest and typically have no restrictions on withdrawals. A 'sensible' customer would therefore transfer any excess funds into a savings account but many don't. In fact, Rabin and O'Donoghue (1998) show how procrastination can lead to never transferring money from a current account, even for a very small transfer cost. Banks deliberately maintain the distinction between current and savings accounts to create barriers to saving by forcing customers to act if they want to avoid losing out on interest. Regulation can be helpful here. Essentially every current account should be a savings account.

Banks also exploit individuals' tendency to procrastinate when they lower interest rates on existing savings accounts. Although customers are informed of such changes (and possibly even advised that they can achieve a higher interest rate by switching to a different product), the presumption is that most will not take the trouble to go for a better deal.

Credit card companies also rely on inertia when they make valuable offers only available to new customers. It is indicative of the forcefulness of inertia that offers, for example to transfer credit card balances, have to be very attractive to get people to switch. 'Teaser rates', which are sometimes zero for an initial period, are apparently very tempting to consumers (Bar-Gill, 2004) although most of the borrowing takes place at high post-teaser rates. Shui and Ausubel (2004) confirm this in an experiment where consumers are randomly assigned to get different credit card offers. They are more likely to accept a low introductory offer for a short period even when they would have been better off with a slightly higher interest lasting for a longer period. Consumers seem reluctant to switch even after the introductory rate expires, perhaps because they don't keep track of the expiry date. Regulation specifying a minimum period for which the teaser rate must be maintained could be considered.

Insurance companies are also very aware of their clients' inertia and exploit this tendency by hiking up premia of existing policy holders to subsidise very attractive offers to new policy holders. This practice, like the teaser rate offers, is a form of price discrimination between new and existing customers and regulation in this area is likely to be welfare improving.

A recent development in the form of ‘payday loans’ i.e. cash advances on salary, paid back on the day the salary arrives into the bank account, is bound to push many people into very serious debt problems. Payday loans are very popular in the US and payday loan firms are increasingly active in the UK. It is very easy to borrow £1,000 instantly as long as you are over 18 and in employment. Interest rates are exorbitant by any standard – equivalent to an APR of over 2000%! Clearly payday loan providers prey on people’s lack of willpower. The problem is exacerbated by the fact that many lenders offer payday loan rollovers which make it very easy to extend the term of the loan. Some providers go as far as automatically renewing the loan as the default option so that borrowers have to make additional efforts to repay the loan. Several US States have banned payday loans. (http://usgovinfo.about.com/od/consumerawareness/a/paydayloans.htm)

Imposing a different default could be very effective in secondary insurance purchase such as mortgage or loan payment protection or extended warranties. It is likely that a requirement to act by, for example, posting in a form if insurance is wanted would generate much lower take-up rates for these types of insurance. This type of regulation is particularly attractive for extended warranties where people may make very different decisions when they are not exposed to sales pressure.

e) Forced saving (for retirement)

The state pension is effectively forced saving for retirement. Extension of this idea could be beneficial to many people, but there are a number of serious problems. First of all, how to decide on the saving rate? In Australia, where compulsion was introduced in the early 1990s, the saving rate actually fell, as most people accepted the compulsory rate as the new benchmark, and reduced their saving accordingly. (http://news.bbc.co.uk/1/hi/business/4404852.stm) Also, compulsory saving could be perceived as tax and is perhaps not politically viable.

5) Loss aversion

Standard economic theory assumes that all that matters to consumers is the bundle of goods they consume. Every day experience suggests this is not the whole story. Someone who expects to earn £60K but actually receives £50K is not as happy as someone expecting £40K and ending up with £50K. As Adam Smith put it "we suffer more... when we fall from a better to a worse situation, than we ever enjoy when we rise from a worse to a better." Gains and losses matter independently of final outcomes. Loss aversion is the tendency of individuals to weigh losses about twice as much as gains (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992). A substantial (experimental) literature shows that loss aversion is very common. There is some evidence that loss aversion increases in age, income and wealth and decreases in education (Johnson et al, 2006; Gächter et al., 2007). Loss aversion leads people to value what they own more than what they don't own in the sense that they demand more money to give up an object than they would be prepared to pay to acquire it (the 'endowment effect'). This has implications for the FSA Baseline Survey capabilities 'choosing products' and 'shopping around'.

In prospect theory, a value function $v(x)$, defined on gains and losses with respect to a reference point replaces the standard utility function of expected utility theory. The reference point normally corresponds to the current position but may also be determined by aspirations or norms (Tversky & Kahneman, 1991). The 'loss side' of the value function is steeper than the 'gain side' (loss aversion), i.e. $v(x) < -v(-x)$ for $x>0$. The value function is concave for gains and convex for losses, indicating declining sensitivity for larger amounts i.e. $v''(x)<0$ for $x>0$ and $v''(x)>0$ for $x<0$ so that the value function is S shaped.

Several interesting observations follow from these assumptions. For multiple gains, x and y, segregation is preferred since $v(x)+v(y)>v(x+y)$. For multiple losses, integration is preferred since $v(-x)+v(-y)<v(-(x+y))$. This latter property may explain the popularity of credit cards (many small losses are pooled into a larger loss) and why it is relatively easy to sell add-ons in insurance (Thaler, 1985). It could also explain the success of debt

consolidation firms and why those who consolidate their debt end up with the same, if not higher, amount of debt two years later. (http://www.bankrate.com/brm/news/cc/20031007a1.asp) In 2007, about 400,000 people in the UK remortgaged or applied for new credit cards or personal loans to pay off old loans. An additional 300,000 people chose bankruptcy, debt management plans or IVAs to resolve their serious debt problems. Of those who enter into an IVA, 45% never complete their payments (Seib, 2008).

Loss aversion implies that people are reluctant to sell at a loss (the ‘disposition effect’). It is an empirical regularity in the housing market that when house prices fall, volume also decreases and houses remain on the market for longer than when prices are rising (Kahneman et al, 1990; Engelhardt, 2003). More direct evidence of loss aversion in the housing market is provided by Genosove and Meyer (2001). According to standard economics, houses are sold for what the market will bear. At any given date, the asking and transaction prices of houses with the same characteristics should not depend on prices prevailing when the seller bought. In fact, in downturns, people who bought at the height of a housing boom ask more, receive more and have their house on the market longer than those who bought when prices were lower. This is loss aversion in action in a real market.

The Save More Tomorrow scheme exploits people’s tendency towards loss aversion. Participants commit to increase their saving rate whenever their income increases so that they never see their take-home pay go down. They therefore don’t view their increased 401(k) contribution as a loss.

It is possible to manipulate loss aversion by using different frames. Benartzi and Thaler (1999) offer subjects repeated gambles which are either described in words (N plays of gamble X) or in terms of the probability distribution of outcomes (after N plays). Subjects like the gambles more in the second format, perhaps because they overestimate the probability of loss in the first format. This finding generalises to an investment context. Subjects are given one year or many year returns for 401(k) plan investments.

Those given the returns over the longer horizon are willing to take more risk. This is important since most employees are rather bad at allocating assets in 401(k) plans; they invest in their employer's stock (bad for diversification reasons) and allocate a large proportion to fixed income accounts.

Myopic loss aversion is the tendency to see risks in isolation rather than taking the perspective that life is a sequence of mostly small risks and what matters is the total outcome, not the outcome of individual small lotteries. The one year returns presentation in the study mentioned above accentuates the risk of investing in stocks and appears to induce myopic loss aversion. This will bias people's investment strategy away from stocks. Given that losses are felt twice as much as gains and the stock market is equally likely to move up and down on a daily or weekly basis, frequently checking how your stocks are doing is bound to make you very miserable indeed.

The myopic loss aversion result is also found by Gneezy and Potters (1997). In their experiment they manipulate the frequency of feedback on outcomes and the opportunity to make decisions, i.e. in the low frequency treatment, subjects are told the outcome every three rounds and make decisions every three rounds whereas in the high frequency treatment, subjects get feedback about the outcome and make decisions every round. The risky options were considered more attractive in the low frequency treatment and subjects in this treatment had higher earnings. Fellner and Sutter (2008) conduct an experiment in which the investment horizon and the frequency of feedback is varied. Longer horizons and less frequent feedback lead to higher investment. Setting a long horizon and low feedback frequency as the default is very effective in inducing higher investment with higher expected return. A lesson for financial regulators is that investment decisions are likely to be affected by how risk and return data are presented. Financial advisers should draw investors' attention to long term distributions of outcomes.

6) Regret aversion

Regret theory (Loomes & Sugden, 1982; Bell, 1982) assumes that the emotional consequences of decisions, such as rejoicing and elation but particularly regret, are anticipated and taken into account when making decisions. People are regret averse and hope to avoid situations where they appear to have made the wrong decision even if the decision was the correct one ex ante given the information available. Loomes and Sugden (1982) show how their theory explains why many people simultaneously gamble and purchase insurance.

Bar-Hillel and Neter (1996) conduct a series of experiments in which Israeli college students were given lottery tickets. They are then asked whether they want to exchange their ticket for another ticket and an expensive chocolate or another small incentive. Their chances of winning the lottery are unaffected by swapping yet only about 40% exchanged their ticket. This resistance to exchange is likely to be driven by regret avoidance. In a follow-up experiment, Maimaran (2003) found that when tickets are concealed in envelopes (and so it is harder to imagine winning) subjects are more likely to exchange. In her experiment the rate of exchanging is 80% with the envelopes and 63% without.

There is obviously potential for regret in most financial decisions. If I invest in portfolio A rather than portfolio B, I can find out about the performance of my rejected option and experience regret. Zeelenberg and Beattie (1997) show that in a financial decision making context where subjects have to choose between two investment options, the expectation of feedback on the outcome of the riskier option can promote risk seeking choices. Subjects may prefer the less risky option if they are not going to find out the result of the (rejected) risky choice but reverse their preference if they are going to get feedback on the risky choice. However, in reality regret aversion is more likely to lead to underinvestment in risky assets. If I invest in a fixed rate investment, the outcomes of alternative investment choices are not always very salient. If I invest in stocks, however, my obvious point of comparison (the fixed rate) is easy to recall.

Choice overload

The possibility or anticipation of regret can have a paralysing influence in financial decision making. In particular, when there are many options to choose from, especially when these options are complex, inaction is likely. People lack the confidence to decide. This phenomenon of 'choice overload' has been documented by Schwartz (2005) and others.

Iyengar and Lepper (2000) describe an experiment which involved displays of Godiva chocolates. Some participants were offered a limited number (6) of options, others a large number (30). They selected (and consumed) one chocolate. Participants choosing from the more limited array were more satisfied and more likely to purchase chocolates again compared to those who were offered the selection of 30. This experiment illustrates that dissatisfaction with choice is likely to be more prevalent when the number of possible choices is larger.

