

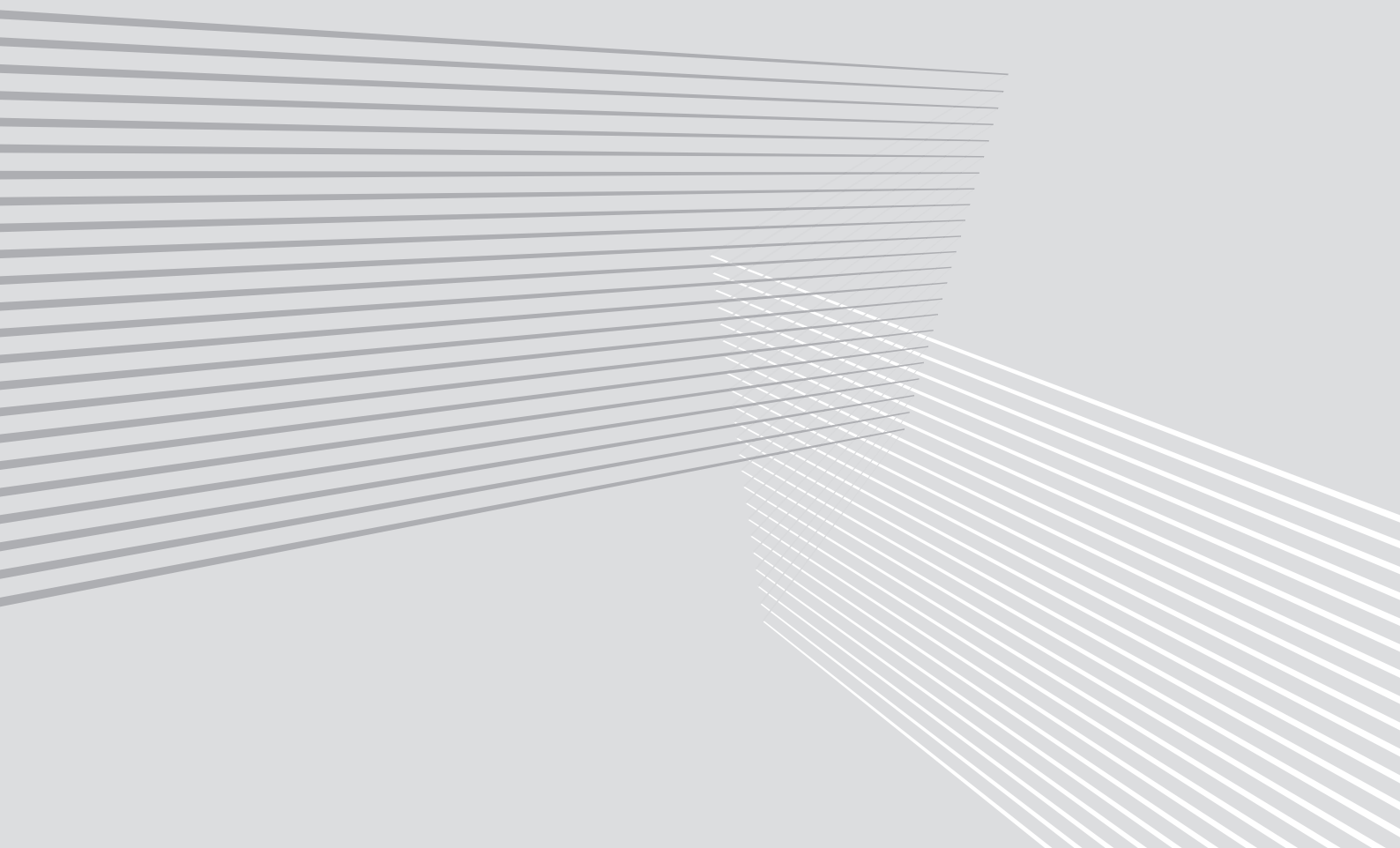
Financial decision making for and in old age



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SUMMARY OF BRIEF

This brief explores how risks of poor decisions increase with age: Financial mistakes are more likely and more consequential when we combine: (1) complexity alongside poor financial literacy; (2) ageing and the related cognitive risks; and (3) high stakes (e.g., super, housing, aged care), where choice widens and support narrows.

Boosting and nudging decisions: Poor financial decisions can arise whether we think deliberatively (e.g., with poor financial knowledge or ability) or impulsively (e.g., when we succumb to biases). The brief thus describes how the former can be *boosted*—enabling people’s capacity via financial literacy and cognitive health interventions—and the latter can be *nudged*—guiding people’s impulses via choice architecture and supports. Australia’s retirement income system offers a case study with features that range from fully paternalistic to fully flexible ([Section 1](#)).

Financial literacy is low: Less than half of all Australians have high financial literacy, with worse results among women and those on low incomes. Low financial literacy is associated with taking fewer risks, planning less, being more impulsive, and saving less. Improving financial literacy can help even low-income households with managing debt, reducing time spent worrying about finances, planning for retirement, building up a buffer for emergencies, identifying fraud, and managing their superannuation ([Sections 2.1-2.2](#)).

Responsibility and confidence increase with age even as financial literacy declines: Financial literacy typically peaks at age 54 and then declines. Such declines coincide with an increasing share of people becoming responsible for household finances. Over half of Australians aged 65+ with low financial literacy are responsible for making financial decisions in their household, compared to a third at ages 45-54. At the same time, confidence in own financial capability is highest at the oldest ages. Interventions can boost financial capability via: (1) early exposure; (2) experiential learning; and (3) *just-in-time* financial education at the point of decision ([Sections 2.3-2.4](#)).

Cognitive ability depends on both fluid processing speed and crystallised knowledge: The former declines; the latter increases as part of normal cognitive ageing. But their sum is maximised in middle age, as is performance in financial tasks that require comparing options, assimilating unfamiliar information, or making quantitative judgements. People are poor judges of their own cognitive ability; confidence in financial ability and participation in financial decisions increases with age regardless of cognitive score ([Sections 2.5-2.7](#)).

Risk of cognitive impairment increases with age but can be reduced: About 5%-20% of the population aged 60+ is estimated to have mild cognitive impairment. This is characterized by problems with memory, language, thinking or judgment. It is not severe enough to disrupt daily life but is likely to affect complex financial decisions. Rates may increase with an older population. Risks can be mitigated, and cognitive health can be boosted by (1) tackling risks related to lifestyle, diet, exercise, and cognitive engagement; (2) contingency planning (e.g., simplifying finances); and (3) dynamically delegating financial decision making to family and/or advisers ([Section 2.8](#)).

Biases can lead us astray even with good financial literacy and cognitive ability: We can calculate optimal strategies related to saving, spending, and investing even where preferences differ. Yet most people diverge from optimal choices by way of systematic biases. Such biases relate to preferences (e.g., *time inconsistency*), beliefs (e.g., *overconfidence*) and decision processes (e.g., using *rules of thumb*). Susceptibility to some biases increases with age (e.g., *framing, priming, overconfidence*); and declines for others (e.g., *sunk cost*) ([Section 3](#)).

Choice architecture can account for biases to nudge decisions to preferred outcome: Research tells us how we can simplify and guide decisions by (1) reducing the choice set (e.g., providing fewer but higher quality products); (2) simplifying supportive information (e.g., product disclosures that inform rather than confuse); (3) adding nudging information (e.g., *anchoring* and *implicit endorsement*); (4) timing of decisions and reminders; (5) coaching the decision; and (6) in the absence of decision, providing advantageous defaults or by outsourcing or sharing decisions with advisers or technology. The vagueness of current policies that require superannuation trustees to help their members with asset decumulation are an opportunity to *design-by-testing* ([Sections 4.1-4.5](#)).

Retirement income system has been designed to be complex: This leads to a greater need for advice. Recent reforms have sought to lift financial adviser standards and eliminate conflicts of interest, inadvertently increasing the cost of advice. More could be done to simplify the system. More could also be done to provide *just-in-time* financial information and general advice, including via use of existing technologies. ([Sections 4.7-4.8](#)).

SUMMARY OF FEATURED RESEARCH

Objective and subjective financial literacy: Researchers measure financial literacy using questions about interest rates, inflation, and diversification. Objective and subjective measures don't align: Less than half got the questions right; yet only 14% of people considered themselves below average (Box 1). Sometimes people get the input into financial decisions wrong: a typical 50-year-old underestimates their life expectancy by 10 years (Box 3).

Motivation & behaviour: Many people plan for old age but for different reasons (e.g., *hedonists* plan to maintain their lifestyle). Helping people make plans for old age requires different messages for different people (Box 2).

Subjective cognitive decline: About a quarter of adults aged 60+ perceive worsening or more frequent confusion or memory loss. So far, this is not a clear indicator of future dementia (Box 4). Such worry about being the target of ageist stereotypes can itself result in worse task performance (Box 5). As with financial literacy, people are poor judges of their own ability: e.g., there was no correlation between objective and self-reported measures of cognitive decline for a cohort of Australians with self-managed superannuation funds (Box 10).

Normal cognitive ageing: Australian longitudinal data is shedding light on cognitive trajectories. Women tend to have better verbal memory while men have faster reaction times. This reserve means that women retain an advantage in verbal memory despite greater declines past age 70 (Box 6). Fluid cognitive ability declines more for those who retire (controlling for pre-existing conditions); retirees from high-status jobs see the steepest declines (Box 7).

Severe cognitive decline: Dementia is not a normal part of ageing, but risk of dementia doubles every five years between ages 70-84. A dementia diagnosis was related to worse pharmaceutical insurance decisions (Box 8). Research suggests that half of dementia cases can be attributed to seven modifiable factors: (1) depression; (2) midlife hypertension; (3) diabetes; (4) low education; (5) smoking; (6) physical inactivity; and (7) midlife obesity (Box 9).

Underspensing in retirement: Research shows that low spending of assets is driven by precautionary not bequest motives. People are unaware of or have low trust in safety nets (Box 11). In practice, about half of retirees draw funds in line with the minimum and about a quarter take a level dollar amount (Box 13). The minimum acts as a *default* and as an *implicit endorsement*. Using an experiment, researchers elicited that the minimum was often chosen '*because government knows best*', especially by those with low incomes and financial skills (Box 18). Research also studied anchoring: specifying a *comfortable lifestyle* dollar value was found to increase participants' drawdown (Box 16). Age Pension means test encourages some spending but less than expected (Box 26).

Optimal annuitisation: Modelling suggests that, in the presence of the Age Pension, those with \$500k in retirement wealth should only spend 18% of it on an annuity, or 10% on a deferred annuity (Box 12). Modelling also shows that the asset allocations in Australia (e.g., housing, super, other financial assets etc.) is driven by the interaction between preferences and institutional settings and frictions. It also reveals that inertia keeps people from saving more (Box 15).

Financial mistakes: Analysis of health insurance choices in the US reveals 80% of people make '*confused*' choices and pay more than they need to. The finding may relate to biases or bounded rationality (Box 14).

Panic selling: Studying a pandemic-related early release of super, researchers found that nearly 60% of people withdrew funds to meet immediate needs, but a third did so to '*protect their savings*' or their '*future*' (Box 17). Engaging super members can make them overreact to negative returns and incur unnecessary loss (Box 23).

Bad defaults: Many stick with the default, even if some do so actively. The presence of bad defaults affects women negatively more than men, since women use defaults more (Box 20).

Regulated information: Superannuation product disclosures as they stand are still not understood well and information provided by them is misinterpreted (Box 22). By contrast, clearly presented *just-in-time* product information can be designed well and aid in product understanding and acceptance (Box 24).

Lottery incentives: Researchers find that the opportunity to win fewer but larger lottery-type prizes encouraged people to check their pension information but didn't make them change saving behaviour (Box 26).

Bad advice: People are bad at judging bad advice. For example they focus too much on adviser credentials (Box 27). Many with self-managed super funds delegate management to advisers and evaluate performance wrongly (Box 28). Alternatively, technology may help diagnose cognitive risks as well as help with financial decisions (Box 28).

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1. INTRODUCTION

Save or spend? Retire or keep working? Will I outlive my savings, or will I need them to fund my care? Should I keep money in superannuation to take advantage of lower taxes or invest it in my home to get more Age Pension? ‘Life is the sum of all your choices,’ Albert Camus reminds us. And our choices don’t get easier as we get older. Indeed, decisions relating to personal finance and care can become more rather than less complex with age.

Decisions of this type are often once-off and the outcomes long-term, so there’s little opportunity to learn from experience. Some of the most important financial decisions need to be made at a time when cognitive ability is at greater risk of decline. And in a world with greater digitalisation and more older people living longer lives, with greater accumulated wealth, even minor financial missteps can have significant implications and be consequential for a greater number of years of life.

1.1 ABOUT THIS RESEARCH BRIEF

The typical process of decision making can take two forms. It can be slow and *deliberative* – where a problem is formulated, alternative options are identified, systematically compared against preferences, then selected; and acted upon. Or it can be instant and *impulsive* – where we respond to the emotional and intuitive aspects of the problem, using rules of thumb, gut instinct, and shortcuts that limit our cognitive load (often referred to as *heuristics*).

Both methods can fail us when making financial decisions. Deliberative thinking won’t get us far if we don’t understand the concepts (e.g., whether about interest, incidence, or inflation) or if our memory fails us when trying to compare options (e.g., whether spending plans or investments). And impulsive thinking can mislead us when biases creep in.

This brief assesses how these decision processes can go wrong and how we can put them right. It evaluates the age profiles of financial literacy and cognitive ability on the one hand and behavioural biases and mental shortcuts on the other. In doing so, it describes the types of interventions that help boost our abilities and nudge our behaviour, improving financial decisions in the process.

The focus of this brief is on decisions related to personal retirement finances, which in Australia are overwhelmingly about superannuation – the individual savings pillar of the retirement income system (even though housing assets make up a greater proportion of wealth). Much of the presented research relates to super, with considerable attention given to the topic of the moment: the decumulation of super. But examples touch on and can be applied to other financial decisions related to housing, insurance, aged care, and retirement from work.

1.2 RESEARCH CONTEXT – FROM NORMATIVE, TO DESCRIPTIVE, TO PRESCRIPTIVE APPROACHES

This brief builds on past CEPAR research briefs, including ‘[Cognitive ageing and decline: Insights from recent research](#)’; a series on retirement incomes, particularly ‘[Retirement income in Australia: Part III – Private resources](#)’; and briefs about housing decisions as well as mature-age employment (see also a related book by Mitchell et al. 2017). It brings together data and research insights from various disciplines, including psychology, economics, and behavioural finance, and from over 40 CEPAR researchers.

These, in turn, build on an evolving literature on decision-making. A short history of the field would typically begin with John von Neumann and Oskar Morgenstern’s elegant notion of *rational utility maximising*. The theory assumes that as rational decision makers we quantify the probabilities and utility of different outcomes, choose the highest expected value, and act accordingly. With new information, we would revise the probability estimates and improve our choices – a *Bayesian* tactic, as espoused by early decision analyst Howard Raiffa. This would be possible even in the absence of active calculation – in the way that a billiard player strikes a ball without the need for trigonometry (Friedman & Savage 1948; Savage 1954). Or rather, that’s how an idealised decision maker *should* make decisions – a *normative* approach to decision making research.

Of course, few people are expert billiards players or consistently good decision-makers. Therefore, subsequent literature has sought to make sense of how people make choices in practice – a *descriptive* (or *positive*) approach to decision-making research explains how and why we diverge from the optimal. Scholars have arrived at two classes of explanations for why this occurs.

First, the more complex the decision the more it comes up against cognitive constraints. Herbert Simon argued that we are rational, but that sometimes collecting full information about available options is too costly and/or calculating the optimal choice is too computationally complex. Simon implied that we are being sensible in using *heuristic* rules of thumb, taking shortcuts around complex calculations because we are bounded by time, knowledge, and ability. The choice would thus be good if not perfect. He called this process *satisficing*, in contrast to *optimising*. So, improving knowledge and cognitive skills may help expand the boundaries of our rationality (Section 2). This is the promise of the now large and expanding field of financial literacy research (Nicolini and Cude 2022).

Second, our psychology can divert us from optimal decisions and actions even if we know better. The field was initially influenced by Daniel Kahneman and Amos Tversky's studies on *loss aversion* and *framing bias* in the 1970s (in what was termed *prospect theory*), and further popularised by Richard Thaler, Robert Schiller, David Laibson, and others (as *behavioural economics* or *behavioural finance*). The early research identified some key biases and rules of thumb, like *mental accounting* (e.g., where a forgotten tax refund is spent impulsively as though it exists outside normal budgeting, or a credit card remains unpaid as someone puts money into savings). Another set included *myopia* or *present bias* (e.g., choosing \$15 now over \$20 in a week, which is like giving up an investment return of some 350% p.a.).

Since then, a wide array of often lab-based studies has continued to reveal our human quirks and fallibility, furnishing behavioural economists and decision scientists with an ever-expanding dictionary of biases and heuristics (see Section 3). They are, in turn, aided by a growing literature in cognitive psychology and most recently neuroscience, observing the dance between reason and emotion, or between the modern and primitive parts of the brain. Many of the insights have informed policy formulation and popular public discourse.

The leading edge in research is increasingly applied. It is more about interventions that change decision settings and help us overcome systematic mistakes – a *prescriptive* approach to decision-making research, which serves us well in the study of practical financial choices (see Section 4).

Understanding the two broad reasons why people diverge from optimal decision making is helpful when considering what can be done about it. The distinction is between our *slow/cold/deliberative/controlled/conscious/cognitive* thinking and *fast/hot/intuitive/automatic/unconscious/experiential* thinking (Metcalf and Mischel 1999; Kahneman 2011). So, on the one hand, boosting financial skills and cognitive health can improve deliberative decision-making, help our bounded rationality be less bounded, and allow standard incentives inherent in institutions and markets to function well. And on the other hand, becoming aware of biases and heuristics and cleverly designing decision settings can nudge us to make better intuitive decisions or slow us down to make more deliberative-type decisions. Both sets of *boosting* and *nudging* policies can help (Hertwig & Grune-Yanoff 2017).

1.3 AUSTRALIAN POLICY CONTEXT

Australia's retirement income system offers a case study on how insights into decision making have affected the evolution of policy. The system includes features that represent the full range of interventions, from paternalistic to fully flexible, and includes compulsions, defaults, and unfettered choice (Fig 1).

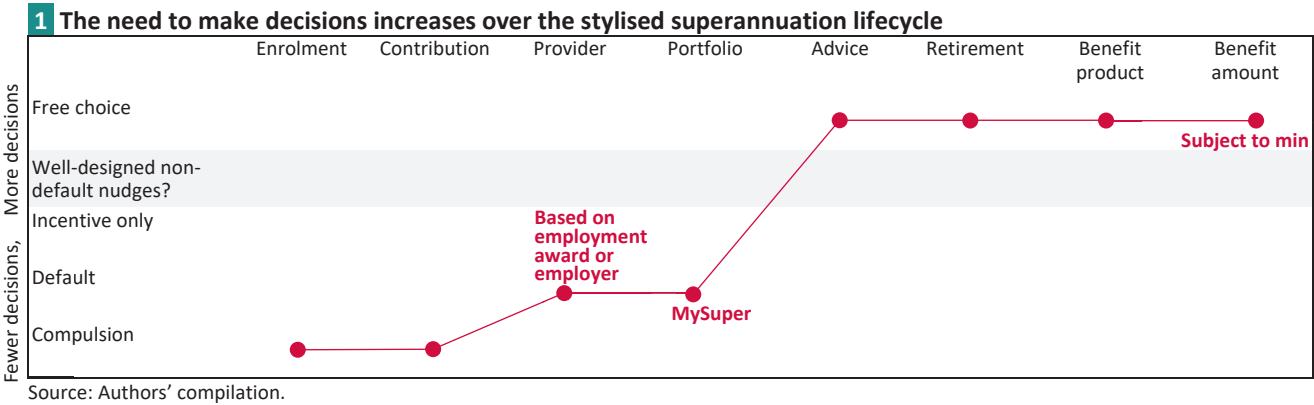
For example, compulsion dominates the retirement saving accumulation phase in Australia (i.e., employers must contribute a set proportion of earnings into employee superannuation accounts). The policy overcomes typical cognitive and behavioural barriers to retirement planning and saving (e.g., myopia). Tax treatment incentives are used to encourage further savings. People can choose fund managers and asset allocations or even self-manage their own fund, but defaults have been introduced for those who don't choose. In the retirement phase, meanwhile, there is full flexibility. And recent proposals to introduce comprehensive retirement income product defaults have been scrapped in favour of a *covenant* that requires funds to develop vaguely defined strategies to

assist their members with retirement incomes. Tax incentives guide the total tax-advantaged accumulation and the minimum annual decumulation (e.g., acting as *implied endorsement* of a spending rate that increases with age; see Boxes 18 and 25).

Yet each approach has seen challenges, as outlined in successive reviews and policy changes. The Retirement Income Review suggested that forced saving means many people disengage while others save more than they need (Treasury 2020). The Productivity Commission (2018) and Financial Services Royal Commission (Hayne 2019) found that disengagement led to inadequate market discipline in the choice and default superannuation sectors. Combined with regulators’ inaction and limited powers, this has in turn resulted in a proliferation of poorly performing funds.

Finally, with respect to decumulation, the Financial System Inquiry (Treasury 2014) identified that free choice left too many individuals with decisions they were ill-equipped to make. This continues to bear out in the underspending of retirement assets, often for fear of outliving one’s funds or concern for future shocks (i.e., underappreciating or mistrusting future health, aged care, and pension safety nets). The extent to which obligations under the retirement income *covenant* will address this remains to be seen.

On top of these, a reappraisal of the quality and affordability of financial advice (Treasury 2022a) and a new financial capability strategy has been launched (incorporating a welcome bi-annual survey), with some suggested targeting of those in or near retirement (Treasury 2022b). In some ways, Australian policy is ahead of similar countries exploring the balance between flexibility and paternalism (OECD 2020a). In some countries financing retirement has been simplified by taking choice away (i.e., via more extensive mandates), which can lower administrative, investment, and advice costs. The nature of the Australian retirement income system — where more financial decisions and the associated risks have been transferred to individuals — means that the topic is expected to continue to attract policy attention.



