# Cognitive and behavioural bias in advance care planning

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***Abstract***

**Background:** We explore cognitive and behavioural biases that influence individual's willingness to engage advance care planning (ACP). Because contexts for the initiation of ACP discussions can be so different, our objective in this study was to identify specific groups, particular preferences or uniform behaviours, that may be prone to cognitive bias in the ACP decision process.

**Method:** We collected data from the Australian general public ($n = 1253$), as well as general practitioners (GPs) and nurses ($n = 117$) including demographics, stated preference for ACP decision-making; six cognitive bias tests commonly used in Behavioural Economics; and a framing experiment in the context of ACP.

**Results:** Compared to GPs ($M = 57.6$ years, SD = 17.2) and the general public (58.1 years, SD = 14.56), nurses on average recommend ACP discussions with patients occur approximately 15 years earlier ($M = 42.9$ years, SD = 23.1; $p < 0.0001$ in both cases). There is a positive correlation between the age of the general population and the preferred age for the initial ACP discussion ($\rho = 0.368$, $p < 0.001$). Our shared decision-making analysis shows the mean share of doctor's ACP input is viewed to be approximately 40% by the general public, significantly higher than health professionals (GPs and nurses), who believe doctors should only contribute approximately 20% input. The general public show varying relationships (all $p < 0.05$) for both first ACP discussion, and shared decision-making for five of six cognitive tests. However, for health professionals, only those who exhibit confirmation bias show differences (8.4% higher; $p = 0.035$) of patient's input. Our framing experiment results show that positive *versus* negative framing can result in as much as 4.9–7.0% shift in preference for factors most relevant to ACP uptake.

**Conclusion:** Understanding how GPs, nurses and patients perceive, engage and choose to communicate ACP and how specific groups, particular preferences or uniform behaviours, may be prone to cognitive bias in the decision process is of critical importance for increasing future uptake and efficient future healthcare provision.

***Keywords:*** advance care planning, cognitive bias, end of life, framing, shared decision-making

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## Introduction

Advance care planning (ACP) and end-of-life (EOL) decision-making are topical issues given an ageing Australian population and its future impact on healthcare services.[1–3] ACP is a process that allows an individual to discuss, plan, and communicate their desires, wishes, and preferences about their future healthcare to family, friends, and health professionals.[4] It is a complex process; however, it has clear benefits for the individual involved by improving quality of life throughout EOL care, and assuring patients' wishes for care are explicitly met.[5] ACP can also alleviate stress and anxiety for family and loved ones, as well as reduce the psychological, emotional, administrative and economic burden on

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the healthcare professionals and organisational systems involved.[6] While the associated benefits of ACP appear clear in principle, patients' understanding and uptake remain low. The available data indicate that only 14% of the Australian population had advance directives (a formal record of an individual's directives for future healthcare), with numbers varying significantly between states and territories.[7] This is also replicated in other parts of the world.[8]

A lack of patient knowledge about ACP has been shown to be one of the primary reasons for low ACP uptake.[6] The literature suggests that interventions that increase communication about ACP naturally lead to increased directive completions.[9] Older people express clear preferences for future EOL care; however, resulting healthcare communications continue to remain inadequate.[10] ACP communication and decision-making research is globally topical, with some critics arguing that the current EOL model of shared decision-making is in effect '*illusory*' (p. 114).[11] This is because in real-life situations, shared decision-making regarding EOL care choices will always be in some part '*incomplete*' (p. 461)[12] as medical experts' advice can effectively bias patient's choices. The ability to make autonomous choices is even more compromised when complex care is required. A more comprehensive understanding of the factors influencing ACP decision-making warrants investigation. One way is by using behavioural economics (BE), which moves beyond the neo-classical and traditional health economics of unidimensional cost benefit analysis. BE instead incorporates the effects and impact of cognitive, emotional, psychological and sociocultural factors in individual and organisational decision-making.[13] BE research methods have previously been used to explore medical expert and patient communication and behaviour across a range of allied health settings, including pharmacy, reconstructive surgery and breast care nursing.[14–16] More specifically to ACP, BE research has shown that the way questions and information are framed to patients in EOL decision-making can impact their preferences and choices.[17,18] Studies have also explored other cognitive barriers to ACP uptake, and the potential for the use of behavioural theories in EOL care decision-making.[19,20] In fact, simply being aware of potential behavioural biases can assist patient's ability to revise counterproductive beliefs in the ACP decision process.[19]

To further enhance the knowledge on this topic, the objective of this study was to explore cognitive biases and key differences in communication, preference and decision-making in the context of ACP for both the general public, as well as general practitioners (GPs) and nurses with an interest in primary care. The study also explored individuals' perceptions of their role in choice and potential shared decision-making with medical experts and identified how framing effects might influence changes in preference for possible motivating factors to engage in ACP. Because contexts for the initiation of ACP discussions can be so different, studies such as this are useful in identifying specific groups, particular preferences or uniform behaviours that may be prone to cognitive bias in the decision process.

## Methods

### *Data collection, sample size and response rate*

Our study comprises of two samples: (Sample 1) an age-representative sample of the Australian population and (Sample 2) a sample of Australian healthcare professionals.

For the general public sample, participants were surveyed online using the *Qualtrics* survey software between 21 and 25 May 2021. Australian participants aged 18–80 ($n = 1248$) were recruited by *Lucid* (https://luc.id/marketplace/), a commercial research company with an online survey respondent community. All people 18 years of age and older at the time of the survey were eligible to participate. All responders received a token payment for the full survey completion. Data were collected from 21 to 25 May 2021.