In their famous 'jam experiment', Iyengar and Lepper (2000) set up tasting booths which displayed either six or 24 different flavours of jam. 60% of passing traffic stopped to sample one of the jams when there were 24 flavours and 40% did when there were six flavours. However, in the extensive choice condition only 3% bought jam whereas 30% did in the limited display condition.

In online shopping, where the seller offers the top 50 'best matches', expected to be a good fit to the consumer's preferences, rather than the top 10, people choose lower quality options. Presenting more options encourages investigation of lower quality options. Since the list is not random but ordered according to fit or quality, the average quality of options considered decreases for a longer list. Perhaps the cognitive overload of considering a large number of possible choices leads consumers to make mistakes (Diehl, 2005).

Iyengar et al (2003) test the 'choice overload leads to inaction' theory in a financial decision making setting. They use a very large data set covering almost 800,000 employees in 69 industries and examine the effect of the number of offered funds in the 401(k) plan on the likelihood of employee participation. Plans offering more funds had significantly lower participation rates. For the same sample, Iyengar and Kamenica (2008) find that the more funds in a plan, the greater the allocation to money market and bond funds. They argue, on the basis of experimental evidence, that it is simplicity seeking rather than risk avoidance which drives these choices. Faced with large choice sets, decision makers apparently tend to prefer the simple options.

Another case which illustrates the perils of 'too much choice' is that of the Medicare Prescription Drug Plan which offers drug discount cards. Each card, provided by Medicare approved organisations, offers savings on medications. The cards, and there are many, differ in monthly premiums and deductibles. Enrolment in the plan is low since most senior citizens find the task of choosing a card daunting and fear choosing the wrong card (Botti & Iyengar, 2006). In the UK, a simple prepayment prescription certificate is available which entitles the holder to free medicines, no agonising choices necessary.

There is a lot of product proliferation in financial markets e.g. savings accounts and credit cards. Given that choice can be debilitating and overwhelming, especially for non-experts, this is likely to be detrimental to welfare.

The obvious remedy for information overload is to restrict choice rather than to try to educate consumers to handle excessive variety in a stress-free fashion. An earlier jams experiment does though find a useful cognitive routine to handle such situations. Wilson and Schooler (1991) asked subjects to rate jams. Left to their own devices, control subjects formed preferences for strawberry jams that corresponded well to the ratings of experts. Subjects asked to think about why they liked or disliked the jams made choices less in agreement with experts. Subsequent work also shows less regret with spontaneous choice. Deliberation and planning is not always the right way to make decisions.

7) Mental accounting

'Mental accounting' refers to the cognitive methods people use to evaluate and keep track of transactions, investments, gambles and other financial outcomes (Kahneman & Tversky, 1984; Thaler, 1985). People tend to group their assets into a number of non-fungible mental accounts and use these accounts for different purposes. They tend to spend gamble winnings or unexpected bonuses differently from other money for example. 'Not all dollars are created equal', as Belsky and Gilovich (2000) put it.

Suppose I am saving to buy a house and my savings are in a low interest account. I buy a car and take out a loan at high interest to pay for the car although I could pay cash out of my savings account. I might do this because I have separate mental accounts for housing and car expenses. It is possible that people engage in this type of behaviour to counteract self-control problems. They may fear that if they withdraw money from their 'special' savings account once, they may not be able to force themselves to pay it back into the account (slippery slope) whereas a loan has to be paid back (Thaler, 1985).

Standard economic theory assumes that people make decisions based on current wealth, probability distributions of future earnings, etc. but in reality transactions are evaluated within a much narrower frame. Thaler (1999) suggests that, in their construction of mental accounts, people engage in 'hedonic editing'; they choose the set of accounts that is most attractive to them. In terms of prospect theory's value function, they choose to evaluate transactions and corresponding gains and losses (x,y) according to

$$v(x \,\&\, y) = \mathrm{Max}\,(v(x+y),\ v(x) + v(y))$$

Thaler and Johnson (1990) show that subjects want to separate gain (intertemporally) but they also want to separate losses, which is inconsistent with prospect theory.

Mental accounting explains why, in contradiction to the life-cycle model, current income flow is more important in budgeting decisions than present value of lifetime wealth. Budgeting is done on a month-by-month basis and expenditures are grouped into categories so that if the 'entertainment budget' has run out for example, consumers will decide to postpone their next movie theatre visit but at the same time they may be willing to spend money on books, as long as there is money left in the 'book' account. Kooreman (1997) finds that spending on children's clothing is much more sensitive to changes in child allowance payments than to changes in other income.

Thaler (1990) provides further evidence of mental accounting. People tend to consume some types of income or wealth and not others. Money in a current account gets spent but special retirement accounts remain untouched. Summers et al (1987) show that the marginal propensity to save for capital gains in the stock market is close to 1. But whilst paper gains don't get spent, cash generated in takeovers does increase consumption (Hatsopoulos et al, 1989). Increases in housing wealth also don't increase consumption (Skinner, 1989) but perhaps this could be explained by people wanting to save more as house prices increase to enable their children to buy a house. However, then we would see increased saving by non-homeowners too when house prices rise and we don't.

According to standard theory, savings in the form of pension wealth should reduce other savings but Cagan (1965) found that the effect of pension saving on other saving is actually positive. It is possible that there was a bias in this sample if people with a taste for saving tend to work for employers who offer pension plans or a positive correlation between pension saving and other saving could be found simply because those with a taste for saving tend to save more in pensions and in other savings. However, Green (1981) used a (UK) sample which was restricted to people who had to join an occupational pension scheme as a condition of taking or remaining in a job with a particular employer and also found a positive effect on other savings. Venti and Wise (1987) show that IRA (Individual Retirement Account) contributors do not reduce their other saving and most of them had not saved much before IRAs were introduced. Pension wealth does not appear to be a close substitute for other wealth.

In 401(k) plans, employees view company stock as a special asset class (or mental account). When employer's stock is not available in the plan, the typical investor allocates 49% to bonds and 51% to cash but when it is included it attracts 42% and the remaining 58% is divided equally between bonds and other stocks (Thaler, 1999). Separate mental accounts are also kept for money already accumulated in the plan and amounts of money not yet contributed (Benartzi & Thaler, 2007).

Investors also choose when to close a mental account and it appears they are very reluctant to close an account which is in the red. Suppose you need to raise cash and are going to sell one of two stocks, one stock has declined and the other has gone up. Which do you sell? Most people sell the 'winner' although (for tax reasons) it is better to sell the 'loser'. Trading volume for stocks which have declined in price is lower than trading volume for stocks which have increased in price (Shefrin & Statman, 1985, 1987). In Odean's (1998) data set of investors' trades the same pattern of selling winners and holding on to losers appears and the stocks sold outperform the stocks bought.

8) Status quo bias

People generally don't like changing strategies or behaviours. Three of the biases already discussed may contribute to a preference for the status quo. Change typically involves a current cost to reap higher benefits in the future, so hyperbolic discounting may result in the investment never being made despite the returns covering costs many times over. Loss aversion and regret aversion may also play a role in status quo bias. By sticking with their existing option, people shield themselves from the regret arising when a new choice leads to a worse outcome than the original choice. A status quo bias follows because errors of commission generate more anticipated regret than errors of omission and because the negative consequences of a change tend to be seen as more painful than the pleasure associated with the possible positive consequences. This tendency to favour the status quo was first formally identified by Samuelson and Zeckhauser (1988). Their field evidence concerned the choices of Harvard employees over retirement savings and health plans. They found that new employees chose significantly different plans from those of the same age who were continuing. Only 3 percent of employees changed plans in a year. Similarly, Benartzi and Thaler (2007) find that adjustments in the allocation of 'old money' i.e. money already accumulated in a 401(k) plan is rare and suggest that this may be due to a fear of regret if the new allocation underperforms the old. For new contributions to 401(k) plans there is no reference point and therefore less potential for regret.

Samuelson and Zeckhauser (1988) conducted experiments in which financially sophisticated subjects were asked to make (hypothetical) choices regarding the investment of a recent inheritance. Some subjects were told they inherited an amount of money and were asked which type of investment they would prefer; others were told they inherited a portfolio of investments. The experiment revealed a significant status quo bias with those inheriting the portfolio being unlikely to change its composition.

Another manifestation of the status quo bias is the endowment effect (Thaler, 1980). This refers to the tendency of individuals to be willing to pay less for a good than the minimum they are willing to accept for the same good once they own it (for a review see Kahneman, Knetsch, and Thaler 1991).

The status quo bias is behind the tendency in financial decisions to follow the path of least resistance (Choi et al. 2002). The most dramatic evidence is the finding, in a series of papers by David Laibson and coworkers, that in financial choices defaults are more influential than (all?) other interventions that have been studied (also a theme of Thaler and Benartzi 2004). For example, even for important choices that will have major long-run consequences, it may make a major difference whether subjects must opt in to a savings scheme or opt out, even if a change from the default merely requires that a phone call is made. Figure 2 shows participation in a 401(k) pension scheme by employees of a US company according to whether the default is the employee is enrolled and must call to cancel (orange) rather than unenrolled and must call to participate (green) (Madrian and

Shea 2001, Choi, Laibson, Madrian, Metrick 2004). The difference is huge and narrows very slowly. It is not easy to think that the real costs of taking such an important saving action could account for the difference. As indicated in Section 2, educational seminars do not have anything like a comparable effect. The reason why many people are so resistant to change what they are dealt is a matter of speculation. To some extent, it may be they think the default option is a genuine endorsement of what the company thinks is the best choice. Or it could be that people find the issues boring and there is a psychological block to making a start. Our section on procrastination shows how it is possible people may constantly postpone an important decision when there is no deadline. Whatever the reason, defaults appear to matter, and it seems by far most effective and cheapest to set the appropriate default rather than educate consumers to think through problems from scratch.