2. ABILITY TO MAKE DELIBERATIVE DECISIONS – THINGS WE NEED

Good financial decisions require basic levels of financial and cognitive ability even before psychological and behavioural idiosyncrasies come into the picture. This foundation relates to what we know and how we process what we know. These may be thought of as computational constraints proposed by the concept of *bounded rationality*.

DOMAIN-SPECIFIC ABILITY

Basic financial literacy is a logical requirement for financial decision making. The concept of financial literacy is often interchangeable with financial knowledge, capacity, and capability. It has two main elements: the ability to *understand* financial information and the ability to *apply* it to manage personal finances (Huston 2010; Remund 2010; OECD 2013a; OECD 2014; Goyal & Kumar 2020; Nicolini and Cude 2022).

Some definitions are broader. They include having specific *knowledge* (e.g., of concepts related to the risk-return trade-off or diversification), *skills* (e.g., numeracy, or the ability to utilise quantitative, graphical, and probabilistic information), *attitude* (e.g., motivation and confidence to act), and actual *behaviour* (e.g., day-to-day money management and working towards goals; Cude 2022). Sometimes the topic extends to specific domains such as debt literacy. In Australia, superannuation literacy is important.

Those who are more financially literate plan and save for their retirement more, have better borrowing behaviour, and invest more in the stock market, with causality appearing to flow from literacy to behaviour (Yoong, 2011; Bennett et al., 2012; Lusardi & Mitchell 2014; Mitchell & Lusardi 2015). By retirement, differences in financial outcomes due to financial literacy are cumulative. Over a lifetime, financial knowledge accounts for an estimated 30-40% of retirement wealth inequality (Lusardi et al. 2017). It is associated with greater financial wellbeing (e.g., feeling secure about the future; ANZ 2021). So, improving the financial knowledge of the most vulnerable could reduce wealth inequality and increase wellbeing.

2.1 FINANCIAL LITERACY DECLINES AT OLDER AGES

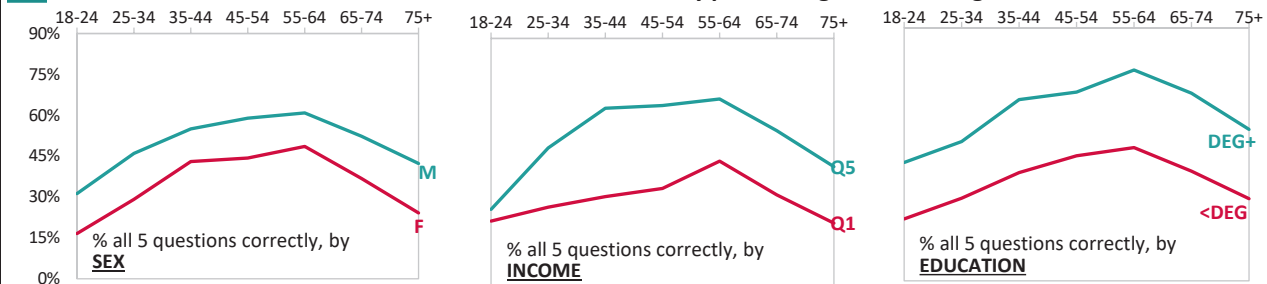
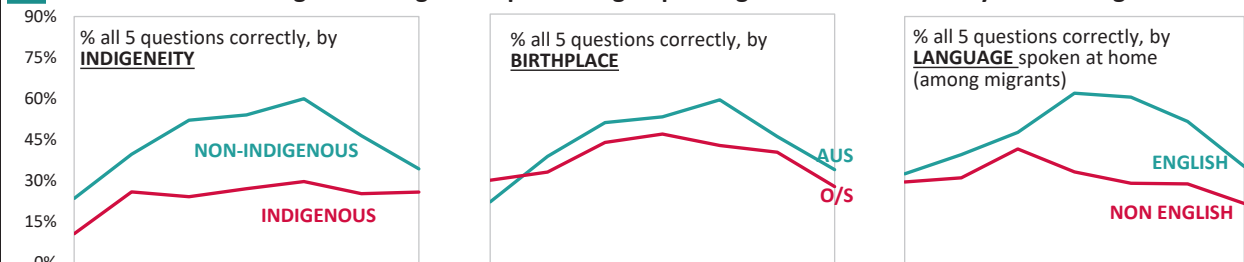
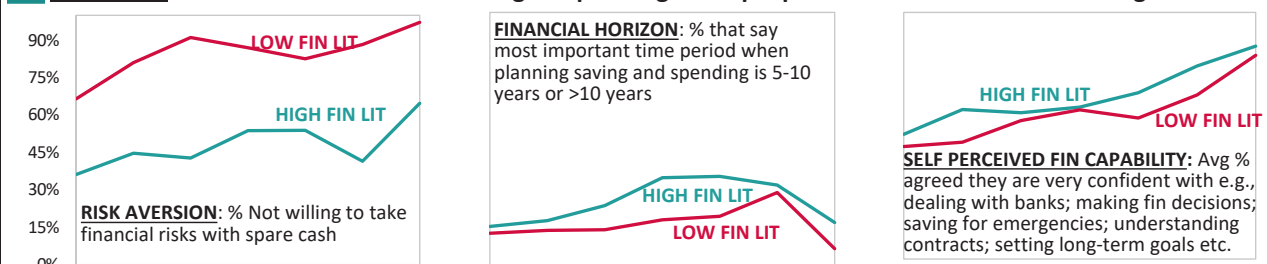
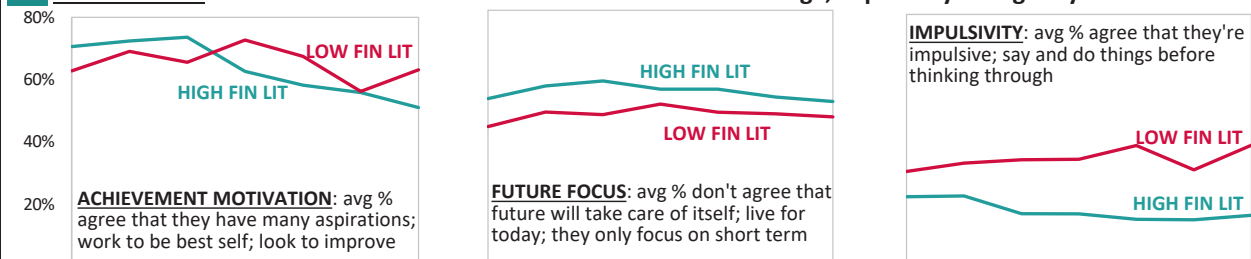
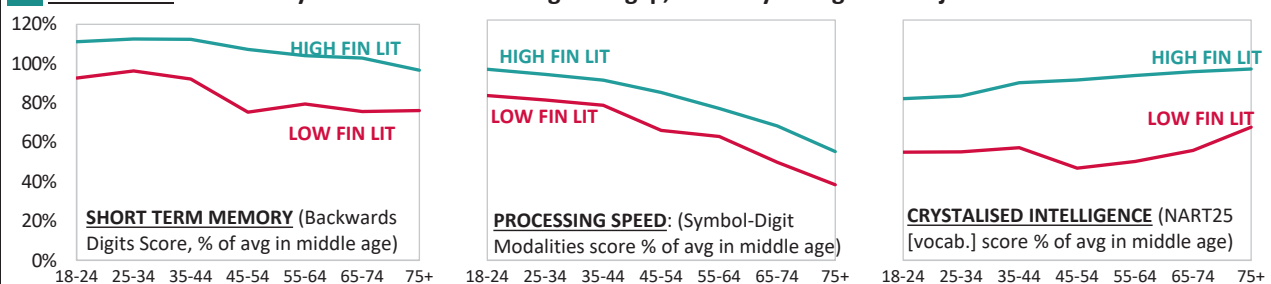
A set of three questions can measure financial literacy, testing concepts and calculations about interest, inflation, and diversification (Lusardi & Mitchell 2011). These have previously been applied to Australia (see Box 1) and continue to be included in the Household, Income and Labour Dynamics in Australia (HILDA) Survey in an expanded set of five questions, which also assess whether people understand that higher returns are related to higher risk, or that increases in inflation offset increases in wages.

Figures 2A-B present the proportion of people that answer all five questions correctly, broken down by age and socio-demographic categories. They show three important aspects of financial literacy across the population. First, financial literacy is low. Less than half the population were able to answer all five correctly. Low financial literacy is observed worldwide, but Australians tend to score better than people in other countries (Box 1; Japelli 2010).

Second, some groups score worse than others. Women, those with lower incomes and education, who identify as Indigenous, were born overseas, or speak a language other than English at home had worse scores. The biggest gaps (of over 30pp at certain ages) were by Indigenous status and language. Lower financial literacy can further entrench disadvantage. For example, women are less likely to plan for retirement or emergencies and more likely to use high-cost borrowing methods (de Bassa Scheresberg 2013; Lusardi & Mitchell 2007, 2008).

Third, across all breakdowns there is a hump-shaped relationship with age, whereby financial literacy is low for the young, then peaks at ages 55-64 and declines in old age. A more granular view of the data would reveal a peak at age 54. The pattern has been observed in various countries for different time periods (Lusardi & Mitchell 2014; OECD 2020b; based on US data from a decade earlier Agarwal et al. 2009 determined the age of *financial* reason as 53). The shape is replicated with related topics like debt literacy (Lusardi & Tufano 2015). There is not enough evidence to parse age and cohort effects.

FINANCIAL LITERACY WITH AGE: LESS LITERACY, MORE DECISIONS, MORE CONFIDENCE

2A SOCIODEMOGRAPHY: 2016 Australian data shows fin. literacy peaks at ages 55-64; is higher for rich, educated, men**2B Diverse cultural and linguistic backgrounds put some groups at a greater financial literacy disadvantage****2C ATTITUDES:** Low fin lit. means less risk taking and planning. Most people are unaware of own increasing limitations**2D MOTIVATION:** Drive to achieve and think about future declines in old age; impulsivity diverges by level of fin lit.**2E PRACTICE:** Despite low fin lit., people become happier with finances as they age and make more financial decisions**2F COGNITION:** Fin. literacy is associated with a cognitive gap, but lifecycle cognitive trajectories are similar

High financial literacy is defined as all 5 questions correctly answered, low financial literacy is 0-2 questions correctly answered. Source: Authors' analysis of Hilda 2016

Box 1 CEPAR research spotlight Measuring financial literacy

Raising the capacity of individuals through financial literacy is a leading strategy for improving decision making. Partner Investigator Olivia S. Mitchell has conducted extensive research in the area as well as reviews of the international literature (e.g., Lusardi & Mitchell 2014; Mitchell & Lusardi 2015).

A good start is measuring financial literacy. Mitchell led the development of a set of three standardised questions, now used internationally, which test understanding of interest rates, inflation, and diversification (e.g., Lusardi & Mitchell 2011; See note in Fig 3).

CEPAR's Julie Agnew, Hazel Bateman, and Susan Thorp (in Agnew et al. 2013) used the same three questions in an Australian study. They showed that financial literacy is higher for men and the more educated and increases with age (see main text for results that reveal hump shape pattern of financial literacy by age based on a set of five questions). Overall, fewer than half of Australian respondents answered all three questions correctly – better than in the US but below others (Fig 3). Most people don't realise their knowledge gap – only 14% of people considered themselves below average.

As elsewhere, low financial literacy in Australia translates to less planning – only a third of non-retired respondents attempted to work out how much to save. In Bateman et al. (2012), the authors showed that it also affects expectations – the financially literate were better at judging the likelihood of shocks and asset price recovery, essential for long-term investing in risky assets.

3 Older, retired, better educated men tend to have higher financial literacy



Note: Abridged version of questions: (1) With \$100, interest 2% p.a., after 5 years, would you have: <\$102, \$102, or >\$102? (2) With interest 1% p.a., inflation 2% p.a., after 1 year, would you be able to buy: more, same as, or less than today? (3) 'Shares in a single company usually provide a safer return than units in a managed share fund': true/false? See main text for related results with a 5-question set. Source: Agnew et al. (2013a), Lusardi & Mitchell (2014).

Making decisions may require a combination of numeracy and information at the point of decision. To test this, Bateman, Louviere, Thorp, Associate Investigator Fedor Iskhakov, and their colleagues (Bateman et al. 2018a) asked individuals to allocate funds between an *annuity* and a *phased withdrawal*. As risk increased, some rationally increased or maintained their annuitisation. It turns out that understanding the product characteristics (tested via a quiz) had a greater explanatory power for good investing decisions than just financial literacy (see Boxes 22 and 24 on disclosure).

Financial literacy can also protect against susceptibility to presentation effects and overreacting to market volatility (see Bateman et al. 2016a and Box 23).

Note for Figures 2 and 6: All data is for the year 2016. Income based on quintiles (within age group) of household equivalised income. *Low financial literacy*: 0-2 of 5 answers correct; *High financial literacy*: 5 correct [Abridged questions (1): With \$100 at 2% p.a. interest rate, after 1yr do you have (a) <\$102, (b) \$102, or (c) >\$102? (2) With interest 1% p.a. and inflation 2% p.a., after 1yr can you buy more, same, or less than today? (3) Shares in a single company are safer than in multiple companies; (a) true or (b) false? (4) Investment with a high return is likely to be high risk; (a) true or (b) false? (5) if in 5 years your income has doubled and prices have doubled, will you be able to buy (a) less, (b) same, (c) more than today?]. Charts showing the proportion who agreed include those who *strongly agreed* and *moderately agreed*. *Risk aversion* based on question about which financial risk willing to take with an assumed spare \$100 to be saved or invested, where answers ranged from substantial risks for substantial returns to not willing to take risks. Middle age refers to ages 45-54. High and low cognition based on average score in top and bottom tertiles of scores within each age group. *NART-25* denotes *National Adult Reading Test*, abridged to 25 questions, a common measure of pre-morbid, crystallised intelligence. In all but last chart (5F, right panel), reference to fluid intelligence based on *Symbol-Digit Modalities* test, which relates to both short term memory and processing speed. *Backward Digits Score* in last chart relates to short term memory only. Source: Authors' analysis of HILDA, 2016 wave.

2.2 IMPLICATIONS OF FINANCIAL LITERACY

The following Figures 2C-F show the association between low and high financial literacy, age, and financial attitudes, motivations, behaviour, and cognitive ability (Wilkins & Lass, 2018, report similar variables but here these are disaggregated by age).

Those with low financial literacy take fewer risks and have shorter planning horizons (2C). For example, at age 45-54, only 18% think beyond 5 years, compared to 35% among the high-financial-literacy group. Indeed, people with low financial literacy are also more impulsive and more focused on the present (2D). Literacy and age appear to interact. For example, those who are oldest and with the lowest literacy are least willing to take risks and have the shortest planning horizons (lower risk tolerance at older ages is likely related to the ability to bear risks; Brooks et al. 2018)

Relatedly, few people with low financial literacy save. At age 25-34, about a quarter of this group save regularly, compared to 42% for the high-financial-literacy group (2E). Perhaps that makes sense since they are also poorer. For some it is rational not to invest in financial skills acquisition if their investment stakes are low (Lusardi et al. 2011). In fact, there is evidence that having and managing more assets can drive financial knowledge (i.e., learning by doing; Frijns et al. 2014). It may also be that the daily reality of low socioeconomic status is stressful enough, and that thinking about savings and the future takes a back seat (see Box 2 on psychological insights on motivation). This is rational given that low-income individuals can get the Australian Age Pension in retirement.

However, low-income households can still greatly benefit from financial literacy: It can help them deal with debt, reduce time spent worrying about finances, plan for retirement, build up a buffer for emergencies, identify fraud, and better invest any surpluses to improve their wealth and break the cycle of disadvantage (Lucarelli & Brighetti 2010; Henager & Cude 2016; Deuflhard et al. 2019; Lusardi et al. 2021).

Interestingly, satisfaction with finances increases with age for both high and low financial literacy groups (2E, left panel). But a gap exists at all ages. At ages 75+, it is a difference of 13 percentage points. This is likely related to financial behaviours and outcomes. Other analyses confirm that, after taking into account socioeconomic factors, saving and spending behaviours (e.g., active saving, not borrowing for everyday expenses) account for a fifth of self-assessed financial wellbeing (ANZ 2021).

2.3 OVERCONFIDENCE AND GREATER RESPONSIBILITY FOR DECISIONS AT OLDER AGES

What is striking is that many don't realise their limitations, as demonstrated by the gap between objective and subjective measures. Self-perceived financial capability is not much lower for those with lower financial literacy, and it continues to increase for both groups as they age even as financial know-how declines. Well over 80% of Australians aged 75+ are confident with their ability to make financial decisions, understand financial contracts, and pursue long-term financial goals (2C right panel) – a pattern also observed elsewhere (James et al. 2012; Lusardi & Mitchell 2014; Allgood & Walstad, 2016; Finke et al. 2017; Belbase & Sanzenbacher 2017). Overconfidence is also apparent among the most engaged who self-manage their super (Box 1).

Furthermore, since older people are more likely to live in a single-person household, involvement in household financial decisions increases with age. Indeed, it is higher for those with the lowest financial literacy. More than half of Australians aged 65+ with low financial literacy are responsible for making financial decisions in their household, compared to about a third at ages 45-54 (2E, right panel). There is also evidence that the nature of financial tasks becomes more difficult with age (less about daily budgeting and more about tax and pension planning; Hershey et al. 2015).

Declining financial literacy combined with increasing confidence, greater responsibility at older ages, and cognitive ageing (see Sections 2.5-2.8) increases the chance that financial decisions made older ages go wrong (Samanez-Larkin et al. 2020). Low levels in both financial literacy and cognition coincide across all age groups (Fig 2F) and the patterns of financial literacy in old age may be driven by cognitive declines (Finke et al. 2017; Gamble et al. 2015).

Box 2 CEPAR research spotlight Motivation & behaviour: The five types of time perspective

Some of us dwell more on the past than others, while others live their life in the moment. Such time perspectives are a good predictor of retirement planning behaviours, such as saving or investing in superannuation.

Most people plan, but their reasons differ

Based on one psychological model, people can be grouped into five types according to their time perspectives: (1) *past positive* – who focus on ‘the good old days’; (2) *past negative* – who believe that negative events in the past dominate their lives; (3) *present hedonistic* – who live in the moment; (4) *present fatalistic* – who feel that they can’t change their lives; and (5) *future-oriented* – who make plans which they believe can change their lives.

CEPAR Associate Investigator Joanne Earl has investigated how Australians’ time preferences relate to retirement planning and major financial decisions, such as home downsizing in late age. She arrived at a number of insights.

Take retirement planning, for example (Mooney et al. 2017). The team found that good planning isn’t just in the realm of the *future-oriented* – those with a *past-negative* perspective also plan for their retirement to avoid repeating past mistakes; and those who are present-hedonistic plan for the future to maintain their lifestyle. Those planning the least had a *past-positive* perspective, since they thought things would turn out okay; and *present-fatalists*, who didn’t believe anything they did would change their lot.

The perspectives appear stable over time, so trying to change these may be difficult. The key insight is that it is the messages about planning and saving that may need to change and adapt to the person’s innate attitudes, perspectives, and goals, like focusing on the holidays that *present-hedonists* may want in retirement.

Time perspectives can also influence satisfaction with past financial decisions (Earl et al. 2019). For example, Earl’s research team found that people who sold their family home to move to a smaller dwelling were generally satisfied with their decision.

Lower levels of satisfaction with downsizing aligned with those classified as having a *past-negative* time perspective. This group also had lower levels of life satisfaction, higher levels of stress, and less positive reflections on past events. The implication is that the impact of financial decisions on psychological wellbeing affects certain high-risk older people to a more negative extent than others. But they also suggest that understanding the experiences of similar groups may even help pessimists to prepare better.

At older ages, people focus on fewer, more important plans

The silver lining is that even the pessimists, as they age, tend to be less troubled by minor decisions and their outcomes. Such insights are related to the psychological theory known as *Selection, Optimisation, Compensation*, which predicts that older people focus on fewer, more important goals and optimise resources to achieve them. The related literature suggests that as people age, they focus more on big decisions and getting these right and less on day-to-day hassles. It implies that they also have fewer regrets. This is what Earl and her co-authors found among downsizers: older people were less likely to regret their decision compared to those who downsized at younger ages (Earl et al. 2019).

Age helps and hinders entrepreneurial decisions

Associate Investigator Hannes Zacher has looked at how age changes people’s time horizons, which in turn can affect decisions to pursue business opportunities among Australians (Gielnik et al. 2018). For example, his team found that older people are more likely to think they have a limited time horizon to invest in a business, which hinders the transition between identifying business opportunities and entrepreneurial intentions. Working in the other direction is the fact that older people have more experience, including in business, which means they are more likely than younger people to transition from forming entrepreneurial intentions to engaging in entrepreneurial activity. The conclusion is that age-related constructs can both facilitate and hinder transitions in the entrepreneurial process.

2.4 FINANCIAL LITERACY INTERVENTIONS: EXPERIENTIAL AND JUST-IN-TIME

National strategies for promoting financial literacy have become a high priority both in Australia (Treasury 2022c; Worthington 2016) and internationally (OECD 2015; OECD 2020c). Some examples of existing programs are given in Fig 4. Particularly welcome is a new bi-annual survey of financial literacy in Australia.

Typical interventions take the form of education in schools and workplaces and by financial institutions, but innovative examples include featuring personal finance lessons in mainstream television (Berg & Zia 2017; Crawford et al. 2018).

Historically, financial education interventions have been shown to minimally improve financial knowledge, but convincing evidence about their influence on behaviours has been lacking (Fernandes et al., 2014). Indeed, analyses of effects appeared even weaker for low-income groups (Lyons et al. 2006). Yet more recent empirical research is bearing fruit, with a meta-analysis treatment effect estimated at three times larger than that based on research from a decade earlier (Kaiser et al. 2022).

