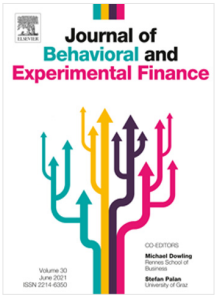

Defaults, disclosures, advice and calculators: One size does not fit all

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Keywords: default, information disclosure, pensions, regulation, consumer finance, choice experiment

JEL classification: G41, G51, D14

Defaults, disclosures, advice and calculators: One size does not fit all

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1. Introduction

Today's consumers have no shortage of choice when determining how and where they invest their money. Retail investors can allocate their capital across a wide range of investment assets, such as stocks, real estate, commodities—and more recently, cryptocurrencies. Investors can also choose who they invest their money with. Depending on the asset class, this might be the choice between trading platforms, currency exchanges, or retirement plan providers. Unfortunately, this abundance of choice can lead consumers to make poor financial decisions. A vast literature has emerged which documents the pitfalls of providing people too many options, both in financial and non-financial contexts (e.g., Agnew, 2006; Benartzi and Thaler, 2001; Brown et al., 2007; Huberman and Jiang, 2006; Scheibehenne et al., 2010).

In the case of investment-related decisions, consumers often struggle with comparing between complex financial products that vary in their expected risks and returns, as well as their associated fees.

In this paper, we investigate the effectiveness of different forms of guidance in helping consumers choose between retirement plan investment funds. Choosing a suitable investment fund is difficult for many consumers; it requires identifying an investment strategy that aligns with one's risk preferences and then comparing between one of the many providers on the menu or the market. It is thus no surprise that many consumers opt into suboptimal investments, which can have a significant impact on their eventual retirement balance. In Australia, where this study was conducted, it has been estimated that selection of a poorer-performing investment option or plan could reduce an individual's balance by as much as 45 percent at retirement (Productivity Commission, 2018).

As awareness of the difficulties experienced by consumers has grown, regulators have become increasingly involved in specifying how investment options are presented to consumers and what guidance should be provided (e.g., Australian Securities and Investments Commission and Dutch Authority for Financial Markets, 2019; Bateman et al., 2016; Kozup et al., 2008). For example, legislation was introduced in 2012 that required Australian retirement plans (known as 'superannuation funds') to designate one of their investment options as the default for new participants (see Butt et al., 2018; Cooper, 2010). Australian retirement plans must also provide product disclosure statements for each of their investment options, which outline key information such as asset allocation strategies, expected returns, and fees. Similar efforts to regulate the disclosure of investment products can be seen around the world—for example, with Summary Prospectuses in the U.S. and Key Investor Information Documents in Europe. Although these provisions are well-intentioned, they can be ineffective or may even inadvertently lead consumers towards poorer choices (Bateman et al., 2016; Beshears et al., 2011; Walther, 2015). This highlights the need to explore the nuances of how consumer guidance influences choices between retirement plan investment funds, and to better understand what does and does not improve decision outcomes.

Our study focuses on four types of consumer guidance commonly observed or required in retirement savings systems globally: defaults, disclosures, advice, and calculator tools. In the context of retirement plans, default investment funds are often chosen by consumers who consider themselves less

financially knowledgeable or who trust their retirement plan to recommend them a suitable investment (Butt et al., 2018). In theory, defaults should be designed to yield the greatest benefit for the most individuals (Smith et al., 2013). However, determining a default investment option is difficult in practice, where there is significant heterogeneity in consumers' financial needs and risk tolerances (Carroll et al., 2009). This becomes problematic when consumers view default options as endorsements from their plans (Brown and Krishna, 2004; McKenzie et al., 2006), even though the option may be unsuitable for their circumstances.

For a similar reason, disclosures can be both helpful and harmful to consumers looking for guidance when comparing between investment funds. Disclosures often take a 'one-size-fits-all' approach when aiming to facilitate comparisons between financial products. For example, Australian retirement plans are required to disclose the fees that would be incurred for each of their investment funds based on a representative balance (A$50,000). Although this may be helpful for consumers with balances close to the representative value, it provides little indication for whether a plan is equally cheap (or expensive) for consumers with lower or higher balances. Consumers may mistakenly assume that the fund that is cheapest for a A$50,000 balance is also the cheapest for their own.

Alongside defaults and disclosures, consumers often also have access to more tailored forms of guidance. Calculator tools are sometimes offered to support cost-related decisions (Johnson et al., 2013), as they allow consumers to input information specific to their own situation and receive personalized costs. For example, the Australian Taxation Office recently released a tool that compares the fees and historical net returns of similar investment plan options based on a consumer's current retirement balance. These tools are naturally helpful for straightforward calculations (e.g., calculating overall fees for an investment option), but are limited in their ability to help consumers navigate more complicated decisions (e.g., comparing between options that differ in investment strategy and fees). Consumers seeking personalized guidance can also request financial advice. However, use of advice can be costly (Foerster et al., 2017), is dependent on consumers' trust in the adviser (Lachance and Tang, 2012), and may not always yield better investment outcomes (Kramer, 2012)[1].

[1]See also Anagol et al. (2017); Bergstresser et al. (2009); Chalmers and Reuter (2020);

1.1. Overview of experiments

To investigate the effectiveness of these four types of guidance, we conducted two incentivized online experiments using a retirement fund choice task. In this task, participants were presented with four funds that followed the same investment strategy but charged different fees. Over multiple trials, participants were instructed to identify the fund which charged the lowest fees given their hypothetical retirement balance.

We focus on fees for three reasons. First, fees influence net returns and thus are an important consideration for any investment-related decision. Second, past research has found that despite their importance, fees are often overlooked or neglected by consumers when making investment decisions (e.g., Anufriev et al., 2019; Choi et al., 2010; Fisch and Wilkinson-Ryan, 2014). This is sometimes exacerbated by the use of complex pricing structures, which obfuscate the true cost of products from consumers and allow sellers to sell their products for a higher price (Carlin, 2009; Célérier and Vallée, 2017; Seim et al., 2017; White et al., 2019). Third, focusing on fees within our study ensured that there was an objectively correct retirement fund for participants to choose (Anufriev et al., 2019). This eliminated the possibility for participants to rationally choose a higher-cost fund—for example, if it better suited their preferences for risk or a particular asset class.

In Experiment 1, we assessed the influence of defaults, disclosures, and advice in helping participants identify the lowest-cost investment fund. Our findings indicated that advice was reliably helpful for participants, whereas defaults and disclosures were only situationally helpful. Participants were influenced by the defaults and disclosures regardless of whether it was appropriate for their circumstances. This motivated us to consider whether a more effective approach to consumer guidance would involve 'boosting' decision-making competency (Hertwig and Grüne-Yanoff, 2017) rather than relying on 'nudge-based' interventions (Thaler and Sunstein, 2008). Thus, in Experiment 2, we introduced tool-based guidance (smart calculators) and tested its effectiveness in supplementing the information-based guidance from our first experiment. This guidance again proved to be generally helpful in improving participants' performance in the fund choice task. However, these benefits did not persist once the guidance was removed.

Cici et al. (2017); Hackethal and Inderst (2013); Hoechle et al. (2017); Inderst and Ottaviani (2012a,b); Mullainathan et al. (2012).

Our paper contributes to a growing literature on the impact of providing consumer guidance on financial decision-making. While consumer guidance has the potential to help individuals make better decisions, our findings also highlight the pitfalls when guidance is designed with a 'one-size-fits-all' approach. This carries important implications for financial regulators as they consider what types of guidance to prescribe and how these should be presented to consumers.

2. Method

2.1. Participants

We recruited 1,018 participants for Experiment 1 (mean age = 45.52, SD = 12.80) and 1,203 participants for Experiment 2 (mean age = 43.15 years, SD = 14.01) from the online survey platform Pureprofile. Participants received a A$4.00 base participation payment and a bonus payment of up to A$8.00 based on their performance in the fund choice task.

Our intention was to recruit a sample that was representative of the Australian working age population (aged between 25 to 65). Appendix Table A1 compares the demographic characteristics of our samples with Australian population data. Our samples tended to have higher education levels but were more likely to be out of work (either unemployed or not in the labor force) and to have lower incomes. We also compared the financial literacy rates of our samples against a previous Australian survey sample (Agnew et al., 2013), which suggested that our samples were comparatively less financially literate (Appendix Table A2).

2.2. Fund choice task

In both experiments, participants completed 40 trials (2 blocks × 20 trials) of a fund choice task. During each trial, participants were presented with investment funds (options) from four retirement plans (see Table 1). Each fund charged a different flat fee (administration fee) and a variable fee (investment fee) that depended on participants' hypothetical retirement balance. There were 20 possible hypothetical balances, which ranged between A$5,000 and A$100,000 in increments of A$5,000. Each of these balances was presented once per block of trials in a random order. Based on this balance, participants were instructed to identify the investment fund that would charge the lowest fees. At the end of each trial, participants received feedback on whether they had chosen the lowest-cost fund. However, this

feedback did not indicate the correct answer for those who had chosen incorrectly. Participants also received 4 points per correct response and 0 points per incorrect response, meaning the highest possible score across the task was 160 points (4 points × 40 trials). These points were used to determine participants' bonus payment (1 point = A$0.05).

Table 1.
Investment options shown in fund choice task.

Fee per annum	Fund 1	Fund 2	Fund 3	Fund 4
Flat admin fee	A$30.00	A$160.00	A$290.00	A$420.00
Variable investment fee	1.00%	0.75%	0.50%	0.25%
Total fee on A$25K balance	*A$280.00*	A$347.50	A$415.00	A$482.50
Total fee on A$75K balance	A$780.00	A$722.50	A$665.00	*A$607.50*

Note. Fees calculated using A$25K and A$75K retirement balances as examples. Lowest-cost plan per balance indicated in italics.

The same four funds were used throughout the fund choice task. These funds were designed such that one fund (Fund 1) would charge the lowest fees when participants' balances were less than or equal to A$50,000, whereas another fund (Fund 4) would charge the lowest fees when balances were greater than A$50,000 (see Appendix B for further details). The A$50,000 threshold was chosen as it approximated the median retirement balance for the Australian working population (Association of Superannuation Funds of Australia, 2021) and also because of its use as a representative balance in current Australian retirement plan disclosures. To highlight that the fees were the only point of differentiation between the four funds, the task was explicit that each fund followed the same investment strategy.

2.3. Consumer guidance interventions

Depending on which experimental condition they were allocated to, some participants received additional guidance while completing the fund choice task (see Appendix C for task screenshots). Experiment 1 used a between-subjects design where participants were provided either defaults, disclosures, advice, or no guidance. In Experiment 2, participants could also receive access to a smart calculator, basic calculator, or no calculator. This was

crossed factorially with the conditions from the first experiment, resulting in a 4 (information-based guidance) × 3 (tool-based guidance) between-subjects design for Experiment 2.

2.3.1. Defaults

In Australia, retirement plans often design their default investment strategy based on the assumption that new participants tend to be younger and are therefore likely to have a greater tolerance for risk (Butt et al., 2018). Following similar logic, younger participants would likely have lower balances than the national median (A$50,000 in Australia's case), meaning Fund 1 would be the lowest-cost option out of our four hypothetical funds. For participants in the *Default* conditions, we thus pre-selected Fund 1 on every trial regardless of their starting balance. We advised participants that this fund was highlighted because it was the least expensive for most investors.

One implication of this design was that the default would be helpful for participants on half of their trials—when their balance was A$50,000 or less—but would be detrimental for the other half. Although we recognised that this default might influence participants to choose the incorrect fund on some trials, we intentionally refrained from explaining how the default had been determined (i.e., how 'most investors' had been defined) as this is usually the case in real-world settings. Consumers are typically not explicitly told how defaults have been chosen, which can make it difficult for them to know whether the defaults are suitable.