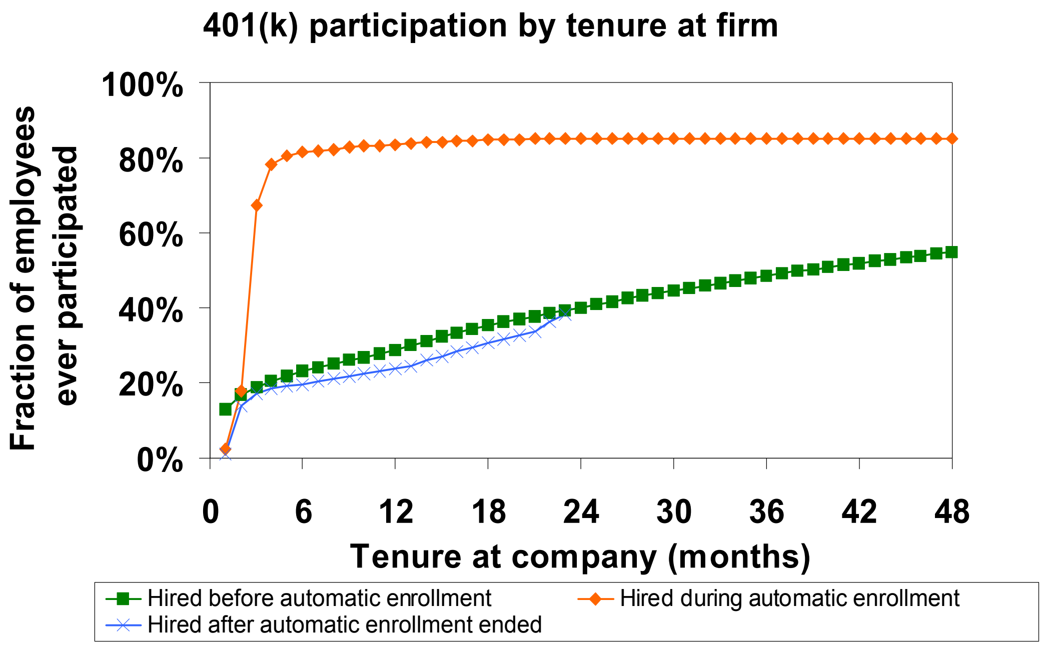

Figure 2

One way to remove the status quo bias is to require an active decision by some imposed deadline. These can be surprisingly effective. Ariely and Wertenbroch (2002) conducted a striking experiment. Though not in a financial context, as we shall see the message has been translated to such a setting. In the experiment, students had to hand in three papers for a course. There were three treatments. One class was told that the papers had to be handed in at the end of term. There were would be a penalty of one mark deducted for every day that a paper was late. A second treatment set equally spaced deadlines for the three papers with the same penalty for deadline overdue. In the third class, the students chose their own deadlines and registered them, but for the self-imposed deadlines the penalty was still the same. The class with the imposed end-of-term deadline performed worst, the best performing the class had the equally spaced deadlines, and the class with

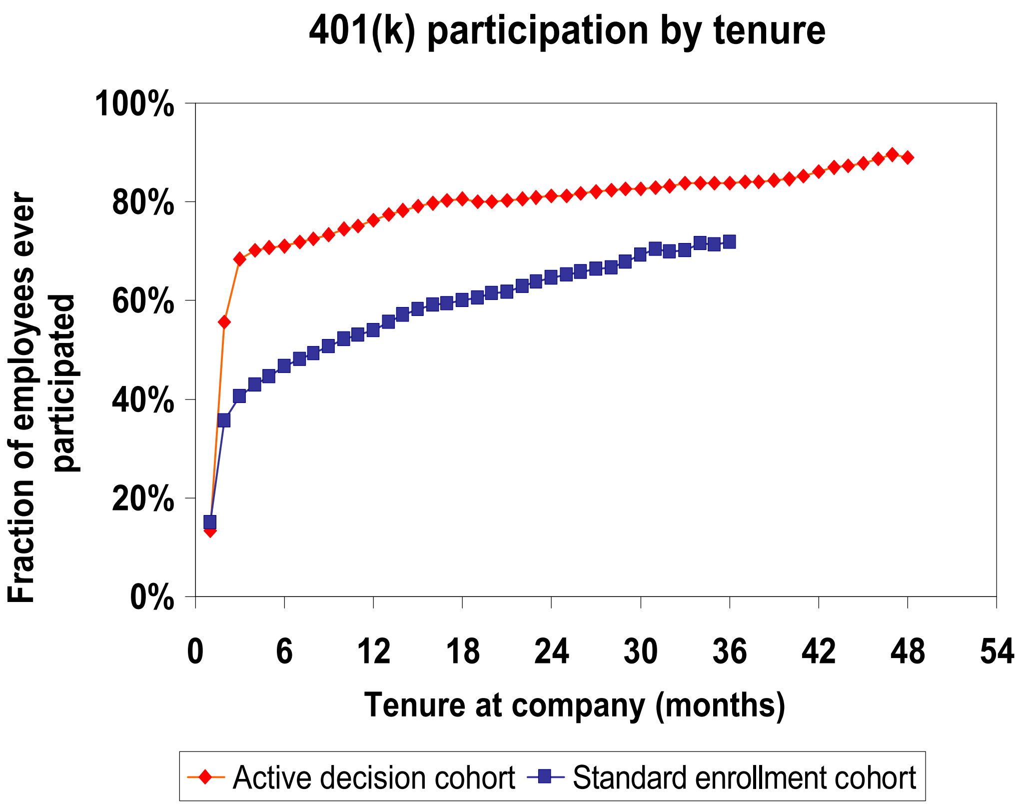

Figure 4

the self-commitment opportunity had grades in the middle. People who set themselves equally spaced deadlines did as well as students with such a schedule imposed and those who set all the deadlines at the latest time possible did the same as students in which those same deadlines were imposed. Some people know their tendency to procrastinate and if there are self-commitment devices available, they will take advantage of them. Others fall into a procrastination trap. There is clearly a case for the dictatorial policy in the interest of the students.

Related ideas have been applied in the financial domain. Choi, Laibson, Madrian, and Metrick (2007) look at the effects of setting deadlines for an active decision to be made. Again the decision was participation in a 401(k) pension plan. The new employees given the active decision scheme were presented with:

- Welcome to the company.
- You are *required* to submit this form within 30 days of hire, *regardless* of your 401(k) participation choice.
- If you don't want to participate, indicate that decision.
- If you want to participate, indicate your contribution rate and asset allocation.
- Being passive is *not* an option.

The comparison with the regular, passive (no deadline) sign-up scheme is shown in Figure 5. Just by forcing a decision to be made there is a big effect on behaviour.

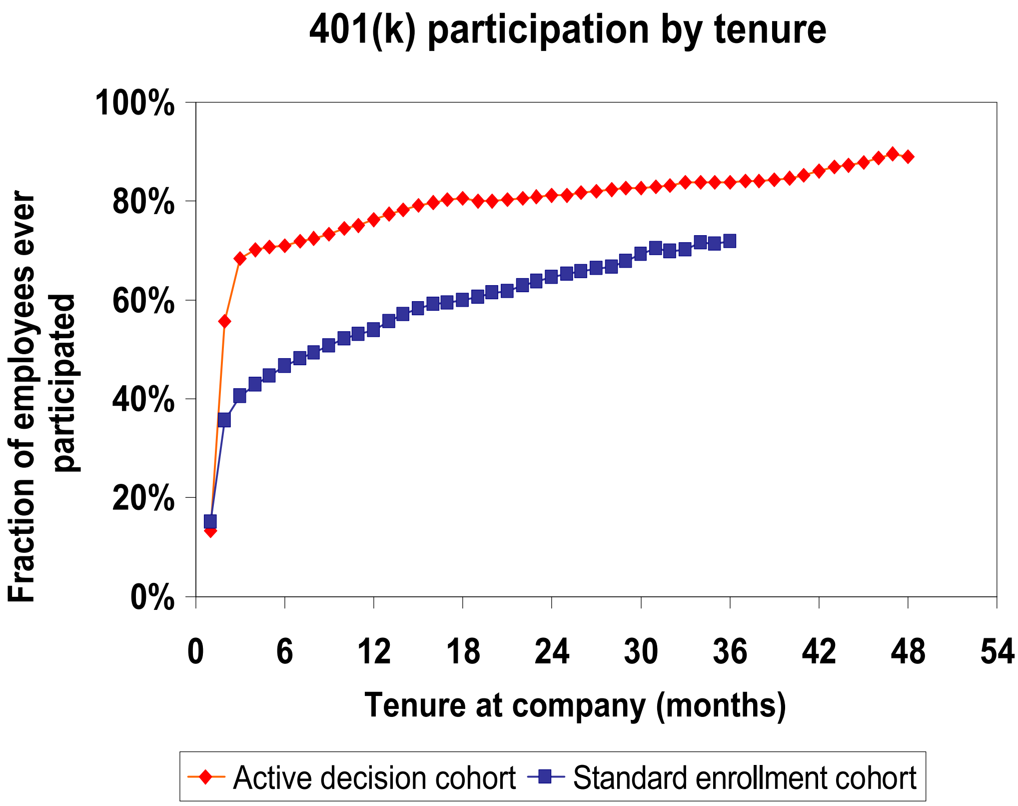

Figure 5

The active decision scheme raises the average saving rate by 50 per cent. It does not set a default but simply requires that there is a choice. Under active decision, employees choose saving rates that they otherwise would have taken three years to achieve.

In the absence of external forces designed to offset (or exploit) the status quo bias, it may be helpful if individuals are taught to frame their financial decisions as "if I had to make the initial choice now, what should I do?" rather than "how should I change from what I am now doing?"

The status quo bias may also explain why people are often resistant to shopping around for better deals once they have made their initial choice. As already mentioned, this tendency not to switch is one that financial service providers often take advantage of by raising insurance premiums or lowering interest rates after consumers sign up. Even if this is noticed, people often do not react by cancelling.

9) The curse of knowledge

Financial education as traditionally conceived supposes that being better informed improves decision. That does not always apply. One reason that more may not be better is that attention is a scarce resource and processing power is limited. More information may deflect attention from what is really important. A pervasive finding (e.g., Kruschke and Johansen 1999) is that cue competition occurs: more salient cues weaken the effects of less salient ones, and the presence of irrelevant cues causes subjects to make less use of relevant cues and base rates (unconditional frequencies). Introducing additional accurate information may therefore lead to worse outcomes. For example, Lacko and Pappalardo (2004) show that a particular rewrite of mortgage disclosure information designed to reveal broker compensation lead to more confusion over the total cost of a mortgage.

Bertrand et al (2005) find in a large-scale field experiment that many factors that are inconsequential in terms of standard theory had large effects on the decision to take a loan. For example, providing applicants with the opportunity to win a prize discouraged loan demand. Less information about the variety of loans available increased take up. Extra information appears to be distracting and leads to poor decisions.