The healthcare professional sample comprised conference attendees of the General Practice Conference and Exhibition (GPCE), in May 2021 at Homebush, Sydney. Conference attendees were approached and invited to participate in person by the research team on the first two days of the conference. Our sample represents 48.1% ($n = 25$) of the 53 nurse attendees and 23.59% ($n = 92$) of the 390 GPs who attended the conference on those days. Healthcare professionals were incentivised to participate with a voluntary random prize draw of two amounts of AUD$500. A total 104 of the 117 healthcare professionals surveyed entered the random prize draw.

**Table 1.** Behavioural bias test and definition.

| Bias | Definition | Practical example |
|---|---|---|
| 1. Conjunction fallacy | When an agent's decision-making is in error from the assumption that the conjunction of two possible events is more likely or probable than a single event | When considering an ACP, patients may join together the likelihood of multiple health outcomes, thus over-estimating, rather than see each individual outcome as independent |
| 2. Illusion of control bias | When individuals overestimate their control over specific events that are patently not within their capacity or influence | Doctors and nurses may make decisions based on previous experiences in which outcomes were dictated by factors not relevant in the current setting |
| 3. Endowment (effect) bias | When an agent's maximum willingness to pay is typically lower than the least amount they are willing to accept. Loss aversion is associated with ownership | Patients without an ACP may overweigh the current value of not having an ACP, propitiate to talking the time to invest in creating one in the future |
| 4. Herding bias | Refers to an agent demonstrating a tendency to follow or copy what others are doing. A misbelief that that is the right course of action purely because majority have chosen it | Patients, doctors and nurses may all gravitate to the behaviour the majority engage in, even if this is not necessarily the best outcome for themselves or others |
| 5. Confirmation bias | Is the tendency for an agent to selectively interpret, favour or search for information that supports their own values or prior beliefs, all the while ignoring data or facts that are not supportive or their position | Patients, doctors and nurses may inadvertently exclusively seek out information that validates their own opinion (or diagnosis), rather than make an independent assessment |
| 6. Loss aversion | Loss aversion refers to an agent's tendency to favour avoiding losses to the acquisition of equivalent gains | Patients and doctors may make medical decisions based on a risk averse position, rather than an independent assessment based on the information available |

ACP, advance care planning.

### *Survey design*

We designed two surveys for Sample 1 and Sample 2. Both surveys (see Appendix 1 for survey questions in full) were designed to capture participants' knowledge and preferences regarding ACP engagement and measure any cognitive bias. The questions used are validated survey measures repeatedly used in BE and applied psychology research.[13,15,16,21] For both samples, we asked participants (1) what the best age for initial ACP discussion between patient and healthcare professional is, and (2) their preference for the degree of shared decision-making between doctor and patient in deciding the content of any potential ACP. Cognitive bias of the participants was measured using six different bias tests, those being; conjunction fallacy, illusion of control, endowment effect, herd bias, confirmation bias and loss aversion. Each cognitive bias response is then treated as a binary variable, with the participant either exhibiting the bias, or not. All are commonly used in BE for scenarios of decision-making under constraint or risk.[13,21] Table 1 provides definitions for each bias, as well as practical examples.

Moreover, we incorporated a randomised framing experiment into the survey design to assess how participants' preference towards ACP uptake is affected by framing. Specifically, we asked participants to rank, from their most preferred to least preferred, five different reasons for ACP

uptake presented in either positive or negative connotations. Half of the participants were randomly allocated to the treatment where reasons were framed as benefits (e.g. an ACP may reduce unwanted financial costs) and the other half to reasons framed as drawbacks (e.g. without an ACP you may experience unwanted financial costs). Furthermore, we included three additional questions on personal experience with ACP in the Australian general public survey, including (1) do participants know what ACP is, (2) if they have completed an ACP and (3) if they have assisted with or participated in an ACP for friends or relatives. Description of ACP was provided to the participants after indicating whether or not they previously knew about ACP (1). These personal ACP experience questions were asked before other ACP-related questions.

For both groups, we collected demographic information (age and sex), while for GPs and nurses, we also collected data on their job title and their years of experience in that role.

### *Statistical analyses*

Data were analysed using Stata 16.1. We begin with some descriptive analysis of our outcome variables of interest, including Pearson's correlation, pairwise comparisons, two-sample *t*-tests presented with 95% confidence intervals and level of significance with Bonferroni's correction for multiple comparison. We then proceed to our ordinary least squares multivariate analysis.

### *Ethical approval*

All participants provided informed consent, and all research was conducted in accordance with the QUT Human Research Ethics Committee protocol clearance (approval no. 2021000128).

## Results

Participant characteristics of the Australian general public and healthcare professionals are summarised in Table 2. Average age of the general public sample is 41.3 years (SD = 17.4). Male participants (45.5%) are, on average, 10.7 years older than female participants. Approximately two-thirds of the GP participants are male (66.3%). The mean age of GPs is 54.1 years (SD = 13.6) with male GPs being 9.1 years older and with 6 years more on-job experience than female GPs, on average. Only two out of the 25 nurses surveyed are males. The average age of nurse participants is 55.7 (SD = 10.5). Pearson's correlation between age and experience for health professionals is high ($\rho = 0.842$) and were run for both the combined sample 0.842 ($n = 116$), with GPs ($\rho = 0.903$) and nurses ($\rho = 0.565$), indicating that the sample of nurses has a larger variance in terms of age when career begin.