Several educational intervention strategies hold significant promise. Firstly, *early exposure*, in school-based environments has the benefit of offsetting inequality of financial experience at home, particularly if accompanied by a *growth mindset* (i.e., the attitude that knowledge is learned not innate) and diverse role models (Walstad et al. 2010; Peng et al. 2007).

Secondly, *experiential* financial education (e.g., the experience of managing budgets or investing in stock) has been shown to have a subsequent effect on behaviour, particularly if the experience occurs at a younger age. (Walstad et al. 2010; Peng et al. 2007; Bagès et al., 2016; Batty et al. 2020; Bottazzi & Lusardi 2021). Role models are important in culturally and linguistically diverse communities because one factor for financial disengagement relates to trust in institutions (Giuso et al. 2008).

Thirdly, *just-in-time* financial education, immediately preceding a financial decision, has been shown to help improve financial decisions (Mandell & Klein, 2007; Fernandes et al., 2014; Boyer et al. 2020; Kaiser et al. 2022). However, the effect of such low-intensity (but low-cost) interventions appears lower than for personalised (but costly) interventions that involve classrooms and/or coaching.

4 Various programs to improve financial capability in Australia but few targeting older people

Target group	Agency	Program	Focus
General	ASIC	Moneysmart	Consumer tools and education
	Services Australia	Manage Your Money	Consumer tools and education
	ATO	Boosting your Super campaign	Superannuation awareness
	ATO	Your Future Your Super	Aiding with product choice
Young	Ecstra Foundation	Community Benefits Payments	Community resources and grants
	ASIC	Moneysmart for teachers	Teacher resources and funding to integrate fin. lit.
	ATO	Tax, Super + You	Secondary school resources
	ATO	Paying it forward	Primary school resources
Women	ATO	Teacher professional development	Primary school teacher courses
	PM&C	Preventing Financial Abuse project	Targeted actions, info, workshops
Low income / vulnerable	Ecstra Foundation	Funding for women's economic security	Support initiatives
	ATO	Tax Help Program	Free help to lodge a tax return
	Services Australia	Financial Information Service	Free in-person/phone/vid-chat fin. decision help
CALD	DSS	C'th Financial Counselling and Financial Capability	Volunteer-based, free financial decision help
	ATO	Migrant education	Education on tax and super
Indigenous Australians	PM&C	Indigenous Women's Financial Wellness Strategy	Support with money skills
	ASIC	Indigenous Outreach Program	Support to target population and industry
Small business	ATO	Small Business Program	Support for tax, super, and growing business
	DESE	Entrepreneur Facilitator Initiative	Information and advice
	DESE	Exploring Being My Own Boss Workshops	Self-employment information and support

Source: Authors' adaptation of Treasury 2022b.

Improving literacy related to retirement from the workforce and retirement finance is particularly challenging since horizons are long and decisions are often once-off. However, new workplace- based programs, such as *midlife reviews*, are now being promoted. These could provide support to employees over the lifecycle, including

on their pathways to retirement (see CEPAR research brief on mature workers: Chomik & Khan 2021). Such programs could help develop knowledge specific to the Australian setting, such as superannuation literacy (see also specific information that can be input into decisions, such as life expectancy estimates: Box 3).

Other avenues involve making use of behavioural insights to improve financial literacy (OECD 2013b; see Section 2). These could include reducing monetary and enrolment barriers to financial education, using opt-outs for financial coaching in the workplace, using rewards or loss of rewards to lower attrition in courses, using emotive and social-preference marketing of financial education, and helping some groups to de-bias by showing them objective measures of their own ability.

The field remains ripe for policy experimentation. For example, the COVID-19 pandemic only accelerated the need for programs that help individuals with the intersection between financial and digital literacy (OECD 2021).

Australia already has a program engaging multicultural communities with tax and superannuation materials and outreach (ATO 2022), but demographic trends suggest that such interventions will need to be scaled up. Over the last 15 years, the average Australian has become both a year older (reaching age 38 by 2021) and 4 percentage points more likely to be born overseas or have at least one parent born overseas (48% in 2021). Both trends are expected to continue (as will be explored in a future CEPAR research brief).

While financial literacy is specific to the domain of finance, broader cognitive ability also matters for deliberative thinking and decision making. This is discussed further in the following sections.

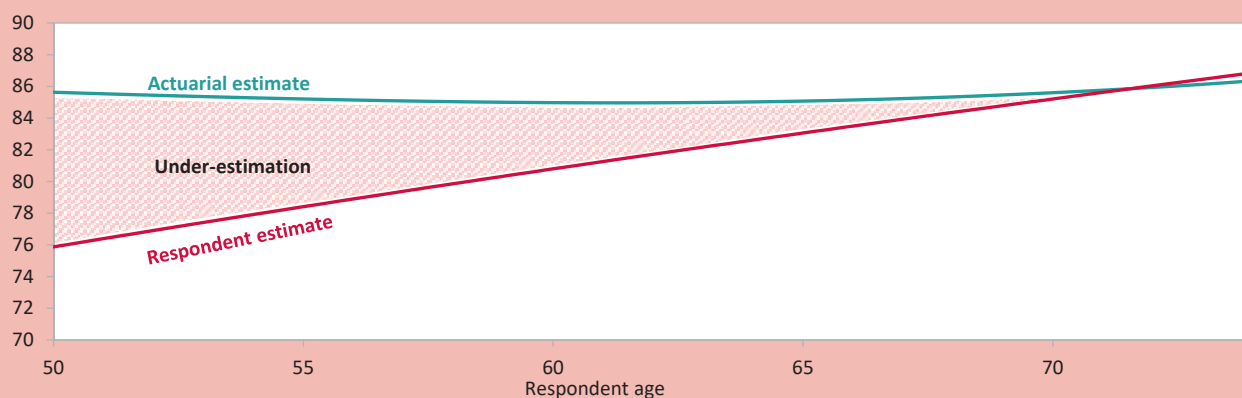
Box 3 CEPAR research spotlight Inputs into financial decisions: Subjective life expectancy

Preparing for retirement requires people to have a good idea about their planning horizons, including how long they can expect to live. Such information is rarely considered when designing financial literacy interventions. The Government's *Moneysmart* portal incorporates cohort life expectancy in its retirement planning projections but doesn't offer a standalone calculator of life expectancy at a granular level.

To understand the extent to which people get such information wrong, CEPAR's Hazel Bateman and Susan Thorp surveyed 4,000 individuals to elicit their subjective life expectancies (Bateman et al. 2015). They found that people are pessimistic about their likelihood of reaching young older age (ages 75 – 80) but are optimistic about reaching 90+ relative to their actual chances.

This phenomenon of expecting to 'either die young or live long' is echoed in two other CEPAR-affiliated projects: Wu et al. (2015) and Agnew et al. (2013). These found that women tend to underestimate their life expectancy, while males are much closer to actuarial expectations. Attempts to assist people to formulate subjective survival expectations by providing peer and familial information on life expectancy are met with continued pessimism.

5 Many people underestimate their lifespan until after they reach age 70



Source: Wu et al. (2013)

COGNITION – PROCESSING ABILITY

2.5 SPEED VERSUS WISDOM

Financial decisions are cognitively intensive. Just as the lack of financial knowledge and skill constrains quality decision making, so do our fundamental cognitive and intellectual capacities. And like financial literacy, some cognitive ability also declines with age.

Cognitive abilities can be grouped into fluid intelligence and crystallised intelligence (Cattell, 1963; Deary 2001; Salthouse 1996; Salthouse 2004). Fluid intelligence refers to things like problem-solving and pattern recognition – the raw processing power and speed of the brain. It also has a greater correlation with numeracy (Peng et al. 2019). Fluid ability tends to decline with age after peaking in one's twenties. Crystallised ability refers to expertise and knowledge that accumulates over time and shows less likelihood of decline.

Crystallised intelligence can be domain-specific or broad, based on life experience. For example, older people are more adept at complex tasks related to communication and social reasoning and are better at emotion regulation (Samanez-Larkin & Carstensen 2011; Grossmann et al., 2010; Bruine de Bruin 2017).

Population patterns for fluid and crystallised intelligence are shown in Figure 6A. Average crystallised intelligence test scores increase over the lifecycle (it is 2% higher at ages 75+ than at ages 45-54) while fluid intelligence scores decline (by about 40% over the same ages). Women score slightly better on fluid intelligence tests at all ages (note that this data is based on cross-sectional analysis; see Box 6 for longitudinal changes by age and sex).

As was the case with financial literacy, cognitive scores vary by socioeconomic factors. Such factors may affect participation in activities important for maintaining cognitive reserves (e.g., socialising, nutrition, exercise), or another variable such as illness may affect both economic outcomes and cognition (Dickinson et al. 2011; also see Box 9 on socioeconomic status as a cognitive health risk factor).

Gaps in crystallised intelligence are greater than gaps related to fluid intelligence. Perhaps unsurprisingly, the former, which uses a vocabulary-based test, sees greater gaps according to education.

2.6 COGNITIVE ABILITY AND FINANCIAL PREFERENCES

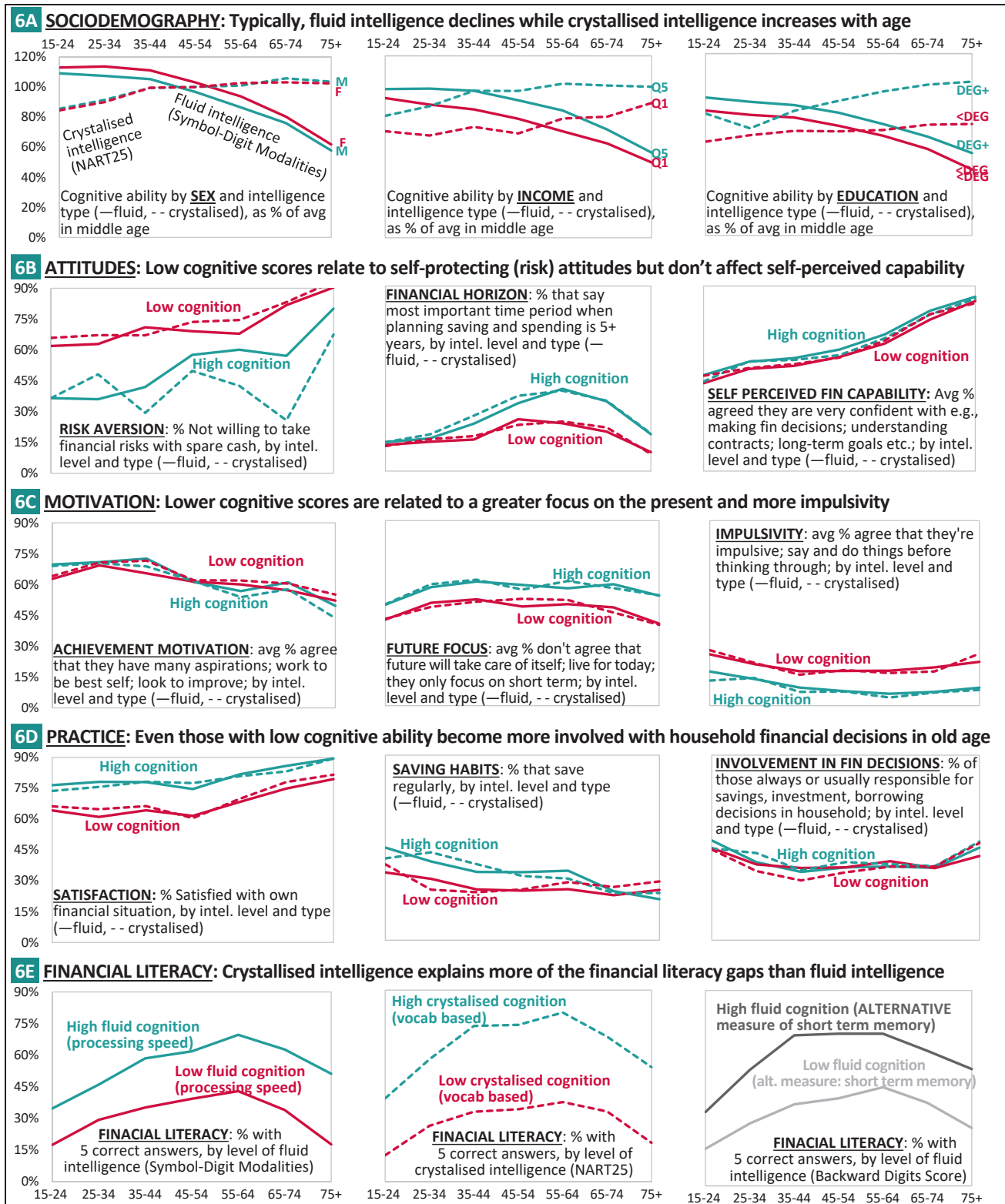
Previously noted relationships between financial literacy and financial preferences, attitudes, motivations, and behaviours are replicated for both intelligence types at both high and low levels (6B-D). For example, at any given age, low cognitive ability of either type is associated with more present focus and impulsivity, and risk aversion (risk aversion and cognitive ability are negatively correlated but drivers are unclear; Bonsang & Dohman 2015).

Consequently, choices about saving, spending, and investing vary according to cognitive ability (Burks et al. 2009). For example, low cognitive function predicts low asset accumulation and lower participation in financial markets (Benjamin et al, 2013; Banks and Oldfield, 2007; Smith, et al, 2010).

Some changes by age are again a cause of concern. Self-perceived level of financial capability increases with age regardless of intelligence score (6B, right panel). It's not uncommon for people with even mild cognitive impairment to remain confident in their functional financial capability (and partners/caregivers appear no better at judging the person's ability; Okonkwo et al. 2008; Sanz et al. 2016; Alexander et al. 2022). Those who are overconfident are also likely to be most exposed to financial risk and cognitive risk (see Box 10 on SMSFs).

Involvement in household financial decisions also increases at older ages regardless of level or change in cognitive ability (6E, right panel). Research suggests that when information about cognitive decline is presented to the household, management of household finances is turned over to the cognitively intact spouse, but often too late (Hsu & Willis 2013; Angrisani & Lee 2019; Hohn et al. 2022). This is less possible as the likelihood of living in a single-person household increases with age due to divorce and widowhood.

COGNITIVE ABILITY: THE IMPORTANCE OF CRYSTALLISED INTELLIGENCE IN OLD AGE



Note: Last chart is in a different colour to denote that it uses an alternative measure of fluid intelligence to that in the rest of this figure. Further explanatory notes can be found below Fig 2, earlier. Source: Authors' analysis of Hilda 2016

2.7 NORMAL COGNITIVE AGEING AND FINANCIAL DECISIONS

There is increasing interest in the interactions between financial literacy and cognitive ability, and their impact on decisions (Banks 2010; Bennett et al. 2012; Wilson et al. 2017; Weissberger et al., 2019; Munoz-Murillo et al. 2020). Financial knowledge may relate to crystallised know-how and financial numeracy may be akin to fluid processing. Figure 6E shows how higher cognitive abilities are associated with higher financial literacy. However, higher crystallised intelligence has the greatest effect (6E, middle panel). In practice, these abilities interact and offset each

other in complex ways. For example, financial literacy is more likely to improve financial decisions for those with lower cognitive function (James et al. 2012). And domain-specific crystallised intelligence and expertise provide an alternative route for sound financial decisions and outcomes (Li et al. 2013; Li et al. 2014; Eberhardt et al. 2018).

Evaluations of basic money management ability (e.g., counting money, identifying prices, understanding bank statements, etc.) show that most older people with normal cognitive ageing remain financially competent (Marson et al. 2009). Still, the sum of fluid and crystallised intelligence peaks in middle age, and, so it seems, does the overall level of cognitive performance. Normal cognitive ageing thus involves some declines which are associated with making more financial ‘mistakes’ (and being subject to some biases: see Section 3).

Mistakes related to normal cognitive ageing appear more likely where financial tasks require comparing a large set of options, assimilating unfamiliar information, or making quantitative judgements (Denburg et al. 2005; Agarwal et al. 2009; Agarwal & Mazumder 2013; Gamble et al. 2015; Kariv and Silverman 2015; Del Missier et al. 2017; Peters et al. 2019). (See Box 5 on stereotype threat and Section 3.6 on the interaction of age with biases.)

The most obvious outcomes of these mistakes manifest in lower risk-adjusted returns and higher quality-adjusted fees (Korniotis & Kumar 2011; Box 27). In this context, changes to retirement income settings (e.g., changes in product menu or regulations) are a potential Achilles heel for financial decision making in old age (Banks & Oldfield 2007).

Box 4 CEPAR research spotlight Self-perception of cognitive ageing and decline

Subjective cognitive decline (where someone perceives worsening or more frequent confusion or memory loss) is a potential early signal of mild cognitive impairment and dementia. Given the importance of early prevention and early intervention, CEPAR researchers were involved in an international project investigating the nature of this indicator (Röhr et al., 2020). Overall, about a quarter of older adults (75+) without dementia experienced subjective decline in cognition, more so among men and people with lower educational attainment. The research does not conclude that subjective cognitive decline is an indicator for the development of dementia without dementia biomarkers.

What do older people think about cognitive ageing in general? A cross-sectional study based on a large sample of cognitively healthy people described their perceived age-related gains and losses in cognition (Sabatini et al., 2021). The gains are measured as more experience and knowledge to evaluate things and people, more foresight, gathering more information before making decisions, becoming wiser, and thinking things through more carefully; while the losses are measured as declining mental capacity, slower thinking, greater difficulty in concentrating or learning new things, and greater forgetfulness. They found that higher subjective age-related losses were associated with poorer objective cognition, deeper depression and anxiety, and lower self-rated health. Their meta-analysis revealed a moderate association between gains and emotional wellbeing, while losses were related to poorer emotional and physical wellbeing (Sabatini et al., 2020).

A similar CEPAR study researched people with much more severe cognitive decline: those diagnosed with dementia. Anstey and colleagues (Sabatini et al., 2022) concluded that although people with dementia were more negative about ageing, this was not necessarily related to cognitive impairment after controlling for depression and self-rated health. The exceptions are people diagnosed with Parkinson’s or Lewy bodies dementia, which cause motor and visual impairments.

Box 5 CEPAR research spotlight Internalised ageism can affect cognitive performance

As we age, we’re more likely to experience ageism and worry about being the subject of ageist stereotypes. This sensitivity can give rise to what’s known as *stereotype threat*, where the fear of a stereotype affects our performance. CEPAR’s Natasha Ginnivan is an expert on ageism. In her reviews of the literature, she found that there are differences in memory performance across cultures when people are primed with age-related prompts (Ginnivan et al. 2015). The effects may be subtle, however. In a study comparing stereotype threat in 100 older Australians and Filipinos (Ginnivan 2016), she found that subtle age-related primes did not have statistically significant effects on memory in either country. Even so, cultural orientation was associated with all domains of attitudes toward ageing. It appears that more intergenerational contact was related to ageing being seen in a more positive light, potentially reducing the stereotype threat demonstrated in other studies.

Box 6 CEPAR research spotlight **We're learning more from longitudinal trajectories of cognitive ability**

There is a paucity of longitudinal research on cognitive ageing in Australia. Even internationally, evidence examining trajectories of cognitive abilities over the full lifecycle and by gender is scarce.

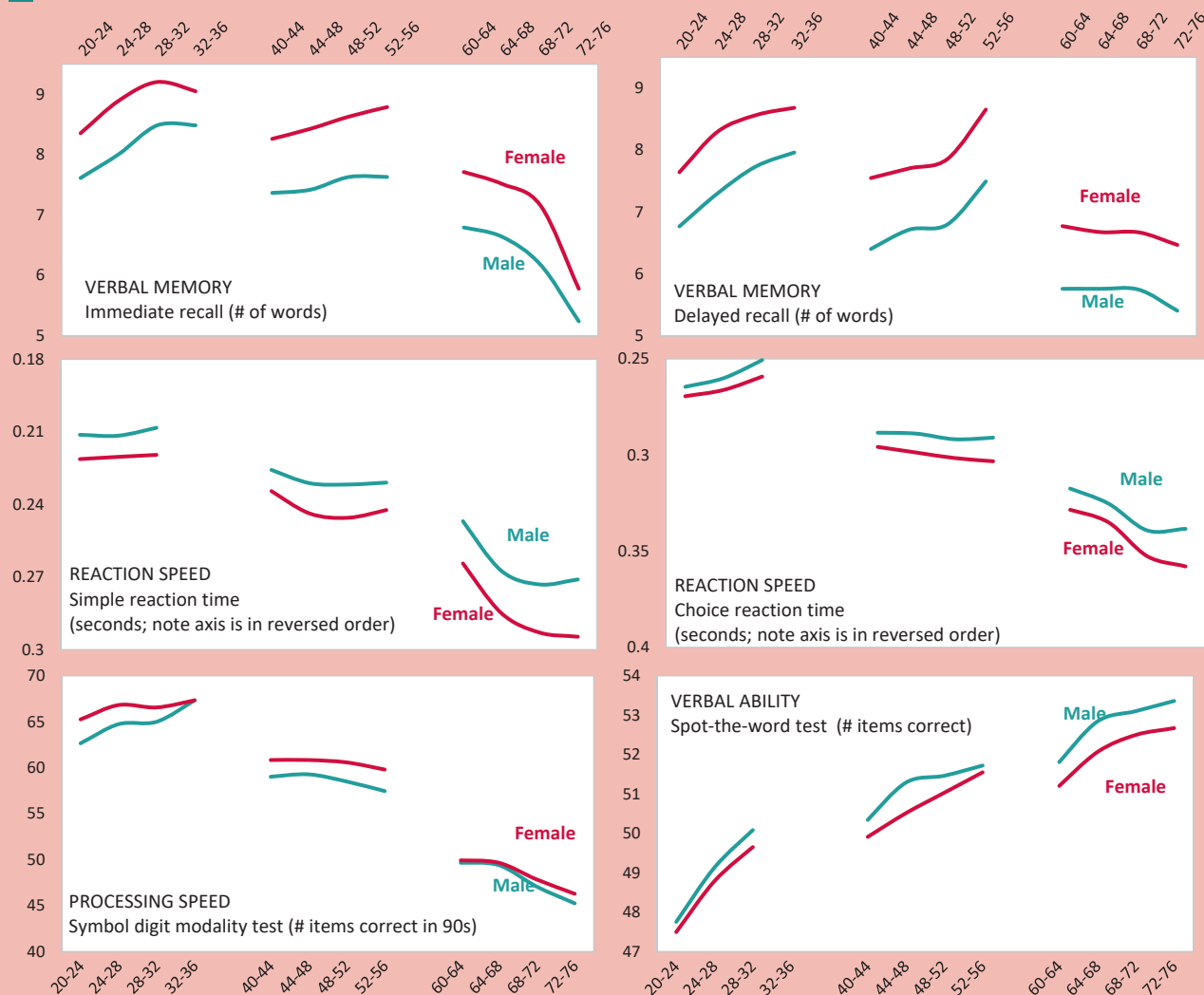
CEPAR's Kaarin Anstey leads a team of researchers seeking to fill that gap. For 12 years they have been tracking the cognitive ability of about 7,500 people aged 20 to 64 (at baseline; 52% were female, 94% Caucasian, 5% Asian, and 1% were from other ethnic backgrounds; Anstey et al. 2021a).

