Uncertain goals and savings adequacy: Contrasting economic and psychological perspectives

Nathan Wang-Ly[*,1], Ben R. Newell[1,2]

[1] School of Psychology, UNSW Sydney, NSW 2052, Australia

[2] UNSW Institute of Climate Risk & Response, UNSW Sydney, NSW 2052, Australia

* Corresponding author (nathan.wang-ly@unsw.edu.au)

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Abstract

Knowing how much to save for the future is a difficult challenge for consumers to solve. While economic research suggests that uncertainty should increase saving motives, psychological research instead suggests that uncertainty may dissuade consumers from saving. Across three incentivised online experiments (N = 540), we examine these competing perspectives using a novel financial decision making task. In this task, participants receive hypothetical income and must choose whether to spend this income or save it towards an uncertain goal. We manipulate participants' uncertainty about the potential goal amount (by varying the width of the savings goal range) as well as their uncertainty about its achievability (by varying the position of the goal relative to income). Our results suggest that both the psychological and economic perspectives on uncertainty hold merit; participants responded to uncertainty by saving more when they had the financial means to do so, but saved less when they did not. Additionally, participants remained motivated to achieve the goal even as it became increasingly out of reach. Overall, our findings provide evidence that uncertainty affects consumers differently based on their financial circumstances.

Keywords: Precautionary saving, Savings goals, Uncertainty, Financial decision making

1. Introduction

It is generally well-accepted that consumers do not save enough for their future needs. All around the world, we hear similar stories about households' low saving rates and vulnerability to potential financial shocks (e.g., Clark et al., 2021; Reyers, 2019). For example, in Australia, a recent survey reported that one in five households held less than A$1,000 (USD 670) in cash savings, and one in ten held less than A$100 (USD 67) (Members Equity Bank, 2022). Similar concerns exist around whether consumers are saving adequately for their retirement (e.g., Bosch et al., 2019; Rhee, 2013).

The widely held belief that households save inadequately raises a natural question: how much should they be saving? According to the life-cycle hypothesis (Ando & Modigliani, 1963; Modigliani, 1986), consumers seek to smooth their consumption over their lifetimes; their saving rates can be determined by considering factors such as their expected future income, their level of time discounting, and the available financial returns on saving. However, solving this "multiperiod dynamic maximization problem" (Thaler, 1994, p. 186) is challenging even for economists, let alone for the layperson, which has given rise to simple saving heuristics. For example, many popular personal finance authors recommend saving a consistent proportion of income (e.g., 20 percent) regardless of age or existing savings (for an overview, see Choi, 2022). In other cases, consumers are suggested to aim for target savings amounts; for example, three to six months' worth of living expenses as an emergency buffer (Collins, 2015; Greninger et al., 1996) or A$690,000 (USD 460,000) at retirement for a "comfortable lifestyle for a couple" (Association of Superannuation Funds of Australia [ASFA], 2023, p. 3). While these saving recommendations help reduce the complexity of an otherwise intractable problem, the guidance is generic in nature. As a result, it is unable to fully resolve consumers' uncertainty about how much they need to save based on their individual circumstances.

In this paper, we explore the extent to which this uncertainty about how much needs to be saved—hereafter referred to as 'goal uncertainty'—contributes to consumers' tendency to under-save. The basic intuition underlying this idea is that goal uncertainty obscures the marginal benefit of saving, whereas the marginal benefit of spending is typically much clearer. To illustrate, imagine having $1,000 at your disposal and deciding how much to allocate towards an emergency savings fund. In a world without uncertainty, it would be possible to calculate your likelihood of encountering different emergencies (e.g., your car

breaking down) over time and their respective costs. With this information, you could compare the benefit of saving against the opportunity cost of not spending it in the present (e.g., to take a well-earned holiday). However, such factors are not precisely known in the real world, meaning the value of saving for the future is unknown. You could accumulate large savings only to realise little to no benefit; for example, if you were fortunate enough to avoid financial shocks throughout your lifetime.[1] As a result, goal uncertainty may motivate consumers to spend rather than save, to obtain guaranteed benefit for their money (J. M. Lee & Hanna, 2015).

This hypothesis is supported by several strands of psychological research. First, a large body of research has documented people's aversion to ambiguity. Dating back to the seminal work of Ellsberg (1961), it has consistently been shown that people tend to favour options that have well-defined outcomes over ambiguous outcomes when making comparative judgments (e.g., Chow & Sarin, 2001; Fox & Tversky, 1995). For example, Du and Budescu (2005) observed that participants strongly preferred bets that had precise probabilities (e.g., 50 percent chance of winning $5) over similar bets that had imprecise probabilities (e.g., 40 to 60 percent chance of winning $5). Ambiguity aversion has also helped to account for real-world financial phenomena; it has been cited as an explanation for why consumers under-invest in stocks, where the returns are ambiguous, and over-invest in asset classes like cash and bonds, where the returns are stable (Cao et al., 2005; Dimmock et al., 2016; Peijnenburg, 2018). It could similarly be reasoned that consumers would prefer the known benefits of spending over the unknown benefits of saving.