Approximately one-third of the general public participants were familiar with ACP and only 14.1% and 21.1% of the participants reported having completed an ACP (which is representative of broader Australian public)[7] and have been involved with an ACP of their friends or relatives, respectively.

### *Preferred age to first discuss ACP*

All participant groups were asked which age they believed was best to first open a discussion with a patient regarding ACP. To restrict outliers, responses were bounded between 16 and 80 years of age. The average ideal age of initial ACP discussion for the general public is 58.1 years (SD = 14.56), which is not statistically different (unadjusted $p$-value = 0.737) from the average of the GP sample ($M = 57.6$ years, SD = 17.2, see Figure 1). However, we find that the nurse participants prefer the first ACP discussions with patients to occur approximately 15 years earlier in patients who are in their early 40s ($M = 42.9$ years, SD = 23.1) compared to the general public and the GP sample. These differences are statistically significant ($p < 0.001$ in both cases). Furthermore, we find that the distribution of ideal age of initial ACP discussion to be bimodal in the nurse sample, whereas for GPs and the general public, the distribution appears to be left skewed.

We find some variation within each sample with respect to participant characteristics. For example, Australian males seem to prefer a slightly later initial ACP discussion in life ($M = 59.4$ years, SD = 14.8) compared to Australian females ($M = 57.1$ years, SD = 14.3; $p = 0.0047$); however, this is not apparent when age is controlled for, whereas for GPs, there were no statistically significant difference between male and females ($p = 0.433$). Sex difference comparisons for our nurse sample were not possible due to only two male participants. More interestingly, for the general public sample, we find that preferred age for first ACP discussion is positively correlated with

**Table 2.** Summary statistics by group.

| **Australian general public (*n* = 1248)** | **Mean** | **SD** | **Min** | **Max** |
|---|---|---|---|---|
| Male (%) | 45.5 | | | |
| Age | 41.3 | 17.4 | 18 | 80 |
| Female | 36.51 | 15.4 | 18 | 78 |
| Male | 47.18 | 17.9 | 18 | 81 |
| Knew about ACP (%) | 33.3 | | | |
| Completed an ACP (%) | 14.1 | | | |
| Assisted with or participated in an ACP of friends or relatives (%) | 21.1 | | | |
| Optimal age for initial ACP discussion | 58.1 | 14.6 | 16 | 80 |
| Share of doctor's input in ACP content | 39 | 31.3 | 0 | 100 |
| **General practitioners (*n* = 92)** | **Mean** | **SD** | **Min** | **Max** |
| Male (%) | 66.3 | | | |
| Age | 54.1 | 13.6 | 24 | 77 |
| Female | 48.0 | 13.4 | 26 | 70 |
| Male | 57.2 | 12.7 | 26 | 77 |
| Years of experience | 24.3 | 13.3 | 2 | 53 |
| Optimal age for initial ACP discussion | 57.6 | 17.2 | 16 | 80 |
| Share of doctor's input in ACP content | 18 | 20.1 | 25 | 100 |
| **Nurses (*n* = 25)** | **Mean** | **SD** | **Min** | **Max** |
| Male (%) | 8 | | | |
| Age | 55.7 | 10.5 | 31 | 69 |
| Female | 56.7 | 10.0 | 31 | 69 |
| Male | 44 | 11.3 | 36 | 52 |
| Years of experience | 27.3 | 13.1 | 4 | 50 |
| Optimal age for initial ACP discussion | 42.9 | 23.1 | 16 | 80 |
| Share of doctor's input in ACP content | 19.2 | 22 | 30 | 100 |

ACP, advance care planning.

participants' age [$\rho = 0.368$, $p < 0.001$, see Figure 2(a)], for both male (0.334) and female (0.391). However, this age bias was not present in the GP and nurse samples [pooled $\rho = 0.055$, $p = 0.563$, Figure 2(b)], even when differentiated by occupation or sex. As such in Figure 2, GPs and nurses are grouped together for simplicity. Furthermore, ideal age of first ACP discussion is also not correlated with health professionals' year of job experience.

### *Shared decision-making in ACP*

In terms of participant preference for the share of contribution to an ACP between patients and doctors, the public hold a more mixed view