So far, the research is shedding light on gender differences in cognitive ageing related to verbal memory, processing speed, working memory, verbal ability, and reaction time.

They found that within each cohort, women had better verbal memory and men had better working memory and faster reaction times (Fig 7, working memory results not shown). Verbal ability and processing speed showed variable gender differences in the young and middle-aged cohorts but no difference in the oldest cohort.

What about changes with age? Among the young and middle aged, there were no gender differences in rates of change in verbal memory, processing speed, reaction time, verbal ability, or working memory. In old age, the gender differences were only observed in rates of change in verbal memory; women see greater rates of decline despite retaining higher average memory performance than men. The authors concluded that gender differences in cognitive abilities are stable but faster memory ageing takes place among women in the eighth decade.

7 Women have better verbal ability but see faster declines at the oldest ages



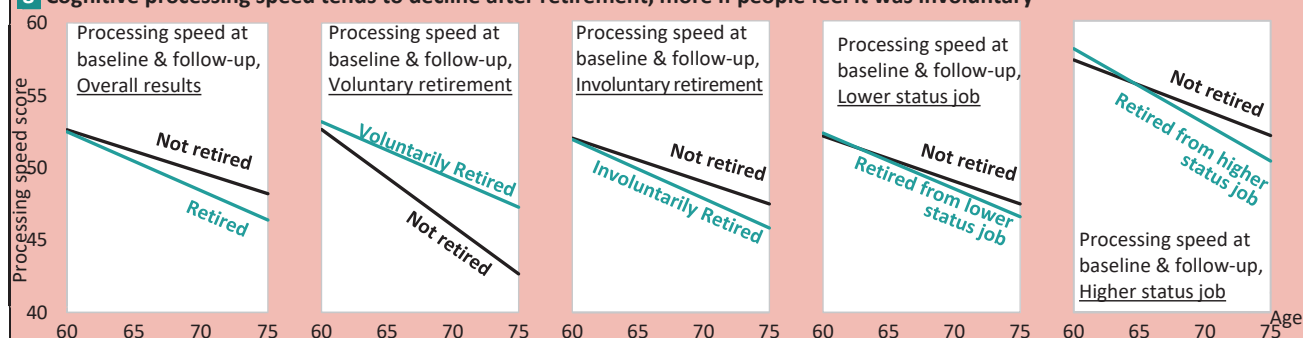
Source: Anstey et al. 2021a. Note: See original paper for confidence intervals.

Box 7 CEPAR research spotlight Retirement and declines in cognitive ability

CEPAR researchers are also shedding light on whether retirement can affect cognitive capacity. Kaarin Anstey and Ross Andel were part of a team that examined the impact of retirement on information processing speed (Andel et al. 2017).

The team assessed people aged 62 to 74 over 12 years, and controlled for baseline age, sex, education, socioeconomic status, work complexity, self-rated health, and any dementia diagnosis. Their findings suggest that retiring is related to a decline in processing speed – a kind of *mental retirement* (Fig 8).

This was less likely when individuals thought their retirement was voluntary. They also found that retiring while still in good health may not always be advisable, at least compared to retiring when in poor health; and that holding on to a job with higher socioeconomic status may be good for cognitive health while retiring from a job with lower socioeconomic status may cause no harm.

8 Cognitive processing speed tends to decline after retirement, more if people feel it was involuntary

Source: Andel et al. 2018

The idea that the characteristics of one's job can affect health and cognition is also explored in the work of CEPAR's Sharon Parker (see CEPAR Research Brief on *Tapping into Australia's ageing workforce*). In a recent paper Parker looked specifically at the pathways through which work design can affect cognition (Parker et al. 2021). The authors assessed relevant literature to conclude that some work characteristics could be cognitively enriching (e.g., a better opportunity to use cognition and new knowledge acquisition and learning) and others could be harmful (e.g., when inadequate feedback increases workers' uncertainty and causes excessive cognitive stress).

2.8 MORE SERIOUS COGNITIVE IMPAIRMENT AND DECLINE

Findings that reveal worse financial decisions among older age groups may, in fact, be driven by a subset of people experiencing serious cognitive impairment rather than normal ageing (Belbase & Sanzenbacher 2017). Mild cognitive impairment is where decline is identifiable but has less impact on daily tasks (it affects between about 5% and 20% of the 60+ population; Anstey et al. 2013; Bai et al., 2022). More serious impairment may represent one of several forms of dementia (it affects about 6% of the population; AIHW 2022; Box 8).

Unsurprisingly, cognitive impairment is linked to greater difficulty in managing money and adverse financial outcomes (Marson et al. 2000; Triebel et al. 2009; Finke et al. 2017; Niccolai et al. 2017; Angrisani & Lee 2019). One standard-deviation increase in cognitive decline was estimated to be equivalent to the decision-making performance of someone seven years older (Boyle et al. 2012).

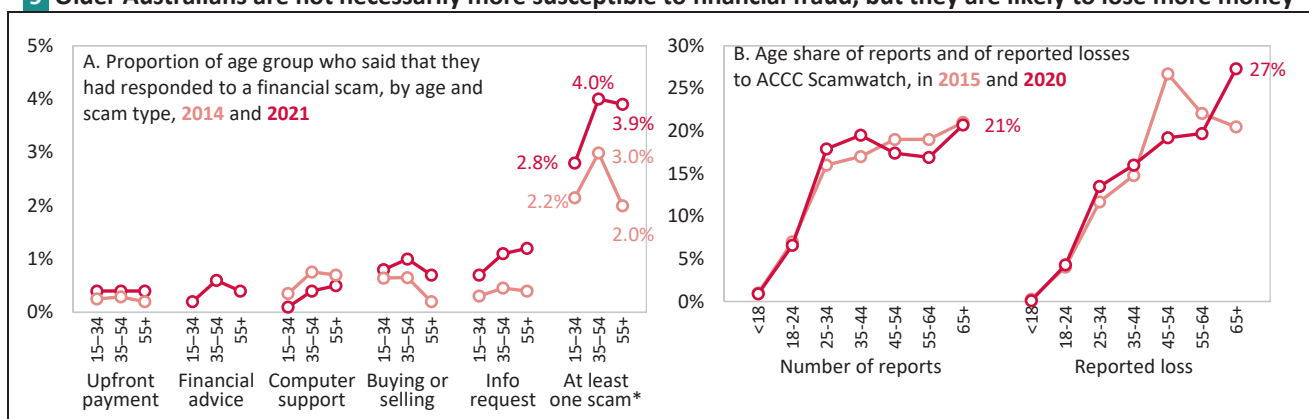
As the population gets older, the share of Australians with some cognitive impairment is expected to increase. While much policy attention has been given to issues related to dementia, policymakers need to develop better strategies to address health and financial risks in late-middle age, before the onset of old age.

Risks can be mitigated by (1) evaluating and tackling cognitive health risks related to lifestyle, diet, exercise, and cognitive engagement (Boxes 7 and 9); (2) making contingency plans (e.g., simplifying finances); and (3) dynamically delegating financial decision making to family and/or advisers (Boxes 10 and 26; Angrisani & Lee 2019; Hsu & Willis 2013; Rentzelas & Santucci 2018; Santucci 2018, 2019; Chandra et al. 2022).

Those experiencing cognitive impairment are also at greater risk of financial exploitation and fraud, consistent with higher levels of credulity (Smith & Budd 2009; Purser et al. 2018). About 2% of the population aged 65+ is estimated to have experienced financial abuse in 2020 (AIFS 2022). Only about 80% of victims took action to stop the abuse, so clinicians, carers, and financial advisers and institutions play an important role in identifying financial abuse (Gardiner et al. 2015; DeLiema & Deevy 2017; Council of Attorneys-General 2019).

What about financial fraud? Greater cognitive decline appears to increase the odds of fraud victimisation (Boyle et al. 2012; Han et al. 2016; Gamble 2017) but risks may be higher for people with mild impairment given their greater ability to act and respond to fraud compared to those with severe decline (Ueno et al. 2021). At the population level there is scant evidence that older people are at greater risk. Middle-aged Australians seem to be at most risk (Fig 9A; see also AIC 2019). However, rates of reporting fraud are higher at ages 65+ and, given their wealth profile, their reported losses are also higher (9B). Interventions may therefore need to target people from middle age.

9 Older Australians are not necessarily more susceptible to financial fraud, but they are likely to lose more money



Note: Responding to scam denotes that, after being exposed to it, they sought further information, provided money or information, or accessed related links. *At least one scam denotes all listed, plus lottery, pyramid, relationship, emp't, betting, extortion, charity, and other scams. Source: Authors' analysis of ABS data; ACCC 2021

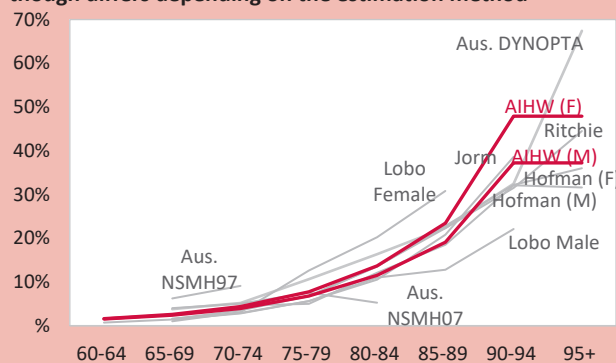
Box 8 CEPAR research spotlight Dementia prevalence and decision-making impact

Dementia is not a normal part of ageing, but its prevalence increases with age. CEPAR research indicates that the rate of dementia doubles every five years between the ages of 70 and 84 (Anstey et al., 2010; Fig 10A).

An evolving literature is quantifying the impact of cognitive decline on financial decision making. CEPAR's Michael Keane and Timothy Neal made use of a US Medicare insurance dataset with over 1.8m plan choices made by over half a million consumers aged 65+ to delve deep into the topic (Keane et al. 2021). The sample included data on health conditions, allowing researchers to identify the 9% of the older population diagnosed with dementia.

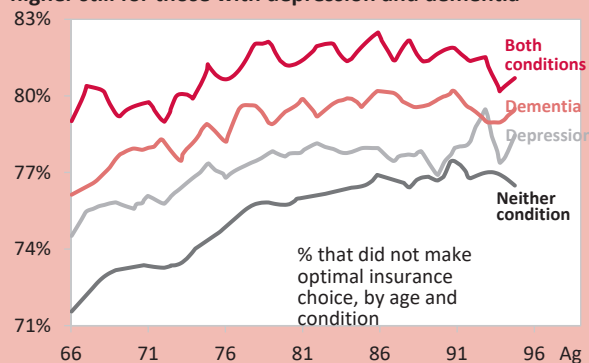
They discovered that most consumers make 'confused' choices, placing too much weight on upfront premiums of insurance plans (ignoring future out-of-pocket costs; Box 14). Individuals who were diagnosed with dementia or depression were even more likely to be 'confused' and make poor choices (Fig 10B).

10A Prevalence of dementia increases significantly with age, though differs depending on the estimation method



Source: Adapted from Anstey et al. (2010), AIHW (2022).

10B Poor financial decisions increase with age, and are higher still for those with depression and dementia



Source: Keane et al. 2021

Box 9 CEPAR research spotlight **Risk factors for cognitive decline and interventions to arrest it**

CEPAR researchers, led by Kaarin Anstey, have found that about half of dementia cases can be attributed to seven modifiable factors: (1) depression; (2) midlife hypertension; (3) diabetes; (4) low education; (5) smoking; (6) physical inactivity; and (7) midlife obesity (Ashby-Mitchell et al., 2017; Peters et al., 2019), although this may differ by ethno-regional characteristics (Lipnicki et al., 2019). Anstey has been involved in translating such findings into broad WHO policy recommendations (Chowdhary et al. 2021; Walsh et al. 2022) but each aspect is rich in insights, as follows.

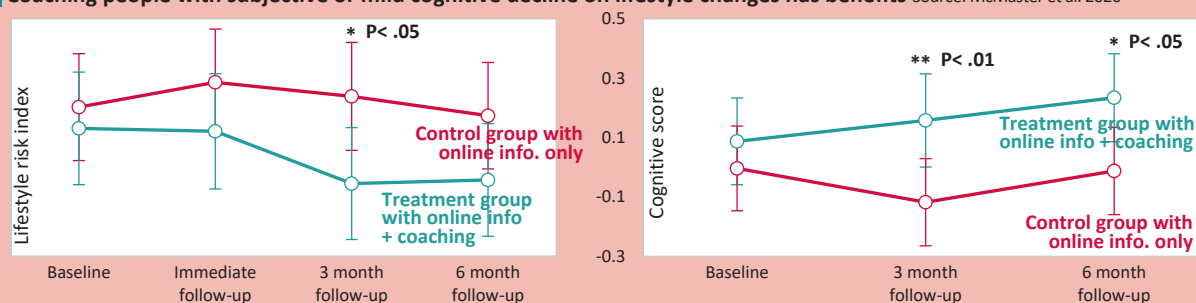
Socioeconomic factors: Experiencing major financial shocks (where nutrition and housing stress is affected) are related to occasion-specific fluid cognition deficits (Kiely et al., 2019). The relationship is even stronger in older groups (Kiely et al., 2020). The local environment also matters. Across Australia, higher neighbourhood pollution and increased social fragmentation are associated with higher dementia risk (Bagheri et al., 2021). And within urban environments, higher population density and easy access to parkland are beneficial to cognitive health (Cerin et al., 2021). CEPAR researchers also found that gender-specific approaches may be needed (McDermott et al., 2017; Anstey et al. 2021a). For example, to preserve memory, for men, it's more important to seek out social activities and avoid financial hardship while women may benefit from treating depression.

Other health-related factors: CEPAR researchers also found that a higher body mass index in middle age is associated with increased cortical thinning, which heightens the risk of developing Alzheimer's (Shaw et al. 2017). Another project that followed participants over an eight-year period in their forties found a link between cardiovascular risk factors and a slowing in cognitive processing speed (Anstey et al., 2014). Relatedly, a cardiovascular condition in one's mid-fifties is associated with a 4-8-year lower life expectancy without cognitive impairment and a higher chance of living with cognitive impairment (Zheng et al., 2020).

Diet: A project with former CEPAR Research Fellow, Diane Hosking, found that regular consumption of oily fish and a Mediterranean diet with plenty of olive oil, nuts, legumes, vegetables, and limited red meat or processed sugar were found to be protective against cognitive decline (Anstey et al., 2015).

Exercise and mindfulness: A team that included Anstey found limited evidence that a sedentary lifestyle affected cognitive ability among older people without dementia, although they did not distinguish between types of sedentary behaviour (e.g., watching TV versus solving puzzles; Maasackers et al., 2020). Other research confirmed that physical activity mattered for preserving memory (Anstey et al. 2021b). Meanwhile, a review of the literature on meditation found that the practice was associated with less age-related cognitive decline (Kurth et al. 2017).

Intervention packages: *Subjective Cognitive Decline* (when someone perceives worsening cognition; see Box 4) and *Mild Cognitive Impairment* (when mild changes begin to be diagnosable) may be precursors of more serious decline and dementia. People experiencing these may be motivated to preserve cognitive capacity but might still need one-on-one help. To test this, Anstey's research team gave online education modules to two groups of older people with subjective or mild cognitive decline. These covered: (1) lifestyle risk; (2) diet; (3) physical activity; and (4) cognitive engagement. The treatment group had four coaching sessions with professionals over the following weeks on how to apply the information to their life. Their results confirmed that this more hands-on intervention enhanced cognitive outcomes in the short term (Fig 11; McMaster et al., 2020). The lesson is that knowledge is not enough – lifestyle change requires a practical plan for how to incorporate the changes and coaching can bridge the intention-action gap. Relatedly, the researchers found that *tailoring* diet plans helps in incorporating changes (Rangel et al. 2021).

11 Coaching people with subjective or mild cognitive decline on lifestyle changes has benefits Source: McMaster et al. 2020

Box 10 CEPAR research spotlight Are the more financially savvy more susceptible to cognitive decline?

Some people choose to move their super out of typical fund management into self-managed superannuation funds (SMSFs). Such accounts have grown in number and value in recent years (though popularity has waned of late). SMSFs now account for over 1 million members and a quarter of all superannuation assets or nearly \$900bn (June 2022).

CEPAR Associate Investigator Joanne Earl and her co-authors found that, unsurprisingly, SMSF members are typically more financially literate and have greater resources to ride out the challenges of self-management (Gerrans et al. 2022). The authors also found a correlation between SMSF members' fluid and crystallised intelligence and measures of basic, advanced, and applied financial literacy. Somewhat reassuringly, crystallised intelligence was more predictive of literacy measures than fluid intelligence. Given that crystallised intelligence is less likely to decline, it may offer some protection from financial blunders as the members age.

Cognitive ability matters but many don't realise their own decline

In a related project (Earl et al. 2015), the researchers explored the topic further. They tested how SMSF members' cognitive ability and self-rated symptoms of dementia related to variables important to financial decision making such as applied financial literacy (e.g., interpreting super accounts) and financial judgement (e.g., readiness to purchase good/bad investments).

They found that those with lower cognitive ability and higher self-rated behavioural dementia scores (e.g., less interest in hobbies or given to wandering) had lower financial literacy. They also found evidence that those with any self-rated dementia symptoms had poor financial judgement. Interestingly, however, there was no correlation between objective and self-reported measures of cognitive decline. This confirms that people are not particularly good at evaluating their own personal characteristics and abilities, as shown in other research.

Financial advice may help, but cognitive ability also affects advice quality

People unable to manage their finances in later life may delegate decisions to advisers. Many SMSFs members already rely on professionals (see Box 27). But what if cognitive ability affects the quantity and quality of financial advice? We know from other research that many are unable to distinguish good advice from bad (see Box 26).

CEPAR's Olivia S. Mitchell and colleagues used the 2016 Health and Retirement Survey in the US, to understand the interactions between cognitive ability (both fluid and crystallised) and financial advice seeking among people aged 50+ (Kim et al. 2020). The team found that cognitive ability and financial literacy were not related to the probability of seeking financial advice *per se*, but they affected the *type* of advice sought.

Those more cognitively able were more likely to obtain advice from professional advisers rather than seeking informal help from family and friends. Expressed in terms of age, the results show that cognitive decline induces people aged 70+ to be 6% less likely to seek professional financial advice than their counterparts aged in their 60s (who have higher cognition scores). At the same time, those with higher cognitive ability harboured a greater distrust of advisers, which may protect them from conflicted or poor advice. The same may not be said about those experiencing greater cognitive decline.

3. HOW IMPULSIVE REASONING AND BIASES LEAD US ASTRAY – THINGS WE SHOULD BE AWARE OF

Even with good antecedents of financial knowledge, basic numeracy, and healthy cognitive abilities, many of us still make systematic mistakes. This section discusses how researchers determine optimal decisions and how impulsive reasoning systematically causes people to deviate from the ideal. Identifying blind spots can help us to correct them.

3.1 OPTIMAL DECISIONS: IDENTIFYING THE BENCHMARK

Objectively better decisions are possible. Simple examples include opting for the lower-fee option from identical funds, taking into account both risk and return, or ignoring irrecoverable *sunk costs* when making investment decisions.

Some courses of action are better even if goals and preferences differ (Keeney et al. 1993). Economists often appeal to *expected utility theory* to model behaviour. Such modelling doesn't necessarily prescribe preferences, but rather infers them from data and assumes that preferences are internally consistent (i.e., more utility is more valuable than less). For example, underlying preferences typically follow from the fact that, on the whole, many people choose to transfer resources from times of plenty to times of scarcity (or from working life to retirement in the lifecycle theory of consumption; Modigliani and Brumberg 1954). Other examples include allowing for altruistic behaviour (e.g., bequests) or the different ways people trade off leisure and effort and the risks that people are willing to take.

In this way, it's possible to identify the optimal benchmark while accounting for real-world preferences. One example currently dominating the retirement financing debate is the optimal approach to decumulating assets in retirement. Some argue that annuitisation is better than the existing account-based pensions typically used in Australia, and that those ignoring the annuity market are irrational. Yet, this conclusion ignores the presence of the Australian Age Pension, a safety net that acts as an annuity-like income stream in case people live longer or spend more than expected, and the comparative cost of annuities. An analysis that accounts for the Age Pension, alongside risk and bequest preferences reveals that the optimal action is to annuitise only a more conservative, small proportion of wealth – up to about 25% in a normal market (see Box 12). That is, unless someone is highly risk averse and prefers total income certainty of income above the Age Pension, in which case a greater proportion of wealth would be annuitised.