A second, related strand of research suggests that uncertainty can cause people to delay taking action. Previous work has identified the postponement of decision making as a coping strategy for uncertainty, as it allows for the opportunity to seek additional information and to make a better informed choice (Lipshitz & Strauss, 1997). This complements findings from the choice overload and deferral literature (e.g., Dhar, 1997; Iyengar & Lepper, 2000; Luce, 1998), which show that consumers may procrastinate or opt out of making a decision altogether if it is too complex. The indecision that results from uncertainty has been argued to be a barrier to taking actions with long-term benefits, such as addressing climate change (e.g.,

[1] However, even in this instance, it could be argued that saving does provide the benefit of reducing anxiety around consumers' ability to meet their future financial obligations (Shim et al., 2012).

Gifford, 2011; Lorenzoni et al., 2007; Newell et al., 2014) or saving for retirement (e.g., Madrian & Shea, 2001; O'Donoghue & Rabin, 1999; Thorp et al., 2020).

The third strand of research relates to goal setting. Having a clear goal plays an important role in directing attention, effort, and action towards desired outcomes (Locke & Latham, 2006). Numerous studies have shown that task performance improves when participants are given specific goals rather than unspecific goals (e.g., Chidester & Grigsby, 1984; Kleingeld et al., 2011; Tenenbaum et al., 1991)—so long as these goals are achievable (T. W. Lee et al., 1997; Soman & Cheema, 2004). It naturally follows that consumers may struggle to determine an appropriate saving strategy if the target amount they should be striving for is unclear.

However, there is also extensive literature from the field of economics which instead makes the claim that uncertainty about the future should increase precautionary saving motives. The prevailing view from previous work on this topic (e.g., Carroll & Kimball, 2018; Christelis et al., 2020; Fuchs-Schündeln & Schündeln, 2005; Gourinchas & Parker, 2002) is that consumers faced with uncertainty seek to save more to buffer against potential negative events, such as having an unexpected reduction in income. While these referenced studies have predominantly been observational in nature, recent work has also offered converging evidence using experimental methods. Coibion et al. (2021) provided households with different descriptions about how much economic forecasters agreed on their region's future growth prospects. In doing so, they manipulated households' level of uncertainty about their region's macroeconomic outlook. In the months that followed this manipulation, it was observed that households who received a more uncertain outlook reported decreased spending on both non-durable items (e.g., groceries) and large durable items (e.g., jewellery)—giving further reason to believe that uncertainty drives saving behaviour.

The opposing perspectives on uncertainty offered by the psychological and economic literature highlight the need for further research. The substantial evidence on both sides suggests that there is likely merit to each perspective; the key question to answer may not be which perspective is correct but rather when each perspective applies. To better understand the nuances of how goal uncertainty influences saving behaviour, we conducted three laboratory experiments in which we manipulated participants' uncertainty about their savings goal in a novel financial decision making task. We find that participants responded to uncertainty by saving more when income was plentiful and saving less when income was

scarce. We also find that participants remained motivated to strive for the saving goal, even as it became increasingly unachievable. Our results broadly align with prior suggestions that uncertainty affects consumers' saving behaviour differently depending on their perceived financial position and capacity to save (van Schie et al., 2012).

2. Materials and Methods

2.1. Experimental task

We developed a financial decision making task[2] to simulate the challenge of compromising between spending and saving. At the start of the task, participants were instructed to imagine that they had started a new job that would leave them with a consistent income each week after essential expenses had been covered (e.g., $500). Participants were also asked to imagine that they had set themselves a savings goal: to accumulate savings within 30 weeks' time to pay for repairs of their home's air-conditioning system, which had recently started to experience issues. The cost of these repairs was uncertain and based on a range that had been provided by a tradesperson quote (e.g., $4,000 to $8,000).

Each round (week) of the task, participants received their income and were asked how much money they would like to spend versus save. Spending money earned participants an immediate reward of 5 points per $1 spent. Any money that was not spent was carried over into subsequent rounds, where it could again be spent or saved. Participants completed ten of these rounds in an initial practice stage and completed 30 rounds as part of the actual experiment. In between the practice and experiment stages, participants' accumulated savings and points were both reset to zero.