Education may be counter-productive, not just due to information overload but because it augments overconfidence in the sense of attaching too much precision to estimates. People may falsely believe they know what they are doing and in the sense and attach excessive precision to their beliefs.[9] Acquiring a "mental model" may result in random effects being downplayed and accumulating evidence interpreted through the distorting lens of confirmatory bias (Griffen and Tversky (1992)). This is particularly the case when event predictability is low. Then it is easy to ignore counter evidence and find excuses for error other than the "model" is wrong. Weinstein and Klein (2002) show how difficult it is to shake false beliefs concerning personal risk.

[9] Willis (2008) reports that victims of financial fraud have above average financial literacy!

A problem related to overconfidence is optimism or self serving bias. The tendency to overestimate the probability of favourable events. As Adam Smith puts it:

"The chance of gain is by every man more or less overvalued, and the chance of loss is by most men under-valued, and scarce by any man, who is in tolerable health and spirits, valued more than it is worth" Adam Smith *Wealth of Nations,* Book i, Chapter X (p. 107)

Modern psychologists agree;

'... considerable research evidence suggests that overly positive self-evaluations, exaggerated perceptions of control or mastery, and unrealistic optimism are characteristics of normal human thought.' (Taylor and Brown, 1988, p. 193).

Optimism is especially prevalent when people think events are under their own control (Langer (1975)), an impression that financial education may foster. It certainly applies in the financial domain. For example a 2008 Natwest survey of 8,500 British teenagers (http://www.natwestf2f.com/natwest/docs/NatWest_MoneySense_research.pdf) found that they expect on average to be earning a salary of £31,000 at the age of 25. In contrast, 22 to 29-year-olds earn on average £17,817 in the Great Britain today. Arabshabani et al. (2000) compared income forecasts and realisations and found financial optimism applies much more widely and is especially important for men.

Optimism gives rise to a host of problems relating to financial capability. Overestimating future income and employment prospects leads to inadequate precautionary saving and too little pension provision. People are too ready to borrow because they are too optimistic about their ability to repay. They set up businesses without realistically factoring in their chance of failure (de Meza and Southey, 1996). Some risks are uninsured because the chance of loss is underestimated. In short, optimism is a prime cause of financial incapability.

One ingredient of overconfidence is the law of small numbers; Kahneman and Tversky (1971). People draw far too strong inferences from small amounts of data. For example, the performance of unit trusts over the last three years is given far too much weight relative to the level of management fees. A tendency to believe lessons from insufficient data is augmented by the availability heuristic whereby people disproportionately weight salient, memorable or vivid evidence. People rely far too much on personal experience or that of friends relative to aggregate data in judging risks and returns and evaluating financial products.

This problem of wrongly evaluating evidence may be worsened by basic mistakes in inference. The most notable is the base rate neglect bias (Kahneman, Tversky 1973). In evaluating evidence, people tend to ignore the prior probability that a hypothesis is true. A striking example is the "Linda" problem. People are told that Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations. People are asked to rate the likelihood that the following statements about Linda are true:

a) Linda is active in the feminist movement.

b) Linda is a bank teller.

c) Linda is a bank teller and is active in the feminist movement.

Many people rate (c) more likely than (a) or (b) though this is a logical impossibility. Their predictions would be better if they knew less about Linda.

Kahneman and Tversky (1982) test whether general knowledge of statistics reduces or eliminates observed biases with surprisingly negative results. The results by Fong, Krantz, Nisbett (1986) are more encouraging.

Camerer, Loewenstein and Weber (1989) coined the term "curse of knowledge" to cover a specific effect according to which better-informed agents are often incapable of reproducing the judgments of less-informed agents. In their experiment, subjects were rewarded according to their success in predicting what others would decide. Participants had the opportunity to buy information that would help predict actual outcomes. Many bought the information even though those that did so were worse at predicting how the uninformed would decide. Had the information not been acquired, they would have been better off, even gross of the purchase price. The problem is that people tend to imagine everyone knows what they know. This bias may lead to mistakes in stock market investment. Beating the market involves finding companies that are undervalued. This involves a theory of mind; appreciating that others may know more or less than you know.

Even experts may react badly to more information. In a meta-analysis of 136 studies, Grove and Meehl (1996) and Grove et al (2000) report that in activities such as predicting individual health outcomes, college grades or criminal recidivism, experts do worse than simple statistical methods. Moreover, the performance of experts deteriorates when, in addition to written information being given, the professionals were able to interview the subjects.

Recent empirical research indicates that professional investors are as prone to irrational, psychologically motivated biases in their investment decisions (e.g. Glaser et al., 2005, Haigh and List, 2005, Menkhoff et al., 2006) as amateurs. Professionalism may reduce biases to some degree but it does not eliminate them entirely (Shapira and Venezia, 2001, 2006, Feng and Seasholes, 2005).

In finance as elsewhere, the overall picture is that *"..research does not support the strong versions of the experts-get-things-right and in the real- world-people-learn hypotheses."* Rabin (1998)

10) Improving financial capability by debiasing?

Numerous studies from psychology and behavioural economics show that humans are systematically prone to various kinds of cognitive biases. Biases lead to predictable but suboptimal decisions. We provide a taxonomy of biases which are likely to be relevant for financial decision making in the Appendix. Almost all biases originate from the human tendency to use rules of thumb or heuristics which considerably simplify the decision process. Heuristics have probably evolved because when dealing with complex problems they often lead to good decisions – unfortunately, this is not always the case.

The three most prominent heuristics are the availability heuristic, the representativeness heuristic, and the affect heuristic (Bazerman 2006). The first denotes the observation that people assess the frequency, probability, or likely causes of an event by the degree to which instances or occurrences of that event are readily "available" in memory (Tversky and Kahneman 1973). According to the representativeness heuristic, people look for characteristics of an individual, an object, or a situation that correspond with previously formed stereotypes. Judgments that are evoked by genuine subjective feelings and moods (for example, sadness or disgust) are influenced by the affect heuristic (Cohen, Pham, Andrade 2008). Some researchers also consider the affect heuristic at work if subconscious emotional evaluations (Slovic, Finucane, Peters, and Mc Gregor 2002) are used as the basis of decisions although they occur even before cognitive reasoning takes place (Kahneman 2003).

Although new biases in judgment and decision making in general are being discovered all the time, there are relatively few studies that investigate these biases with a specific focus on financial decision making. Examining these biases in such a context is highly desirable because the few existing studies yield surprising insights. Kahneman and Thaler, for example, asked wealthy investors to bring to mind the financial decision they regretted the most. In line with the omission bias, most investors reported that their worst regret was about some action they had taken. Interestingly, those individuals who remembered a regret of omission held an unusually high proportion of their portfolio in stocks. Kahneman and Riepe (1998) conclude from this that investors who regret the opportunities they missed tend to take more risk than people who regret actions that failed. In accordance with the scale bias, Christensen (1989) finds that the more is spent on a primary purchase the more willing people are to buy additional smaller items. Apparently, small extra purchases are perceived as minor expenditures when they follow larger purchases. This might be one of the reasons why mortgage protection insurance with its seemingly minor fees (compared to the mortgage) are so successfully sold as secondary products by lenders.

There is even less research on how financial decision makers can be made less vulnerable to relevant biases. Overviews of generally investigated debiasing approaches can be found, for example, in Fischhoff (1982), Arkes (1991), Larrick (2004). In the following we briefly discuss the more prominent of those debiasing techniques which can be applied by the individual decision maker rather than by institutional design such as appropriate defaults. We focus on the following approaches: (*i*) consider-the-opposite, (*ii*) accountability, (*iii*) training in rules, (*iv*) training in representations, (*v*) voluntary cooling-off-periods, and (*vi*) group decisions. With these techniques in mind one might hope to be able to tailor and test more effective advice schemes for people who are in the process of taking decisions on financial matters. As an organising principle we use the five different aspects of financial capability as identified in the FSA Baseline Survey. Although it can be argued that some of the debiasing techniques are relevant for several capabilities, we discuss each technique under the capability for which we consider it most relevant.

So far little is known on whether mere knowledge about biases reduces their impact. Thus, it is not immediately clear whether enhancing the awareness of biases really reduces their consequences. For some biases the answer seems to be negative. For example, teaching people the existence of the hindsight bias does not make them much less vulnerable to it (Wood 1978, Fischhoff 1982, Quattrone et al. 1984). More research is needed regarding the effect of teaching the existence of cognitive biases. One way to do this might be to let people gain their own experiences with relevant biases. Learning by doing, with feedback, has the advantage that people are more likely to remember the consequences of these traps and how difficult it is to avoid them. Such a learning environment could be implemented by well designed, interactive and incentivised (online) simulations.

10.1 Managing money / making ends meet

Despite the importance of budgeting for consumers, our knowledge about the budgeting process is limited. Thaler and Johnson (1990) report evidence that budgeting is highly dependent on prior outcomes. Prior gains, for example, can induce people to increase budgets for gambles. They called this tendency the "house money effect". In contrast, prior losses can decrease willingness to take risks and outcomes which offer the opportunity to break even become especially attractive. In a recent study Ülkümen, Thomas, and Morwitz (2008) analyse how different temporal frames can lead to different budgeting. They find that estimated budgets for the next year are closer to recorded expenses than monthly budgets because consumers feel less confident when estimating the former and therefore adjust them upward. Their interpretation is that the budget-estimation process entails an anchoring and adjustment mechanism in which initial estimates are too low, and the amount of upward adjustment depends on the degree of confidence and the availability of cognitive resources. Consumers' beliefs about the accuracy of easily generated budget estimates make them more confident in a next month frame. Changing these beliefs by informing consumers that feelings of ease do not signal accuracy leads to a significant increase in the amount of adjustment for next month budgets. They find that participants persistently underestimate their expenditures for the next month even when the budget estimates were elicited only seconds after participants reported their earlier period's actual expenditures. This observation is consistent with the finding that people fail to incorporate past experiences into their predictions (Buehler et al. 1994, Jacoby et al. 1984).

Accountability involves decision makers imagining or really having to explain their decision to somebody else. It has been shown that such an expectation leads people to anticipate and take into account potential criticism by employing a kind of pre-emptive self-criticism. People who think about a decision in the expectation of being held accountable tend to exert more effort. They spend longer on the task and collect more information before taking a decision. It is important to guarantee that the decision maker believes that the person to whom he is held accountable has no preference regarding the decision outcome. If this is not guaranteed, social issues, such as wanting to please the other, come into play which might bias the search for information. A potential drawback of holding people accountable comes from the fact that decisions are perceived as more difficult if accountability is higher (Lerner, Tetlock 1999, Zhang, Mittal 2005).