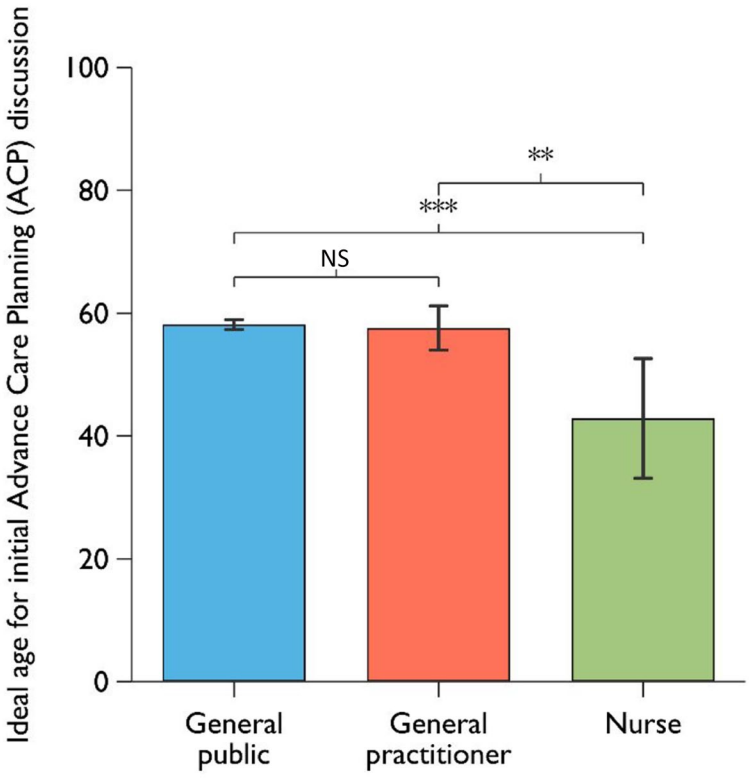


**Figure 1.** Ideal age of first ACP discussion by group.
Two-sample *t*-tests presented with 95% confidence intervals. ** and *** represent 1% and 0.1% levels of significance with Bonferroni's correction for multiple comparison, respectively. NS represents not statistically significant.

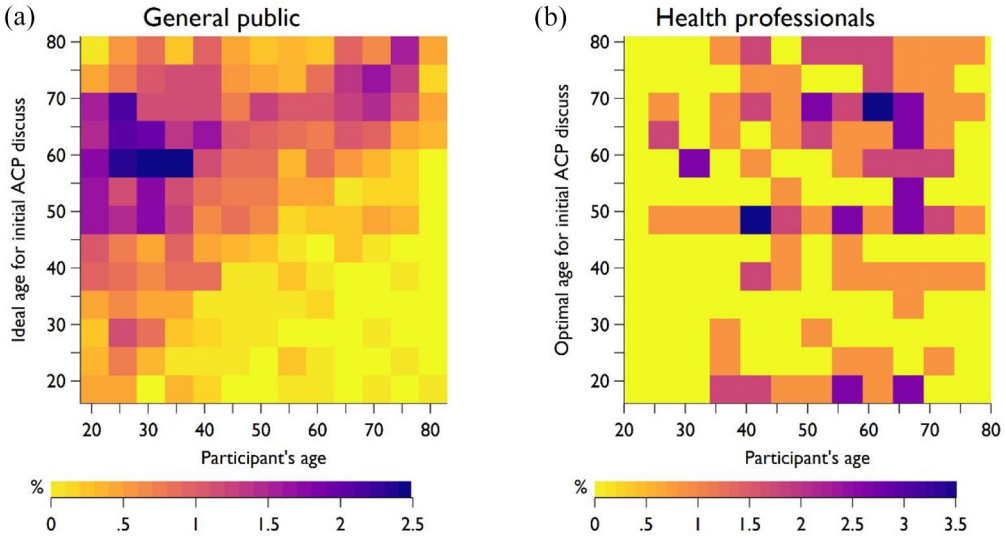


**Figure 2.** Correlation between participant age and preferred age of initial ACP discussion, by group.
Colour shows the proportion of participants.

compared to health professionals. As shown in Figure 3 (also see Table 2), the mean share of doctor's ACP input is viewed to be approximately 40% for the general public, which is significantly higher compared to health professionals (GPs and nurses), who believe doctors should only

contribute about 20% input in terms of designing the patient's ACP. Moreover, the variance of the distribution for the general public is substantially larger than health professionals ($p < 0.001$, based on a two-tailed equality of standard deviations), indicating the former has more diverse opinions in this matter. Nonetheless, there was no statistically significant difference between the GP and nurse sample in level of shared ACP decision-making preference. Furthermore, there was a significant sex difference within both the general public ($p < 0.001$) and GP ($p = 0.071$) sample (see Figure 10), in which female participants deemed patients should have a higher share in deciding the content of an ACP (difference of 8.8% and 8% points, respectively). No apparent relationship between participants' age and share of doctor–patient ACP decision-making was found (see Figure 11).

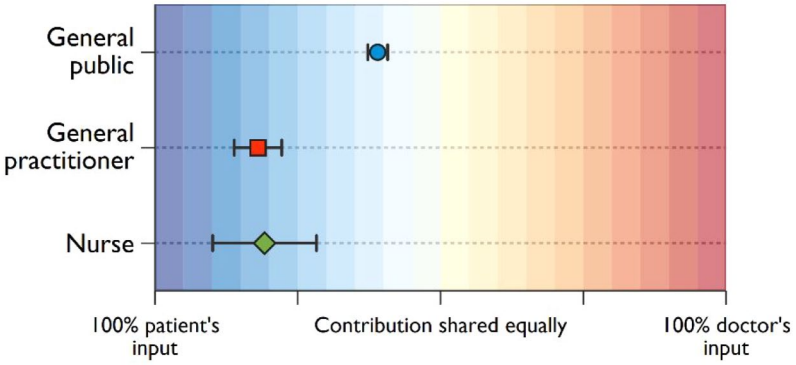


**Figure 3.** Share of doctor–patient contribution in ACP decision-making, by group.
Error bars represent 95% confidence intervals.