Even so, far fewer people annuitise than even conservative models would suggest. And many draw income fast enough to avoid means test tapers (Chomik et al. 2018; Box 25). Analyses of drawdown behaviour in Australia reveal that most people either stick with the government minimum or take a level dollar amount regardless of inflation (Box 13). The slow drawdown, coupled with substantial unintended bequests could indicate that some people are engaging in excessive precautionary saving. This could in turn arise from poor information or biases (e.g., fear that the Age Pension won't always be there; DPM&C 2020). Poor choices also appear in insurance, where up to 80% of the population make 'confused' choices (Box 14). Typical biases and heuristics that lead to systematic mistakes are summarised next.

Box 11 CEPAR research spotlight Why do retirees spend so little? Spending and saving motives

Older people tend to hold their assets, and some even continue to save in retirement. What might be the motives? CEPAR's Hazel Bateman and Jennifer Alonso-García sought to understand the puzzle by asking around 2,000 older people in Australia and the Netherlands to suggest spending patterns for eight hypothetical retired couples who differed in health and liquidity constraints (Alonso-García et al., 2022). Participants needed to justify their choice by ranking their motives. Results imply that leaving a bequest is not considered to be important in either country. Instead, being able to enjoy life and autonomy were most important, followed by precautionary motives. It seems people are unaware of or have low trust in safety nets and as a result choose to self-insure rather than spend money to enjoy their life.

12 Top 5 saving motives by country

Australia – high liquidity environment

The Netherlands – low liquidity environment

1	self-gratification - enjoy life	self-gratification - enjoy life
2	autonomy - financially independent	liquidity - enough cash on hand at any time
3	security - peace of mind	autonomy - financially independent
4	precautionary health - unforeseen health and aged care expenditure	precautionary health - unforeseen health and care expenditure
5	precautionary - other unforeseen expenditure	intra-household bequest - your partner

Source: Alonso-García et al., 2022

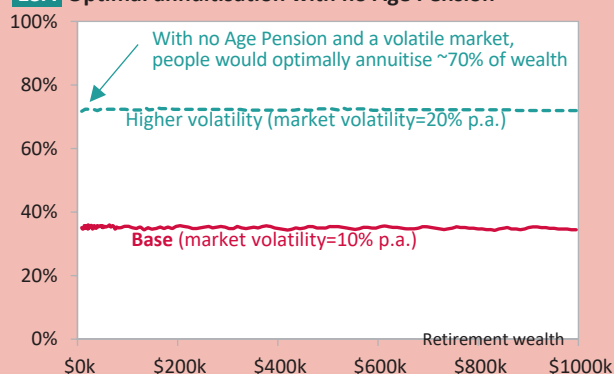
Box 12 CEPAR research spotlight Optimal annuitisation

Everyone has different preferences, but it's possible to calculate the optimal annuity purchase in different circumstances by taking account of risk, bequest, wealth, and institutional settings.

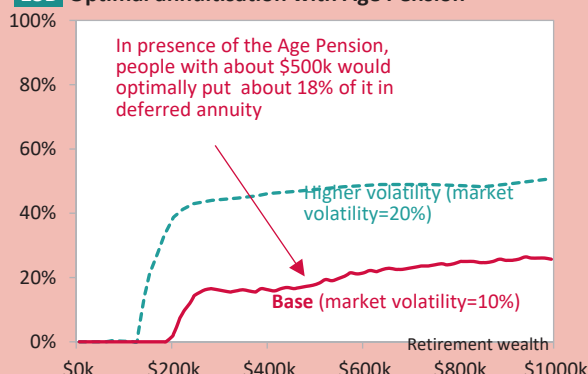
CEPAR's Fedor Iskhakov, Hazel Bateman, and Susan Thorp (2015), developed a model to investigate this in the Australian context. It involved a choice between risky assets and either an immediate or deferred annuity (purchased at 65 to pay out at 85), for an illustrative single male homeowner reaching retirement with different levels of accumulation.

They found that in the absence of an Age Pension, 38% of one's wealth should be used to buy an annuity; or about 70% if the market is more volatile. When the Age Pension is included, the rate drops to about 18% for someone with an accumulation of \$500,000. Interestingly, the findings also show that annuitising all savings is worse than annuitising nothing, especially when the retirement asset is low.

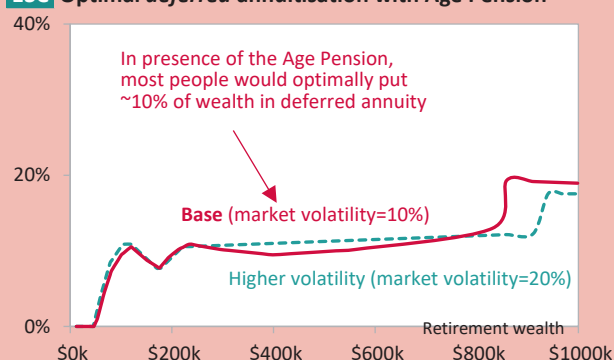
13A Optimal annuitisation with no Age Pension



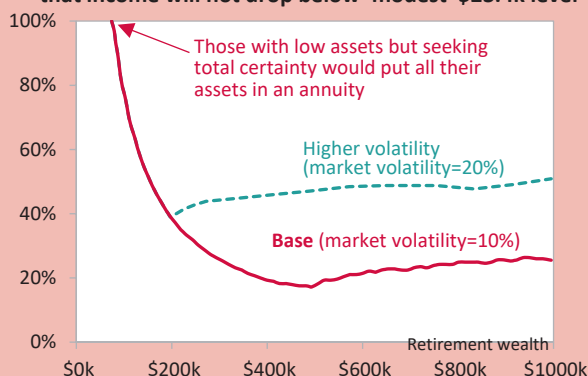
13B Optimal annuitisation with Age Pension



13C Optimal deferred annuitisation with Age Pension



13D Optimal annuitisation with Age Pension and certainty that income will not drop below 'modest' \$23.4k level



Source: Iskhakov et al. (2015).

In the case of a deferred annuity, the Age Pension crowds out even more than would an immediate annuity. This is because as wealthier retirees age and their retirement wealth decumulates, they will probably begin receiving the pension at the same time as the deferred annuities begin to pay out (some may not live long enough to get it).

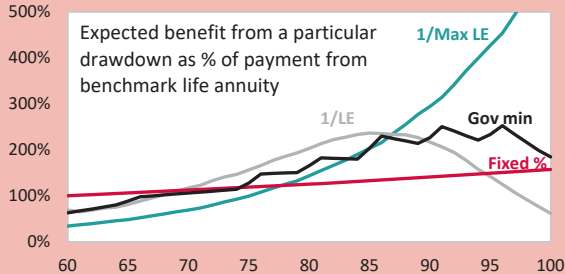
However, retirees with low wealth (between about \$50,000 and \$250,000) can optimise their purchases by choosing deferred annuities rather than immediate annuities. If the individual seeks complete certainty of retiring on \$23,400 (i.e., a 'modest' lifestyle), the model suggests 100% annuitisation for those with \$75,000 through to below 20% for those with over \$400,000 (those with less than \$75,000 cannot reach the modest standard).

Box 13 **CEPAR research spotlight** **From optimal drawdowns to what people actually do**

People spend their wealth surprisingly slowly, even if facing the Age Pension means test (see Box 25). So, what is optimal? CEPAR’s Hazel Bateman and Susan Thorp (2008) investigated optimal drawdown strategies given the constraint of legislated minimum drawdowns. They found that minimum drawdowns lowered welfare for the majority when compared with following an optimal path or a simple fixed percentage drawdown rule. They found that the regulations were a binding constraint on optimal drawdown plans, but welfare reductions compared with the unconstrained plans were small. The simulations suggest that the optimal *heuristic* rule-of-thumb strategy is to initially draw at a higher fixed rate until the rising minima require drawing larger proportions (Fig 14A).

CEPAR’s Igor Balnozan (2018) looked at what people do in practice. He evaluated data for 44,000 retirees and found that simple strategies explain most drawdown behaviours, but not those that were necessarily optimal. Two dominant strategies were: (1) withdrawing funds in line with the legislated minimum (about half did this, some of whom revised down the amount when the minimum was lowered); and (2) taking a level dollar amount (28% of members; which implies that they preferred less money over time in real terms). Many also made ad hoc drawdowns, which highlights the need for flexibility in the system.

14A **Annual benefit depends on rule used**



Source: Bateman and Thorp (2008); Balnozan (2018)

14B **Who used which strategy?**

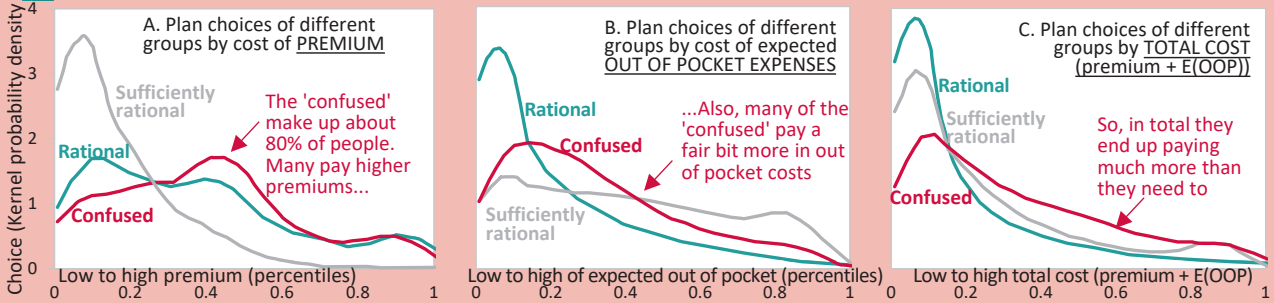
Those following min drawdown rates were more likely to:	Those drawing fixed level amounts were more likely to:
• Be female • Have larger account balances • Have lower risk appetites • Have retired later	• Be male • Have smaller account balances • Have higher risk appetites • Have retired younger

Box 14 **CEPAR research spotlight** **Confusion and poor choices in health insurance**

We know that people make suboptimal choices when risk is involved. The insurance market is one such area. CEPAR’s Michael Keane and Timothy Neal (with colleagues) modelled older Americans’ choices of prescription drug insurance (Medicare D; Keane et al. 2021). They found that only 10% of people acted as *rational* decision makers — they weighed equally \$1 paid in insurance premium with \$1 paid in out-of-pocket costs. However, even this rational group had choice inertia – they stayed with their plan rather than shop around. An explanation could be their assessment of switching costs.

Another 10% were ‘*sufficiently rational*’. They were optimistic about future expenses, weighing a present value of \$1 cost in premiums paid today more than \$1 in costs in future. They were more likely to switch to a plan with a lower premium. But roughly 80% of people, who the authors termed as ‘*confused*’, appeared to pay attention to irrelevant characteristics like brand. They often ended up paying more than they needed for total insurance costs when current and future costs were added (Figure 15).

15 **Rational decision makers weighed premium and out of pocket costs in a way that minimised their total costs**



Source: Keane et al. 2021

3.2 BEHAVIOURAL BIASES AND HEURISTICS

It's been twenty years since Kahnman won a Nobel prize for demonstrating that people overvalue losses relative to gains. Since then, scholars have continued to compile an imposing list of systematic biases and heuristics that affect decision making (DellaVigna 2009; OECD 2013b; Kumar & Goyal 2015; Samson 2022).

Three broad categories of deviation from optimal models include (1) preferences; (2) beliefs; and (3) decision processes, which are summarised below with respect to financial decision making.

3.3 BIASES RELATED TO PREFERENCES

Time preference inconsistency: where someone might want to start saving for retirement next week until next week comes and temptation to spend is never overcome. The implication is that small transaction costs or paperwork can be a major barrier to action, which is also the reason why defaults work well (Choi et al. 2004) or why some might get into too much credit card debt (Meier and Sprenger 2010).

Reference dependence: where value is relative rather than absolute. For example, when value is *anchored* to the first price one observes, or when wealth changes are valued in terms of a starting point, which causes losses to be felt more acutely. This can result in selling investment winners but holding losses, despite the *sunk cost* (Barber et al. 2009). Aversion to selling an asset is also referred to as the *endowment effect* (where an owned asset is valued more than if it was being bought). Combining *loss aversion* and *myopia* can result in selling assets too soon in a downturn or buying late in a recovery (Gneezy et al. 2003; see Box 23). The *endowment effect* may also drive defaults because people might be unwilling to lose what they have even if they didn't actively choose it.

Reference dependence means that *framing* really matters. A choice of retirement investment portfolios varies when choices are re-framed in terms of outcomes. For example, when projected retirement income is offered or annuities are framed as guaranteeing consumption rather than as an investment (Benartzi & Thaler 2002; Brown et al. 2008a; see Box 16 on projections in super). Money ends up being thought of in reference to specific mental accounts, rather than fungible (see Box 15). This might amount to a strategy for managing imperfect self-control (e.g., an attempt not to dip into 'savings' to pay off credit card debt). It reflects a preference to tackle cognitive problems in parts, rather than as a whole.

Social preferences: where behaviour is copied from peers, tied to identity (Benjamin et al. 2010), or based on moral values like altruism (Fehr & Schmidt 2006). In practice, people's investments end up resembling those observed in their community, which can lead to *herding bias*, *groupthink*, and investment bubbles (Brown et al 2008b; Bailey et al. 2018; Kuchler & Stroebel 2021). In Australia, there is evidence that super withdrawal may to some extent be affected by implied endorsement and social norms, another reason why defaults work (See Box 18).

3.4 BIASES RELATED TO BELIEFS

Overconfidence: relates to optimistic beliefs about the self, market, advisers, and risks. For example, a famous study (Svenson 1981), found that 80% of all drivers consider themselves in the top 30% of all drivers. There is similar evidence regarding financial decision making (see Section 2.3 on financial literacy and confidence in own ability). The effect can result in overoptimism, where typical negative events, such as stock market falls or health shocks are underestimated (while the risk of other, emotively dramatic events, like plane crashes, are overestimated). This can lead to excessive risk-taking and under-insurance (Barberis & Thaler 2003; see Box 14 on evidence in the health insurance market).

Probabilistic mistakes: where people find numerical probability difficult to understand (see Box 22 on the interpretation of risk) and commonly misrepresent the base rate (i.e., ignoring the underlying probability of a certain outcome based on a full in favour of an anecdotal sample). This might occur when judging future investment based on past investment returns (Choi et al. 2010). The mistakes also occur when consumers underweight the extent to which both planned and emergency expenses will affect their disposable income (Berman et al., 2016; Sussman & Alter 2012).

3.5 BIASES RELATED TO DECISION PROCESSES

Limited attention: Attention is a scarce resource. So, available or recent information is over-weighed while more salient but harder to come by information is ignored. Alternatively, excessive information leads to overload, stress, and worse decisions or no decisions. In practice, it can lead to limited attention paid to investment fees, taxes, or risk-return trade-offs. People end up using rules of thumb, such as the $1/n$ heuristic (e.g., with 3 investment choices, they would allocate $1/3$ to each regardless of risk; Benartzi & Thaler 2001). Disengagement has been demonstrated with superannuation-type accounts: the more available options and the greater the complexity, the more the tendency to stay with the default or take the option requiring the least mental effort (Sethi-Iyengar et al. 2004; Iyengar and Kamenica 2010; PC 2018). (See Box 3 on how people haven't updated their information on increasing life expectancies.)

Emotions and affect: Emotions themselves are a type of decision-making short-cut based on learned triggers that help reduce computational load. This also means that decisions can differ based on mood (Loewenstein and Lerner 2003; Loewenstein & Rick, 2009). The effect is demonstrated by the phenomenon of home bias or familiarity bias in investment (French & Poterba 1991). Even though prices seem objective, fonts, colours and digits can alter how people feel about a price. Thinking swayed by emotion can be distinguished from other impulsive aspects and can be characterised as a *head-heart-gut model* of decision making (Soosalu et al. 2019).

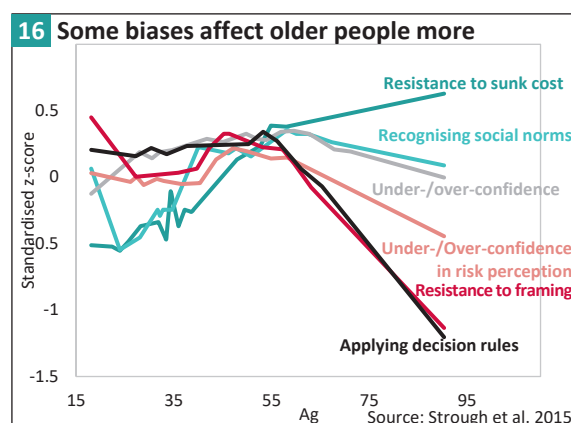
In sum, fast and frugal intuitive skill can be beneficial but easily lead to overconfident bias (Kahneman & Klein 2009; Gigerenzer & Gaissmaier 2011). An expanding suite of modelling techniques can show us the implications not just for individuals but at the aggregate level (Keane & Thorp 2016).

3.6 DOES SUSCEPTIBILITY TO BIASES DIFFER BY AGE?

Age differences in capacities (e.g., financial literacy and cognitive ability) and outlooks (e.g., motivations, emotional states, and confidence) can combine to affect both deliberative and intuitive decision-making processes. At older ages, people may be more likely to rely on the latter and be more prone to biases (Finucane et al. 2003). Yet evidence on bias susceptibility by age is mixed (Bruine de Bruin 2017; Strough et al. 2015; 2020; Fig 16).

Some studies find that age increases susceptibility to: framing (e.g., when risks are framed as losses as opposed to gains; Kim et al. 2005); priming with emotional cues (Hess et al. 2000); choice overload (e.g., picking products based on criteria; Finucane et al. 2005; Besedeš et al. 2012; Frey et al. 2015); and overconfidence (Section 2.3; Finke et al. 2017; Sunderaraman et al. 2020; Samanez-Larkin et al. 2020). Outcomes relate to task characteristics. That is, bias is more likely to lead older people astray when tasks require numeracy (e.g., risk assessment), short-term memory, or have a learning component (McDowd & Hoffman, 2008; Hosseini et al. 2010; Mata et al. 2011).

Other studies find that susceptibility to some biases declines with age. This includes sunk cost bias (Fig 16; Strough et al. 2008; Del Missier et al. 2013; Bruine de Bruin et al. 2014). Age and experience increases the ability to ignore irrelevant information, often by eliminating bad options and reducing the number of choices (Besedeš et al. 2012; Reed et al. 2013). Doing so allows people to manage cognitive load by choosing not to pursue optimal choices, caring less about things personally less important, and *satisficing* more (Hess 2014). Susceptibility to biases may additionally differ by both age and socioeconomic factors and by measured financial literacy and cognitive ability (see Sections 2).



The efficacy of interventions to *debias* thinking is mixed though some argue that early training in decision making has benefits (Ludolph & Schulz 2018; Decision Education Foundation 2022). The more common and effective strategies involve modifying the decision journey and presentation of choices via what has come to be known as *choice architecture* or by outsourcing or sharing decisions with family, advisers, or technology, as discussed in the following sections.

Box 15 CEPAR research spotlight

How mental accounting and inertia might affect asset allocations

We make countless saving, spending, and investing decisions. Each decision, big or small, is related to others. Yet we don't often make them in an integrated way.

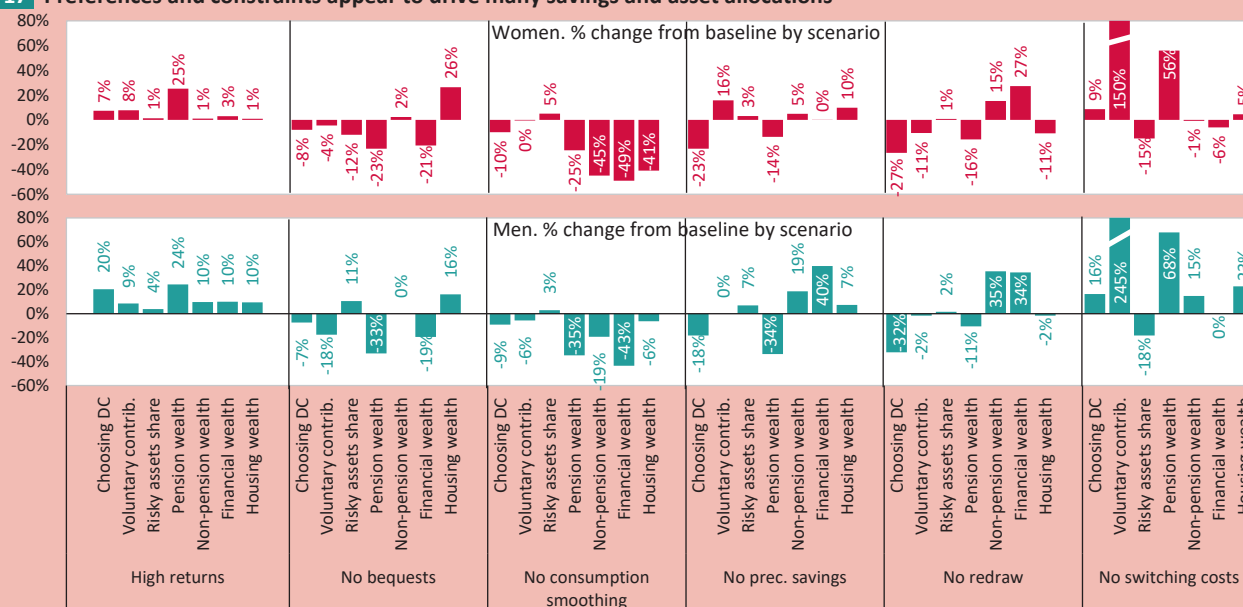
Take the way we think about housing. Reverse mortgages can unlock income from one's home that many households might need, yet uptake is low. CEPAR research (reported in Ho 2021) suggests behavioural explanations, including that people think of the house separately from other assets – a form of *mental accounting*. Another explanation is that people separate complex decisions about finances into more manageable parcels, a form of *narrow choice bracketing*, where, for example, the house is for bequests and nothing else.