The recency bias refers to the tendency to overweight information received later in a sequence. This clearly has the potential to distort financial decisions, for example, by generating urgent desires for products one has been informed about recently. It has been shown that accountability reduces the tendency for recency of information in auditing tasks. (Kennedy 1993). Accountability also reduces the tendency for recency of information to influence judgments when predicting a candidate's success at a job based on sequential information (Kruglanski, Freund 1983). This remains true if subjects experience mental fatigue (Webster, Richter, Kruglanski, 1996).

10.2 Keeping track of finances

People often behave as if their money resides in different compartments, so called "mental accounts" (Thaler 1991). This leads to the illusion that money is not as "fungible" as it actually is. Mental accounting is helpful in overcoming people's impulsiveness or their tendency to neglect the long term. They reserve some money for retirement, some for food, some for fuel, etc. Thus, mental accounting is an important means for financial self-control by way of pre-commitment (Thaler, Shefrin 1981, Heath, Soll 1996). Consumers also use mental accounting to justify purchases by setting up an account for a transaction, debit the expense, and credit the benefit accrued from consumption (Prelec, Loewenstein 1998). However, mental accounting may lead to inconsistent financial decisions. For example, one may borrow at high interest to buy a consumer item whilst simultaneously saving at lower interest rates for a child's college fund.

Another aspect of mental accounting relates to observations that people vary in their attitudes to risk between their mental accounts. Although in general mental accounts support self-control, sometimes they can also be used to justify additional spending by "creative bookkeeping" (Cheema and Soman, 2007). Consumers have flexibility (a) in *classifying* ambiguous expenses (and, therefore, in assigning them to different mental accounts) and (b) in *constructing* mental accounts to accommodate unclassified expenses. Soman and Gourville (2001) show that in situations of price bundling (let's say, for example, mortgage bundles consisting of the mortgage and a mortgage protection insurance), the individual typically has flexibility in assigning portions of the total cost to each of the separate benefits. Soman and Cheema (2001) show that unbudgeted windfalls introduce flexibility into mental accounts, allowing consumers to allocate the gain to a mental account at their discretion and helping them write off sunk costs.

Kivetz (1999) finds that the principles of mental accounting often regulate the purchase and consumption of luxuries. In particular, buying and consuming luxury goods tends to call for justification and can evoke intra-personal conflict that might be resolved with the aid of mental accounting. For example, there is evidence that people prefer to pay for luxurious consumption with “windfall gains” (Thaler 1985).

The “disposition bias” is closely related to mental accounting and loss aversion. It denotes the tendency of sellers of an object to treat its original purchase price as a reference point for the selling price. According to Weber andWelfens (2006), learning seems to attenuate the magnitude of the disposition effect. Frequent traders sell their winners less and their losers more often, resulting in lower disposition effects.

10.3 Planning

A remedy for various cognitive biases is to encourage decision makers to ask themselves: “What are the reasons that my judgement might be wrong?” The basic mechanism is to counteract the problem of overly narrow sampling of evidence which mainly results from the availability heuristic (Tversky and Kahneman 1973, Lord, Lepper, Preston 1984). Expanding the sample makes it more representative. Interestingly, a similar procedure of simply listing more reasons for or against making a particular decision is not effective! Why is this? Again due to the availability heuristic, decision makers tend to generate reasons which support their view since these reasons come to mind more readily. The “consider-the-opposite” remedy turns out to be effective in reducing the severity of a number of biases, for example, anchoring and overconfidence, but is not very effective with respect to the hindsight bias.

Hoch (1985) investigated the influence of counterfactual reasoning on accuracy when predicting the outcomes of future personal events – a setting which is quite relevant when planning ahead and thinking about the right amount of savings or insurance. Graduate business students made predictions about the results of their job search efforts nine month in advance (e.g. starting salary). Some subjects were asked to generate pro and/or con reasons concerning event occurrence before making their predictions. Generating con reasons increased their predictive accuracy while generating pro reasons had no effect – the latter suggesting that subjects may have automatically generated supportive reasons.

Hindsight bias involves the error of assuming that what you now know you always knew. Investors may as a result overweight past success and failure in judging competence of fund managers, companies and indeed their own skills. People fail to remember how ignorant they were in the past. This can have serious negative consequences for learning in financial environments and compromises planning ahead. Biais and Weber (2007) provide evidence that investment bankers who score highly on hindsight bias have lower performance. Sanna, Schwarz, Stocker (2002) and Sanna, Schwarz (2003) find that to force oneself to argue against the inevitability of a reported outcome, that is, to try to convince oneself that it might have turned out otherwise, might in fact increase the hindsight bias. Ironically, the strategy may be less effective the more one tries to convince oneself that it might have turned out otherwise realising along the way that reasons for an alternate outcome are difficult to bring to mind.

How difficult it is for humans to plan ahead becomes evident from the findings on the "planning fallacy" which denotes the tendency to underestimate task-completion times (Buehler, Griffin, Ross 1994, 1995, 2002, Newby-Clark et al. 2000). Buehler et al. (1995) ask students for times by which they are 50% sure, 75% sure, and 99% sure to finish an academic project. Only 13% of the participants finished their project by the time assigned a 50% probability level, only 19% finished by the time assigned a 75% probability, and 45% finished by the time of their 99% probability level. Buehler et. al. (2002) write: "The results for the 99% probability level are especially striking: even when asked to make a highly conservative forecast, a prediction that they felt virtually certain that they would fulfil, students' confidence in their time estimates far exceeded their accomplishments." Newby-Clark et al. (2000) find that asking subjects for their predictions based on realistic "best guess" scenarios, and asking subjects for their hoped-for "best case" scenarios, produces indistinguishable results. When asked for their "most probable" case, people tend to envision everything going exactly as planned, with no unexpected delays or unforeseen catastrophes, i.e. the same vision as their "best case". The debiasing manipulation that has worked best so far is what Buehler et. al. (2002) call the "recall-relevance" manipulation. Within this manipulation people are asked to describe a plausible scenario, based on their past experience, that would result in their completing an assignment at their typical time (Buehler, Griffin, Ross 1994). This manipulation avoids the "internal approach" to prediction which involves sketching out a scenario that captures how a future project is likely to unfold. This is, by and large, what planning means to most people: develop a series of steps that lead from the beginning to a successful conclusion of the project. Completion estimates for such exclusively plan-based, future scenarios, however, are likely to be overly optimistic. In contrast the "recall-relevance" manipulation takes an outside view by referring to experience with broadly similar projects.

Kahneman and Lovallo (1993) distinguish between two modes of forecasting: the inside view focuses on the specifics of the case at hand, whereas the outside view focuses on the statistics of a family of cases similar to the case at hand. The former approach results in exceedingly optimistic forecasts, and the latter approach results in more accurate forecasts.

Taking decisions as a group is sometimes a successful debiasing technique because (i) groups can be an error-checking system, (ii) synergies can emerge if group members have complementary expertise, (iii) groups can increase the effective sample size of knowledge. For example, it has been shown that simply averaging forecasts tends to reduce errors. However, one also has to be careful when taking a decision as a group because social influence can undermine the effectiveness of the group. In a group, people often intentionally withhold or misrepresent their private information or they are unknowingly influenced by the public judgement of other group members.

The aim to make appropriate financial decisions for the future is also likely to be influenced by unrealistic optimism, i.e., people's consistent tendency to claim that they are less likely than their peers to suffer harm (Weinstein 1980). Informing people about relevant health risk factors in general and requiring them to describe their standing on these factors had no overall effect on subsequent risk judgement (Weinstein, Klein 2002). However, if individuals are exposed to lists made by other individuals of factors improving the other individuals' chances of positive outcomes reduces unrealistic optimism (Weinstein 1980). Also offering people information about their *own* individual standing on risk factors or information about peers' standing on these factors has been shown to decrease optimism Weinstein (1983). Exposing people to a concrete instance of the occurrence has also been proven to successfully offset optimism. Thus, for instance, a recent series of studies of smoking behaviour finds that smokers are more likely to believe that smoking will harm their health if they are aware of specific instances of such harm (Sloan, Taylor, Smith 2003). The latter is in line with the finding that people generally tend to respond to concrete, narrative information even when they do not respond, or respond far less, to general statistical information (Nisbett et al. 1982).

10.4 Making informed decisions about financial products

Our survey of the literature on information overload shows that it is questionable whether people make better decisions when they have more or better information. Dhar (1997) finds that the tendency to defer choice is greater when the difference in attractiveness among the available alternatives is small than when it is large. The percentage of people who defer choice among comparable alternatives tends to decrease when people first learn to make trade-offs among the different features. As discussed earlier, increased introspection can cause subjects to make choices that, compared with control subjects, correspond less with expert opinions. (Wilson, Schooler 1991).

To be able to make informed decisions about financial products people have to be familiar with basic mathematical and statistical reasoning. So, is it possible to improve financial decision making by teaching rules of mathematical and statistical reasoning? Ideally the rules should be learned in such a way that the trained person can apply them in a wide range of events. Nisbett et al. (1987) consider two approaches: (i) formal training in abstract rules in the hope that people can transfer the abstract knowledge to specific decision domains; (ii) learning the rule in a specific domain in the hope that people can generalise the knowledge to other domains.

Abstract rule training improved statistical reasoning in:

- Manifestly probabilistic problems

  Objectively measurable events such as those involving achievements of some kind

(e.g. performance estimates of graduates from a certain school from a few particular graduates' performance)

- Subjective judgments such as those assessing someone‘s sense of humour or kindness (e.g. subjects should realise that a first impression of a person might not be a good indication of that individual's personality)

Training by examples did enable routines to be transferred to very different domains.

The "sunk cost" or "escalation fallacy" denotes the tendency of people not to consider past actions as "sunk". They often feel drawn to persue and escalate a previous unsatisfactory course of action. This may lead to throwing "good money after bad". In a study by Larrick, Morgan and Nisbett (1990) students were successfully trained to ignore sunk costs in financial domains. They were also successful in generalising the rule to time allocation decisions (i.e., to ignore that they have spent a lot of time on a project in the past if it does not look promising in the future). They were also able to generalise the sunk cost rule to financial matters if it was taught in the time domain. In addition, they could correctly distinguish between sunk cost problems and problems for which the normative principle implies opposite actions (discontinuing versus continuing investments, respectively).

There is evidence that people reason more accurately about frequencies than about probabilities (see Gigerenzer and Hoffrage 1995). At least two possible strategies emerge from this insight which have been shown successful: (*i*) regulation to exemplify decision alternatives by frequencies rather than probabilities; (*ii*) training people to translate probabilistic reasoning tasks into frequency formats.