### *Cognitive bias and ACP*

In Figure 4, we present our six cognitive bias test findings, differentiated by group. For five of our six [Figure 4(a)–(e)] tests (with the exception of loss aversion), there were statistically significant differences between the general public and GP populations. Specifically, the general public exhibit less conjunction fallacy and herd bias

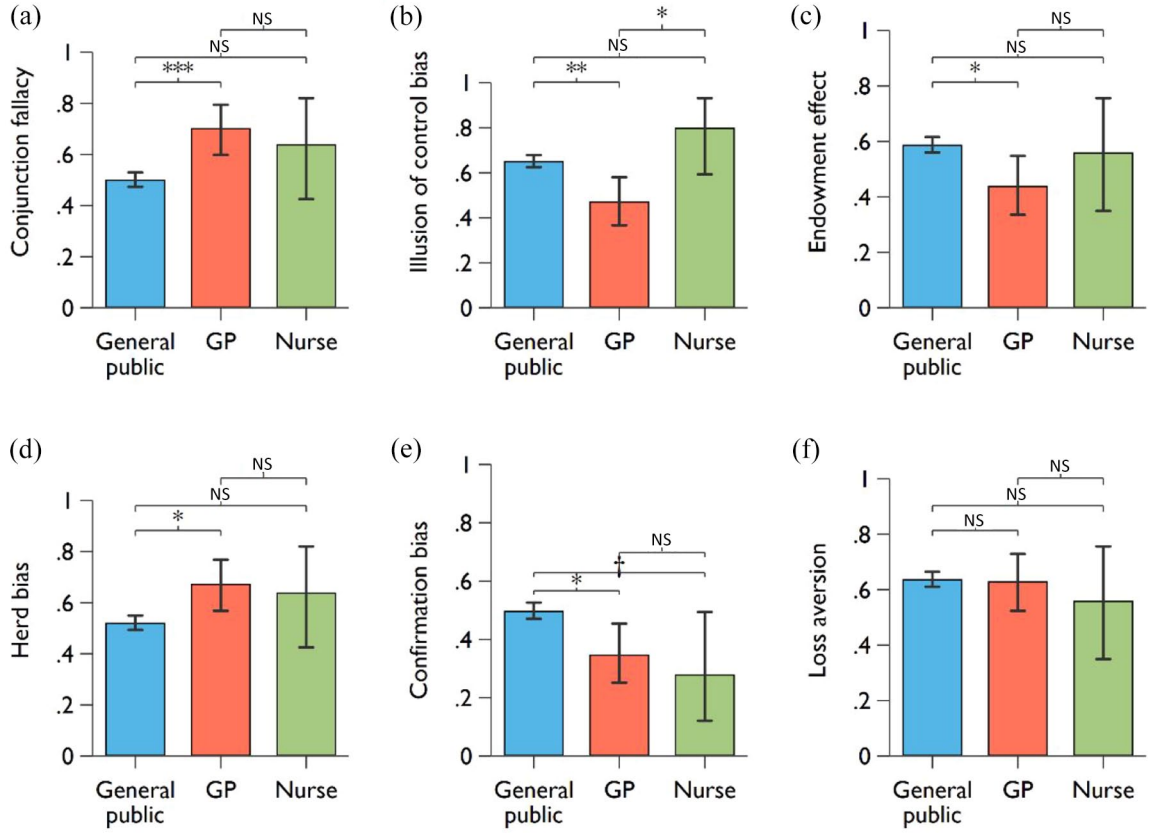


**Figure 4.** Cognitive bias two-sample comparisons, by group.
Two-sample tests of proportion presented with 95% confidence intervals. †, *, ** and *** represent 10%, 5%, 1% and 0.1% levels of significance with Bonferroni's correction for multiple comparison, respectively. NS represents not statistically significant.