At the end of the task (30th round), the cost of the air-conditioning system repairs was revealed to participants. Across all conditions run in our experiments, this cost turned out to be $6,000. If participants were holding sufficient savings to afford the repairs, they "won" the game, meaning they would receive a bonus 45,000 points reward for meeting the savings

[2] The task was designed using the *jsPsych* JavaScript library (de Leeuw, 2015) and deployed online using *JATOS* (Just Another Tool for Online Studies; Lange et al., 2015). The code used for the task and select screenshots are provided in the Supplementary Materials (https://osf.io/97ec5/).

goal. However, if their savings were inadequate, they "lost" the game and did not receive any bonus points.

The objective of the task was therefore to strike a balance between spending and saving to maximise the total amount of points earned. While participants knew of the large reward for reaching the savings goal, saving more than ended up being needed would mean forgoing points that could have been earned by spending. Conversely, spending too much meant risking missing out on the savings goal and the 45,000 bonus points.

2.2. Summary of experiments

Across all three experiments, we recruited our participants from a pool of undergraduate psychology students at the University of New South Wales. Participants received course credit for their participation and were eligible for a $20 reward if their final points score was within the top 20 percent of performers in the task.

Within each experiment, participants received different ranges of possible values that the air-conditioning repairs could cost. In Experiments 1 and 2, we manipulated the width of the range, which allowed us to vary the level of uncertainty about the savings goal amount. A wider range therefore corresponded to greater goal uncertainty. This operationalisation of uncertainty was inspired by previous experimental work which similarly used ranges (Du & Budescu, 2005; Morton et al., 2011). In Experiment 3, we manipulated the position of the range rather than its width. This allowed us to vary participants' uncertainty about the goal's achievability and disentangle this from uncertainty about the goal amount.

2.2.1. Experiment 1

We recruited 135 participants for our first experiment (M_{age} = 19.38 years; 34 males; 99 females; 2 preferred not to say). Participants received one of three possible ranges for the cost of the air-conditioning system repairs (*n*'s = 45). In the "Low Uncertainty" condition, this range was $5,500 to $6,500. In the "Medium Uncertainty" and "High Uncertainty" conditions, the ranges were $4,000 to $8,000 and $2,500 to $9,500 respectively. The ranges therefore all centred around the same value ($6,000) but varied in their widths. This allowed us to manipulate participants' level of uncertainty about the goal amount they should save

towards. All participants received $500 in income per week in the task—totalling $15,000 across the 30 experiment rounds.

2.2.2. Experiment 2

135 new participants were recruited for the second experiment (M_{age} = 20.16 years; 34 males; 101 females). In Experiment 2, our objective was to examine whether participants' saving behaviour would change if their income no longer guaranteed that they could reach the savings goal. We thus provided participants with the same goal ranges from Experiment 1 (Low Uncertainty, Medium Uncertainty, and High Uncertainty; *n*'s = 45), but halved participants' weekly income to $250 ($7,500 total across the task). This meant that in the Medium and High Uncertainty conditions, it was possible for participants to still miss out on the savings goal even if they saved their entire income throughout the task.

2.2.3. Experiment 3

180 new participants were recruited for our final experiment (M_{age} = 19.77 years; 67 males; 113 females). Experiment 3 sought to disentangle uncertainty about the potential goal amount from uncertainty about the goal's achievability. Unlike the previous two experiments, we thus kept the width of the savings goal ranges constant between conditions and instead varied the position of the range. Participants received one of four possible ranges (*n*'s = 45), which we refer to as "Definitely Achievable" ($3,500 to $7,500), "Likely Achievable" ($4,500 to $8,500), "Possibly Achievable" ($5,500 to $9,500), and "Unlikely Achievable" ($6,500 to $10,500).[3] As with Experiment 2, participants received $250 in weekly income ($7,500 total across task). This meant that it was only in the Definitely Achievable condition where participants' income allowed them to guarantee that they would meet the savings goal; the likelihood of achieving the goal became progressively less likely in the other conditions.

[3] Due to a coding error, participants in the Unlikely Achievable condition were (unintentionally) misled about the possible cost of the air-conditioning system repairs. While the stated range was $6,500 to $10,500, the final cost was revealed to be $6,000—as in all other experimental conditions. However, as participants would not have known this until they had completed the task, this error should not have impacted their behaviour.

2.3. Measures

For all three experiments, our primary outcome of interest was participants' 'final savings'—the amount of savings they had accumulated by the end of the task. In Experiments 2 and 3, we also measured how achievable participants perceived the savings goal to be ('perceived goal achievability'). Participants were asked to rate how possible they thought it was to save enough to reach the goal using an 11-point scale (0 = "Definitely not possible"; 10 = "Definitely possible"). This served as a manipulation check as in some conditions, participants' income was no longer sufficient for them to guarantee the goal could be achieved.