Anchoring refers to the tendency for numerical estimates to be influenced by a previously considered (and potentially exogenously provided) standard of comparison. It does not require much imagination to see that this type of bias can easily be exploited, for example by insurance sellers. The anchoring effect is quite robust and has been shown in many experiments. For example, Ariely, Loewenstein, and Prelec (2003) showed six products to subjects and briefly described them without mentioning a market price. Subjects were asked whether they would buy each good for a dollar figure equal to the last two digits of their social security number (SS#). This was a simple accept/reject decision. Afterwards, subjects were asked to state their dollar maximum willingness-to-pay (WTP) for each product (via an incentive compatible procedure). A random device determined whether the product would in fact be sold on the basis of the first accept/reject response or the second WTP response. Subjects understood that both responses had some chance of being decisive for a potential purchase.

AVERAGE STATED WILLINGNESS-TO-PAY SORTED BY QUINTILE OF THE SAMPLE'S SOCIAL SECURITY NUMBER DISTRIBUTION

Quintile of SS# distribution	Cordless trackball	Cordless keyboard	Average wine	Rare wine	Design book	Belgian chocolates
1	\$ 8.64	\$16.09	\$ 8.64	\$11.73	\$12.82	\$ 9.55
2	\$11.82	\$26.82	\$14.45	\$22.45	\$16.18	\$10.64
3	\$13.45	\$29.27	\$12.55	\$18.09	\$15.82	\$12.45
4	\$21.18	\$34.55	\$15.45	\$24.55	\$19.27	\$13.27
5	\$26.18	\$55.64	\$27.91	\$37.55	\$30.00	\$20.64
Correlations	.415	.516	0.328	.328	0.319	.419
	$p = .0015$	$p < .0001$	$p = .014$	$p = .0153$	$p = .0172$	$p = .0013$

The last row indicates the correlations between Social Security numbers and WTP (and their significance levels).

The table above shows that the SS# had a significant impact on WTP, i.e., subjects with above-median SS# stated values from 57 percent to 107 percent higher than did subjects with below median numbers. WTPs of top SS# quintile subjects were typically higher by a factor of three!

Wansink, Kent, and Hoch (1998) provide empirical support for the anchoring effect in an illustrative field experiment. Imagine you are walking down the supermarket aisle and you encounter a stack of cans of canned tomato soup, and a sign saying “Limit 12 per customer.” Their data show that this sign actually causes people to buy more cans of tomato soup since customers anchor at 12.

To demonstrate the effect of anchoring, Russo and Schoemaker (1989) performed the following experiment. First, they asked professionals: “What is your best estimate of the prime interest rate six months from now?” The average guess was 10.9 percent (at that time the actual prime was around 11 percent). Then they surveyed a second group with the following two questions: 1. “Do you believe that six months from now the prime rate will be above or below 8 percent?” and 2. “What is your best estimate of the prime rate six months from now?” The first question was intended to anchor subjects on 8 percent. The average guess was now 10.5 (40 basis points below the unanchored group). When they anchored a third group at 14 percent by an analogous first question the average was 11.2. One can imagine how powerful this subtle manipulation can be if it is used strategically, i.e. mentioning a statistic to encourage the listener to anchor on it. Consider, for example, negotiations with a banker or an insurance seller who argues “Generally we charge customers like you *x* for this product’.

Mussweiler, Strack and Pfeiffer (2000) designed an experiment to test for the effect of the “consider-the-opposite” debiasing technique for anchoring. In a car-selling-scenario subjects were asked to estimate the value of a 10-year-old car. They were given all relevant information (mileage, year, etc.) and they had the car right in front of them. Four treatment conditions were employed along two dimensions: (*i*) anchoring by experimenter: “I thought that the car should sell for about 2,800 / 5,000 Marks.” (*ii*) half the participant were encouraged to “consider the opposite”, i.e., to reason why the anchor might be inappropriate (“A friend of mine mentioned yesterday that he thought this value is too high/low”). As expected, it turned out that the high anchor led to higher estimates for the value of the car than the low anchor. The anchoring, however, was weaker when participants were instructed to generate anchor-inconsistent arguments.

Overconfidence involves people giving subjective range estimates which are typically too narrow. Such overconfidence in judgement is quite relevant in financial decision making, for example in judging whether to hedge investment risk. Soll and Klayman (2004) asked subjects to answer knowledge questions, for example, “In what year was the first flight of a hot air balloon?” Ranges for which people are 80 percent confident captured the truth only 30 percent to 40 percent of the time. They also induced other subjects to “consider-the-opposite” by asking them to estimate 10th and 90th percentiles in two *separate* stages. This increased hit rates to nearly 60 percent by both widening and centering ranges.

Numerous studies have found that people in good moods make unrealistically optimistic judgments and choices and that people in bad moods make unrealistically pessimistic judgments and choices (see Loewenstein et al. 2001, for an overview). Loewenstein (2000) suggest that “it is probably not an overstatement to say that visceral factors [like negative emotions, (e.g., anger, fear), drive states (e.g., hunger, thirst, sexual desire), and feeling states (e.g., pain)] are more basic to daily functioning than the higher level cognitive processes that are often assumed to underlie decision-making” (p. 427). There is evidence that people in “hot” states tend to overestimate how long those states will last (“projection bias”, Loewenstein, O’Donoghue, Rabin 2003). Additionally, it has been shown that “visceral factors […] are powerfully influenced by temporal proximity” (Loewenstein 1996, p. 279) indicating that voluntary cooling-off-periods promise to be quite effective for debiasing.

Zajonc (1980) argues for greater speed and automaticity of affective over cognitive reactions and showed that people can have an affective reaction to a stimulus before they know what it is they are reacting to. For example, sudden, unexpected noises can cause fear well before we determine the source of the noise. Thus, it may well be that "I decided in favor of *X*" is no more than "I liked *X*". Bechara et al. (1997) also find support for the hypothesis that non-conscious biases guide behaviour before conscious knowledge does.

Affect in particular influences decisions about whether to purchase insurance. Hsee and Kunreuther (2000) find that people are willing to pay twice as much to insure a beloved antique clock against loss in shipment than to insure a similar clock for which "one does not have any special feeling." In the event of loss, the insurance paid $100 in both cases.

Judgments about risk may also be the result of subconscious evaluations. People may have a positive 'image' of a market sector and perhaps associate 'pharmaceuticals' with 'healing', 'beauty products', 'cleanliness', etc. MacGregor et al. (2000) tested this hypothesis by asking business students to write the first three images that came to mind for 40 industry groupings, and then to rate how positive these evaluations were. They were then asked to say how well these sectors had done in 1994 and how well they would do in 1995, and indicate their own willingness to buy shares in these sectors. Their judgements of how well these industry groupings had done in 1994 and would do in 1995, and their willingness to buy were predictable on the basis of how positive their images were of these sectors. These judgements of sector performance, as well as willingness to assume risk by buying shares in these sectors, were only weakly related to indicators of actual performance. Based on subconscious retrieval of positive (or negative) associations, people may 'feel good' (or 'bad') about an industry sector and therefore predict successful (or unsuccessful) performance in that sector.

Choosing the right financial product might also be significantly hindered by the conjunction error due to which probability is often over-estimated in compound conjunctive problems. This is nicely demonstrated in Johnson et al. (1993). MBA students at Wharton are scheduled to travel to Bangkok as part of their degree program. Several groups of students with similar social and demographical background are asked how much they are willing to pay for terrorism insurance. One group of subjects is asked how much they are willing to pay for terrorism insurance covering the flight from Thailand to the US. A second group of subjects is asked how much they are willing to pay for terrorism insurance covering the round-trip flight. A third group is asked how much they are willing to pay for terrorism insurance that covers the complete trip to Thailand. These three groups respond with average willingness to pay of $17.19, $13.90, and \$7.44 respectively. According to probability theory, adding additional detail onto a story must render the story less probable Thus, covering the whole trip should be worth at least as much as covering just part of the trip. However, since the flights from Thailand to the US or the other way are more representative for a situation prone to a terrorist attack and therefore make the attack appear more probable, students value these insurance policies higher. According to Simonson and Nye (1992) accountability is an appropriate remedy for conjunction error.

10.5 Staying up to date about financial matters

There are three biases that together are likely to inhibit the motivation of people to stay up to date about financial matters: the confirmation bias, the belief bias, and the completeness bias. The confirmation bias (also called myside bias) denotes the tendency to evaluate evidence, generate evidence, and test hypotheses in a manner biased toward one's own previously held opinions. The belief bias refers to people's difficulties to evaluate conclusions that conflict with what one thinks one knows about the world. According to the completeness bias people tend to stop searching too early if they have generated one hypothesis to answer an open question. All three biases are forcefully documented by Wason (1960) in his classic "2-4-6" task experiment. Subjects are asked to *discover a rule,* known to the experimenter but not to the subject. Initially subjects are given the triplet 2-4-6, and told that this triplet fits the rule. Subjects are then asked to generate own triplets that fit the rule. After coming up with a new triplet the experimenter gives feedback whether the triplet fits the rule or does not fit the rule. Subjects can continue testing triplets until they feel sure they know the experimenter's rule, at which point the subject is asked to announce the rule. While the actual rule is simply "any ascending sequence", subjects seem to have a great deal of difficulty in deducing it, often announcing rules that are far more complex than the correct rule. Subjects seemed to test only "positive" examples triples that they believe will conform to their rule and confirm their hypothesis. What they do rarely do is attempt to challenge or falsify their hypotheses by testing triples that they believe will not conform to their rule. The experiment also shows that subjects stop far too early once they think they have found *the* answer to a problem.

Huber and Seiser (2001) report that in a judgmental task two types of justification pressure, i.e., the requirement to explain the decision afterwards and the requirement to convince another person, lead to a distinct increase in the amount of utilised information. There is also evidence that counterfactual primes – i.e., providing examples that make subjects aware of both an actual outcome (e.g. getting into an accident; winning a lottery) and the converse counterfactual outcome (e.g. avoiding the accident; losing the lottery) – attenuates the confirmation bias in a trait hypothesis testing context. The number of questions designed to elicit hypothesis-disconfirming answers are increased by such priming (Galinsky, Moskowitz 2000). Evans et al. (1994) show that teaching in principles of reasoning (by elaborated verbal instructions) seem to reduce the belief bias in syllogistic reasoning, but cannot eliminate it. Evans and Curtis-Holmes (2005) show that the necessity of rapid responding increases the amount of belief bias observed on a syllogistic reasoning task and it reduces the number of logically correct decisions. Thus, it is not unlikely that the three biases which make it particularly difficult to stay up to date with financial matters are amplified by time pressure, information overload, cognitive busyness, increased introspection, etc.