Sometimes, people overcome their mental accounting biases when given clear choices. CEPAR's Katja Hanewald, Hanming Fang, Hazel Bateman, and Tin Long Ho investigated whether home equity could fund long-term care insurance for households in China (Hanewald et al. 2022). They found that if participants could only use savings, they used on average 5% of their wealth to buy care insurance. However, when given access to reverse mortgages or home reversion, they were willing to use 12-15% of their total wealth to buy such insurance.

In a modelling exercise, CEPAR's Isabella Dobrescu, Akshay Shanker, and Hazel Bateman (with colleagues) tested the extent to which mental accounting or sensible saving and investment decisions based on frictions and constraints of Australian institutional settings are driving asset allocations (Dobrescu et al. 2022). Their model fits real world data outcomes (from HILDA and UniSuper) and can help us understand underlying asset allocation drivers.

Their simulations are revealing for four key reasons. First, consumption smoothing motives are the main reason for the accumulation of financial and housing wealth (when the motive is removed these are lower; see Fig 17). Second, pension contributions and plan choices are driven by defaults and switching costs (e.g., the costs to overcome the inertia of saving more than the default are estimated to be so high that removal of these sees the proportion voluntarily contributing increase by 150-245%). Third, as pension wealth increases, housing wealth also rises. This is because when people anticipate a richer retirement, they are more willing to invest in housing at younger ages to minimise future adjustment costs in housing (e.g., stamp duty, search costs etc.). And fourth, if costless redraws from the mortgage are removed and people face borrowing constraints, they're more likely to invest in financial assets outside of superannuation and housing. In this case, the financial wealth acts as both insurance against labour income risk and a form of retirement saving to smooth consumption. The findings suggest that it is the interaction between preferences and system settings that results in asset allocations, not mental accounting biases per se. Still, it reveals that biases related to inertia to save more than mandated is high.

17 Preferences and constraints appear to drive many savings and asset allocations



Source: Dobrescu et al., 2022

Box 16 **CEPAR research spotlight** **Income stream information and anchoring for asset decumulation**

The anchoring heuristic describes how some people use an initial value as an anchor and then make decisions with greater reference to that value than they would otherwise. Can anchoring nudges help people make more use of their retirement assets and affect drawdown and consumption decisions?

A CEPAR project by Hazel Bateman, Isabella Dobrescu, Ben Newell, and Susan Thorp (and colleagues) is investigating the phenomenon (Xian et al., 2022). The team recruited 1,200 people aged 55-67 for two online experiments in which participants chose how much to spend in retirement.

The team first tested the provision of a (1) lump-sum wealth projection at death (e.g., ‘If you continue to spend at this rate you will have \$122K left in your account at the age of 92’); (2) an income stream projection (e.g., ‘If you continue to spend at this rate you will have \$16K per year to spend on average until you are 92’; (3) both; or (4) no projection. Results suggest that providing an income stream projection only (treatment 2) significantly encouraged participants to consume more in retirement.

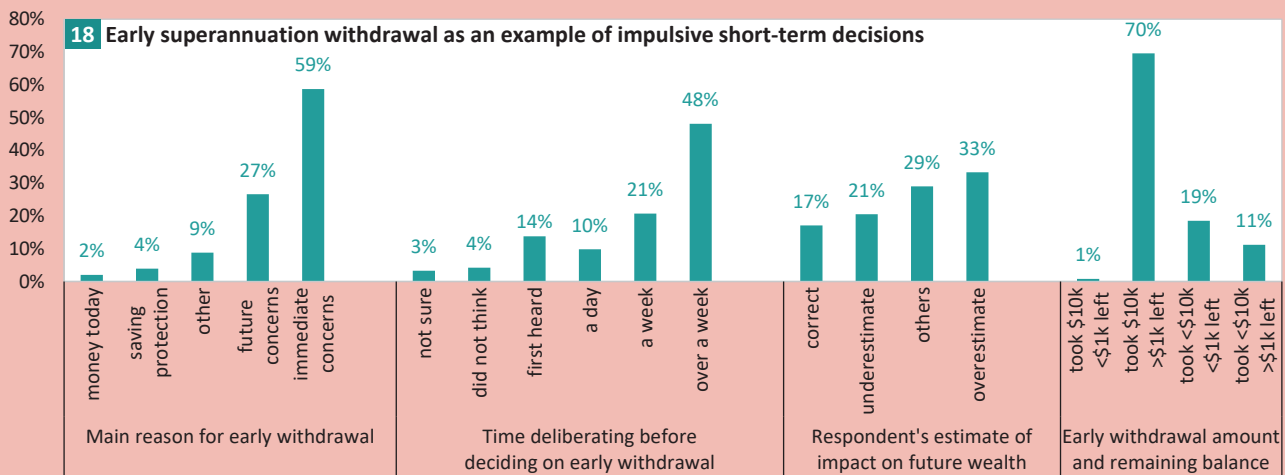
In the second experiment, the team incorporated two anchor values: a specified *adequate* income level and a higher *comfortable* income level and repeated the set-up of the first experiment, with a total of eight treatments. They found that specifying the dollar value supporting a *comfortable lifestyle* was found to significantly increase participants’ consumption. The method offers a potentially simple way to address underspending in retirement.

Box 17 **CEPAR research spotlight** **Saving and spending decisions during the pandemic**

The COVID-19 pandemic has had a broad impact on personal finances. The economic shock has exposed savings unpreparedness (e.g., see work by Olivia S. Mitchell in the US: Hasler et al. 2022) and how it can lead to impulsive decisions with long term consequences.

In the initial stages of the pandemic, the Australian government allowed early access to superannuation to address financial hardship, allowing withdrawals of \$10,000 in 2020 and 2021. The merits of the scheme were dubious – potentially targeting those most at risk to withdraw what little super they had in a volatile market. But 3 million Australians took up the offer, withdrawing \$38 billion in total, one of the largest stimulus measures in Australian fiscal history.

CEPAR researchers investigated these decisions (Bateman et al., 2022). They found that nearly 60% of respondents withdrew funds to meet immediate needs, but a third did so because to ‘protect’ savings or their ‘future’. More than half took a week or less to decide, and many appeared to use the government-set \$10,000 limit as an anchor in choosing the withdrawal amount, often without evaluating the future impact of the withdrawal (Fig 18).



Another pandemic phenomenon was panic buying. CEPAR’s Michael Keane and Tim Neal modelled such behaviour using Google search data, generating an index of consumer panic for 54 countries in the first four months of the pandemic (Keane & Neal 2021). They found that case numbers and government policy (e.g., movement restrictions) contributed to panic. Some countries were more affected than others. Australia topped the list for panic buying despite low case numbers, possibly because of early policy announcements.

4. DECISION CONTEXT – THINGS THAT POLICY CAN AFFECT

While policies that boost individual capabilities in deliberative thinking are more orthodox (i.e., educational and health interventions), nudging policies to guide impulsive thinking are newer. Governments around the world have established teams to apply nudges (World Bank 2017) but such interventions remain arguably underexploited. Sometimes the nudges are in place without deliberate policymaker attention.

4.1 CHOICE ARCHITECTURE: THE TOOLS

It's well demonstrated that choice architecture affects decision making. Its features range from mandates to unguided choice. Figure 1 illustrated these settings in Australian superannuation. Somewhere between mandates and unguided choice are instruments that nudge us toward preferred choices. The overall institutional structure may affect preferences and choices at a societal level (e.g., see Box 13, which shows how the Australian retirement income system might make conservative spenders in retirement).

There is no one-size-fits-all nudge rulebook (Sunstein 2014). Since decision makers are sensitive to cognitive effort the overriding principle is to make the preferred choice easy. Stemming from this, a choice architect's checklist would include: (1) reducing the choice set (see Section 4.4); (2) simplifying supportive information (e.g., disclosure; see Section 4.5); (3) adding nudging information (e.g., anchoring suggestions; implicit social endorsement, or emotive warnings; see Box 16); (4) timing the decision (at a more convenient time, via pre-commitment, or offering an early reward) and the information via reminders (e.g., about obligations); (5) coaching (e.g., inviting people to plan an action); and (6) in the absence of choice, providing advantageous defaults.

Box 18 CEPAR research spotlight Implied endorsement for decumulation

Many people hold on to their assets and under-consume in retirement. Can they be nudged to make greater use of their savings? Australia employs tax rules to encourage a minimum drawdown. So, to what extent are these taken as *implied endorsement* for the rate of spending?

CEPAR researchers conducted an online survey to investigate the effect of using different nudges to guide asset decumulation (Alonso-García, et al. 2021). Australian and Dutch participants were asked to make hypothetical drawdown choices and explain their reasoning about spending rates in a situation without a prescribed drawdown and one with a government-prescribed drawdown. In the latter case, available explanations for participant choice included '*because government knows best*', a form of *implied endorsement*, and '*because that's what most people do*', a form of *peer effect*. Results suggested that, when available, the government-regulated drawdown was followed by a large majority of participants, especially those with low incomes and low financial skills. Those who were overconfident about their financial capability were more likely to ignore the default and risk running out of money in retirement. Australian participants were more influenced by the implicit government advice while the Dutch participants were more likely to follow the social norms.

How does consumer guidance influence choices between retirement plan investment funds? What improves decision outcomes? CEPAR's Hazel Bateman, Susan Thorp, Ben Newell, and Isabella Dobrescu conducted two experiments to seek answers to these questions (Wang-Ly et al., 2022). They focused on four types of consumer guidance that were common globally: defaults, disclosures, advice, and calculator tools. In the experiment, participants were presented with four different retirement funds with the same investment strategy but different associated fees and different consumer guidance. They then needed to identify the fund that charged them the lowest fee based on a hypothetical balance. The results suggest that advice was helpful but underused and that defaults and disclosures were used regardless of whether they suited participants' situation, leading to suboptimal choices. A smart calculator, though used rarely, was generally helpful.

Box 19 **CEPAR research spotlight** **Institutional set-up and its influence**

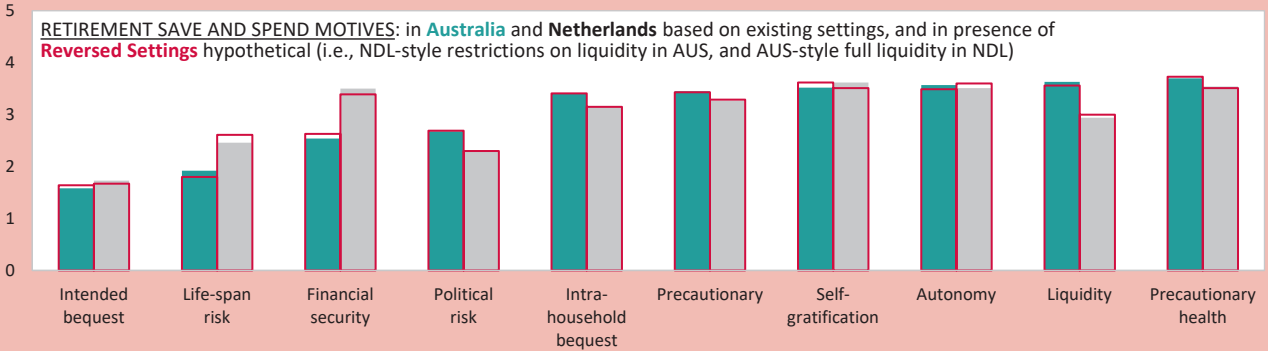
In practice, decisions take place in the context of a specific institutional set up. Over time, some of the rules, and settings, and their embodied incentives, might become common knowledge and/or filter into certain preferences. One way to understand the effects of local institutional settings is to compare countries with different retirement income features.

Researchers led by CEPAR’s Hazel Bateman exploited country similarities and differences in Australia and the Netherlands. The research confirmed that people are much more familiar with the mainstream offering in their home country, and that equally timely and balanced information about the other country’s retirement income product was not as readily absorbed by participants (Bateman et al., 2018b).

While both countries have individual superannuation-style accounts, in the Netherlands, at the time of the research, people faced the defined benefit plans with no lump sum option. This restricts people’s liquidity but insures them against longevity risk. So, to what extent does such a difference affect how residents in the two countries perceive risks and form spending and saving preferences in retirement?

CEPAR researchers investigated this in a related paper (Alonso-García et al., 2022). The team sought participants’ advice for hypothetical retirees in different circumstances. Australian participants were shown to be more conservative spenders, which reflects the lower Australian replacement rates and lack of longevity insurance in Australia. Indeed, life-span risk is one of the most important considerations for Australians. By contrast, liquidity is a much more important consideration for people in the Netherlands, since they live in a fully annuitised environment (Fig 19). Yet, when the hypothetical annuitisation and liquidity constraints were switched, there was no significant impact on people’s saving and spending motives in either country (Fig 19, red outlines). The researchers suggest that rather than making a decision based only on the information in front of them, people’s internalised preferences continue to reflect their local settings and that these need time to adapt to policy changes.

19 **Preferences appear to reflect institutional settings and are hard to shift**



Source: Alonso-García et al., 2022

4.2 UNINTENDED CONSEQUENCES

Defaults are sticky, pervasive, and sometimes present without us realising. For example, in superannuation, default settings for plan type, contribution rate, asset allocation, and life insurance have all been demonstrated to be sticky (Box 20).

However, all public interaction with the retirement income system have been designed by someone with or without intention. For example, a typical form asking people for their preference of superannuation decumulation will ask if they’d prefer to take the legislated minimum or a dollar amount (providing more info or guidance is often avoided for fear it may be interpreted as financial advice and be subject to onerous regulation; see Section 4.7). It is unsurprising therefore that half the population draws down the minimum and a quarter takes a dollar amount that then remains unchanged over time (see Box 13). For many, the driver is the implicit endorsement of minimum amounts (see Box 18).

Sometimes it's not easy to identify which measure is a *boost* and which is a *nudge*. For example, information provision at point of decision can be interpreted as either (Pedroni et al. 2017; Franklin et al. 2019).

Moreover, sometimes it's not clear what effect a given format and set of choices will have or what is stopping the preferred option until the decision journey is examined and rigorously tested. Therefore, the advice is to *design by testing*. Testing the practical effect of different financial choice features has been the focus of much of the latest research (see Boxes throughout this report). Future research on choice architecture will need to give greater weight to cognitive decline at older ages (see Section 5.2).

4.3 DESIGN BY TESTING: COVENANT AS AN OPPORTUNITY

Australian superannuation policy has established mandates and defaults for the accumulation phase. A major review had recommended taking defaults further, by reducing the choice set of default accumulation accounts to a '*best in show*' of the top ten low-fee, well-performing products (PC 2018). Following industry opposition, the move was rejected in favour of eliminating the long tail of underperforming funds (Mather 2018).

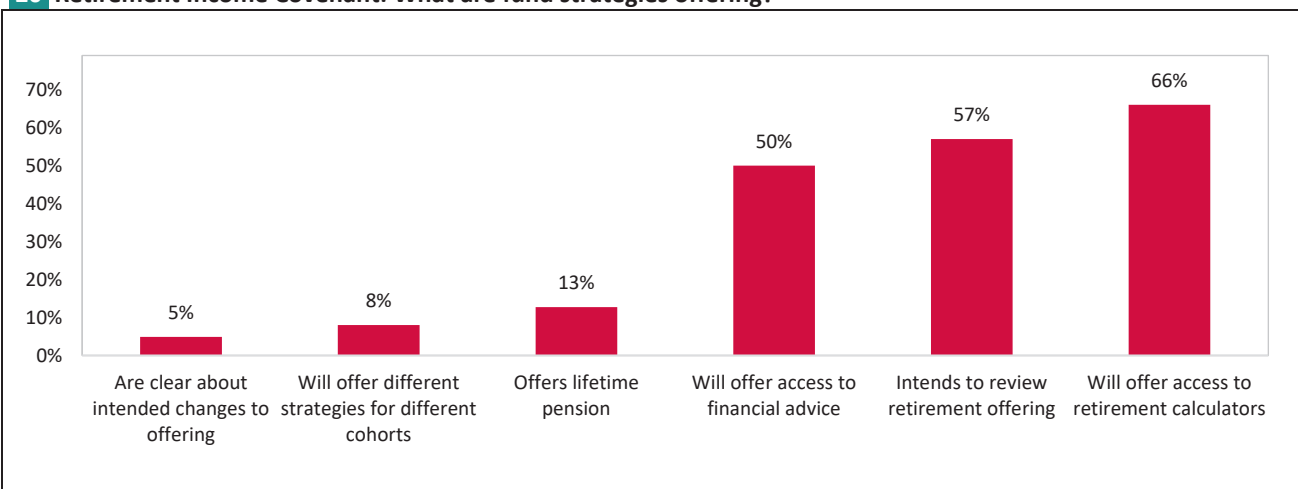
Similar events took place with respect to the decumulation phase. A recommendation to introduce new default retirement income products that combine flexibility with some longevity risk protection has been rejected (Treasury 2014). Instead, the government introduced a *Retirement Income Covenant* whereby trustees of superannuation funds must develop strategies to assist their members with retirement incomes.

The vagueness of the requirements is an opportunity for *design by testing*. This will allow providers to test out which approaches work best for different people, not just the average or representative member, and how different people respond to different nudges, including those with different health and care needs as well as financial literacy and cognitive abilities.

For example, the process could involve testing how retirees, who have a strong aversion to financial loss and loss of control, may or may not prefer products that offer guarantees and control of income and spending. So far, with new requirements in place for a few months, only 8% of strategies differ by cohort and 13% indicated the intention to offer 'lifetime pensions' including annuities. More than half of superannuation funds intend to make changes but only 5% know what they want to do (Mercer 2022; Fig 20).

Similarly, the design of other non-superannuation financial products may be expected to be subject to choice-architecture considerations. Under new outcomes-based obligations, financial product providers are required to design products that meet consumer needs, distribute them in a way that reaches the appropriate consumers, and monitor consumer outcomes.

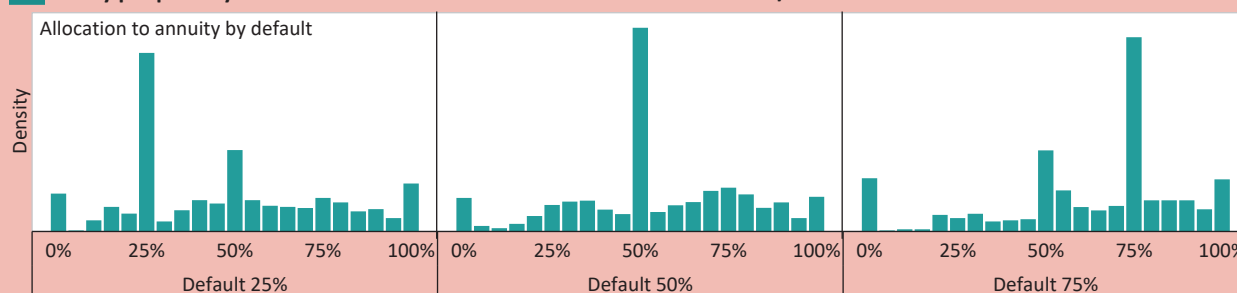
20 Retirement Income Covenant: What are fund strategies offering?



Source: Mercer 2022

Box 20 CEPAR research spotlight**The power of defaults in Australian superannuation**

CEPAR's Hazel Bateman, Susan Thorp, Christine Eckert, and Fedor Iskhakov looked at defaults and rules of thumb in annuity choice in an online experiment (Bateman et al. 2017). Participants were allocated different risks of running out of money and a slider showing different initial annuity allocations. In theory, those facing higher risks should annuitise more. Yet many stuck with the default or invested equally in the annuity and the risky asset. About 22% of choices relied on the default and 10% on naïve diversification. Lower education, wealth, and higher self-assessed (but not actual) financial literacy were associated with less annuitisation.

21 Many people stay with default annuitisation. Others use heuristics like 1/n or min-max allocations

Source: Bateman et al. 2017

CEPAR researchers also studied self-rated interest in superannuation and the extent to which it results in active choice (Bateman et al. 2014a). They found that active choices are rare (e.g., changing investments or accessing the account online). Less than a third moved out of the default balanced investment option. Active choice was associated with being older, male, a permanent employee, and having higher wages. This makes sense: such characteristics, except for gender, increase one's stake in super. Being interested doesn't mean active choices – some may 'choose' to stay with the default.

Dobrescu, Bateman, Newell, and Thorp (with other colleagues) modelled the effect of bad defaults, given the rate of choices away from default account types and portfolios (Dobrescu et al. 2018). The implications for wealth are large but varied. For example, since women are less likely to opt out, inappropriate defaults can deepen the gender wealth gap.

While interest and engagement are important, low levels of trust in the pension fund may be another factor at play. Bateman, Dobrescu, Newell, Thorp, and their colleagues (in Deetlefs et al. 2019) found that those less likely to recommend their pension provider to friends tend to make more active choices. In other cases, savers benefit from delegating financial decision making and focusing on their own job-specific skills instead.

Thorp and colleagues surveyed default superannuation customers to understand them better (Butt et al., 2018). The researchers distinguished passive members and members who actively chose the default. This is critical but typically unobservable from administrative data. The authors noticed that passive plan members tend to be younger, less wealthy, more risk averse and more likely to be female. Furthermore, there seems to be some mismatch between the 'real' situation of passive members and fund providers' perception. For instance, fund executives set higher risk exposure in default plan investment strategies than some would prefer. Additionally, passive members expressed that it wasn't interest that they lacked but skill; therefore, they preferred trusting their fund provider's default setting. The research results highlighted the difficulty of setting a single default for heterogeneous members.

Thorp and colleagues also interviewed funds executives to get their take (Butt et al., 2017). Executives in general portrayed default member needs as a priority and business needs as secondary or as constraints. They perceived default members as disengaged and poorly informed. Their strategy for MySuper design was generally paternalistic and tended toward a 'one-size-fits-all' approach (which, in fairness, is the legislative requirement) even though shortcomings of oversimplification were acknowledged. An argument could be made that accumulation, like decumulation, could benefit from greater customisation of defaults.