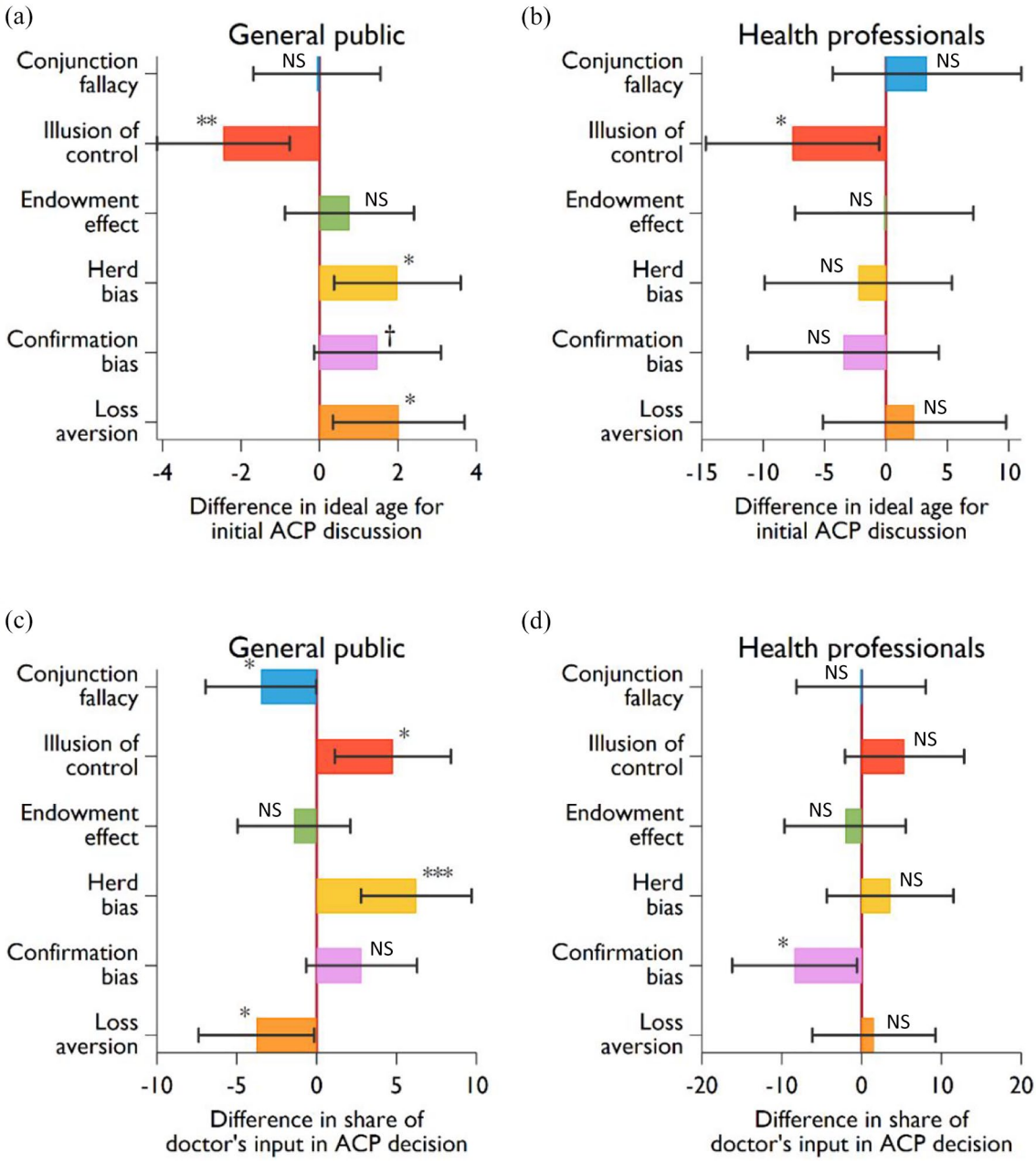


**Figure 5.** Cognitive bias and ACP decision-making process.
Two-sample *t*-tests presented with 95% confidence intervals. Mean differences are calculated by subtracting the average value of those who exhibit the bias from those who do not exhibit the bias. †, *, ** and *** represent 10%, 5%, 1% and 0.1% levels of significance, respectively. NS represents not statistically significant.

than GPs, but experience more illusion of control, endowment effect, and confirmation bias. For most biases, there was no statistically significant difference between nurses and the other two samples; however, this finding is likely due to the small sample size of nurses. The only significant difference was between GPs and nurses with less GPs exhibiting illusion of control bias [Figure 4(b)].

Next, we examine whether these cognitive biases are correlated with the timing participants prefer one should initiate a discussion about ACP with healthcare professionals and their preferences for level of shared decision-making regarding ACP between doctor and patient. To do so, we first compare the averages of the outcome between participants who exhibit bias to a specific behavioural aspect to those who do not (Figure 5),

then, using a multiple regression approach, we assert the effect of these behavioural bias by controlling for other potential confounding factors (Tables 3 and 4).

This simple mean (*t*-test) comparison analysis reveals that participants who exhibit the illusion of control bias are more likely to prefer the initial discussion of ACP to happen in earlier life stages [difference by 2.5 years ($p = 0.005$) for Australian general public participants and 7.6 years ($p = 0.035$) for health professionals, respectively]. Other behavioural biases appear to have no related effect on health professionals, while the general public who exhibit herding bias, confirmation bias, and loss aversion state an older ideal age for first ACP discussion.

Interestingly, general public participants who exhibited behavioural biases rated the share of doctor–patient contribution in ACP decisions differently. Specifically, participants rate the share of doctor's input in deciding ACP content to be higher if they exhibit herding bias (4.77%, $p = 0.01$) or illusion of control bias (6.24%, $p = 0.0004$), but if conjunction fallacy or loss aversion is present, participants tend to rate patient's input to be higher (3.49%, $p = 0.049$ and 3.77%, $p = 0.041$, respectively). In contrast, behavioural bias did not appear to affect health professionals' view on ACP decision-making between doctor and patients, with the exception of confirmation bias. More specifically, health professionals with confirmation bias rated patient's input to be 8.4% higher than those who do not ($p = 0.035$).

In our multivariate analysis, we controlled for basic demographics (i.e. age and sex) of participants as they were previously identified to be correlated with the two outcome variables. For the general public sample, we also controlled for participants' experience with ACP, which is coded as a binary variable with value equals to one if the participants have answered 'Yes' to any of the three questions relating to personal experience with ACP. Furthermore, we included an extensive range of socio-demographic variables to the analysis of the general public sample, including education, type of schooling, ethnicity, household income, marital status, number of offspring, religion, political views, self-rated happiness and self-rated health. For healthcare professionals, we included years of job experience in addition to sex and age. Control variables were procedurally added in the regression analysis in a stepwise manner as a robustness check for coefficient estimates.

In Table 3, after the participants' age and sex were controlled for, the effects of behavioural biases were not statistically significant. Those with a history of any form of ACP experienced no difference in their preference to those without.

In Table 4, participant age had a statistically significant negative correlation with the general public's preference for amount of input by doctors into ACP content. Males compared to females preferred greater doctor's input, and those who exhibited herding bias also preferred greater doctor's contribution. Importantly, a history of any form of ACP experience appeared to have no impact on preference for contribution by doctor or patient.