2.3.2. Disclosures

In the *Disclosure* conditions, participants were shown a message on each trial advising them that Fund 1 charged the lowest fees for balances of A$50,000. This was designed to mirror existing regulations that require Australian retirement plans to indicate their fees for a representative balance (A$50,000). As with the defaults, these disclosures would be helpful for half of the trials, but detrimental for the other half.

2.3.3. Advice

In the *Advice* conditions, participants were given the option to pay for advice from an adviser. This advice cost participants 1 point per trial it was accessed—reflecting the high search costs and adviser fees required to

obtain financial advice in the real world[2]. Upon paying for the advice, the lowest-cost fund would be highlighted for the participant[3].

2.3.4. Calculators

Similar to the *Advice* condition, participants in the *Smart Calculator* conditions could access a calculator tool which calculated the overall fund fee based on the retirement balance, administration fee, and investment fee inputted by participants. Participants paid 0.5 points per trial to access this calculator but could use it multiple times within a trial once paid for without incurring additional costs. Although smart calculator tools are often available to consumers free of charge, we chose to impose a small artificial cost within the experiment. Our rationale in doing so was that participants would otherwise have had no reason to not use the smart calculator on each trial, thereby guaranteeing a correct response and limiting our ability to draw meaningful conclusions.

In contrast, participants in the *Basic Calculator* conditions were given access to a simple calculator at no cost. This calculator helped to compute arithmetic operations but offered no guidance for how to calculate the total fee per fund. We included this condition to rule out the possibility that participants knew how to calculate the total fee but were having difficulty performing the calculation on their own.

2.4. Procedure

Both experiments followed a similar procedure. After consenting to participating in the experiment, participants were first asked to provide their age, date of birth, and gender. Following this, participants completed two blocks of the fund choice task. In Experiment 1, both blocks were completed with the support of the guidance interventions (or no guidance if participants were in the *Baseline* condition). In Experiment 2, guidance was only

[2]In Australia, the average cost of personal financial advice is estimated between A$2,600 and A$2,900 (Australian Securities and Investments Commission, 2020).

[3]Participants could choose to ignore the offered advice and select a different fund. Each trial where this occurred, participants' overall score would be reduced by 1 point (0 points for an incorrect answer, -1 point for accessing advice). If participants' final score at the end of the task was negative, this would result in a reduction of their A$4.00 base payment. However, this did not occur for any participants across either experiment; no participants ended the task with negative points and only on 2 percent of *Advice* trials did participants go against the offered advice.

provided in the first block—termed the 'Intervention stage'. During the second block—termed the 'Transfer stage'—all participants completed the trials without any additional guidance. Upon completion of both blocks, participants responded to a series of questions collecting information such as their demographic characteristics, financial and numerical competence, and risk preferences (see Appendix D for a list of measures used).

3. Results

3.1. Experiment 1

3.1.1. Influence of information-based guidance on overall task accuracy

We first compared participants' accuracy in the fund choice task based on what type of guidance they had been provided (Figure 1)[4]. Using OLS regression, we analyzed the number of correct responses participants provided during the task and controlled for individual-level characteristics captured in the post-task survey (i.e., demographics, financial and numerical competence, and risk preferences) (Appendix Table E2). The regression indicated that participants in the *Advice* condition performed the best—on average providing about six more correct responses (out of 40) than participants in the *Baseline* condition ($p < .001$). In contrast, participants in the *Default* and *Disclosure* conditions were not significantly more accurate than those in the Baseline condition (p's $> .75$). In a follow-up regression, we included interactions between the different guidance conditions and the individual-level characteristics. On average, participants with higher financial and numerical ability performed better in the task (p's $< .001$). However, the greater accuracy observed for more financially able participants was significantly reduced in the *Default* and *Advice* conditions (p's $< .05$). On the one hand, this might suggest that these conditions were particularly effective at boosting the performance of those with lower financial ability. On the other hand, at least in the case of the *Default* condition, it may instead have been the case that the guidance worsened the performance of participants with higher financial ability. No other interactions were found to be statistically significant.

[4]While our focus was on participants' accuracy across the task, we also report accuracy on a trial-by-trial basis in Appendix Figures E1 and E5. In Experiment 1 and the Intervention stage of Experiment 2, we observed improvements in accuracy for all conditions as the task progressed. However, participants' accuracy did not appear to improve over trials in the Transfer stage of Experiment 2.

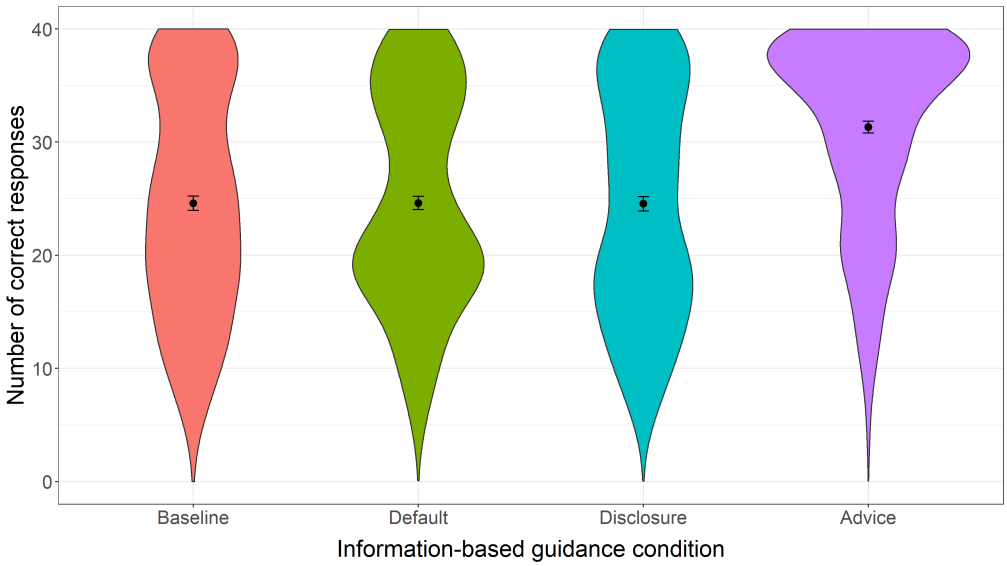


Figure 1. Violin plots of the number of correct responses (out of 40) in the fund choice task based on information-based guidance provided. Means and standard error bars indicated.

We suspected that the default and disclosure interventions did not improve overall task accuracy because they were only situationally helpful. Because they nudged participants towards selecting Fund 1 as the lowest-cost fund, this would only be helpful for half of the task's trials—when the balance was less than or equal to A$50,000. To investigate whether this was the case, we also examined participants' accuracy on trials as a function of whether the balance was above or below A$50,000.

As seen in Figure 2, the accuracy of participants in all conditions was lower for trials where their balance was greater than A$50,000, particularly for those in the *Default* and *Disclosure* conditions. Follow-up regressions indicated that participants in the *Default* and *Disclosure* conditions outperformed those in the *Baseline* condition on trials where the balance was less than or equal to A$50,000 ($p$'s $< .01$) (Appendix Table E3). However, these participants responded less accurately for trials where their balance was above A$50,000 ($p$'s $< .05$). In contrast, participants in the Advice condition outperformed the Baseline condition regardless of balance.

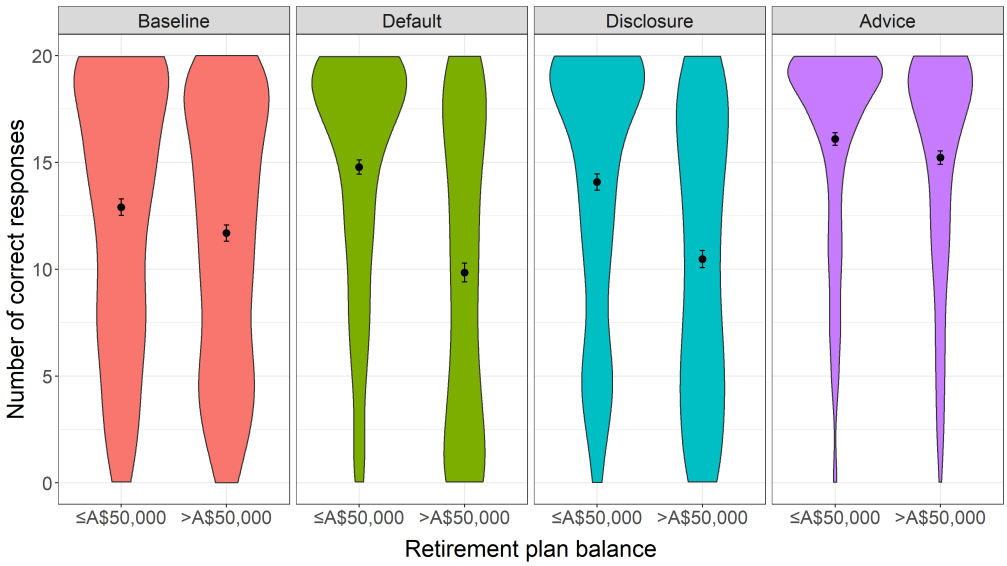


Figure 2. Violin plots of the number of correct responses (out of 20) on trials with balance above or below A$50,000 based on information-based guidance provided. Means and standard error bars indicated.

3.1.2. Use of advice

Finally, we focused on participants in the *Advice* condition and their use of the offered advice. We started by examining how frequently participants accessed the advice throughout the task. Nearly two-fifths (39 percent) of participants opted not to use advice on any of the trials ('non-users'), about one-third (35 percent) used advice on fewer than half the trials ('infrequent users'), and the remaining quarter (26 percent) of participants used advice on more than half the trials ('frequent users').

Using an OLS regression, we analyzed whether the number of rounds in which participants accessed advice was predicted by the individual characteristics captured in the post-task survey (Appendix Table E4). We found that advice was more frequently used by male participants ($p < .05$) and by participants with lower demonstrated financial ability ($p < .001$). However, participants' age, self-reported financial literacy, numerical ability, and risk preferences were not found to have influenced the frequency of advice use (Kramer, 2012)[5].

[5]See Stolper and Walter (2017) for a survey of the connection between financial advice-

We then investigated the relationship between advice use, task accuracy, and overall task performance. We observed a moderately positive correlation between how frequently participants accessed advice and their accuracy in the task, $r(254) = .31$, $p < .001$. This was unsurprising as the advice provided to participants within the task was guaranteed to be correct. Despite this, we also observed evidence that suggested many participants should have relied more on this advice. We determined this by comparing participants' final score in the task against a 120-point benchmark. This benchmark represented the minimum score that a participant in the *Advice* condition should have achieved. A participant with no ability to select the lowest-cost fund could access advice every trial and score 3 points per trial (4 points for a correct answer, -1 point for accessing advice) for each of the 40 trials. A participant with some ability to select the lowest-cost fund could forego advice on some trials, thereby avoiding the 1-point penalty and scoring higher than 120 points. This reasoning would naturally only hold true if participants were perfectly aware of their own ability to select the lowest-cost fund.

Instead, we found that nearly two-fifths (40 percent) of participants in the *Advice* condition scored fewer than 120 points. Furthermore, we observed this 'suboptimal' task performance irrespective of how frequently participants accessed advice, as shown in Figure 3. This was most prevalent in infrequent users, where over half (55 percent) of participant scored below the benchmark. About one-third (35 percent) of non-users and one-quarter (26 percent) of frequent users also scored below the benchmark.

taking and financial literacy. Collins (2012) finds that advice is often a complement to financial capability. See also Bhattacharya et al. (2012); Hackethal et al. (2012).