3. Results

Code and experimental data files for the analyses reported in this section are provided in the Supplementary Materials (https://osf.io/97ec5/).

3.1. Experiment 1

3.1.1. Final savings

As shown in Figure 1, we observed that mean final savings increased with greater goal uncertainty. On average, final savings were highest in the High Uncertainty condition (M = \$8,638.49), followed by the Medium Uncertainty condition (M = \$7,864.64), and then the Low Uncertainty condition (M = \$6,975.24).

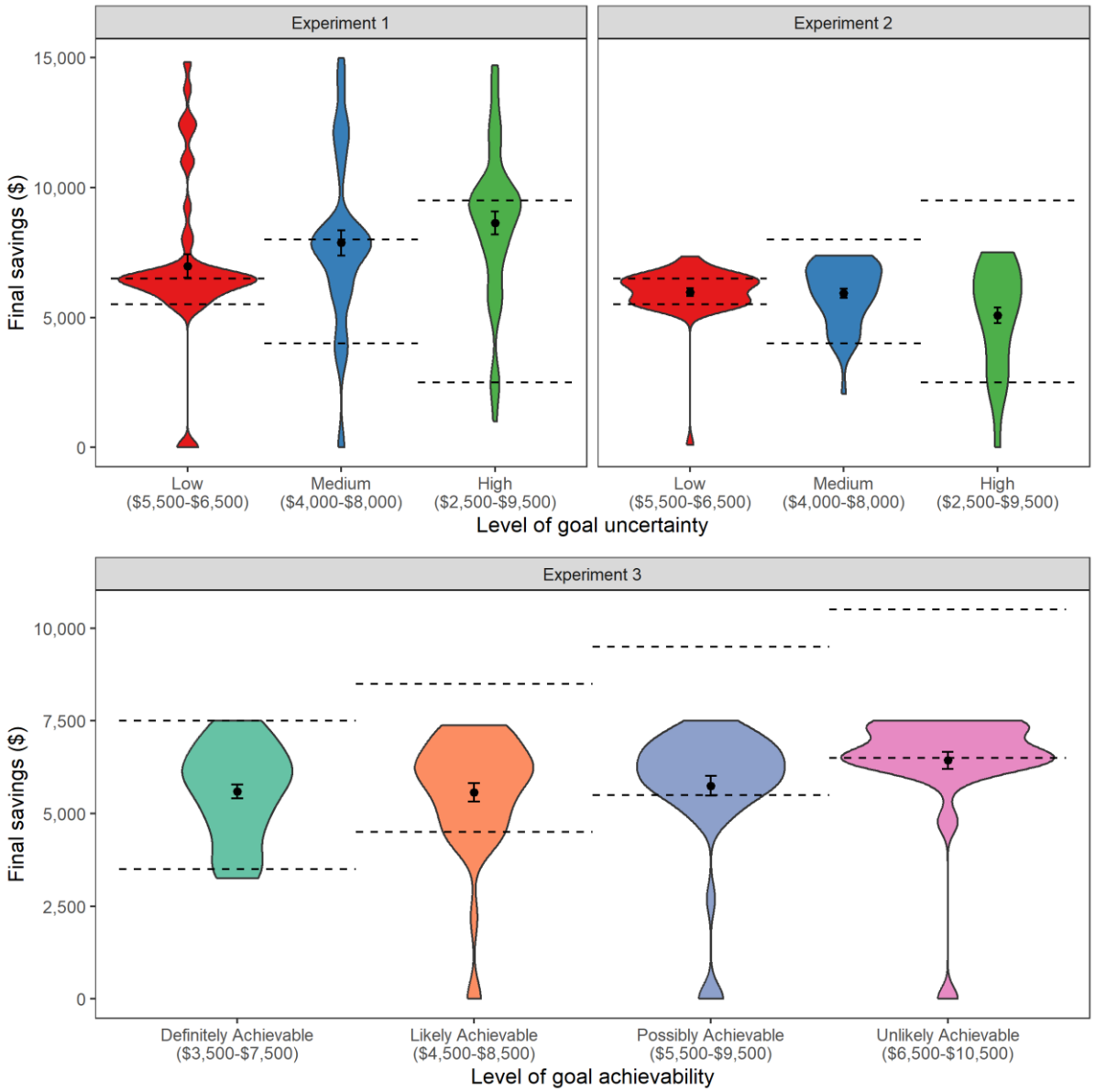

Figure 1. Distribution of final savings by level of goal uncertainty (Experiments 1 and 2) and goal achievability (Experiment 3). Mean and standard error bars indicated. Dashed lines indicate bounds of uncertain goal range. Maximum possible savings based on income was $15,000 for Experiment 1 and $7,500 for Experiments 2 and 3.