As the majority of our general population sample have no previous experience with ACP, it is not surprising that cognitive short-cuts are employed in the decision-making process. As a robustness check, we explore the interaction of ACP experience and bias, on our two outcome variables in our general population sample.

For age of first ACP discussion, our multivariate results are presented in Table 5 with specification (7) visualised as Figure 6. All specifications include additional controls [those previously included in Table 3 specification (4)]. We find that those who exhibit confirmation bias or herding bias, and have prior knowledge of ACP, state a preference for later age for first ACP discussion.

For percentage share of ACP decision, our multivariate results are presented in Table 6 with specification (7) visualised as Figure 7. All specifications include additional controls [those previously included in Table 2 specification (4)]. In relation to contribution to an ACP. We find that those who exhibit confirmation bias in the general population, and have prior knowledge of ACP, prefer greater GP contribution in the decision process.

### *Framing effects on preferences for factors motivating ACP uptake*

Prior to any analysis, it is methodologically important to qualify that we find no statistical difference between participant's sex ($p = 0.397$ in the general public sample and $p = 0.932$ health

**Table 3.** Multivariate analysis on ideal age for initial ACP discussion.

| | Australian general public | | | | Health professionals | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Behavioural bias | | | | | | | |
| Conjunction fallacy | 0.1973 (0.8252) | 0.2557 (0.7732) | 0.2637 (0.7731) | 0.0688 (0.8013) | 2.642 (3.837) | 2.135 (3.814) | 2.535 (3.906) |
| Illusion of control bias | −2.632** (0.8553) | −0.0406 (0.8344) | −0.0683 (0.8355) | −0.3503 (0.8485) | −4.005 (3.674) | −3.436 (3.897) | −3.372 (3.905) |
| Endowment effect | 0.8408 (0.8423) | 1.006 (0.7908) | 0.9371 (0.7938) | 0.9356 (0.8249) | 1.702 (3.43) | 1.731 (3.498) | 1.574 (3.53) |
| Herd bias | 2.23** (0.8266) | 1.24 (0.7907) | 1.156 (0.7932) | 0.4819 (0.8228) | −1.238 (4.028) | −0.9735 (4.104) | −1.238 (4.213) |
| Confirmation bias | 1.544† (0.8235) | 1.123 (0.7767) | 1.161 (0.7769) | 1.073 (0.8081) | −5.546 (3.942) | −5.472 (3.949) | −5.613 (3.993) |
| Loss aversion | 2.057* (0.8346) | 0.7336 (0.7937) | 0.7134 (0.7934) | 0.6644 (0.8207) | 1.249 (3.626) | 1.193 (3.665) | 0.9402 (3.76) |
| Participant's age | | 0.3115*** (0.0235) | 0.314*** (0.0237) | 0.2554*** (0.0305) | | 0.0132 (0.1228) | 0.1139 (0.2219) |
| Male | | −1.151 (0.813) | −1.193 (0.8152) | −1.725* (0.8715) | | 3.753 (4.251) | 3.523 (4.293) |
| Experience with ACP | | | 1.13 (0.8038) | 0.5721 (0.8348) | | | |
| Nurse | | | | | −14.18* (5.415) | −12.24* (6.058) | −12.19* (6.043) |
| Years of job experience | | | | | | | −0.1174 (0.2399) |
| Constant | 56.01*** (1.247) | 43.42*** (1.53) | 42.98*** (1.555) | 39.16*** (3.196) | 59.01*** (5.339) | 55.73*** (9.566) | 53.43*** (9.862) |
| Additional control | No | No | No | Yes | No | No | No |
| *N* | 1248 | 1246 | 1246 | 1138 | 112 | 112 | 112 |
| $R^2$ | 0.0201 | 0.141 | 0.143 | 0.191 | 0.141 | 0.148 | 0.15 |
| Adjusted $R^2$ | 0.015 | 0.136 | 0.137 | 0.165 | 0.083 | 0.073 | 0.066 |
| AIC | 10,213.7 | 10,038.3 | 10,038.2 | 9139.9 | 976.8 | 979.8 | 981.6 |
| BIC | 10,249.6 | 10,084.4 | 10,089.5 | 9326.3 | 998.6 | 1007.0 | 1011.5 |

ACP, advance care planning; AIC, Akaike information criterion; BIC, Bayesian information criterion.
Dependent variable: Ideal age for initial ACP discussion. Standard errors (robust) in parentheses.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