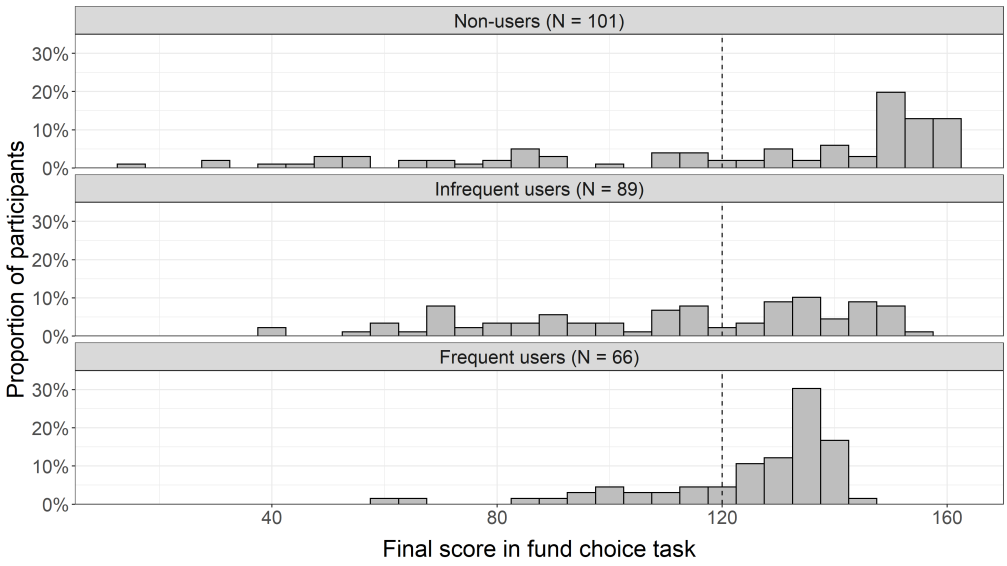


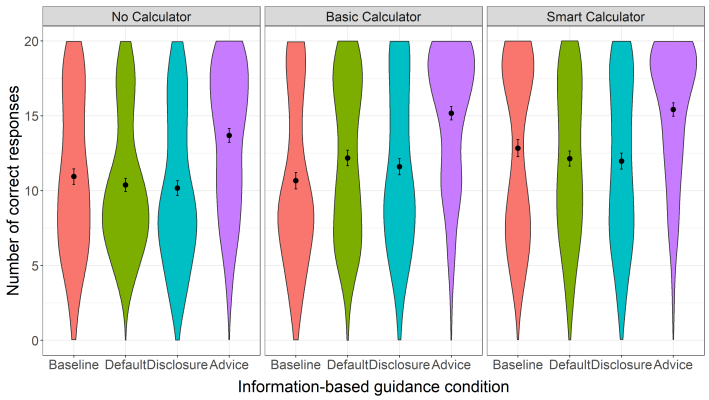
Figure 3. Final task score of participants in *Advice* condition by frequency of advice use. Dashed line indicates the 120-point benchmark.

3.2. Experiment 2

3.2.1. Influence of guidance during Intervention and Transfer stages

For Experiment 2, we separately examined participants' performance during the Intervention stage of the fund choice task (when they were provided guidance) and the Transfer stage (when the guidance was removed) (Figure 4).

(a) Intervention stage



(b) Transfer stage

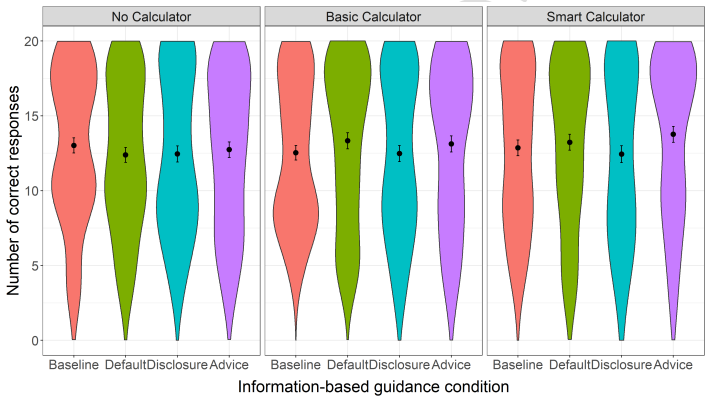


Figure 4. Violin plots of the number of correct responses (out of 20) in the Intervention and Transfer stages of the fund choice task by information-based and tool-based guidance conditions. Means and standard error bars indicated. Note that in the Transfer stage all guidance—defaults, disclosures, advice and calculators—were removed. The labelling in (b) remains in place for consistency to indicate the experimental condition participants were in during the Intervention stage.

During the Intervention stage, our findings regarding the influence of information-based guidance were consistent with the first experiment (Appendix Tables E6-E8). Firstly, participants averaged more correct responses when provided access to advice ($p < .001$) but not when given the default or disclosure (p's $> .48$). Secondly, we again observed that participants in the *Default* and *Disclosure* conditions performed better than the *Baseline* conditions on trials where the balance was less than or equal to A$50,000 ($p$'s $< .05$), but poorer on trials where the balance was greater than A$50,000 ($p$'s

$< .01$). Thirdly, we continued to observe a large proportion of participants who could have improved their overall task performance by accessing advice more frequently.

Our analysis also indicated that participants' accuracy improved when given access to the smart calculator ($p < .01$)—though this benefit was reduced for male participants ($p < .05$). In contrast, the basic calculator only led to improved performance for the participants with greater financial ability ($p < .05$). There were no significant interactions observed between any of the information-based and tool-based guidance conditions (p's $> .11$).

During the Transfer stage, we found that participants in all conditions exhibited similar levels of accuracy regardless of whether they had received guidance during the Intervention stage. There were no significant differences in performance for participants who had initially received information-based guidance (p's $> .41$), tool-based guidance (p's $> .60$), or any combination of the two (p's $> .20$).

One potential explanation for why we did not observe a carry-over effect of the smart calculator tool in the Transfer stage is that a large proportion of participants used it infrequently—or not at all—throughout the task (described further in the next section). As a result, the effectiveness of the smart calculator in boosting competency may have been diluted in our initial regression. We thus conducted two follow-up regressions to explore this possibility. We first included interaction terms between the calculator conditions and the number of trials in which participants accessed the calculator tool during the Intervention stage of the task. This indicated that participants' accuracy during the Transfer stage was not predicted by how frequently they used the calculator tool (p's $> .40$). We also conducted a regression where we excluded participants in the *Basic* and *Smart Calculator* conditions who did not access the calculator tool at least once during the task. However, there continued to be no significant differences in accuracy for either calculator conditions (p's $> .14$) nor their interactions with the information-based guidance conditions (p's $> .24$).

3.2.2. Use of calculators

As was done for advice in Experiment 1, we examined participants' use of the smart and basic calculators during the Intervention stage of Experiment 2. Our first observation was that both calculators were rarely accessed by participants—though they were accessed on slightly more rounds (out of 20) for participants in the *Smart Calculator* condition ($M = 2.59$, $SE = 0.27$)

than the *Basic Calculator* condition (M = 1.05, SE = 0.13), $t(585.97)$ = -5.16, $p < .001$. Across both calculator conditions, about three-fifths (60 percent) of participants did not access the calculators on any trials.

An OLS regression indicated that participants with higher demonstrated financial ability used the basic calculator more frequently ($p < .05$), but this relationship was not observed for the smart calculator (Appendix Table E10). Aside from this, frequency of calculator use was not predicted by any of the other individual characteristics we had captured. We did, however, observe a small positive correlation between how frequently participants accessed either calculator tool and their accuracy in the task, $r(797) = .19$, $p < .001$.

4. Discussion

4.1. Moving beyond mass defaults and disclosures

Our results from both experiments highlight the double-edged nature of providing defaults or disclosures that take a one-size-fits-all approach. Participants in our experiments were evidently influenced by the default and disclosure regardless of whether it was appropriate for their circumstances. This can be beneficial when there is a shared optimal decision for most decision-makers. However, as noted earlier, it can instead be problematic when decision-makers have highly heterogeneous preferences—as is the case for consumers choosing their retirement plans (Carroll et al., 2009).

In these situations, regulators may find that 'smart defaults' or 'adaptive defaults' are more conducive for guiding consumers towards better investment decisions. Smart and adaptive defaults are often proposed as alternatives to a single mass default (e.g., Butt et al., 2018; Goldstein et al., 2008; Smith et al., 2013); they share a similar approach in which they use information known about a decision-maker to determine which option is most likely to be optimal for them and should thus be presented as the default. Some Australian retirement plans already use this approach by offering 'life-cycle' or 'target-date' investment strategies as their default option (Butt et al., 2018; Chant et al., 2014). These investments adjust their exposure to risky assets based on participants' ages—investing initially in growth (higher risk) assets for younger participants and shifting this allocation towards defensive assets as their participants grow older. One option for regulators is to mandate that all retirement plans offer target-date funds by default. These funds attempt to address some of the heterogeneity in participants' investment preferences by assuming that their age proxies for their risk tolerance.

An alternative option is for regulators to extend the smart default approach further. Rather than requiring retirement plans to offer a single default investment option, regulators may instead require that information about new participants is first captured before a default option can be offered. For example, new participants could be asked to provide their age, level or risk tolerance, preference for socially responsible investments, and more. Based on these responses, retirement funds could then offer an informed default recommendation that is accompanied by an explanation for why this default is likely to be suitable. While this is not possible for Australian retirement funds under current legislation[6], this may be an approach for their international counterparts to consider.

Proposing a better alternative to disclosures is less straightforward. In the case of Australian retirement plans, fee disclosures must somehow cater for all possible investment balances. Some retirement plan providers have attempted to reach a compromise by providing fee disclosures for multiple balances, rather than for only the mandated representative balance. However, this fails to fully resolve the underlying problem whereby consumers will still not know how fund fees compare for their specific balance. Another potential solution is for regulators to mandate that retirement plans supplement their fee disclosures with worked examples. These could show consumers how the fee calculations are performed, thereby allowing them to easily substitute the representative balance with their own. A third possible solution is to remove the requirement for fee disclosures and to replace them with dynamic calculator tools that can calculate personalized fees for each consumer, which we discuss in the next section.

Perhaps this suggests that the more effective strategy for regulators is to mandate simpler fee structures than to rely on disclosures of fees that are inherently complex. Disclosures aim to facilitate comparisons between similar options and work best for investment products when fees and returns are structured simply. Managed funds are a good example; while they often charge consumers a range of different fees, the fees are typically all percentage-based (i.e., based on the consumers' investment balance) and thus can easily be combined and compared with each other irrespective of

[6]Australian retirement funds are required to offer a single default investment product for new plan participants (see Butt et al., 2018).

how much the consumer intends to invest[7]. In contrast, disclosures fail in the context of Australian retirement plan fees because the price competitiveness of each plan depends on how much is invested. Without addressing the underlying problem of complex fees or returns, regulators may find that there are few clear alternatives to disclosures that will lead to better consumer decisions.

4.2. Boosting competency with calculators?

Compared to defaults and disclosures, calculator tools have the advantage of being flexible and providing information that is tailored to the individual consumer. This helps consumers navigate investment decisions that would otherwise require complex calculations (Australian Securities and Investments Commission, 2014). In the case of our fund choice task, the accuracy rates of participants in our *Baseline* conditions (on average, around 60-70 percent) made it evident that many participants did not know how to combine the flat and variable fees to calculate the overall fee. The fact that this did not significantly improve when participants were given access to a basic calculator eliminated the possibility that participants did know how to perform the calculation but were unable to do it without the aid of a calculator.

This is where we had expected a smart calculator would instead prove helpful. We had provided the smart calculator with the expectation that it would show participants how to perform the fee calculation. We had hypothesized that in doing so, this would build their competency in calculating the fees and provide persisting benefits even when guidance was removed (i.e., during the Transfer stage of Experiment 2). The results from our second experiment were unable to support this. While we found that participants who received access to the smart calculator improved their accuracy during the Intervention stage of the fund choice task, this benefit did not carry over once access to the calculator was removed.