4.4 PRODUCT MENU

Good decisions require a good set of options – but not too many. In superannuation accumulation, policy has moved away from simplifying and reducing choices. In decumulation, most people use *account-based pensions*. The product menu for retirement could be broader and take into account different risks, including the risk to cognitive decline by reducing the need to make decisions at older ages (see Fig 22, Box 21). However, decision architects tread a fine line. The danger is too many options increasing complexity and costs (replicating problems observed in accumulation; PC 2018). A balance can be found by settling on a preferred set without closing off alternatives.

22 Potential product menu of decumulation products is broad with complicated risk protection trade-offs

Illustrative extent of risk coverage/protection of different decumulation products by risk type	Longevity risk protection	Investment risk protection	Inflation risk protection	Liquidity risk protection	Timing (or sequence) risk protection	Replacement rate (or price) risk protection	Counter-party (or provider) risk protection
Account-based phased withdrawal (min)	LOW	LOW	LOW	HIGH	HIGH	HIGH	HIGH
Account-based phased withdrawal (min-max)	LOW	LOW	LOW	MED	HIGH	HIGH	HIGH
Immediate fixed-income fixed-term annuity	LOW-MED	HIGH	LOW	LOW	LOW	MED	MED
Immediate inflation-indexed fixed-term annuity	LOW-MED	HIGH	HIGH	LOW	LOW	LOW	MED
Immediate fixed-income life annuity	HIGH	HIGH	LOW	LOW	LOW	MED	LOW
Immediate inflation-indexed life annuity	HIGH	HIGH	HIGH	LOW	LOW	LOW	LOW
Immediate variable life annuity	MED	LOW	MED	LOW	LOW	LOW	LOW
Immediate variable guaranteed annuity	HIGH	MED	MED	LOW	LOW	LOW	LOW
Group self-annuitisation (GSA)	MED	MED	LOW	LOW	LOW	HIGH	HIGH
Deferred inflation-indexed annuity	HIGH	HIGH	HIGH	LOW	LOW	MED	LOW
Phased withdrawal + deferred lifetime annuity	HIGH	MED	MED	MED	MED	HIGH	MED

Source: Authors' compilation. Note: Intended for illustrative purposes. Actual risk protection will depend on exact structuring of product.

Box 21 CEPAR research spotlight Product menu: Different options for different people

Longevity and care insurance: CEPAR's Hazel Bateman, Shang Wu, and Ralph Stevens used US data to explore the welfare gains of combined longevity and care insurance (Wu et al., 2022a). Their model captured a typical decision of how much to annuitise given preferences in consumption, bequests, and risks for investment, health, care, and mortality. The results revealed a significant benefit of life care annuities. This applied both to those that were healthy (i.e., via lower premiums rather than separate products) and unhealthy (via care coverage). Such benefits could increase demand for annuities by 12 percentage points, reducing precautionary savings and increasing retirement consumption.

Informal care insurance: Future care expenses are commonly cited as a reason for retirement underconsumption. Yet private care insurance is rare. What if the products need to be simpler and flexible enough to allow for informal carer payments? CEPAR researchers (Wu et al. 2022b) elicited preferences for such products and found that demand was higher for flexible care insurance compared to typical insurance. A large proportion of respondents said they would use this to release precautionary savings. Demand was stronger among women who plan to rely on informal care. Another benefit was an absence of adverse selection based on objective risk, allowing for good risk pooling.

Home equity release products: Another set of theoretically beneficial but underappreciated products consists of reverse mortgages. CEPAR researchers conducted surveys targeting older Chinese homeowners and their adult children to investigate the demand for home equity release products in China (Hanewald et al. 2020). They found solid demand for the products from older homeowners and support from adult children. Familiarity with the product, a good objective understanding of the product, and having constrained liquidity all contribute to greater interest.

Products with guarantees: Individuals often seek a combination of security and returns, which is something that guarantees in variable annuity products can deliver. CEPAR researchers have investigated these at length in projects led by Michael Sherris. Examples include *Guaranteed Lifetime Withdrawal Benefits* where the policyholder can withdraw funds (Fung et al. 2014); *Guaranteed Minimum Maturity Benefits* that offer a cooling-off period (Shen et al. 2016); and *Guaranteed Annuity Options*, where the annuitant can only receive the guarantee at the maturity of the contract (Ziveyi et al. 2013).

Too much choice? There are strong arguments for simplifying and limiting product choice to help people make better decisions and reduce choice fatigue. However, recent CEPAR research presented a counterexample (Keane et al, 2021). In the case of Medicare plans in the US, researchers found that removing 'bad' choices had negligible total value, despite systematic decision mistakes (see Box 14) for two reasons: (1) since such pharmaceutical insurance is heavily subsidised, even the worst combination of insurance premium and out-of-pocket costs is still better than no insurance at all; and (2) because of the vast heterogeneity in preferences, most plans will suit someone's needs.

4.5 INFORMATION AND DISCLOSURE: PEOPLE USE IT IN UNINTENDED WAYS

The complexity of financial information means that it can be used for nudges as well as *sludges* – the term Richard Thaler famously used to refer to exploitative nudges. That is, financial information is subject to an asymmetry between customers and financial institutions so its withholding and its presentation may be exploited at the expense of customers (Gabaix & Laibson 2006).

In the past, regulators have sought to correct asymmetries via disclosure requirements with less regard for how information was used and understood. Recent practice has seen greater simplifying and standardising efforts (Commonwealth of Australia 2011; ASIC 2022a). Requirements for superannuation accounts include a text description of the investment strategy, real-return target, strategic asset allocation, and risk. MySuper – designed to be simple and comparable from the start (Commonwealth of Australia 2012a, 2012b) – requires a one-page dashboard with information about fees and performance (ASIC 2014). Similarly, a one-page fact sheet has been proposed for retirement income products (Treasury 2018). New obligations also require financial product providers to assess actual and potential harms related to their products as part of their design and distribution processes.

Research can further inform and guide such efforts. Recent analyses have looked at how the type of information or format results in better choices and how information provision can trigger worse choices, over-reactions, or disengagement. For example, in choosing insurance plans, we know that people are too easily swayed by brand characteristics (Box 14), while with superannuation accounts they focus on broad asset allocation but not the risk-return trade-off (see Box 22).

Getting presentation right can have enormous benefits for both regulated and supportive information. Based on US research, Mitchell & Keim (2018) found that simplifying information about a DC pension can not only make choices easier, but can also reduce costs, with potential savings of over US\$9,000 per person over 20 years. In Australia, researchers also find that regulated dashboards have room for improvement (see Box 22), while those that have been developed and tested on potential customers, such as a Treasury-proposed fact sheet on annuities, have promise (see Box 22).

Risk remains one of the least well understood forms of financial information (Lusardi 2015; Yakoboski et al. 2021). In line with the established phenomenon of loss aversion, research confirms that presenting risk in terms of the frequency of loss (e.g., ‘*negative returns occur X years in every 20*’) has greater salience to consumers and results in worse choices (see Box 22). The presentation effect is so strong that even increased financial literacy does not completely offset it. When risk information was presented in a graph, table, or text, people understood the information in text best, even though it was not always the participants’ preferred medium (see Box 22).

The research also cautions against too much information. During times of market turmoil sending a letter to tell an account holder to remain calm triggered many to sell their risky assets, locking in losses (see Box 23).

Box 22 **CEPAR research spotlight** **Information: Regulated disclosure is not always well understood**

Projection info drives contribution decision: CEPAR researchers conclude that income projections have a significant effect (Smyrnis et al., 2021). Both in an online experiment and a year-long field experiment, people who saw retirement balance *and* income projections were more engaged and tended to contribute more money, more often.

Asset allocation info is misused in portfolio decisions: Disclosure requirements dictate the information you see when deciding between different super accounts that have different investments, risks, and fees. Bateman et al. (2016b), found that people naively thought they were diversifying their investment based on the shares in different assets and ignored actual risk-return information. Only when asset allocation info was removed, did they react more to risk-return trade-offs. This demonstrates that regulated information is not always used as expected.

Info simplification works for accumulation products: In Thorp et al., (2020), CEPAR researchers investigated how fee and return information presented on a single page in the MySuper product dashboard affected choices. They found that simplifying the dashboard led to a significantly higher rate of sensible choices. Still, some information had more weight. Most appeared to understand total fees in dollar terms, but not as a percentage of assets. They also detected deteriorating performance better than improving performance.

Simple decumulation product fact sheets help but some concepts remain difficult: CEPAR's Hazel Bateman and Inka Eberhardt conducted a survey to test pre-retirees' knowledge, perception, and choices of retirement income products after reading a fact sheet with standardised information (Bateman & Eberhardt 2020). Overall, annuity was most understood product, while the account-based pension, which is the dominant form in the Australian market, was least the well-understood product. Of the five information items — which included (1) average annual income; (2) product rating; (3) income shape over retirement; (4) access to capital; and (5) death benefits — access to capital was consistently least well-understood product feature.

Text presentations of investment return ranges were better understood: Bateman and colleagues looked at responses to different presentations of risk information. Participants were asked to rank three investment options (safe, mixed, and risky) in order of preference given various risk scenarios (Bateman et al. 2016a). The average return of each option stayed the same – 2% for safe, 3.25% for balanced, and 4.5% for risky – but the risk profile for each, as well as how this risk was presented, changed. In some cases, a graphical risk range was presented, while in others, the range was described in text (e.g., as either the chance of return falling within a range or frequency of gains and losses). The team tested the extent to which presentation was associated with irrational choices. They found that text was better than graphical presentation but that text descriptions of the frequency of negative or positive returns led to the highest incidence of mistakes. The worst performer was frequency of negative returns (e.g., *negative returns 7 years in every 20*), the presentation formally adopted by Australian regulators. Similar results were found by Bateman et al. (2015).

Higher financial literacy doesn't fully offset the presentation effect: In a similarly designed experiment, the researchers focused on the interaction between presentation and financial literacy (Bateman et al., 2014b). They found that even increased financial literacy cannot completely offset the presentation effect. It was also found that simply switching from textual range to graphical range led to more risky choices. Participants were more cautious with the left tail (e.g., *there is a 1 in 20 chance of a return below x%*) but more reckless facing the right tail (e.g., *there is a 1 in 20 chance of a return above y%*). It seems that people may not have the ability to capture the whole picture based on one-sided information. People find a full range easiest.

Decumulation product info was also better understood in text format: In testing people's understanding of information about decumulation products, CEPAR's Hazel Bateman and Inka Eberhardt also found that people best understood product information presented in text format. However, graphically emphasised text was key. Visually emphasised information of the risk rating (indicating protection from inflation, market, and longevity risk on a scale 1-7) helped participants correctly understand that annuity-based products are less risky. It also made annuities more appealing (Bateman & Eberhardt, forthcoming).

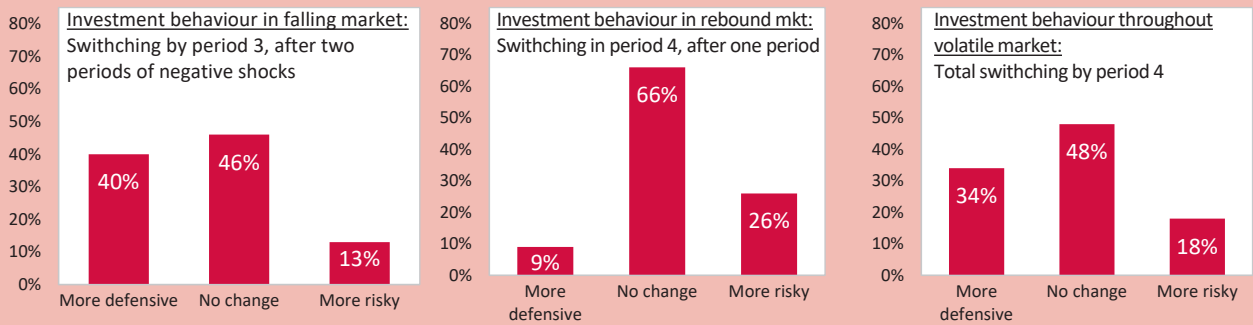
Box 23 **CEPAR research spotlight** **Engaging fund members to act: Too much of a good thing?**

When it comes to investment, offering information and encouraging people to take an active interest in managing their retirement assets may backfire and lead to worse financial outcomes. For example, recency of market information may loom large and prompt ‘excessive’ engagement with investments, overreacting to the latest headlines and leading to mistakes such as *chasing returns* (where past returns are used as a guide to future returns) or miss-timing additional investments. During market declines at the onset of the global pandemic, about 3% of members in a typical superannuation fund chose to switch their investments portfolio, with 80% of those switching moving into defensive assets. Doing so around the bottom of the market means that just two years later, their average losses totalled \$30,000.

A forthcoming paper by CEPAR’s Hazel Bateman, Inka Eberhardt, and Shang Wu (with a colleague) investigated this phenomenon (Bateman et al., forthcoming). The team looked at the levels of lab-based engagement that resulted from highly-volatile returns over three experimental periods and the interaction between these returns and diverse types of communication, including reassuring messages advising against switching investments, deterministic benefit projections, and goal tracking. All participants first experienced normal market returns, then two periods of negative shocks, followed by a recovery period. Market returns in the three latter periods varied between experiment participants. They started with an approximation of their real-world super allocations but could choose to switch and invest in six different investment options after each period. Despite being given information about investment risks, many participants appear to make their own implicit risk assumptions.

The results suggest that people engage with available information but make poor decisions, often switching to defensive assets *after* market declines. Figure 23 illustrates the switching behaviour throughout volatile market periods. After two periods with negative shocks, 40% of participants switched to a more defensive portfolio than what they held after the first period. In the positive market of the fourth period, 1 in 4 participants switched to a riskier portfolio. Over the course of the experiment, a third of participants ended up with a more defensive portfolio, and 18% with a riskier portfolio. Providing participants with a benefit projection or a goal tracker (that adjusts deterministically) do not reduce investment switching. Among choice members (i.e., those who are not in a default account in the real world), those invested in only one option were less likely to change their investment portfolio, while those invested in more than one option were more likely to switch. This suggests that some choice members are confident in their investment choices, while others might be naively diversifying and are more prone to *return chasing*. Financial literacy and numeracy were associated with a lower likelihood of switching to more defensive choices following shocks, suggesting that targeting such skills may be of benefit.

23 **Negative returns see people switching to defensive assets, often too late and often locking in losses**



Source: Bateman et al. (forthcoming)

As is noted throughout this brief, underlying such decisions is the interplay between deliberative responses (e.g., controlled and thought through) and impulsive responses (e.g., emotional, conditioned, and intuitive). To explore this, CEPAR researchers, led by Kaarin Anstey conducted an experiment (using a game of dice) with over 1,000 older participants (aged 72-78) where risks were made explicit (Sinclair et al. 2021). Those making better choices were more likely to be younger, male, and have higher scores on a test of verbal learning. Those making worse choices were more likely to also perform poorly on tests measuring the type of executive functions that help prevent people from overreacting emotionally.

Box 24 CEPAR research spotlight Information and effort: the right combination to improve outcomes

We are increasingly learning that boosting people's understanding of financial products at the point of decision is key. Recent CEPAR research investigating the demand for reversed mortgages in China reinforced this (Hanewald et al., 2020). The researchers improved the design of reversed mortgage products and presented them in a clear and comprehensive format, resulting in a surprisingly high acceptance of reverse mortgages among older Chinese homeowners (89%) and adult children (84%).

Among all retirement income products, the current mainstream offers in Australia and the Netherlands represent two opposite extremes in terms of flexibility: life annuities (or defined benefit income streams) and flexible income (account-based pensions). CEPAR's Hazel Bateman, Ralph Stevens, and Jennifer Alonso-Garcia (with a colleague) investigated people's understanding and relative valuation of these two products (Bateman et al. 2018b). Around 2,000 people aged 50–64 from these two countries participated in the online experiment. Their results revealed the power of timely, balanced information (Table 24) and opportunities to learn about the key features of retirement income products. Together, these can reduce the gap between 'willingness to pay for additional flexible income' and/or 'willingness to accept a drop in flexible income'. Greater understanding can also offset the framing effects.

24 An example of 'just-in-time' information

	Lifetime guaranteed income product	Flexible account product
How much income will I receive?	You and your partner will receive a regular income	You can choose how much to withdraw each month
How long do payments last?	Your regular income will be paid for as long as you or your partner live	You and your partner can continue to withdraw as long as your account balance is positive
What happens if my partner or I die?	If one of you passes away, the surviving spouse will receive the regular income, but the income will be reduced by one third (similar to the Age Pension)	If one of you passes away, any remaining money in your account will be left to the surviving spouse
What happens if I and my partner die?	If both you and your partner have passed away, there will be no inheritance for your dependents or your estate	If both you and your partner have passed away, the remaining money in your account will be inherited by your dependents or your estate
What happens if the prices of things I buy increase?	Your regular income is automatically adjusted to the price level	The amount you withdraw is not automatically adjusted to the price level. However, you can increase the amount you withdraw when the prices increase
What happens if there are market fluctuations (e.g., interest rates, share prices)?	Your regular income will be unchanged	Your account balance will fluctuate with financial markets
What happens if I live longer than expected?	As long as you or your partner live, you will receive a regular income	When you or your partner live long you may run the risk of outliving your account

Source: Bateman et al., 2018b

The importance of the combination of information and individual effort is also suggested in another CEPAR research project (Bateman et al., 2018a). The researchers found that *just-in-time* product-specific knowledge predicts people's ability to manage retirement income and minimise associated risks. Overall, good decisions rely on both people's cognition and their efforts in learning about the key features of retirement income products.

4.6 FINANCIAL INCENTIVES

As is clear from the research presented in this brief, many people are poor at maximising financial benefits. This doesn't mean that incentives don't matter. Economic incentives are still the underlying driver of decisions related to saving, spending, and investing, even if some pursue them unsuccessfully.

In Australian superannuation, tax treatment seeks to encourage voluntary retirement savings. However, there is a debate about the extent to which these simply change the allocation of assets as opposed to incentivising new savings, especially for those with higher incomes (Poterba et al. 1996; Venti & Wise 1991; Chetty et al. 2014; Feng 2014).

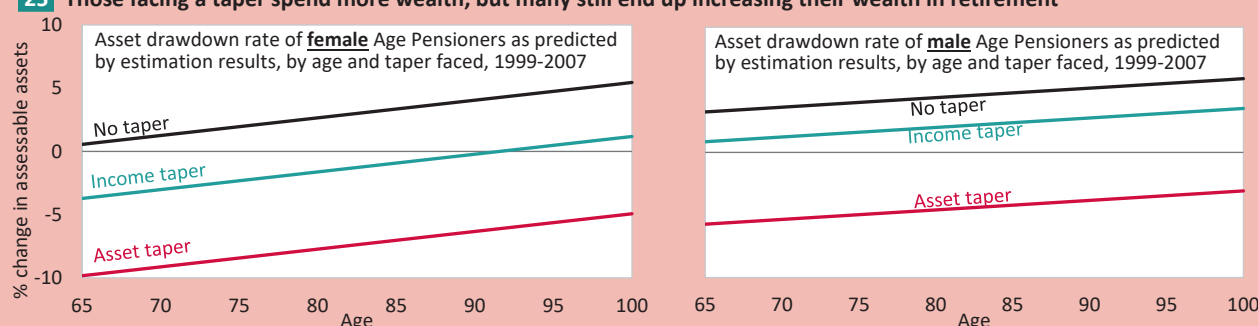
Sometimes better communication of incentives can make them work better. For example, the provision of projection of retirement income motivated people to save a greater proportion of earnings in super (see Box 22).

Box 25 CEPAR research spotlight Incentives matter, to an extent

While financial decision making is often imperfect, financial incentives still influence choices. One example is the Australian Age Pension means test. CEPAR's Ramona Meyricke, Susan Thorp, and Shang Wu (with Anthony Asher) found that those affected by means testing choose to drawdown faster, which then increases their Age Pension benefit (Asher et al., 2017).

In general, people spend their wealth faster early in their retirement and slower as they age. But there is a difference between full pensioners – who are unaffected by the means test – and richer, part pensioners, who can gain more pension by spending their wealth. Compared to full pensioners, part pensioners subject to the income test drawdown 3–4% faster and those subject to asset test drawdown 9–10% faster (Fig 25). This is the intention of the means test: to provide for those who have less and encourage others to use their own assets before relying on the pension.

Despite such incentives, however, the researchers found that most pensioners continue to ‘under-consume’ their wealth. For example, on average, full pensioners are saving more than they are spending, which increases in with age. The median pensioner left bequests (mainly financial) equivalent to 90% of the assets recorded at first observation.

25 Those facing a taper spend more wealth, but many still end up increasing their wealth in retirement

Source: Authors' analysis of Table 8 in Asher et al. 2017

Retirement and work decisions are also shaped by incentives dictated by system parameters, including those relating to pension eligibility ages and pension-related work incentives. CEPAR's Erik Hernaes, Simen Markussen, and John Piggott investigated how a series of policy reforms in Norway affected work incentives (Hernaes et al., 2016). They found that lowering the pension eligibility age but including a new actuarial adjustment that rewarded later retirement had no effect on labour supply. But when the earning test associated with pension was removed, there was an impressive increase in average labour supply: an increase of 30% and 46% of people working at age 63 and 64, respectively. The implication for Australia is that greater forgiveness of labour earnings could see more older people working.

In further research, Hernaes et al. (2021) considered the overall effect of flexible arrangements on retirement and hours worked. By analysing similar groups of workers before and after the reform (and controlling for income effects), the researchers found that the policies incentivised older workers remain in the labour force longer but work fewer hours. In addition, there was a decreased inflow to disability pensions. Overall, the results were encouraging for promoting a gradual exit from the labour market.