11) Conclusion

Behavioural economics has identified a host of systematic biases many of which are evident in the personal finance decisions that many people take. Most people do not act as fully rational individuals who choose in their self interest. Inertia, complexity, status quo bias, self-control and hyperbolic discounting are amongst the factors that sway financial decisions. Rational calculation is a useful benchmark but is not descriptively accurate. Not surprisingly, the deep-seated psychological traits also at work seem fairly resistant to conventional information-based financial education and advice. The question arises what can be done? Most straightforward is to learn about the biases, introduce regulations that recognize their presence and offset their effects in the least intrusive fashion possible.

What is largely unexplored territory is whether techniques can be learned that can effectively neutralise bias itself. A few possibilities have been discussed in this survey. What should be taught may not be explicit financial capability but thinking skills.

Our skepticism with regard to financial literacy education is shared by Willis (2008a,b). This leads her to make two interesting policy proposals. The first is *norm manipulation.* The idea is that some suitable financial rules of thumb would be inculcated as widely as possible. Perhaps a norm of scepticism regarding the claims of sellers of financial products would also be promulgated. The emphasis would not so much be on the reason behind the advice, but on the delivery of easily digestible slogans that may influence behaviour at key moments. Examples in other contexts are "don't drink and drive" and "safe sex" campaigns. "Save 10%" may be a harder sell. There are fewer vivid images to exploit though the consequences of high debt could perhaps be effectively dramatised. Saving norms do appear to differ internationally. It is a challenge to work out how such norms could be altered. Critics would accuse the state of indoctrination, but further consideration seems warranted.

The second of Willis proposals is face to face crisis counselling. There is some evidence from counselling studies that such personalised advice works. Basically, the individual knows they are in trouble and get specific advice what to do and perhaps help with filling in forms. This is analogous to curative medicine whereas financial literacy education is like preventative medicine. Counselling is rather likely to deliver immediate benefits but it is not clear there are long-term effects in helping people avoid getting into such situations.

At this point more research should be undertaken on the determinants of financial decisions in the UK. There is scope for further statistical analysis of the FSA survey and use of the British Household Panel Study. This would be relatively easy to accomplish.

The problem is that neither survey contains the kind of psychological variables that are emphasised by behavioural economics. So there is a need to collect more data. Secondly, there is little convincing evidence on what “therapies”, if any, are effective. Both to collect more information and to test the effectiveness of different methods of improving financial competency, we recommend that a large scale online survey and experiment is conducted. This would involve randomised treatments involving a conventional financial learning module, an active learning module based on behavioural principles, and a control group. In addition to an immediate test of the effects of the treatments, the subjects would be revisited after a year or two to retest and collect data on loan default, payday borrowing and credit card use over the interval. Working with a bank or subprime lender may be an even better alternative than online implementation.

A first step in debiasing may be for people to recognise their biases. Doing so will require that a bias against recognising one’s own biases is overcome. Seeing whether this approach is feasible and effective seems well worthwhile.

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Taxonomy of cognitive biases likely to be relevant for financial decision making

Bias	Description and potential relevance	Reference	(Non-)Remedies
Memory			
Curse of knowledge	Knowledge of an event's outcome can compromise the ability to reason about another person's beliefs about that event.	Wood (1978), Camerer, Loewenstein, Weber (1989), Birch, Bloom (2007)	Individuals cannot ignore private information even when monetary incentives and feedback are provided. However, a market setting reduces (but does not eliminate) this bias. Camerer, Loewenstein, Weber (1989) Entreating subjects to work hard and warning them about the bias have been largely ineffective. Fischhoff (1982), Wood (1978) The curse of knowledge is not mitigated by accountability defined as the requirement to justify one's judgments when called upon (but it encourages people to exert additional cognitive effort). Counterexplanation, i.e., explicitly considering evidence that would *not* support or lead one to expect the outcome that occurred, helps (because it addresses the cognitive nature of this bias and weakens causal connections between evidence and the actual outcome). Alternative outcomes are made more salient with counterexplanation. Kennedy (1995)
Hindsight [3]	Outcomes that are considered improbable ex ante are often overestimated ex post.	Fischhoff (1975), Fischhoff, Beyth (1975), Slovic, Fischhoff (1977), Campbell, Tesser (1983), Hawkins, Hastie (1990), Sanna, Schwarz, Small (2002), Guilbault et al (2004), Hölzl, Kirchler (2005), Biais, Weber (2007)	Advanced students of strategy analyzing a complex business case systematically distort their evaluations of initial decisions and projections for the future. Bukszar, Connolly (1988) The amount of hindsight bias in a knowledge question task is not reduced by having received information about the bias in advance or by having received feedback about their individual performance before being subject to the same

			procedure a second time. Pohl, Hell (1996) When surprise levels are moderate or low, judgments are consistent with the hindsight bias, whereas highly surprising outcomes lead to the reversal of the bias. Subjects under these conditions seek explanations to the outcome and “effortless assimilation,” the most accepted theoretical account for the hindsight bias, is less likely. Ofir, Mazursky (1997) To force oneself to argue against the inevitability of the reported outcome, that is, to try to convince oneself that it might have turned out otherwise might in fact increase the hindsight bias. Ironically, the strategy may be less effective the more one tries to convince oneself that it might have turned out otherwise realising along the way that reasons for an alternate outcome are difficult to bring to mind. Sanna, Schwarz, Stocker (2002)Sanna, Schwarz (2003)
Mental accounting [2]	Mental accounting is the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities. People are assumed to group their assets into a number of non-fungible mental accounts.	Thaler (1985), Thaler (1990), Heath (1995), Heath, Soll (1996), Thaler (1999), Prelec, Loewenstein (1998), Kivetz (1999), Cheema, Soman (2006)	
Procastination [3]	Postponing things one knows one should do today. A psychological reason might be that present or immediate costs/benefits are unduly salient or vivid in comparison to future costs/benefits.	Lay (1986), Ferrari, Johnson, McGown (1995), Rabin, O’Donoghue (1999), O'Donoghue, Rabin (2001), Andreou (2007)	The tendency to defer choice is greater when the difference in attractiveness among the available alternatives is small than when it is large. However, the percentage of people who defer choice among comparable alternatives decreases when the subjects first learn to make trade-offs among the different features. Dhar (1997)
Recall, Imaginability	An event or class may appear more numerous or frequent if its instances are more easily	Tversky, Kahneman (1974, 1981)	Financial accounting information only mildly mitigates investors’ tendency to judge those

[3, 4]	recalled than other equally probable events.		outcomes more probable for which they are able to generate the most supporting reasons. Moser (1989)
Naïve Statistics			
Base rate neglect, stereotyping [1, 3, 4]	The base-rate fallacy is people's tendency to ignore base rates in favour of, e.g., individuating information (when such is available), rather than integrate the two.	Kahneman, Tversky (1973), Ajzen (1977), Bar-Hillel, Maya (1980), Camerer (1987), Kleiter et al (1997)	
Conjunction [1, 4]	Probability is often over-estimated in compound conjunctive problems.	Tversky, Kahneman (1983), Teigen, Martinussen, Lund (1996), Hertwig, Gigerenzer (1999), Mellers et al (2001), Sides et al (2002)	Statistical training tends to improve reasoning. Fong, Krantz, Nisbett (1986) Bayesian reasoning can be improved by representing information in frequency formats rather than in probabilities. Tversky, Kahneman (1983), Gigerenzer, Hoffrage (1995, 1999), Kahneman, Tversky (1996) Accountability has a positive effect. Simonson, Nye (1992)
Correlation [1, 3, 4]	The probability of two events occurring together can be overestimated if they can be remembered to have co-occurred in the past.	Tversky, Kahneman (1973)	
Disjunction [1, 4]	Probability is often under-estimated in compound disjunctive problems.	Bar-Hillel, Neter (1993)	
Small number [1, 4]	Believers in the law of small numbers tend to over- infer the outcome of a random process after a small series of observations. People tend to believe that small samples replicate the probability distribution properties of the population.	Tversky, Kahneman (1971, 74), Kahneman, Tversky (1973), Hogarth (1975), Bar-Hillel, Wagenaar (1991), Rapoport, Budescu (1992, 1997), Rabin (2002)	
Adjustment			
Anchoring [4]	Assimilation of a numeric judgement to a previously considered standard	Jacowitz, Kahneman (1995), Strack, Mussweiler (1997), Galinsky, Mussweiler (2001), Mussweiler (2001), Brewer, Chapman (2002), Chapman, Johnson (2002), Ariely, Loewenstein, Prelec (2003), Epley (2004), Epley, Keysar, Van Boven, Gilovich	Implausibly extreme anchors have a proportionally smaller effect than anchors close to the expected value of the lotteries evaluated. Anchoring occurred only if the anchor and preference judgment are expressed on the same

		(2004), Mussweiler, Englich (2005), Epley, Gilovich, (2001, 2006)	scale. Chapman, Johnson (1994) Prompting subjects to consider features of the item that are different from the anchor reduces anchoring, while increasing consideration of similar features has no effect. Chapman, Johnson (1999) Anchoring can be reduced by applying a consider-the-opposite strategy. Mussweiler, Strack, Pfeiffer (2000) One can distinguish between externally provided (by another person, e.g., by the experimenter) and "self-generated" anchors. The latter are invented by oneself as part of a heuristic process and function as a short-cut and therefore they are known from the beginning to be wrong. Responses to "self-generated" anchors are found to be influenced by monetary incentives for precise judgment and by forewarning regarding an anchoring bias. Responses to externally provided anchors are not. Epley, Gilovich, (2005)
Default [3, 5]	People tend to stay with the default.	Johnson et al. (1993), Madrian, Shea (2001), McKenzie, Liersch, Finkelstein (2006), Camerer, Issacharoff, Loewenstein, O'Donoghue, Rabin (2003), Johnson, Goldstein (2003)	
Disposition [2]	The original purchase price of an item is treated as the reference point (closely related to mental accounting and loss aversion).	Shefrin, Statman (1985), Weber, Camerer (1998), Heath, Huddart, Lang (1999), Brown, Chappel, Da Silva Rosa, Walter (2006), Genesevo, Mayer (2001)	Learning seems to attenuate the magnitude of the disposition effect. Frequent traders sell their winners less and their losers more often, resulting in lower disposition effects. Weber, Welfens (2006)
Endowment [2, 3, 5]	The value of an item increases when it becomes a part of a person's endowment. The person demands more to give up an object then they would be willing to pay to acquire it.	Kahneman, Knetsch, Thaler, (1990, 1991)	