However, we refrain from drawing any definitive conclusions about the efficacy of smart calculators based on our data. As described earlier, over half of participants in our *Smart Calculator* condition did not access the calculator once throughout the task, and therefore had no opportunity to

[7]However, Walther (2015) found that by facilitating easier comparison between investment fees and returns, disclosures encouraged greater stock picking behaviour and lowered consumers' likelihood of diversifying their investments.

learn how to perform the fee calculation (if they did not know how to do so already). While our analyses suggest that this low uptake did not dilute the effect of the smart calculator, there are alternative possibilities that we cannot rule out. For example, it may have been the case that only participants with lower learning abilities were willing to pay to use the smart calculator. These participants may have struggled to carry over the learnings from the Intervention stage into the Transfer stage, resulting in the impression that the smart calculator tool was ineffective in boosting competency. In reality, however, it is possible that smart calculator tools are beneficial for individuals with average or high learning abilities. Thus, had the smart calculator tool been made available to all participants, we may instead have observed a significant boosting effect. Future work may seek to address such selection issues by reducing the cost of accessing the smart calculator or removing the cost altogether. We discuss these and other opportunities for future research in a later section.

4.3. Promoting uptake of financial advice

Another option for consumers wanting personalized guidance for their investment decisions is to seek out financial advice. Though this typically comes at a cost, it may be worth it for consumers with complicated or unusual financial situations, as well as for those who may lack the skill to make an informed decision. However, consistent with past research (e.g., Bhattacharya et al., 2012; Collins, 2012), our results suggest that many individuals may choose not to seek advice even when it would be beneficial for them to do so. A large proportion of participants in our *Advice* conditions across both experiments could have improved their overall task performance by relying more on the offered advice. This was particularly evident in the subset of participants we labelled 'infrequent users' of advice, in which over half of participants would have benefited from accessing advice more frequently. Similar to the smart calculator, this may have been partly driven by the salient cost of accessing advice. Along the same lines, participants may have overestimated their ability to identify the lowest-cost fund and therefore did not think it was necessary to incur the 1-point cost per trial to access advice. This is somewhat analogous to consumers reasoning that the improvements in investment returns from following financial advice would not outweigh the costs of an adviser (Australian Securities and Investments Commission, 2019). Although there has been previous research investigating

how to promote the uptake of financial advice (e.g., Amaral and Kolsarici, 2020), this remains another area ripe for further research.

4.4. Limitations and future directions

Aspects of our fund choice task may appear unrealistic and raise questions about the external validity of our findings or the conclusions we have drawn. In some cases, these artificial aspects further emphasize our main takeaways. For example, unlike in our experiment, it is not guaranteed that advisers will always provide the best recommendation for their clients. Advisers are susceptible to their own behavioural biases (Bergstresser et al., 2009) and may sometimes be incentivized to encourage products that are unsuitable (Anagol et al., 2017). This has been reported as one of the barriers that deters consumers from seeking out financial advice (Australian Securities and Investments Commission, 2019). Yet even when we guaranteed the advice would be correct—and we provided regular feedback to participants when they chose incorrectly—we continued to observe that participants failed to access advice as frequently as they should have. Thus, we could argue that our results perhaps underestimate the degree to which consumers underutilize advice in the real world.

Likewise, we constructed a highly specific scenario for our fund choice task—one in which multiple retirement plans offered the same investment strategy with differing fees. In reality, consumers must compare investment funds that differ not only in their fees, but their investment strategies, the reputation of the plan provider, and more. This only further complicates the decision process—increasing the need for consumers to be provided with guidance and making it even more critical for regulators to carefully consider how their mandates might affect consumers' choices.

At the same time, we recognise that there are also aspects of our task—for example, the costs imposed for participants seeking access to advice or the smart calculator—that do limit our ability to draw conclusions from our data. This is especially true for the smart calculator, which we required participants to pay for but is typically offered to consumers at no cost. As described previously, this introduces questions around the types of participants who would willingly pay to access the guidance, and whether the resulting selection effects complicate the interpretation of our findings. Future research may seek to test the effectiveness of both forms of guidance when made freely available to participants, as well as when offered at different prices. This would firstly demonstrate whether the interventions are

effective when participants can freely access them. Additionally, it may yield interesting insights as to participants' preferences between the interventions (if priced equally) and participants' maximum willingness to pay for either.

5. Conclusion

In this paper, we set out to improve our understanding of how different forms of consumer guidance can influence investment-related decisions—specifically within the context of choosing between retirement plans. Our experimental results yielded three key insights. First, defaults and disclosures are highly influential, which can be problematic if they are designed generically despite the heterogeneity in consumers' investment needs. Second, financial advice can be helpful for consumers who lack the skill to make complex investment decisions but may not be sought out because consumers are overconfident or view the cost as prohibitive. Third, calculator tools can also be helpful, but further research is needed to understand whether they build consumers' competency for similar decisions in the future. These findings highlight important considerations for financial regulators and retirement funds seeking to help consumers make better retirement planning choices.

Appendix A. Sample representativeness

Table A1.
Comparison of participant sample demographic characteristics with Australian population.

Variable	Population (%)	Experiment 1 (%)	Experiment 2 (%)
Age			
20-29	21.4	13.9	21.7
30-39	21.6	21.3	22.1
40-49	20.9	22.7	19.9
50-59	19.7	24.7	19.3
60-69	16.4	17.4	17.0
Gender			
Female	50.7	49.7	49.5
Male	49.3	50.3	50.5
Marital status			
Never married	30.6	28.0	32.3
Widowed	2.2	1.6	1.7
Divorced/Separated	11.5	11.3	10.3
Married/De facto	56.4	59.4	55.7
Work status			
Employed (Full time)	47.4	38.2	44.0
Employed (Part time)	22.0	22.4	20.2
Unemployed	4.8	9.9	7.3
Not in labor force	25.9	29.5	28.5
High school completion			
Year 12	62.9	72.9	75.6
Year 11	9.3	8.2	7.8
Year 10	19.9	14.4	14.0
Year 9	4.3	2.8	1.7
Year 8 or less	2.9	1.6	0.7
Did not go to school	0.8	0.1	0.2

Continued on next page.

Variable	Population (%)	Experiment 1 (%)	Experiment 2 (%)
Tertiary qualification			
Postgraduate	6.3	10.2	9.9
Graduate Diploma/Certificate	2.6	6.1	5.7
Bachelor Degree	19.7	25.6	25.7
Vocational Diploma	11.1	14.8	15.0
Vocational Certificate	19.4	19.1	20.4
None of the above	40.9	24.2	23.4
Gross personal income			
Negative or no income	7.8	10.0	8.1
A$1 to A$20,799	17.5	21.3	22.4
A$20,800 to A$41,599	24.3	23.4	21.1
A$41,600 to A$64,999	21.2	18.7	18.7
A$65,000 to A$103,999	18.5	18.7	19.1
A$104,000 or more	10.8	8.0	10.6

Note. Source for population statistics: Australian Bureau of Statistics Census of Population and Housing, 2016.

Table A2.
Comparison of participant sample financial literacy with previous Australian survey sample.

Financial literacy question	Previous sample[a] (%)	Exp 1 (%)	Exp 2 (%)
Interest rate	83.1	75.7	75.8
Inflation	70.8	61.8	60.1
Risk diversification	54.7	53.3	49.0

Note. Financial literacy questions originally developed by Lusardi and Mitchell (2011). [a]Financial literacy rates reported in Agnew et al. (2013) based on a representative Australian sample also drawn from Pureprofile.

Appendix B. Total fees per fund

Each of the four hypothetical funds charged a flat administration fee and a variable investment fee as outlined in Table 1. To calculate the total fee per fund, participants needed to perform the following calculation:

$$\text{Total Fee} = \text{Administration Fee} + (\text{Retirement Balance} \times \text{Investment Fee})$$

For example, the total fees for Fund 1 for a participant with a retirement balance of A$25,000 would be calculated as follows:

$$\text{Total Fee} = \text{A\$30} + (\text{A\$25000} \times 1.00\%) = \text{A\$280}$$

Figure B1 illustrates the total fees per fund for each possible retirement balance included in the fund choice task. For balances of less than or equal to A$50,000, Fund 1 charges the lowest total fees. For balances of greater than A$50,000, Fund 4 charges the lowest total fees.

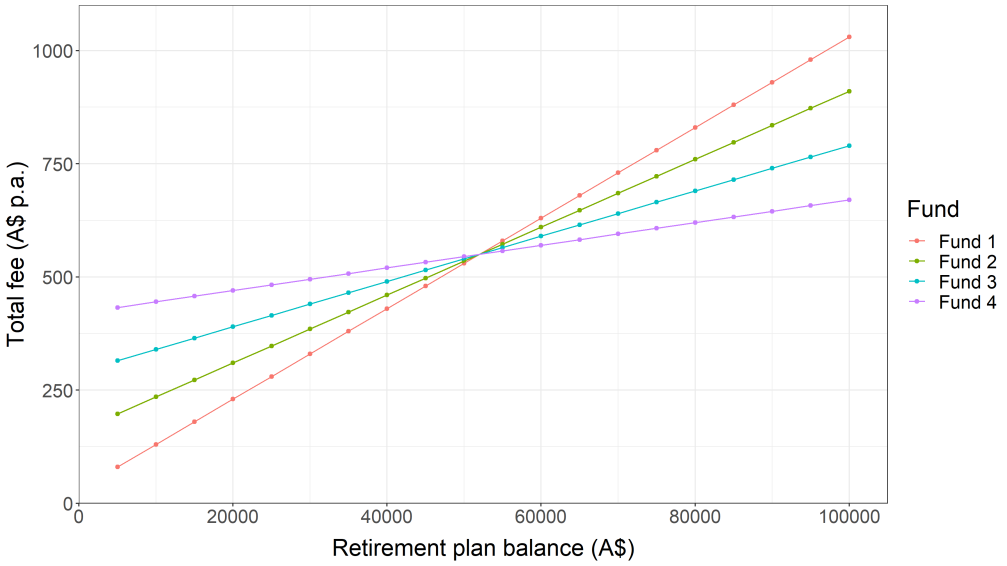


Figure B1. Total fees per fund per possible balance in fund choice task.

Appendix C. Fund choice task screenshots

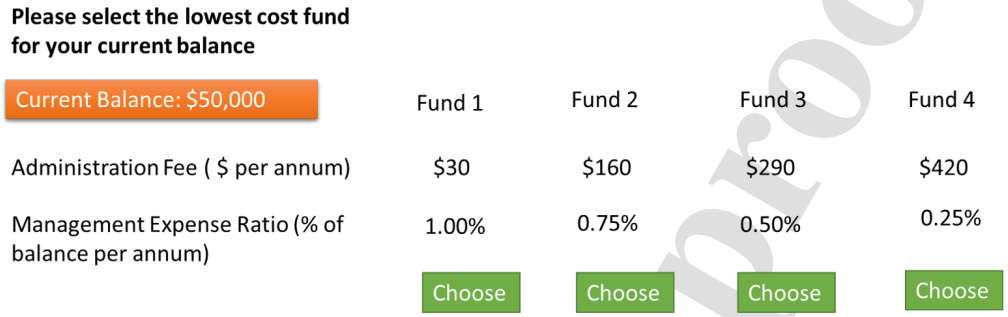


Figure C1. Example screenshot of Baseline conditions.