We know from behavioural economics that some incentives work better than others. Being entered into a lottery to win big seems to work best according to CEPAR's Inka Eberhardt (Bauer et al. 2022). She tested different incentives to get people to engage with their retirement savings account. Letters giving people peer information (e.g., *'a large proportion of people think they save too little'*) had little effect on getting them to check their balance. By contrast, the opportunity to win lottery-type prizes as a reward for checking had a significant impact. This was more so when the prizes were fewer but large (as opposed to many small prizes). Still, the financial incentive only activated people's behaviour of checking their account, not motivating them to save more or boost their pension knowledge.

In the past, tax incentives were used in decumulation to encourage Australians to annuitise their super in retirement (Chomik et al. 2018). Since all withdrawals are now tax free, there is little that tax incentives can offer in terms of encouraging a certain type of decumulation.

The Age Pension means test exerts certain incentives. Some of these operate in the direction of an intended outcome. For example, those who face the taper of the Age Pension means test spend their assets faster or accumulate savings slower (even though drawdowns are still slow enough to result in savings and unintended bequests; see Box 25).

Some Age Pension means testing incentives result in unintended consequences. For example, the exemption of the family home from the asset test means it encourages overcapitalisation in housing assets. And the availability of the Age Pension from a given age may incentivise many people to withdraw from the labour force earlier than might otherwise be the case (Gruber & Wise 2009). To remedy such poor labour market incentives, policymakers are experimenting with how earnings affect pension benefits (see Box 25).

4.7 FINANCIAL ADVICE

One way to overcome the complexity of financial decision making, especially if one's own financial or cognitive capability is low or waning, is to delegate financial judgement to financial advisers (Kim et al. 2016; 2017; see Box 27 on how SMSF members delegate many decisions to advisers). Customers could improve their outcomes with good, unbiased personal advice, improving wealth and minimising savings-related tax (Bhattacharya et al. 2012; Finke 2013). About 40% of Australians have accessed financial advice in their lifetimes (half of them at young ages; DPM&C 2020), though rates of accessing advice have recently declined.

Yet obtaining quality advice has its challenges. For a start, low or declining financial literacy and cognitive ability can in themselves compromise the process of acquiring, screening, and monitoring financial advice services (Box 26).

A major concern relates to the competence of financial advisers in retirement planning. Traditional technical skills and knowledge (e.g., accounting, investment, superannuation, and tax), may not be enough for longer term retirement planning (e.g., estimating retirement income, decumulation options, annuitisation, life expectancy, aged care, and estate planning). New standards and greater ministerial oversight aim to improve competence in this sector (ASIC 2022b; Treasury 2021).

Personal financial advice may also be conflicted and result in higher fees, poor investment performance, or over-trading (Inderst & Ottaviani 2009, 2012a, 2012b; Inderst & Ottaviani 2012; Hackethal et al. 2012; Anagol et al. 2017; Egan 2019). In the past, commission structures for advisers aligned with a financial institution may have seen them introduce only products from that institution. The incentives may be subtle. Even for independent advisers, if fees are charged based on assets held, advisers may be less likely to suggest one-off products (e.g., mortality insurance) since these require no further advice. Such a fee structure may be incompatible with helping retirees run down assets.

Indeed, a common complaint among consumers is that financial adviser recommendations maximise commissions instead of improving investment performance (Choice 2022). Only a third of Australian respondents expressed trust in the financial adviser industry in providing high-quality advice that meets their needs. Low trust and high cost may explain why older Australians are more likely to seek advice from families or even aged care providers than from financial advisers (Australian Government Productivity Commission 2015).

The *Future of Financial Advice* reforms in 2013 aimed to tame the commissions-based system to a professional service with an onus on advisers to put the interests of clients first (Bateman & Kingston 2012). This aim was further pursued in the fall out of a Royal Commission into financial misconduct (Hayne 2019). But higher standards and changes in fee structure have apparently caused many advisers to exit the market and increased the cost of advice, creating what some have called a *financial advice gap* (a similar pattern has been observed in the UK).

A new review, focused on the affordability and accessibility of advice appears to revisit some of the past changes (Treasury 2022d; 2022e). The rationale is that replacing the *best interest* duty with an obligation to provide 'good advice' would benefit the client at a lower cost. Another challenge is in the distinction between providing *factual information*, *general advice*, and *personal advice*, which attract different degrees of regulation (*intra-fund advice* given by superannuation funds is different again and restricted in scope). Where that distinction lands may determine the extent to which

providers of online tools such as robo-advice, forecasts, and calculators can offer good quality, partly tailored, limited-scope, affordable advice without onerous licensing and duties (see next Section on supportive technologies).

Most people don't know the legal boundaries of *financial advice* and often seek it informally from friends and family. They may search for information online, including on the Government's *Moneysmart* website, or access other free but less well-known, in-person services like the *Financial Information Service* through *Centrelink* or talk to a *financial counsellor* (a not-for-profit community-embedded service with exemptions from licensing but strict conditions).

Another broad strategy to deal with the financial advice gap could be to simplify the retirement income system so that less advice is needed (e.g., fewer accumulation products and fewer decumulation products as recommended by PC 2018 and Treasury 2014).

As things stand, the role of financial advice will continue to evolve. It should also attract research attention. For example, it's still unclear the extent to which advice is followed and implemented and the extent to which people follow different types of advice and to what net benefit.

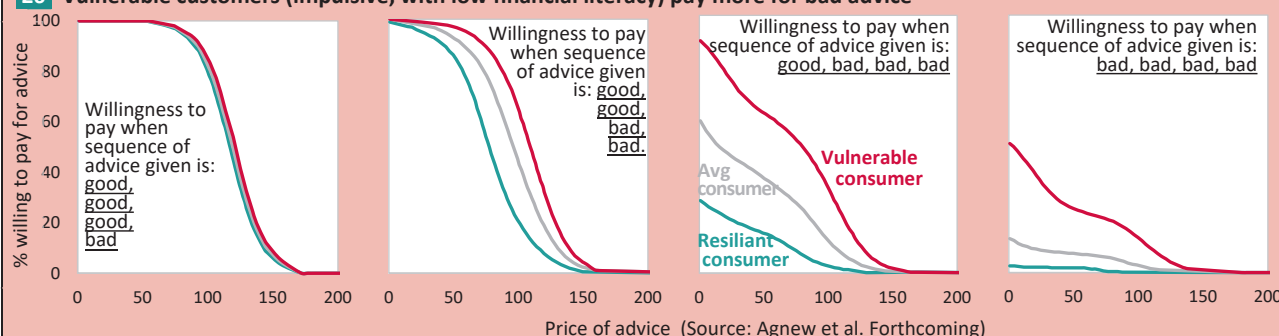
Box 26 CEPAR research spotlight The danger of bad financial advice

A recently published study by CEPAR's Julie Agnew, Hazel Bateman, Fedor Iskhakov, and Susan Thorp (with colleagues) found that more financial literacy and experience meant a lower likelihood of following bad advice (Agnew et al. 2018). But the differences were small. What's more the complexity of a topic increased the likelihood of even the financially literate and experienced making the wrong choice.

The researchers also concluded that first impressions mattered, and adviser credentials increased the likelihood of advice being followed, but that some consumers had difficulty discerning real credentials from fake ones – a problem that exists outside the laboratory as shown in the regular crackdowns on scam advisers in Australia. Perhaps most worrying and yet understandable was the finding that clients were unlikely to recognise and ignore bad advice from someone who had gained their trust in a previous interaction (for example, by merely agreeing with them).

In their follow-up research, Agnew et al. (forthcoming) provided a sketch of people who stick with bad financial advisers and pay for bad advice. In the perfect situation, people should only use questions that they find easy to decide whether a financial adviser is good or bad because those easy questions can provide them clear signals. However, the research found that most people also use ambiguous signals (using questions that they themselves find difficult) to confirm their belief about a financial adviser. Thus, there is a greater chance of confirmation bias. People who are impulsive and have limited financial skills are more likely to do this and pay for bad advice.

26 Vulnerable customers (impulsive, with low financial literacy) pay more for bad advice



Partner Investigator Olivia S. Mitchell and colleagues questioned whether even satisfactory financial advice is beneficial for seniors (Kim et al. 2017). They examined the trade-offs between the cost of delegating responsibility to a professional and the cost of self-management in the form of reduced leisure and work time. They find that the later the decision is made to delegate control of funds in one's lifetime the less beneficial it is to do so, and by one's 60s the benefits approach zero.

Box 27 CEPAR research spotlight SMSFs: Wanting control yet delegating decisions to advisers

CEPAR Associate Investigator Susan Thorp and colleagues surveyed SMSF members to understand the motivations and strategies for managing their super (Bird et al. 2018). For most, the idea to start an SMSF originated from their accountant, financial planner, or friend; and the key drivers included the desire to be involved in the management and investment choices of their super and the ability to minimise tax (Figure 27).

Yet many SMSF members have only partially satisfied these goals. The authors note that SMSFs vary so widely that it is hard to pin down any clear relationship between elements of SMSFs and overall member satisfaction.

Thorp and her colleagues also asked individuals what they found to be the most frustrating aspect of having an SMSF. While 21% of respondents reported that nothing was frustrating, 23% suggested that compliance and administration were the most difficult parts of running an SMSF.

Perhaps most interesting is that while respondents expressed the benefit of having control of their investments as the most important reason for having an SMSF, the majority delegated much of their operational and investment tasks to financial advisers and other professionals. This may not be a bad outcome, since SMSF members rarely realise that their actual levels of financial literacy are lacking (their literacy is lower than members in typical APRA funds).

27 Most/least important factors given in survey on reasons for starting an SMSF

Important factors	Unimportant factors
Can choose investments myself	Can purchase artwork and other collectibles in SMSF
Can manage fund myself	Previous fund was a poor communicator
Can minimise tax	Previous fund takes too little risk
Can have a better transition to retirement	Can borrow in SMSF
Can choose individual equities	Was entering retirement
Can invest in a wider variety of assets	Advised to set up SMSF by family/friend

Source: Bird et al. (2018).

In a follow-up paper, the team dug deeper into the attitudes and behaviours of current and former SMSF members (Thorp et al. 2021). Some behaviours were incongruent with good investing. For example, most people used their total account balance to evaluate performance rather than returns; few benchmarked performance against alternatives (e.g., in the non-SMSF sector), and when they did, the benchmarks were inappropriate (e.g., comparing to term deposits with no adjustment for risk). It's not surprising, then, that members overestimated how well their investments were doing. The authors suggest that the members may instead be gaining *illusory superiority* from their investment.

The authors also suggest that regulators could better support SMSF members in evaluating fund performance, including by providing guidance on computing risk-adjusted net returns and on what benchmarks to use.

4.8 SUPPORTIVE TECHNOLOGIES

Financial behaviour is intrinsically linked to modern technologies. Willingly or not, smartphones have become a tool for spending, saving, and investing. Over the last decade, the low costs and accessibility of FinTech have helped 1.2 billion people access financial services for the first time (World Bank 2021).

The technology has yet more potential to assist in financial decision-making given the chance. Greater customisation and sophistication may play a role, including via nudging techniques. Examples include credit card repayment reminders, available from many banks. Research has confirmed that such features indeed increase credit card repayment rates with long-lasting benefits (Box 28).

Supportive technology may be incorporated into existing platforms to help with just-in-time information at the point of decision; for example, via simple calculators and comparison aids when products or product features are being selected. Apps can play a role in boosting cognitive capacity by helping people identify their health risks and make plans to address them (Box 28).

Boosting could also take place via financial literacy educational tools or generic guidance (see Section 2.4). The Australian government, like those in other countries (Charles Schwab 2019; Consumer Financial Protection Bureau 2019; Strough et al. 2020), already provides the *Moneysmart* website, which has unbiased tools to help with financial management on various topics. However, at present, *Moneysmart* doesn't exist in a mobile app format, and the information may be too generic for some. How such technology evolves to provide more tailored information and advice will depend on the evolution of financial advice regulation (Treasury 2022e). With the right regulatory infrastructure, artificial intelligence could personalise information (e.g., perform financial health checks, help retirement planning, and adapt investment information based on risk preferences). Such FinTech could disrupt existing personal financial advice models and/or fill a gap in advice in the mass market. But there is still insufficient research to know how people use such tools and which tools work best.

Box 28 CEPAR research spotlight Money advice? Cognition concerns? There's an app for that

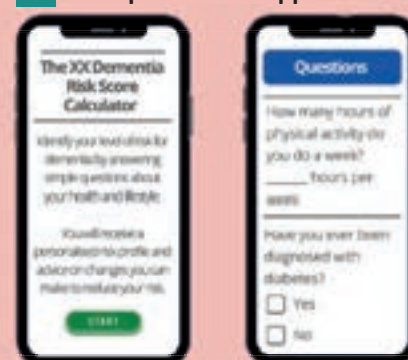
Mobile-based supportive technologies help us in many areas of life. Since we know that personal financial decisions are affected by cognitive factors, it would be valuable for consumers to self-diagnose any potential cognitive risks and promote cognitive health.

A team led by CEPAR's Kaarin Anstey has looked at the potential of such an app and/or website (Anstey et al. 2021b, 2022). This would rely on an algorithm based on the available literature and coefficient beta-weights calculated based on data from a specific study or meta-analyses. It would allow for the self-assessment of current risks but also the likely effect of changing one's lifestyle (see Fig 28). With questions or questionnaires typically used to assess dementia risk in clinical settings being packaged and converted into websites and smartphone applications, modern technologies are shortening the distance between the lab and real-world practice.

Supportive digital technologies can also help to nudge us toward sensible financial behaviours. CEPAR's Seda Peksevim assessed how behavioural insights can be incorporated into technological innovations. She suggests that there's potential for applications that boost users' saving accounts, promoting saving at the point of consumption, and FinTech applications that remind people to increase their pension contribution (Peksevim 2021).

CEPAR researchers have tested the efficacy of such approaches. CEPAR's Susan Thorp (and colleagues) analysed data from a randomised control trial to evaluate the impact of sending reminders to 30-days-overdue credit card users via an application or online portal (Campbell et al. 2022). The reminders significantly increased repayment rates among high-credit-score 'delinquent' debtors. Indeed, the effect lasted for at least 12 months after treatment. However, there was no significant effect found among those with lower credit scores.

28 Example risk tool app



Source: Anstey et al. 2021b

5. CONCLUSION AND RESEARCH GAPS – THINGS WE NEED TO KNOW MORE ABOUT

Whether decisions are made with the head, heart, or gut, it's easy for things to go wrong. Financial mistakes are more likely and more consequential when ageing, complexity, and large sums of money combine. The research presented here offers a variety of lessons and insights about boosting our knowledge and cognitive health for better deliberative thinking and adapting settings to biases so that our impulsive thinking gets us further.

5.1 LESSONS FROM PAST RESEARCH

We now know from empirical research that financial literacy can be improved with: (1) early exposure; (2) experiential learning; and (3) just-in-time education at the point of decision.

We also know that as the population gets older the share of people with cognitive impairment could increase. Cognitive health risks can be mitigated by: (1) evaluating and tackling risk factors related to lifestyle, diet, exercise, and cognitive engagement; (2) making contingency plans in case of future cognitive changes (e.g., simplifying finances, locking in financial products earlier, and via advanced care planning); and (3) dynamically delegating financial decision making to family and/or advisers (with appropriate safety mechanisms to prevent financial fraud and exploitation).

Furthermore, research in behavioural finance tells us that we can guide decisions by (1) reducing the choice set (e.g., providing fewer but higher quality products); (2) simplifying supportive information (e.g., making product disclosures that inform rather than confuse); (3) adding nudging information (e.g., anchoring suggestions and implicit endorsement); (4) timing of decisions and reminders; (5) coaching the decision; and (6) in the absence of choice, providing advantageous defaults or by outsourcing or sharing decisions with advisers or technology.

Many of the above are easier to identify than to implement. So, the process of *design-by-testing* is advised. This would involve online experimental surveys, lab-based experiments, and field testing that examine how people behave under different treatments. The approach is of relevance in the context of a new policy requiring superannuation providers to help retirees spend their savings with little guidance on how to do so. The policy is therefore an opportunity to design by testing.

5.2 QUESTIONS FOR FUTURE RESEARCH

As ever, such answers come with further questions. For example, since experiential just-in time financial literacy education works, how can it be best incorporated into work-based, late-career advice and planning? How can we better monitor the interaction between cognitive ability and financial vulnerability to uncover and mitigate the risk of exploitation? Another related gap is in our understanding of how families make decisions.

How can we further refine choice architecture for better autonomous, shared, and surrogate decision making, especially in light of superannuation policy changes? What are the net benefits of regulated financial advice and how can new FinTech applications fill the gaps in financial advice? And how can these decision supports be better tailored to sub-classes of decision makers (e.g., those from culturally and linguistically diverse communities) and consider future cognitive ageing and the risk of cognitive impairment?

Areas of decision making that were not covered in detail here are also worth focusing on. These include high-stakes, complex decisions related to aged care. For example, transitions in housing, health, and care are very different in the Australian context than elsewhere. It is unclear how such transitions are impacted by cognitive ageing and decline at different ages. Some findings in this area are expected soon based on a large Australian cohort led by Anstey. And a team led by Susan Thorp is working on mortgage decision making – a major household decision that has been notably absent from most studies of financial decision making.

Decisions are virtually never just financial and virtually never just individual. To deal with such complexity will require a lot more nuanced research. The field is expected to benefit from better linked datasets, greater use of technology, and new cross-disciplinary methods (e.g., neuroeconomics). Together, these will shed new light on old questions.

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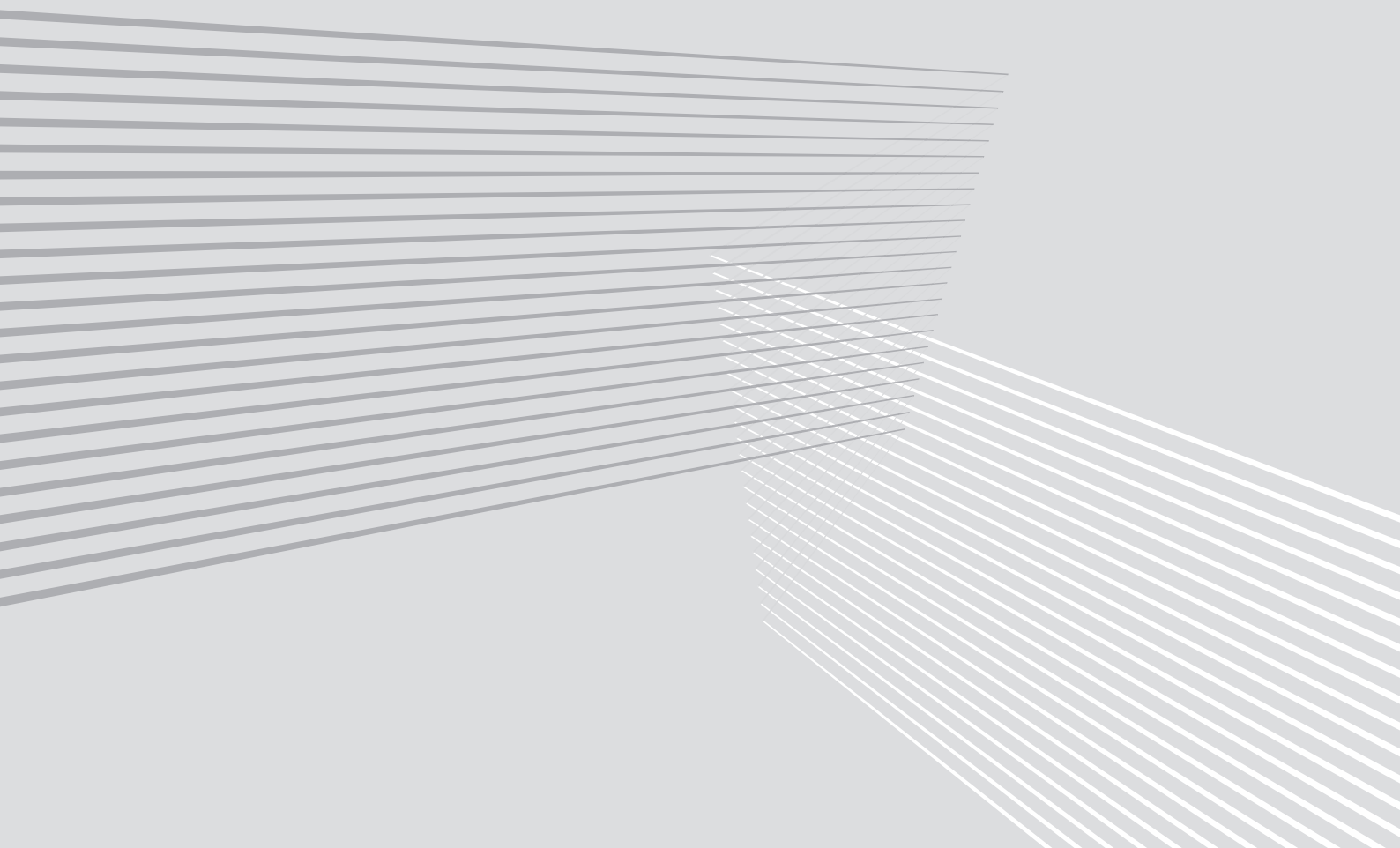
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About CEPAR

The ARC Centre of Excellence in Population Ageing Research (CEPAR) is a unique collaboration between academia, government and industry, committed to delivering solutions to one of the major economic and social challenges of the 21st century.

Funded primarily by an initial seven-year grant from the Australian Research Council (ARC), with generous support from the collaborating universities and partner organisations, the Centre was established in March 2011 to undertake high impact independent multidisciplinary research and build research capacity in the field of population ageing.

Renewed funding awarded for an additional seven-year term from 2017-2023 supports an exciting new research program which will deliver comprehensive outcomes with the potential to secure Australia's future as a well-informed nation with world-best policy and practice for an ageing demographic.

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