Loss aversion [2, 3, 5]	Tendency of individuals to weigh losses about twice as much as gains.	Kahneman, Tversky(1979), Kahneman, Knetsch, Thaler (1991), Odean (1998), Tversky, Kahneman, (1991, 1992), Engelhardt (2003), Fellner, Sutter (2005), Johnson, Gächter, Herrmann, (2006), Gächter, Johnson, Herrmann, (2007)	
Projection [3]	People exaggerate the degree to which their future tastes will resemble their current tastes.	Loewenstein, O'Donoghue, Rabin (2003), Conlin, O'Donoghue, Vogelsang (2007)	
Regression to mean	Consider two variables X and Y which have the same distribution. If one selects individuals whose average X score is higher than the mean of X by k units, then the average of their Y scores will usually deviate from the mean of Y by less than k units. Often people do not take this into account in their judgments. For example, investments that have been extraordinary profitable yesterday are likely to regress back to their mean today.	Tversky, Kahneman (1974), Greve (1999)	
Regret aversion [3, 5]	Tendency to avoid taking an action due to a fear that in hindsight it will turn out to have been suboptimal.	Loomes, Sugden (1982), Bell (1982), Ritov, Baron (1995), Bar-Hillel, Neter (1996), Zeelenberg, Beattie (1997)	There seems to be a temporal pattern to the experience of regret. Actions, or errors of commission, generate more regret in the short term; but inactions, or errors of omission, produce more regret in the long run. Gilovich, Medvec (1993)
Omission [3]	Tendency to judge harmful actions as worse or less moral than equally harmful omissions (inactions), especially in the short run.	Ritov, Baron (1992, 1995), Baron, Ritov (1994), Schweitzer (1994), Anderson (2003)	Bias towards omission tends to be higher when potential regret or knowledge of outcome is expected. Ritov, Baron (1995)
Status quo [3, 5]	People like things to stay the same. An alternative may be chosen only because it was used before (habit).	Slovic (1975), Samuelson, Zeckhauser (1988), Kahneman, Knetsch, Thaler (1991), Ritov, Baron (1992), Johnson et al. (1993), Baron, Ritov (1994), Schweitzer (1994, 1995), Anderson (2003), Thaler, Benartzi (2004)	
Confidence			
Belief [3, 4, 5]	Difficulty evaluating conclusions that conflict with what one thinks one knows	Klauer, Musch, Naumer (2000)	Rapid responding increases the amount of belief bias observed on a syllogistic reasoning

	about the world.		task and it reduces the number of logically correct decisions Evans, Curtis-Holmes (2005) Elaborated verbal instruction in principles of reasoning seem to reduce the belief bias in syllogistic reasoning, but cannot eliminate it, Evans et al. (1994)
Completeness [3, 4, 5]	Perception of an apparently complete or logical data presentation of information base can stop the search process too early.	Wason (1960), Fischhoff, Slovic, Lichtenstein (1978)	
Confirmation, Myside [3, 4, 5]	Tendency to evaluate evidence, generate evidence, and test hypotheses in a manner biased toward one's own previously held opinions.	Wason (1960), Deighton (1984), Klayman, Ha (1987, 1989), Klayman (1995), Nickerson (1998), Rabin, Schrag (1999), Jonas et al. (2001), Davis (2003)	Counterfactual primes – examples that make subjects aware of both an actual outcome (e.g., getting into an accident; winning a lottery) and the converse counterfactual outcome (e.g., avoiding the accident; losing the lottery) – attenuated the confirmation bias in a trait hypothesis testing context by increasing the selection of questions designed to elicit hypothesis-disconfirming answers Galinsky, Moskowitz (2000) In a judgmental task two types of justification pressure, i.e., the requirement to explain the decision afterwards and the requirement to convince another person, lead to a distinct increase in the amount of utilised information Huber, Seiser (2001)
Unrealistic optimism, desire, wishful thinking [3]	The probability of desired outcomes is assessed to be greater than actually warrants.	Einhorn, Hogarth (1981), Bar-Hillel, Budescu (1995), Olsen (1997) Armor, Taylor (2002)	Offering people information about their own standing on risk factors or information about peer's standing on these factors decreased optimism. Weinstein (1983) Counterfactual reasoning tends to increase accuracy when predicting the outcomes of future personal events. Hoch (1985) The desirability bias tends to be reduced in the case of repetitive events. Budescu, Bruderman (1995)

			Generally informing people about relevant health risk factors and requiring them to describe their standing on these factors had no overall effect on subsequent risk judgement. Weinstein, Klein (2002)
Illusion of control [4]	The expectancy of a personal success probability of an outcome often increases (normally above the objective one) when one has some control over the outcome.	Langer (1975) Langer, Roth (1975), Budescu, Bruderman (1995)	
Planning fallacy [3]	Refers to the tendency to underestimate task-completion times.	Buehler, Griffin, Ross (1994, 1995, 2002)	Pessimistic-scenario generation is unlikely to be an effective debiasing technique for personal completion predictions. Newby-Clark et al. (2000) The "recall-relevance" manipulation is more promising. Within this manipulation people are asked to describe a plausible scenario – based on their past experience – that would result in their completing an assignment at their typical time. (Buehler, Griffin, Ross 1994)
Overconfidence [3]	The ability to solve difficult or novel problems and the accuracy of our own judgements is often over-estimated.	Weinstein (1980), Brenner, Koehler, Liberman, Tversky (1996); Klayman, Soil, Gonzalez-Vallejo, Barlas, (1999), Blanton, Pelham, DeHart, Carvallo (2001), Soll, Klayman (2004), Van den Steen. (2004), Della Vigna, Malmendier (2006)	Calibration is improved after intensive training in the task. Lichtenstein, Fischhoff (1980). In a preexposure-accountability condition of a personality prediction task (subjects learned of the need to justify their responses before seeing the test-takers' responses) subjects reported more integratively complex impressions of test-takers, made more accurate behavioural predictions, and reported more appropriate levels of confidence in their predictions than did either no-accountability or postexposure-accountability subjects. Tetlock, Kim (1987) Subjects who have received five apparently "easy" practice questions and then have been given feedback on the accuracy of their answers are underconfident on the final 30 questions. Subjects who anticipate a group

			discussion of their answers to general knowledge questions take longer to answer the questions and express less overconfidence in their answers than does a control group. Arkes, Christensen, Lai, Blumer, (1987)
Success	Often failure is associated with poor luck and success with the abilities of the decision maker.	March, Sproull, Tamuz (1991), Denrell (2003), Barnett, Pontikes (2008)	
Presentation			
Dilution [4, 5]	The weakening of a belief by providing irrelevant neutral information.	Nisbett, Zukier, Lemley (1981), Zukier (1982), Peters, Rothbart (2000), Waller, Zimbelman (2003)	
Framing [3, 4, 5]	Alternative wordings of the same objective information can significantly alter the decision, though differences between frames (e.g., as losses or gains) should have no effect on the rational decision.	Kahneman, Tversky (1979), Tversky, Kahneman (1981), Levin, Schneider, Gaeth, (1998), Bertrand et al. (2005), Epley, Mak, Idson (2006)	
Linear	Decision makers are often unable to extrapolate a non-linear growth process.	Bar-Hillel, Maya (1973)	
Information order, recency [4]	The first item presented or the last may be over-weighted in judgment. Decision makers derive different conclusions depending on the order in which they receive information	Hogarth, Einhorn (1992), Tubbs, Gaeth, Levin, Van Osdol (1993)	Accountability reduced tendency for recency of information to influence judgments when predicting a candidates' success at a job based on sequential information. Kruglanski, Freund (1983) This is still true if subjects experience mental fatigue. Webster, Richter, Kruglanski (1996) Accountability reduced tendency for recency of information to influence judgments in auditing tasks. Kennedy (1993) In auditing task-specific experience tends to reduce the recency bias. Trotman, Wright (2000)
Pruning bias, partition dependence	Bias in probability assessment due to which the particular choice of events into which the state space is partitioned does affect the	Fischhoff, Slovic, Lichtenstein, (1978), Ofir (2000), Fox, Clemen (2005)	

	assessed probability distribution over states		
Scale [4]	The perceived variability of data can be affected by the scale of the data. This might cause that small extra purchases are perceived as minor expenditures when they follow larger purchases.	Tversky, Kahneman (1981), Christensen (1989)	
Situation			
Attribution	Tendency to draw inferences about a person's unique and enduring dispositions from behaviours that can be entirely explained by the situations in which they occur.	Gilbert, Malone (1995)	
Complexity [4, 5]	Time pressure, information overload, cognitive busyness, increased (internal) inspection and other factors that increase the perceived complexity of the task can lead to worse decisions.	Gilbert, Osborne (1988), Gilbert, Pelham, Krull (1989), Ordóñez, Benson (1997), Dror, Busemeyer, Basola (1999)	Increased introspection caused people to make choices that, compared with control subjects', corresponded less with expert opinion. Wilson, Schooler (1991)
Escalation, sunk cost [1]	Commitment to follow or escalate a previous unsatisfactory course of action. This leads to throw “good money after bad”.	Arkes, Blumer (1985), Staw, Ross (1987, 1989), Garland, Newport (1991), Arkes, Hutzel (2000), McAfee, Mialon, Mialon (2008)	Professional training in economics is positively correlated with cost-benefit reasoning and naïve subjects who have been given brief training in the sunk-cost rule (i.e., only future costs and benefits should be considered in current decisions) subsequently use the rule outside the laboratory. Larrick, Morgan, Nisbett (1990, 1993) Simonson, Staw (1992) Accountability (expectation that at some point in the future one might be required to justify ones decision to other people) do not necessarily reduce the sunk cost bias. This is consistent with the notion that accountability effects in decision making are driven by the desire to be favourably evaluated and avoid criticism by others. Simonson, Nye (1992) Sunk cost effects are mitigated by explicit

			estimating the future returns the given options might yield. Tan, Yates (1995) Observing the budgeting process suggests that people are only likely to escalate commitment when they fail to set a budget or when expenses are difficult to track. Heath (1995) The level of training, as measured by the number of college courses in managerial accounting, is found to be positively correlated with performance (by making less use of sunk cost information), while the level of experience, as measured by years of financially-related work, is not. Justification is found to improve decisions only for those participants with significant work experience. Fennema, Perkins (2007)

Numbers in brackets [ ] indicate (most) likely relevance for different characteristics of financial capability [1] being able to manage money; [2] keeping track of finances; [3] planning ahead; [4] making informed decision about financial product; [5] staying up to date about financial matters;

The Taxonomy is in parts structured according Arnott (2002).

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