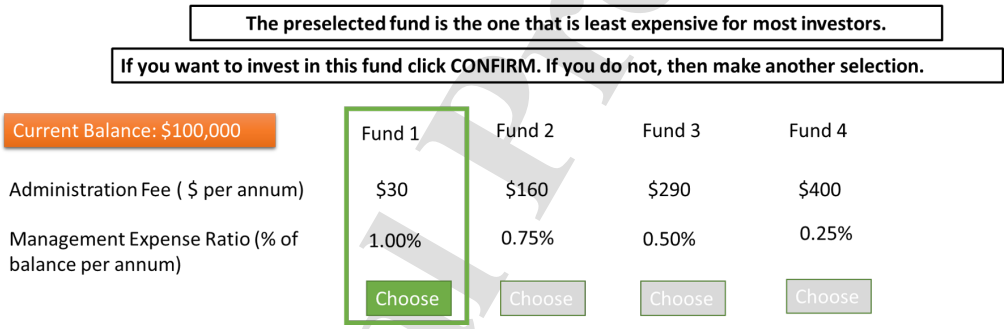


Figure C2. Example screenshot of Default conditions.

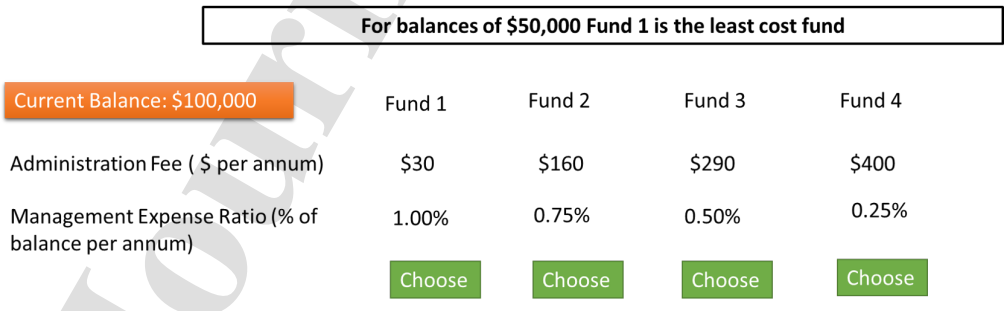


Figure C3. Example screenshot of Disclosure conditions.

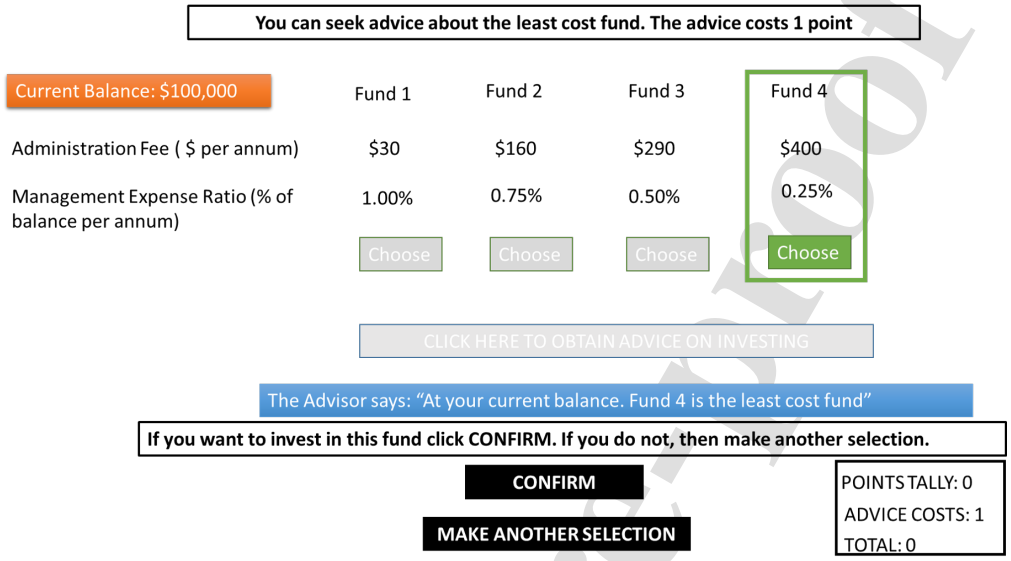


Figure C4. Example screenshot of Advice conditions.

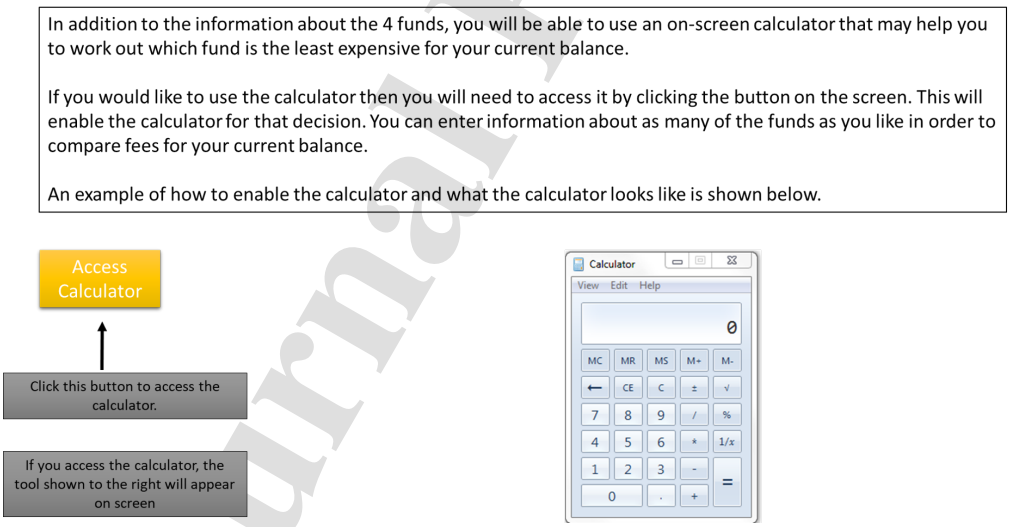


Figure C5. Instructions for Basic Calculator conditions.

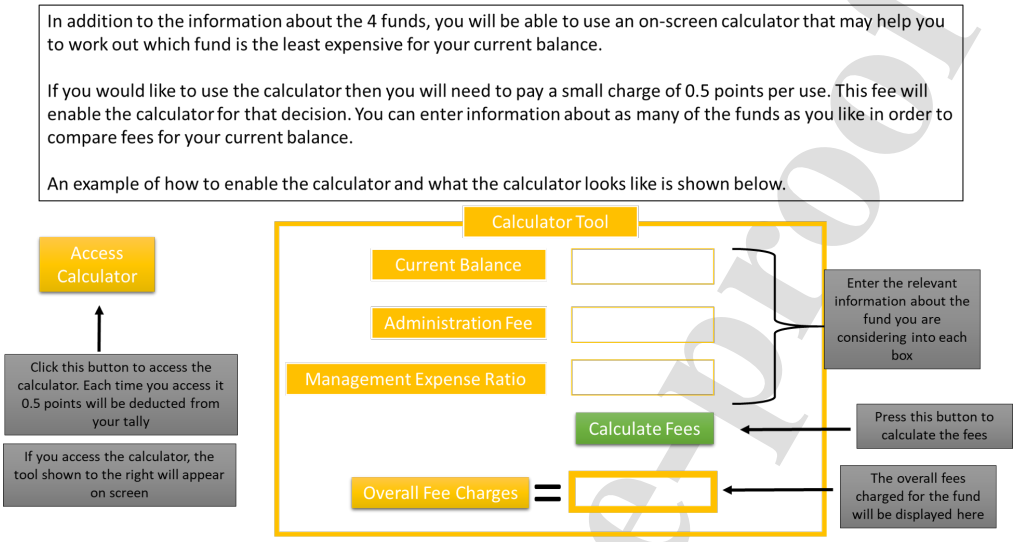


Figure C6. Instructions for Smart Calculator conditions.

Appendix D. Questionnaire

Appendix D.1. Financial competence, numeracy and preferences

Self-ratings of financial literacy:
Q1. On a scale of 1 to 7, where 1 means very low and 7 means very high, how would you assess your understanding of finance?

Financial ability:
Participants received a score between 0 and 3 based on the number of correct responses provided (indicated in bold).

Q2. Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?

- **More than $102**
- Exactly $102
- Less than $102
- Do not know

Q3. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?

- More than today
- Exactly the same
- **Less than today**
- Do not know

Q4. Buying shares in a single company usually provides a safer return than buying units in a managed share fund.

- True
- **False**
- Do not know

Numerical ability:
Participants received a score between 0 and 3 based on the number of correct responses provided (indicated in brackets).

Q5. Imagine that we rolled a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up even (i.e. 2, 4 or

6)? [500]

Q6. In a lottery, the chance of winning a $500 prize is 1%. What is your best guess of how many people would win the prize if 1,000 people each buy a single ticket in the lottery? [10]

Q7. In a raffle, the chance of winning a car is 1 in 1,000. What per cent of tickets in the raffle win a car? [0.1%]

Financial product knowledge:
Q8. Have you heard of the following? [Yes/No]

- Bank/credit union transaction accounts
- Bonds
- Shares (stocks)
- Managed funds
- Private health insurance
- Life insurance
- Superannuation accounts

Trust in the financial services industry:
Q9. Please read each of the 4 statements below, and then rank them from 1 to 4; where (1) is for the statement that least describes how you feel about the financial services industry, and (4) is for the statement that most describes how you feel about the financial services industry.

- Generally, the financial services industry does what is best for their customers
- For the most part, the financial services industry is trustworthy
- The financial services industry tends to have their own business interests in mind
- Fees and commissions influence the service that the financial services industry gives to their customers

Self-ratings of risk-taking:
Q10. Are you generally a person who is fully prepared to take risks in financial matters or do you try to avoid taking risks? Please tick a box on the scale, where the value 0 means 'unwilling to take risks in financial matters' and the value 10 means 'fully prepared to take risks in financial matters'.

Self-ratings of patience:
Q11. Are you generally an impatient person, or someone who always shows great patience? Please tick a box on the scale, where the value 0 means 'very impatient' and 10 means 'very patient'.

Appendix D.2. Demographics and personal characteristics

Q12. What is your marital status?

- Never married and not living in a long term (de facto) relationship
- Widowed
- Divorced
- Separated but not divorced
- Married
- Living in long term relationship (de facto)

Q13. Who is most responsible for the major financial decisions in your household?

- You
- Someone else
- You and someone else are equally responsible

Q14. How many people in your household do you fully or partially support financially?

- 1 (yourself)
- 2
- 3
- 4 or more

Q15. What is the highest level of school you have completed?

- Year 12 or equivalent
- Year 12 or equivalent
- Year 11 or equivalent
- Year 10 or equivalent
- Year 9 or equivalent
- Year 8 or equivalent
- Year 7 or equivalent
- Year 6 or below
- Did not go to school

Q16. What is the highest post school qualification you have?

- PhD
- Master Degree or equivalent
- Graduate Diploma and Graduate Certificate from university or equivalent
- Bachelor Degree or equivalent
- Advanced Diploma and Diploma from university/TAFE or equivalent
- Certificate or equivalent from TAFE or equivalent
- None of the above

Q17. Which of the following best describes your current work status?