We analysed these differences using a linear regression, where participants' final savings were entered as the dependent variable and their level of goal uncertainty was entered as the independent variable. The regression supported the observation that, on average, participants in the High Uncertainty condition saved significantly more than those in the Low Uncertainty condition (p = .01), with the difference in their mean savings being approximately $1,663. However, final savings did not differ significantly when comparing

the Low and Medium Uncertainty conditions (p = .17), nor the Medium and High Uncertainty conditions (p = .24).

3.2. Experiment 2

3.2.1. Perceived goal achievability

As expected, participants' mean achievability ratings (out of 10) were highest in the Low Uncertainty condition (M = 8.09), followed by the Medium Uncertainty condition (M = 7.20), and then the High Uncertainty condition (M = 6.89) (see Figure 2). A subsequent linear regression indicated that participants rated the goal as significantly more achievable in the Low Uncertainty condition compared to the High Uncertainty condition (p = .02), but not compared to the Medium Uncertainty condition (p = .08). The regression also indicated that achievability ratings did not differ significantly between the Medium and High Uncertainty conditions (p = .54).

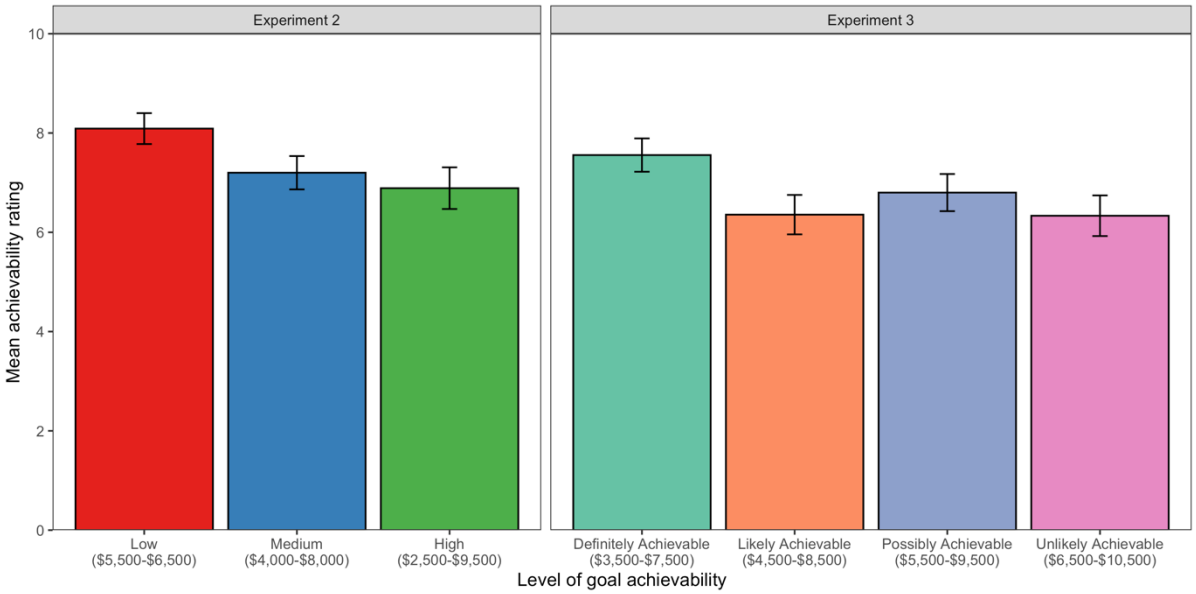

Figure 2. Mean goal achievability ratings by level of goal uncertainty (Experiment 2) and level of goal achievability (Experiment 3). Standard error bars indicated.

3.2.2. Final savings

Unlike in Experiment 1, where participants had substantially more available income ($15,000 vs $7,500), we found that participants averaged lower savings as goal uncertainty increased (Figure 1). While we observed similar mean final savings for participants in the Low Uncertainty (*M* = $5,971.29) and Medium Uncertainty (*M* = $5,927.96) conditions, there was a noticeable decrease in savings for the High Uncertainty condition (*M* = $5,081.00). We analysed these differences using a series of linear regressions (Table 1). The first regression mirrored what was done in the previous experiment: we examined participants' final savings as a function of the level of goal uncertainty. We compared this against a second regression, where we included participants' ratings of the goal's achievability as a covariate.

Table 1.

Influence of goal uncertainty and goal achievability on final savings in Experiment 2.