- Employed full time
- Employed part time
- Unemployed
- Not in the labour force-Stay-at-home parent or caregiver
- Not in the labour force- Full-time student
- Not in the labour force-Retired
- Not in the labour force-other

Q18. Which of the following categories best describes your weekly (annual) gross personal income (before tax)? *Note: Figures in Australian dollars.*

- Negative income
- Nil income
- $1-$199 ($1-$10,399)
- $200-$299 ($10,400-$15,599)
- $300-$399 ($15,600-$20,799)
- $400-$599 ($20,800-$31,199)
- $600-$799 ($31,200-$41,599)
- $800-$999 ($41,600-$51,999)
- $1,000-$1,249 ($52,000-$64,999)
- $1,250-$1,499 ($65,000-$77,999)
- $1,500-$1,999 ($78,000-$103,999)
- $2,000 or more ($104,000 or more)

Q19. Which of the following categories best describes your weekly (annual) gross household income (before tax)? *Note: Figures in Australian dollars.*

- Negative income
- Nil income

- $300-$399 ($15,600-$20,799)
- $400-$599 ($20,800-$31,199)
- $600-$799 ($31,200-$41,599)
- $800-$999 ($41,600-$51,999)
- $1,000-$1,249 ($52,000-$64,999)
- $1,250-$1,499 ($65,000-$77,999)
- $1,500-$1,999 ($78,000-$103,999)
- $2,000-$2,499 ($104,000-$129,999)
- $2,500-$2,999 ($130,000-$155,999)
- $3,000-$3,499 ($156,000-$181,999)
- $3,500-$3,999 ($182,000-$207,999)
- $4,000-$4,999 ($208,000-$259,999)
- $5,000 or more ($260,000 or more)

Q20. Your wealth is what you own (your assets) less what you owe (your debts). We are going to ask you about your wealth in two parts. First we will ask you about the assets you own. We will then ask you about the debts that you owe. Think about what you own. These are your assets. Some examples of what you could own (your assets) include:

- (Cash) bank accounts, currency, CDs, notes.
- (Fixed interest) bonds, debentures, term deposits.
- (Equities) shares, units in trusts, mutual funds, warrants, convertibles, derivatives.
- (Property - own home)
- (Other property) listed and unlisted property trusts, investment properties.
- (Superannuation) in defined benefit funds, accumulation schemes, large superannuation funds, self-managed superannuation funds.
- (Private businesses) farms, family businesses etc.
- (Other) such as collectibles, home contents, vehicles.

For each of these assets, please enter their approximate value. You should report the current value of these assets, without deducting any debts.

Q21. Now think about what you owe. These are your debts. Some examples of what you could owe (your debts) include:

- Outstanding credit card or store card balances
- Car loans, hire purchase agreements or other personal loans

- Home loans (mortgages)
- Loans to purchase investment properties or other investment loans (such as loans to buy financial assets or shares)
- Overdrafts or business loans
- Other loans (such as, amounts you borrowed from family or friends but excluding HECS/HELP)
- I don't have any debts

For each of these debts, please report the approximate amount outstanding.

Q22. Do you have HELP(HECS) debts or other student loans? [Yes/No]

Q23. What is your outstanding debt? (in $)

Q24. Please indicate how well each of the following describes you
[A lot/Somewhat/A little/Not at all]

- Organised
- Responsible
- Hardworking
- Careless
- Thorough

Q25. Please tell us how often you do each of the following:
[Very often/Often/Sometimes/Rarely/Never/Don't know]

- Spend too much money
- Buy things on impulse
- Buy things you hadn't planned to buy
- Buy things you don't really need

Appendix E. Additional results

Appendix E.1. Experiment 1

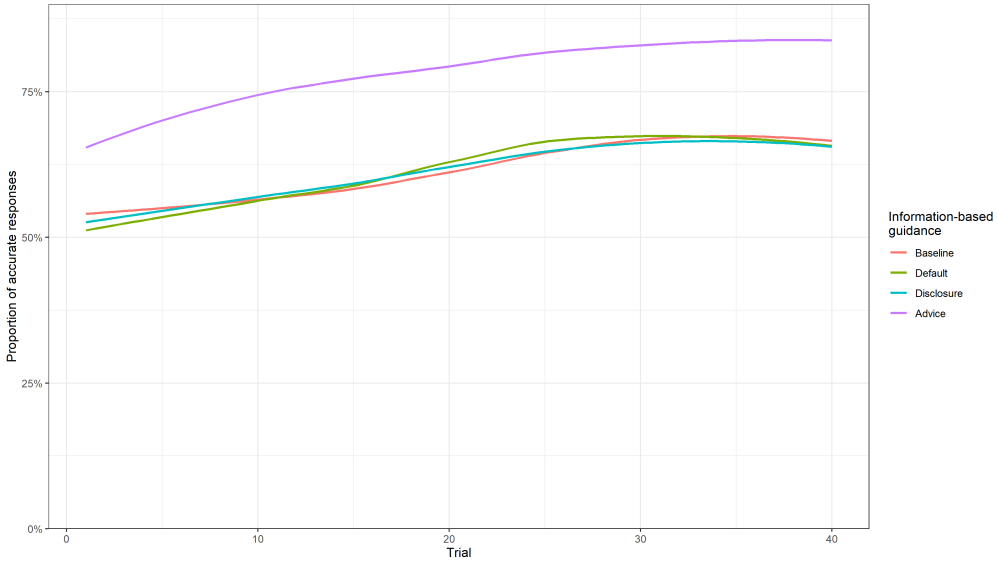


Figure E1. Smoothed task accuracy across trials in the fund choice task by information-based guidance conditions.

Table E2.
OLS regression of number of correct responses in fund choice task by information-based guidance condition.

	Number of correct responses (out of 40)	
	(1)	(2)
Constant	12.044*** (1.371)	11.387*** (2.689)
Default	−0.221 (0.713)	3.012 (3.913)
Disclosure	0.014 (0.718)	0.131 (3.670)
Advice	6.147*** (0.716)	6.664 (3.647)
age	0.006 (0.021)	−0.008 (0.044)
genderM	−0.439 (0.531)	−0.989 (1.095)
risk.self	−0.226* (0.109)	−0.169 (0.216)
risk.patience	0.401*** (0.111)	0.437 (0.228)
fin.self	0.885*** (0.220)	0.619 (0.437)
fin.ability	1.892*** (0.295)	2.938*** (0.611)
math.ability	2.883*** (0.266)	3.084*** (0.541)
Default×age		0.011 (0.062)
Disclosure×age		−0.003 (0.062)
Advice×age		0.034 (0.060)
Default×genderM		−0.063 (1.529)
Disclosure×genderM		0.238 (1.528)
Advice×genderM		1.624 (1.507)
Default×risk.self		−0.150 (0.310)
Disclosure×risk.self		−0.139 (0.308)
Advice×risk.self		0.128 (0.304)
Default×risk.patience		0.005 (0.316)
Disclosure×risk.patience		−0.272 (0.324)
Advice×risk.patience		0.021 (0.315)
Default×fin.self		−0.123 (0.630)
Disclosure×fin.self		0.574 (0.618)
Advice×fin.self		0.531 (0.622)
Default×fin.ability		−1.807* (0.849)
Disclosure×fin.ability		−0.018 (0.845)
Advice×fin.ability		−2.379** (0.844)

Continued on next page.

	Number of correct responses (out of 40)	
	(1)	(2)
Default×math.ability		0.603 (0.768)
Disclosure×math.ability		−0.142 (0.750)
Advice×math.ability		−0.984 (0.759)
Observations	1,018	1,018
R^2	0.353	0.375
Adjusted R^2	0.346	0.355
Residual Std. Error	8.005 (df = 1007)	7.951 (df = 986)
F Statistic	54.882*** (df = 10; 1007)	19.061*** (df = 31; 986)

Note. Column (2) includes interactions between information-based guidance conditions and individual-level characteristics. *p<0.05; **p<0.01; ***p<0.001

Table E3.
OLS regression of number of correct responses in fund choice task by information-based guidance conditional on retirement plan balance.

	Number of correct responses (out of 20)	
	Under A$50K	Over A$50K
	(1)	(2)
Constant	7.071*** (0.879)	4.973*** (0.947)
Default	1.793*** (0.457)	−2.014*** (0.492)
Disclosure	1.265** (0.460)	−1.251* (0.496)
Advice	2.953*** (0.459)	3.194*** (0.494)
age	0.010 (0.014)	−0.004 (0.015)
genderM	−0.330 (0.340)	−0.108 (0.367)
risk.self	−0.147* (0.070)	−0.078 (0.075)
risk.patience	0.161* (0.071)	0.239** (0.077)
fin.self	0.493*** (0.141)	0.392* (0.152)
fin.ability	0.706*** (0.189)	1.186*** (0.204)
math.ability	1.360*** (0.171)	1.523*** (0.184)
Observations	1,018	1,018
R^2	0.201	0.291
Adjusted R^2	0.193	0.284
Residual Std. Error (df = 1007)	5.136	5.529
F Statistic (df = 10; 1007)	25.293***	41.254***

Note. *p<0.05; **p<0.01; ***p<0.001

Table E4.
OLS regression of frequency of advice use based on individual characteristics.

	Number of trials where advice was used (out of 40)
Constant	8.286* (4.113)
age	0.071 (0.067)
genderM	3.725* (1.728)
risk.self	0.525 (0.356)
risk.patience	0.164 (0.364)
fin.self	1.037 (0.739)
fin.ability	−4.338*** (0.973)
math.ability	−1.407 (0.887)
Observations	256
R^2	0.168
Adjusted R^2	0.145
Residual Std. Error	13.274 (df = 248)
F Statistic	7.176*** (df = 7; 248)

Note. *p<0.05; **p<0.01; ***p<0.001

Appendix E.2. Experiment 2

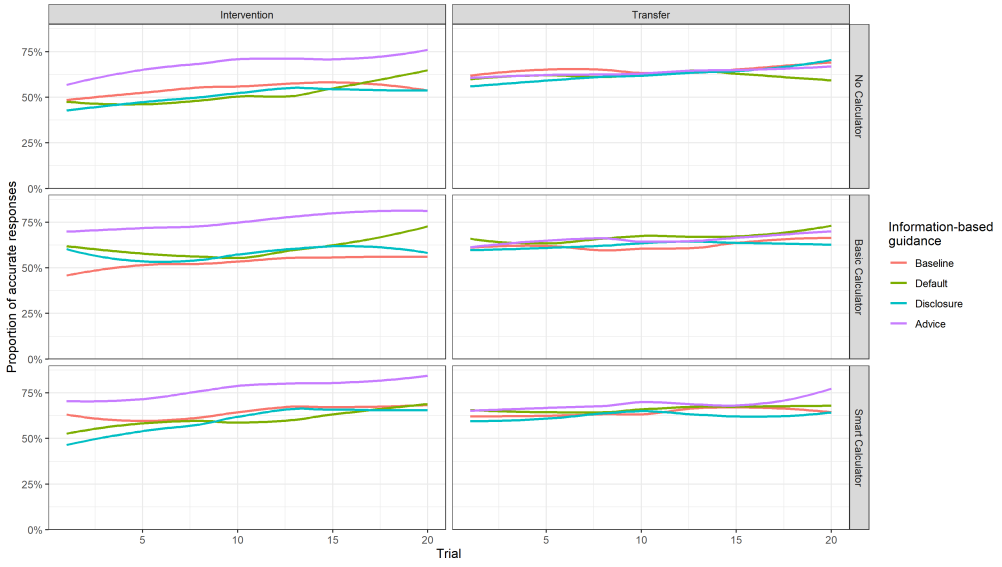


Figure E5. Smoothed task accuracy across trials in the fund choice task by information-based and tool-based guidance conditions.

Table E6.
OLS regression of number of correct responses in fund choice task by information- and tool-based guidance conditions.

(a) Intervention stage

	Number of correct responses (out of 20)			
	(1)	(2)	(3)	(4)
Constant	5.090***	2.525	2.483	1.450
	(0.713)	(1.362)	(1.346)	(1.465)
Default	−0.424	1.850	1.769	3.707
	(0.603)	(1.702)	(1.681)	(2.072)
Disclosure	−0.215	0.528	0.756	1.580
	(0.606)	(1.652)	(1.633)	(1.951)
Advice	2.734***	6.637***	6.752***	8.456***
	(0.603)	(1.707)	(1.688)	(2.027)
Basic Calc	0.093	1.169	0.900	1.719
	(0.605)	(1.495)	(1.480)	(1.864)
Smart Calc	1.748**	3.703*	3.454*	4.037*
	(0.607)	(1.508)	(1.491)	(1.924)
age	0.005	0.032	0.034	0.060*
	(0.010)	(0.023)	(0.023)	(0.026)
genderM	−0.544*	1.004	0.880	0.727
	(0.262)	(0.636)	(0.629)	(0.720)
risk.self	−0.169**	0.077	0.072	0.090
	(0.054)	(0.129)	(0.127)	(0.144)
risk.patience	0.069	−0.009	0.013	−0.096
	(0.055)	(0.145)	(0.143)	(0.180)
fin.self	0.472***	0.547*	0.523*	0.613*
	(0.106)	(0.246)	(0.243)	(0.282)
fin.ability	1.200***	0.727*	0.727*	0.863*
	(0.148)	(0.359)	(0.354)	(0.414)
math.ability	1.427***	1.805***	1.805***	1.733***
	(0.130)	(0.314)	(0.310)	(0.352)
Default×Basic Calc	1.324	0.980	1.069	−0.396
	(0.858)	(0.860)	(0.850)	(1.178)
Disclosure×Basic Calc	0.660	0.350	0.412	−0.546
	(0.857)	(0.856)	(0.846)	(1.119)
Advice×Basic Calc	1.337	1.069	1.126	1.507
	(0.854)	(0.854)	(0.843)	(1.083)
Default×Smart Calc	−0.068	−0.262	−0.293	0.493
	(0.857)	(0.861)	(0.850)	(1.128)
Disclosure×Smart Calc	−0.270	−0.325	−0.430	0.484
	(0.857)	(0.853)	(0.843)	(1.103)
Advice×Smart Calc	−0.503	−0.322	−0.211	−0.216
	(0.855)	(0.853)	(0.843)	(1.122)
Basic Calc×Calc Use			0.210**	
			(0.080)	
Smart Calc×Calc Use			0.195***	
			(0.040)	

Continued on next page.

	Number of correct responses (out of 20)		
(1)	(2)	(3)	(4)
Default×age	−0.023	−0.026	−0.076*
	(0.027)	(0.027)	(0.035)
Disclosure×age	−0.028	−0.034	−0.049
	(0.028)	(0.027)	(0.035)
Advice×age	−0.023	−0.023	−0.058
	(0.028)	(0.028)	(0.035)
Default×genderM	−1.076	−0.811	−0.862
	(0.732)	(0.725)	(0.945)
Disclosure×genderM	−0.669	−0.671	−0.173
	(0.734)	(0.725)	(0.953)
Advice×genderM	−1.444	−1.184	−0.609
	(0.749)	(0.742)	(0.952)
Default×risk.self	−0.330*	−0.330*	−0.433*
	(0.158)	(0.156)	(0.212)
Disclosure×risk.self	−0.359*	−0.372*	−0.351
	(0.154)	(0.153)	(0.191)
Advice×risk.self	−0.154	−0.139	−0.141
	(0.151)	(0.149)	(0.188)
Default×risk.patience	0.125	0.109	0.146
	(0.163)	(0.161)	(0.221)
Disclosure×risk.patience	0.264	0.258	0.281
	(0.161)	(0.159)	(0.216)
Advice×risk.patience	0.179	0.129	0.465*
	(0.158)	(0.156)	(0.216)
Default×fin.self	0.137	0.184	0.282
	(0.308)	(0.304)	(0.408)
Disclosure×fin.self	0.068	0.113	−0.033
	(0.285)	(0.282)	(0.361)
Advice×fin.self	−0.167	−0.184	−0.590
	(0.300)	(0.297)	(0.395)
Default×fin.ability	0.093	0.100	0.187
	(0.416)	(0.411)	(0.543)
Disclosure×fin.ability	0.112	0.079	0.015
	(0.410)	(0.405)	(0.541)
Advice×fin.ability	−0.401	−0.369	−0.817
	(0.423)	(0.418)	(0.537)
Default×math.ability	−0.468	−0.489	−0.558
	(0.387)	(0.382)	(0.483)
Disclosure×math.ability	0.298	0.294	0.349
	(0.376)	(0.372)	(0.461)
Advice×math.ability	−0.755*	−0.742*	−0.696
	(0.362)	(0.358)	(0.451)
Basic Calc×age	−0.014	−0.010	0.0003
	(0.024)	(0.024)	(0.034)
Smart Calc×age	−0.006	−0.011	0.007
	(0.024)	(0.024)	(0.030)
Basic Calc×genderM	−0.716	−0.752	−0.395
	(0.643)	(0.635)	(0.848)
Smart Calc×genderM	−1.423*	−1.329*	−2.186**
	(0.648)	(0.641)	(0.844)
Basic Calc×risk.self	0.057	0.073	−0.065
	(0.133)	(0.131)	(0.170)

Continued on next page.

	Number of correct responses (out of 20)			
	(1)	(2)	(3)	(4)
Smart Calc×risk.self		−0.195	−0.175	−0.153
		(0.134)	(0.133)	(0.177)
Basic Calc×risk.patience		−0.193	−0.190	−0.171
		(0.134)	(0.132)	(0.195)
Smart Calc×risk.patience		−0.045	−0.074	0.261
		(0.134)	(0.132)	(0.200)
Basic Calc×fin.self		−0.075	−0.080	−0.046
		(0.255)	(0.251)	(0.365)
Smart Calc×fin.self		−0.138	−0.148	−0.666
		(0.261)	(0.258)	(0.366)
Basic Calc×fin.ability		0.924*	0.856*	0.656
		(0.369)	(0.365)	(0.515)
Smart Calc×fin.ability		0.537	0.530	0.448
		(0.360)	(0.355)	(0.471)
Basic Calc×math.ability		−0.285	−0.335	0.013
		(0.308)	(0.305)	(0.395)
Smart Calc×math.ability		−0.171	−0.126	−0.268
		(0.325)	(0.321)	(0.445)
Observations	1,203	1,203	1,203	723
R^2	0.357	0.392	0.408	0.426
Adjusted R^2	0.348	0.364	0.379	0.381
Residual Std. Error	4.276	4.223	4.171	4.116
	(df = 1184)	(df = 1149)	(df = 1147)	(df = 669)
F Statistic	36.585***	13.964***	14.348***	9.378***
	(df = 18; 1184)	(df = 53; 1149)	(df = 55; 1147)	(df = 53; 669)

Note. Column (2) includes interactions between guidance conditions and individual-level characteristics. Column (3) includes interactions between calculator conditions and number of trials in Intervention stage where calculator was accessed. Column (4) excludes participants in the calculator conditions who did not access the calculator once during the Intervention stage of the task. *p<0.05; **p<0.01; ***p<0.001

(b) Transfer stage

	Number of correct responses (out of 20)			
	(1)	(2)	(3)	(4)
Constant	7.675***	6.437***	6.421***	5.868***
	(0.733)	(1.411)	(1.412)	(1.556)
Default	−0.507	1.188	1.162	1.946
	(0.620)	(1.762)	(1.763)	(2.201)
Disclosure	−0.013	0.210	0.261	0.984
	(0.623)	(1.711)	(1.713)	(2.072)
Advice	−0.269	1.796	1.856	2.920
	(0.620)	(1.768)	(1.770)	(2.152)
Basic Calc	−0.116	0.075	−0.011	3.133
	(0.622)	(1.548)	(1.552)	(1.979)
Smart Calc	−0.327	0.648	0.641	−0.350
	(0.624)	(1.562)	(1.563)	(2.043)
age	0.002	0.029	0.029	0.040
	(0.010)	(0.024)	(0.024)	(0.028)
genderM	−0.508	0.233	0.225	0.428
	(0.269)	(0.659)	(0.660)	(0.765)
risk.self	−0.188***	0.118	0.119	0.083
	(0.056)	(0.133)	(0.133)	(0.153)
risk.patience	0.045	−0.057	−0.053	0.045
	(0.056)	(0.150)	(0.150)	(0.191)
fin.self	0.307**	0.105	0.104	0.016
	(0.109)	(0.255)	(0.255)	(0.300)
fin.ability	1.312***	1.040**	1.039**	0.997*
	(0.153)	(0.372)	(0.372)	(0.439)
math.ability	1.657***	1.849***	1.844***	1.808***
	(0.134)	(0.325)	(0.325)	(0.374)
Default×Basic Calc	0.673	0.581	0.615	−1.036
	(0.882)	(0.890)	(0.892)	(1.251)
Disclosure×Basic Calc	−0.598	−0.880	−0.859	−1.334
	(0.881)	(0.887)	(0.887)	(1.188)
Advice×Basic Calc	0.445	0.349	0.364	−0.307
	(0.877)	(0.884)	(0.885)	(1.150)
Default×Smart Calc	1.113	0.886	0.883	1.132
	(0.880)	(0.891)	(0.892)	(1.198)
Disclosure×Smart Calc	0.006	−0.246	−0.249	−0.624
	(0.881)	(0.883)	(0.884)	(1.172)
Advice×Smart Calc	0.798	0.889	0.888	1.313
	(0.878)	(0.883)	(0.884)	(1.192)
Basic Calc×Calc Use			0.071	
			(0.084)	
Smart Calc×Calc Use			0.004	
			(0.042)	
Default×age		−0.039	−0.039	−0.062
		(0.028)	(0.028)	(0.037)
Disclosure×age		−0.061*	−0.061*	−0.071
		(0.029)	(0.029)	(0.037)
Advice×age		−0.025	−0.026	−0.040
		(0.029)	(0.029)	(0.038)

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	(1)	Number of correct responses (out of 20) (2)	(3)	(4)
Default×genderM		−0.076	−0.048	−0.579
		(0.758)	(0.760)	(1.004)
Disclosure×genderM		−0.200	−0.201	−0.185
		(0.760)	(0.760)	(1.012)
Advice×genderM		0.051	0.057	0.052
		(0.776)	(0.778)	(1.011)
Default×risk.self		−0.398*	−0.399*	−0.376
		(0.163)	(0.163)	(0.225)
Disclosure×risk.self		−0.580***	−0.584***	−0.615**
		(0.160)	(0.160)	(0.203)
Advice×risk.self		−0.294	−0.296	−0.173
		(0.157)	(0.157)	(0.200)
Default×risk.patience		0.112	0.110	0.016
		(0.169)	(0.169)	(0.235)
Disclosure×risk.patience		0.314	0.311	0.128
		(0.166)	(0.167)	(0.229)
Advice×risk.patience		0.055	0.046	0.016
		(0.164)	(0.164)	(0.229)
Default×fin.self		0.245	0.249	0.449
		(0.319)	(0.319)	(0.433)
Disclosure×fin.self		0.525	0.525	0.827*
		(0.296)	(0.296)	(0.383)
Advice×fin.self		0.112	0.114	−0.214
		(0.311)	(0.311)	(0.420)
Default×fin.ability		0.019	0.016	0.153
		(0.430)	(0.431)	(0.577)
Disclosure×fin.ability		0.419	0.423	0.222
		(0.425)	(0.425)	(0.574)
Advice×fin.ability		−0.005	−0.003	0.263
		(0.439)	(0.439)	(0.571)
Default×math.ability		0.120	0.125	0.013
		(0.401)	(0.401)	(0.513)
Disclosure×math.ability		0.320	0.328	0.361
		(0.389)	(0.390)	(0.490)
Advice×math.ability		−0.293	−0.283	−0.187
		(0.375)	(0.376)	(0.479)
Basic Calc×age		−0.009	−0.008	0.004
		(0.025)	(0.025)	(0.036)
Smart Calc×age		0.025	0.025	0.057
		(0.025)	(0.025)	(0.031)
Basic Calc×genderM		−0.571	−0.580	0.303
		(0.666)	(0.666)	(0.900)
Smart Calc×genderM		−1.407*	−1.404*	−1.555
		(0.671)	(0.672)	(0.896)
Basic Calc×risk.self		0.124	0.128	0.102
		(0.138)	(0.138)	(0.180)
Smart Calc×risk.self		−0.094	−0.093	0.055
		(0.139)	(0.139)	(0.188)
Basic Calc×risk.patience		−0.002	0.0004	−0.154
		(0.139)	(0.139)	(0.207)
Smart Calc×risk.patience		−0.079	−0.080	−0.082
		(0.138)	(0.139)	(0.212)