	Final savings		
	(1)	(2)	(3)
(Intercept)	5,791.29***	5,203.67***	4,836.80***
	(221.04)	(483.19)	(593.97)
Uncertain_Med	-43.33	-41.02	
	(312.59)	(313.64)	
Uncertain_High	-890.29**	-776.41*	-721.99*
	(312.59)	(316.56)	(340.48)
Achievability		94.90†	140.25*
		(53.23)	(67.50)
Observations	135	135	90
R^2	0.07	0.09	0.12
Adjusted R^2	0.06	0.07	0.10
Residual SE	1,482.76	1,470.68	1,568.69
	(df = 132)	(df = 131)	(df = 87)
F Statistic	5.16**	4.55**	5.78**
	(df = 2; 132)	(df = 3; 131)	(df = 2; 87)

Note. †$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

The results of the first regression indicated that, on average, participants in the High Uncertainty condition saved about $890 less by the end of the task than participants in the Low Uncertainty condition ($p < .01$). This effect reduced to $776 when factoring in participants' perceptions of the goal's achievability in the second regression ($p = .02$). The effect of perceived achievability itself on final savings, however, was not significant ($p = .08$).

We hypothesised that the effect of perceived achievability may have been diluted by the inclusion of the Medium Uncertainty condition in the analysis, which participants did not view as significantly different in achievability from the other two conditions. We thus conducted an exploratory third regression which focused on the two extreme conditions: the Low and High Uncertainty conditions. In this third regression, we again observed that participants saved less in the High Uncertainty condition relative to the Low Uncertainty condition ($p = .04$). In addition to this, we observed a positive association between participants' achievability ratings and their final savings amounts—with a 1-point increase in these ratings predicting $140 more in final savings ($p = .04$).

3.3. Experiment 3

3.3.1. Perceived goal achievability

As shown in Figure 2, participants' ratings of the savings goal's achievability were highest in the Definitely Achievable condition ($M = 7.56$). In comparison, we observed lower mean achievability ratings from the Likely Achievable ($M = 6.36$), Possibly Achievable ($M = 6.80$), and Unlikely Achievable conditions ($M = 6.33$).

A linear regression indicated that participants rated the savings goal as significantly more achievable in the Definitely Achievable condition than those in the Likely Achievable ($p = .03$) and Unlikely Achievable ($p = .02$) conditions, but not the Possibly Achievable condition ($p = .16$). There were otherwise no significant differences in ratings between conditions (p's > .39).

3.3.2. Final savings

Figure 1 shows the final savings amounts across the four experimental conditions. Mean savings were highest in the Unlikely Achievable condition (M = \$6,435.00) and were comparatively lower in the Likely Achievable (M = \$5,572.56), Possibly Achievable (M = \$5,748.67), and Definitely Achievable (M = \$5,593.71) conditions.

Table 2 reports the results of a series of linear regressions that were conducted to analyse these differences. The first regression used level of goal achievability as the sole predictor for final savings. The second regression included participants' achievability ratings as an additional predictor. The third regression excluded participants in the Possibly Achievable condition; our prior analysis indicated that these participants had not perceived the goal to be less achievable than the Definitely Achievable condition, suggesting that our manipulation had not worked as intended for this condition.[4] This was similar to our rationale for excluding the Medium Uncertainty condition in the third regression of our Experiment 2 analysis.

[4] We were unable to come up with a plausible explanation for why the manipulation would have failed only for this condition other than it being an unfortunate chance result. Had there been a systematic flaw in our experimental design, we would have expected the manipulation to similarly fail for one of the Likely Achievable or Unlikely Achievable conditions (or both).

Table 2.

Influence of goal uncertainty and goal achievability on final savings in Experiment 3.

	Final savings		
	(1)	(2)	(3)
(Intercept)	5,593.71***	5,023.27***	4,824.13***
	(233.38)	(418.37)	(436.97)
Achiev_Lik	-21.16	69.44	101.07
	(330.05)	(333.10)	(316.23)
Achiev_Poss	154.96	212.00	
	(330.05)	(330.32)	
Achiev_Unlik	841.29*	933.57**	965.78**
	(330.05)	(333.27)	(316.44)
Achievability		75.50	101.86*
		(46.05)	(50.01)
Observations	180	180	135
R^2	0.05	0.06	0.10
Adjusted R^2	0.03	0.04	0.08
Residual SE	1,565.58	1,558.13	1,472.74
	(df = 176)	(df = 175)	(df = 131)
F Statistic	3.03*	2.96*	4.73**
	(df = 3; 176)	(df = 4; 175)	(df = 3; 131)

Note. †$p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Regardless of regression specification, we observed significantly higher final savings from participants in the Unlikely Achievable condition compared to the other three conditions: Definitely Achievable (p's < .05), Possibly Achievable (p's < .05), and Likely Achievable (p's < .01). There were otherwise no significant differences in final savings between conditions (p's > .52). In contrast, the relationship between participants' perceived achievability ratings of the savings goal and their final savings was inconsistent. In our second regression, which included all conditions, this relationship was not significant (p = .10). However, the relationship was significant in the third regression, only after the participants in the Possibly Achievable condition had been excluded (p = .04). A 1-point increase in participants' ratings corresponded to a $102 increase in final savings (similar to the $140 increase observed in Experiment 2).

4. Discussion

4.1. Integrating perspectives on uncertainty

The aim of this study was to investigate how uncertainty influences saving behaviour given seemingly conflicting perspectives offered by the psychological and economic literature. Across our three experiments, we observed mixed results on how our participants responded when given uncertain savings goals. In Experiment 1, we observed that participants tended to save more when there was greater uncertainty about the goal amount—consistent with prior economic work showing that uncertainty motivates precautionary saving (e.g., Carroll & Kimball, 2018; Christelis et al., 2020; Coibion et al., 2021). However, in Experiment 2, when we halved participants' hypothetical income and no longer guaranteed that the savings goal was achievable, we observed the opposite: the participants who experienced the greatest uncertainty were then found to have saved the least. This latter result could be interpreted as evidence supporting the psychological perspective that people are averse to ambiguous outcomes (in this case, saving towards a potentially unachievable goal) and would instead prefer an outcome with certainty (spending for guaranteed points within the task) (e.g., Du & Budescu, 2005; Fox & Tversky, 1995).

Our opposing findings from Experiments 1 and 2 could be reconciled by drawing upon the explanatory account offered by van Schie et al. (2012). Based on their previous work, it was suggested that people save more when faced with uncertainty if they believe they have the means to do so; otherwise, they become less motivated to save. Consistent with this view, our participants saved more when the goal was uncertain, and they had more than adequate income to increase their savings (Experiment 1) but saved less when their income was inadequate (Experiment 2). However, this account could not fully explain our findings in Experiment 3. In our final experiment, we observed the highest savings from the participants who were most uncertain about whether the goal was achievable.

To explain our collective results, we propose a minor addition to what was suggested by van Schie et al. (2012). The overall account can be summarised as follows. First, when people are faced with an uncertain savings goal, those who have the financial means to do so will seek to reduce their uncertainty by saving more. Second, for those without the financial means, uncertainty about the achievability of the savings goal reduces their motivation to save. Third, while those without the financial means may be less motivated to save, they

remain motivated to achieve the goal; in other words, they seek to avoid allowing the goal to become completely out of reach.

This modified account neatly explains the pattern of results we observed across our three experiments. In Experiment 1, participants had more than enough income to eliminate the uncertainty around the savings goal amount and most chose to do so. Consequently, we observed the greatest level of savings in the High Uncertainty condition, who had to set aside $9,500 to be sure they would achieve the savings goal. In Experiment 2, participants no longer had the income to eliminate uncertainty around the savings goal, and so were less motivated to save. However, they still sought to give themselves a chance to reach the goal. Thus, we saw lower average savings for those in the High Uncertainty condition (who only needed to set aside at least $2,500) compared to those in the Low Uncertainty condition (who needed to set aside at least $5,500). This remained the case for Experiment 3, as participants still did not have the financial means to guarantee the achievability of the goal. However, because of how we constructed the goal ranges, the desire to remain within reach of the savings goal meant that participants in the Unlikely Achievable condition were the ones who had to save the most, as they required the most savings to do so (at least $6,500). Overall, this suggests that both the psychological and economic perspectives of uncertainty hold merit, and that the nuance lies in how the consumer perceives their ability to resolve the uncertainty at hand.

4.2. Implications for motivating saving behaviour

Our findings highlight the need to consider individuals' circumstances when providing financial guidance and the importance of avoiding a one size fits all approach to goal setting (Wang-Ly et al., 2022). Consider, for example, the challenge of boosting retirement savings. In Australia, it is advised that single consumers should aim to retire with savings of between A$100,000 (USD 67,000) for a "modest" retirement and A$595,000 (USD 399,000) for a "comfortable" retirement (ASFA, 2023, p. 3). The results of our experiments suggest that consumers who are already in strong financial positions are likely to save more when provided this range; these consumers may respond to the uncertainty around how much is needed for retirement by seeking to guarantee a comfortable retirement. In contrast, consumers in poorer financial positions—who may be uncertain about their ability to reach

the A$595,000 upper bound—may become less motivated to save. Instead, these consumers may aim to save around the A$100,000 lower bound despite having the capacity to save more. This has the potential to exacerbate inequalities in financial outcomes, as those with the financial means are motivated to save more, and those without to save less.