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	Number of correct responses (out of 20)			
	(1)	(2)	(3)	(4)
Basic Calc×fin.self		0.006	0.003	−0.400
		(0.264)	(0.264)	(0.387)
Smart Calc×fin.self		−0.053	−0.054	−0.227
		(0.271)	(0.271)	(0.388)
Basic Calc×fin.ability		0.246	0.223	0.411
		(0.382)	(0.383)	(0.546)
Smart Calc×fin.ability		0.215	0.216	−0.542
		(0.373)	(0.373)	(0.500)
Basic Calc×math.ability		−0.319	−0.337	−0.495
		(0.319)	(0.320)	(0.419)
Smart Calc×math.ability		−0.383	−0.383	0.093
		(0.337)	(0.337)	(0.473)
Observations	1,203	1,203	1,203	723
R^2	0.312	0.339	0.339	0.355
Adjusted R^2	0.302	0.308	0.308	0.304
Residual Std. Error	4.394	4.372	4.375	4.371
	(df = 1184)	(df = 1149)	(df = 1147)	(df = 669)
F Statistic	29.852***	11.116***	10.713***	6.950***
	(df = 18; 1184)	(df = 53; 1149)	(df = 55; 1147)	(df = 53; 669)

Note. Column (2) includes interactions between guidance conditions and individual-level characteristics. Column (3) includes interactions between calculator conditions and number of trials in Intervention stage where calculator was accessed. Column (4) excludes participants in the calculator conditions who did not access the calculator once during the Intervention stage of the task. *p<0.05; **p<0.01; ***p<0.001

Table E7.
OLS regression of number of correct responses in fund choice task by information- and tool-based guidance conditional on retirement plan balance.

(a) Intervention stage

	Number of correct responses (out of 10)	
	Under A$50K	Over A$50K
	(1)	(2)
Constant	2.416*** (0.470)	2.674*** (0.479)
Default	0.928* (0.397)	−1.352*** (0.405)
Disclosure	0.982* (0.399)	−1.197** (0.407)
Advice	1.718*** (0.397)	1.017* (0.405)
Basic Calc	0.431 (0.399)	−0.338 (0.407)
Smart Calc	1.000* (0.400)	0.747 (0.408)
age	0.013* (0.006)	−0.008 (0.007)
genderM	−0.417* (0.172)	−0.128 (0.176)
risk.self	−0.072* (0.036)	−0.097** (0.036)
risk.patience	0.039 (0.036)	0.030 (0.037)
fin.self	0.208** (0.070)	0.263*** (0.071)
fin.ability	0.422*** (0.098)	0.778*** (0.100)
math.ability	0.782*** (0.086)	0.645*** (0.087)
Default×Basic Calc	−0.065 (0.565)	1.390* (0.577)
Disclosure×Basic Calc	−0.060 (0.565)	0.720 (0.576)
Advice×Basic Calc	0.362 (0.562)	0.975 (0.574)
Default×Smart Calc	−0.117 (0.564)	0.049 (0.576)
Disclosure×Smart Calc	−0.561 (0.565)	0.291 (0.576)
Advice×Smart Calc	−0.426 (0.563)	−0.077 (0.575)
Observations	1,203	1,203
R^2	0.220	0.283
Adjusted R^2	0.208	0.272
Residual Std. Error (df = 1184)	2.817	2.874
F Statistic (df = 18; 1184)	18.571***	25.992***

Note. *p<0.05; **p<0.01; ***p<0.001

(b) Transfer stage

	Number of correct responses (out of 10)	
	Under A$50K	Over A$50K
	(1)	(2)
Constant	3.366*** (0.467)	4.309*** (0.511)
Default	0.252 (0.395)	−0.759 (0.432)
Disclosure	0.642 (0.397)	−0.655 (0.434)
Advice	0.199 (0.395)	−0.467 (0.432)
Basic Calc	0.371 (0.396)	−0.487 (0.433)
Smart Calc	−0.146 (0.397)	−0.181 (0.435)
age	0.012 (0.006)	−0.010 (0.007)
genderM	−0.471** (0.171)	−0.037 (0.187)
risk.self	−0.076* (0.035)	−0.111** (0.039)
risk.patience	0.020 (0.036)	0.025 (0.039)
fin.self	0.189** (0.069)	0.118 (0.076)
fin.ability	0.551*** (0.097)	0.762*** (0.106)
math.ability	0.893*** (0.085)	0.764*** (0.093)
Default×Basic Calc	−0.346 (0.562)	1.019 (0.615)
Disclosure×Basic Calc	−0.547 (0.561)	−0.051 (0.614)
Advice×Basic Calc	−0.177 (0.559)	0.621 (0.612)
Default×Smart Calc	0.411 (0.561)	0.702 (0.614)
Disclosure×Smart Calc	−0.197 (0.561)	0.203 (0.614)
Advice×Smart Calc	0.257 (0.560)	0.541 (0.613)
Observations	1,203	1,203
R^2	0.223	0.197
Adjusted R^2	0.211	0.185
Residual Std. Error (df = 1184)	2.799	3.063
F Statistic (df = 18; 1184)	18.837***	16.134***

Note. *p<0.05; **p<0.01; ***p<0.001

Table E8.
OLS regression of frequency of advice use during Intervention stage based on individual characteristics.

	Number of trials where advice was used (out of 20)
Constant	9.644*** (1.890)
Basic Calc	−0.704 (0.909)
Smart Calc	−0.173 (0.910)
age	−0.034 (0.031)
genderM	−0.095 (0.812)
risk.self	0.150 (0.161)
risk.patience	0.192 (0.157)
fin.self	−0.401 (0.334)
fin.ability	−1.059* (0.475)
math.ability	−0.914* (0.370)
Observations	302
R^2	0.109
Adjusted R^2	0.081
Residual Std. Error	6.396 (df = 292)
F Statistic	3.957*** (df = 9; 292)

Note. *p<0.05; **p<0.01; ***p<0.001

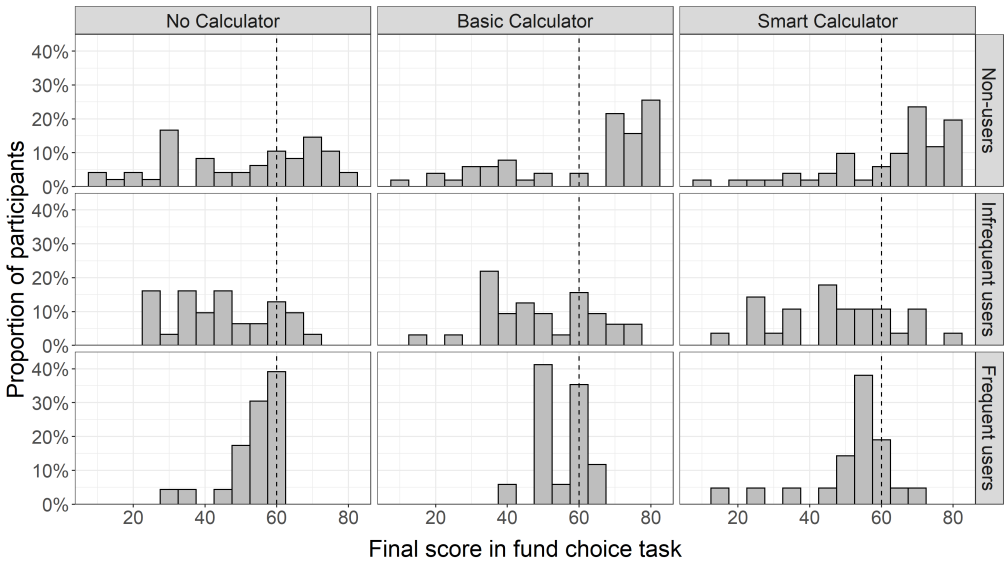

Figure E9. Final task score of participants in *Advice* conditions by frequency of advice use during Intervention stage. Dashed line indicates 60-point benchmark rather than 120-point benchmark used for Experiment 1 due to there only being 20 trials.

Table E10.
OLS regression of frequency of calculator use during Intervention stage based on individual characteristics.

	Number of trials where calculator was used (out of 20)		
	Combined	Basic Calc	Smart Calc
	(1)	(2)	(3)
Constant	1.128 (0.760)	1.061 (0.659)	1.224 (1.356)
Default	−0.221 (0.434)	−0.524 (0.383)	0.037 (0.771)
Disclosure	0.088 (0.431)	−0.328 (0.377)	0.459 (0.762)
Advice	−0.463 (0.432)	−0.252 (0.377)	−0.609 (0.763)
age	0.008 (0.012)	−0.013 (0.010)	0.027 (0.021)
genderM	−0.210 (0.319)	0.118 (0.278)	−0.534 (0.569)
risk.self	−0.098 (0.066)	−0.039 (0.057)	−0.104 (0.120)
risk.patience	0.033 (0.069)	−0.033 (0.061)	0.123 (0.122)
fin.self	0.143 (0.135)	0.042 (0.116)	0.097 (0.244)
fin.ability	0.105 (0.184)	0.325* (0.165)	0.039 (0.320)
math.ability	0.034 (0.165)	0.252 (0.138)	−0.189 (0.308)
Observations	799	400	399
R^2	0.009	0.045	0.020
Adjusted R^2	−0.004	0.020	−0.006
Residual Std. Error	4.303 (df = 788)	2.654 (df = 389)	5.362 (df = 388)
F Statistic	0.715 (df = 10; 788)	1.830 (df = 10; 389)	0.778 (df = 10; 388)

Note. *p<0.05; **p<0.01; ***p<0.001

Table E11.
Description of variables used in regression.

Variable	Description
Age	The age in years of the respondent.
Gender	An indicator variable that equals one if the respondent is a male, zero otherwise.
Self-reported risk	Rating from zero to ten indicating respondents' self-assessment of level of risk-taking *(Q10)*.
Self-reported patience	Rating from zero to ten indicating respondents' self-assessment of level of patience *(Q11)*.
Self-reported financial ability	Rating from one to seven indicating respondents' self-assessment of level of financial literacy *(Q1)*.
Observed financial ability	Continuous variable that equals the sum of the number of financial ability questions answered correctly *(Q2-4)*.
Observed numerical ability	Continuous variable that equals the sum of the number of numerical ability questions answered correctly. *(Q5-7)*.
Default	An indicator variable that equals one if the respondent was allocated to the *Default* condition, zero otherwise.
Disclosure	An indicator variable that equals one if the respondent was allocated to the *Disclosure* condition, zero otherwise.
Advice	An indicator variable that equals one if the respondent was allocated to the *Advice* condition, zero otherwise.
Basic Calculator	An indicator variable that equals one if the respondent was allocated to the *Basic Calculator* condition, zero otherwise.
Smart Calculator	An indicator variable that equals one if the respondent was allocated to the *Smart Calculator* condition, zero otherwise.
Calculator Use	Number of trials during Intervention stage in which participants accessed a calculator tool. Value of zero assigned for participants in the *No Calculator condition*.

Note. Question numbers in brackets indicate corresponding items from questionnaire shown in Appendix D.

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