Instead of generic savings targets, it may be beneficial to provide consumers with personalised goals based on their financial circumstances. Our findings suggest that one way of doing so could involve setting goals where the lower bound is slightly less than consumers' capacity to save. For example, a consumer whose current financial circumstances places them on track to retire with A$300,000 in savings may be suggested to aim for between A$250,000 and A$545,000 (rather than A$70,000 and A$545,000). This follows a similar approach to stretch goals—a term used to describe goals that are unlikely to be achieved and may extend beyond one's current capabilities (Pina e Cunha et al., 2017; Sitkin et al., 2017). Stretch goals have been shown to have a strong motivational effect on goal attainment, particularly for those who may not have previously taken the goal seriously (Ahmadi et al., 2022).[5]

However, the challenge that will need to be overcome in providing personalised financial goals is scalability. Providing personalisation at the individual or household level would require significantly greater resources than providing general advice, as ASFA have done. Moreover, this approach would rely on consumers proactively seeking out financial advice, which has historically not been the case (e.g., due to the cost of advice or lack of trust in advisors; Foerster et al., 2017; Lachance & Tang, 2012). Fortunately, these barriers continue to reduce over time, as lower-cost sources of advice emerge (e.g., robo-advisors; Jung et al., 2018) and financial institutions leverage more data and more sophisticated machine learning methods to provide better personalised predictions about consumers' financial needs.[6]

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[5] However, see Ordonez et al. (2009) and Zhang and Jia (2013) for prior work on the potential negative consequences of setting stretch goals.

[6] For example, US-based financial advisory company, Betterment, provides consumers with personalised retirement savings goals, based on factors such as their current spending behaviour and expected costs of living in their area.

4.3. Limitations and future directions

One limitation of our study is that participants may have held beliefs about the task's savings goal which differed from how they would view goals in real life. This stems from the idea that experiment participants are "intuitive scientists", who generate hypotheses about the experimental environment that may not match what was intended by the experimenter (Szollosi & Newell, 2020). For example, some participants may have assumed that the savings goal was set by the experimenter, and that the experimenter would not choose an amount that was impossible to reach. Others may have been optimistic that their financial circumstances would change midway through the task (e.g., due to an increase in their income; Puri & Robinson, 2007; Seaward & Kemp, 2000) such that the savings goal would become achievable. While we believe this to be unlikely, given the differences in achievability ratings we observed between our experimental conditions, future work may seek to eliminate this possibility by being explicit about the parameters of the task (e.g., how goal amounts are determined or whether any changes in income should be expected).

Another limitation of our work, and inherent in any lab-based study, is that our task contained artificial characteristics that were not fully representative of the real world. Potentially the most consequential of these characteristics was our decision to use an all-or-nothing reward structure to incentivise achievement of the savings goal (i.e., 45,000 bonus points for reaching the goal and 0 points otherwise). Although we made this choice to keep the task simple for participants, it deviated from how savings goals typically function. Generally speaking, it is better to have saved more money than less, even if a goal has not been reached. In contrast, there was no benefit to having additional savings within our task if participants were not going to reach the goal; if anything, there was an opportunity cost because the money was not being spent to earn points. Such disparities naturally invite scepticism about the external validity of our findings. However, in this specific case, it could be argued that the all-or-nothing reward structure adds to our findings rather than detracts from them. Across our experiments, participants remained motivated to achieve the goal even when the likelihood of achieving the goal was low and the opportunity cost was high. In the real world, where holding savings has value even if one falls short of a goal, it would thus stand to reason that consumers would have even greater motivation to save. Even so, future work may seek to incorporate a more realistic reward structure that would build greater

confidence in the generalisability of our findings (e.g., rewarding participants proportionally to their savings).

Finally, it is worth noting that our experiments only focused on situations in which the goal was possible to achieve. In many cases, consumers may not believe it is possible for them to save, either for emergencies or for retirement (Members Equity Bank, 2020). Previous work has highlighted the importance of financial self-efficacy in influencing saving behaviour (Asebedo & Seay, 2018; Rothwell et al., 2016), suggesting the opportunity to build upon our work by examining instances where the goal is perceived to be completely unachievable. However, care should be taken in testing such scenarios as it may invoke scepticism from the participant. As alluded to earlier, participants may develop a range of hypotheses as to why the experimenter would present a goal that was clearly impossible to reach. Nevertheless, this remains an avenue for future research that could contribute to our broader understanding of how consumers perceive and work towards uncertain savings goals.

5. Conclusion

Knowing how much to save for the future is a difficult challenge for consumers to solve. In this study, we investigated how this (savings) goal uncertainty affects consumers' motivation to save. Using a novel financial decision making task, we provide evidence that consumers respond differently to uncertainty depending on their financial circumstances; those with the financial means were motivated to save more, whereas those without the means saved less. Overall, our findings reconcile contrasting perspectives of uncertainty from the psychological and economic literature and help to build a more nuanced understanding of how uncertainty affects financial decision making.

6. References

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