**Table 4.** Multivariate analysis on share of doctor–patient contribution in ACP decision.

| | Australian general public | | | | Health professionals | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Behavioural bias | | | | | | | |
| Conjunction fallacy | −3.387† (1.759) | −2.934† (1.714) | −2.919† (1.713) | −2.727 (1.75) | −0.5614 (4.259) | −0.344 (4.15) | −0.0472 (4.369) |
| Illusion of control bias | 4.639* (1.852) | 2.98 (1.881) | 2.926 (1.882) | 3.104 (1.937) | 6.248 (3.971) | 6.113 (3.907) | 6.12 (3.937) |
| Endowment effect | −1.744 (1.807) | −1.791 (1.765) | −1.925 (1.762) | −2.716 (1.77) | −0.5707 (3.852) | 0.3392 (3.71) | 0.2643 (3.818) |
| Herd bias | 5.6** (1.754) | 5.96*** (1.717) | 5.796*** (1.72) | 4.949** (1.779) | 2.517 (4.069) | 2.803 (3.914) | 2.589 (3.982) |
| Confirmation bias | 2.861 (1.756) | 2.574 (1.713) | 2.647 (1.715) | 2.474 (1.737) | −8.773* (3.953) | −9.087* (3.824) | −9.222* (4.006) |
| Loss aversion | −3.279† (1.818) | −2.757 (1.786) | −2.796 (1.786) | −2.616 (1.831) | 0.1331 (3.97) | 0.9898 (3.881) | 0.8475 (3.869) |
| Participant's age | | −0.3579*** (0.0518) | −0.3532*** (0.0518) | −0.3964*** (0.0697) | | −0.2383 (0.1509) | −0.1611 (0.3346) |
| Male | | 12.63*** (1.791) | 12.55*** (1.789) | 12.64*** (1.893) | | 9.962* (4.078) | 9.768* (4.233) |
| Experience with ACP | | | 2.198 (1.734) | 2.411 (1.768) | | | |
| Nurse | | | | | −0.8542 (4.918) | 5.375 (5.096) | 5.413 (5.107) |
| Years of job experience | | | | | | | −0.0903 (0.3384) |
| Constant | 36.44*** (2.627) | 45.97*** (3.367) | 45.12*** (3.431) | 68.7*** (6.775) | 16.51* (7.117) | 21.63* (9.902) | 19.87 (12.2) |
| Additional control | No | No | No | Yes | No | No | No |
| *N* | 1248 | 1246 | 1246 | 1138 | 115 | 115 | 115 |
| $R^2$ | 0.0226 | 0.0771 | 0.0783 | 0.167 | 0.0652 | 0.117 | 0.118 |
| Adjusted $R^2$ | 0.018 | 0.071 | 0.072 | 0.140 | 0.004 | 0.041 | 0.033 |
| AIC | 12,120.7 | 12,031.5 | 12,031.9 | 10,924.1 | 1026.7 | 1024.1 | 1026.0 |
| BIC | 12,156.6 | 12,077.6 | 12,083.2 | 11,110.5 | 1048.7 | 1051.6 | 1056.2 |

ACP, advance care planning; AIC, Akaike information criterion; BIC, Bayesian information criterion.
Dependent variable: Share of input contributed by the doctor. Standard errors (robust) in parentheses.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

**Table 5.** ACP experience and bias interaction for age of first ACP discussion – General Pop.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Experience with ACP | 0.9349 (1.177) | −0.6379 (1.383) | −0.6127 (1.334) | −1.735 (1.281) | −0.9236 (1.182) | 1.328 (1.37) | −4.108 (2.504) |
| ACP experience × Conjunction fallacy | −0.7117 (1.64) | | | | | | −0.4084 (1.659) |
| ACP experience × Illusion of control bias | | 1.878 (1.722) | | | | | 1.37 (1.714) |
| ACP experience × Endowment effect | | | 1.984 (1.69) | | | | 1.639 (1.712) |
| ACP experience × Herd bias | | | | 4.373** (1.634) | | | 4.279** (1.653) |
| ACP experience × Confirmation bias | | | | | 2.991† (1.625) | | 2.807† (1.653) |
| ACP experience × Loss aversion | | | | | | −1.157 (1.69) | −0.9696 (1.685) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 1138 | 1138 | 1138 | 1138 | 1138 | 1138 | 1138 |
| $R^2$ | 0.191 | 0.192 | 0.192 | 0.196 | 0.194 | 0.191 | 0.201 |
| Adjusted $R^2$ | 0.164 | 0.165 | 0.165 | 0.169 | 0.166 | 0.164 | 0.170 |
| AIC | 9141.7 | 9140.7 | 9140.4 | 9134.3 | 9138.4 | 9141.4 | 9138.5 |
| BIC | 9333.1 | 9332.1 | 9331.8 | 9325.7 | 9329.8 | 9332.9 | 9355.1 |

ACP, advance care planning; AIC, Akaike information criterion; BIC, Bayesian information criterion.
Dependent variable: Ideal age for initial ACP discussion. Standard errors (robust) in parentheses.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

professional sample) and age ($p = 0.122$ in the general public sample and $p = 0.454$ health professional sample). Years of experience also do not differ between health professionals who were exposed to the different conditions ($p = 0.84$) and all other sample characteristics (e.g. education, income, political views) do not differ across the positive and negative framing general public subsample.

In Table 7 and Figure 8, we present our framing experiment results again differentiated by group. In Figure 12 (see Appendix 1), we also present the complete distribution of rank preferences by ACP alternative for both positive and negative conditions.

For our general public group, exact medical care is on average the most prioritised factor, but that when alternatives are framed positively, participants rank the exact medical care ($p = 0.012$) option higher than those in the negative frame. Conversely, hospital transfers are ranked lower in a positive frame, although only at a 10% significance level ($p = 0.062$).

For our GP group, we see similar results in that positive framing of the exact medical care ($p = 0.079$) option results in higher priority, while again positively framing hospital transfers ($p = 0.034$) results in lower order preferences.

Finally in our nurse group, we find novel results in comparison to our previous two groups, in that nurses (on average) in our positive frame condition place higher priority on family impact ($p = 0.015$), but in a negative frame, we see nurses place higher priority on optimal EOL care although again only at a 10% significance level ($p = 0.078$).

Furthermore, by comparing the order of preference in pairs of ACP uptake reasons (Table 8), we find that framing causes the order of preference to switch for certain pairs. In particular, in our general public sample, 79.4% of the participants rank

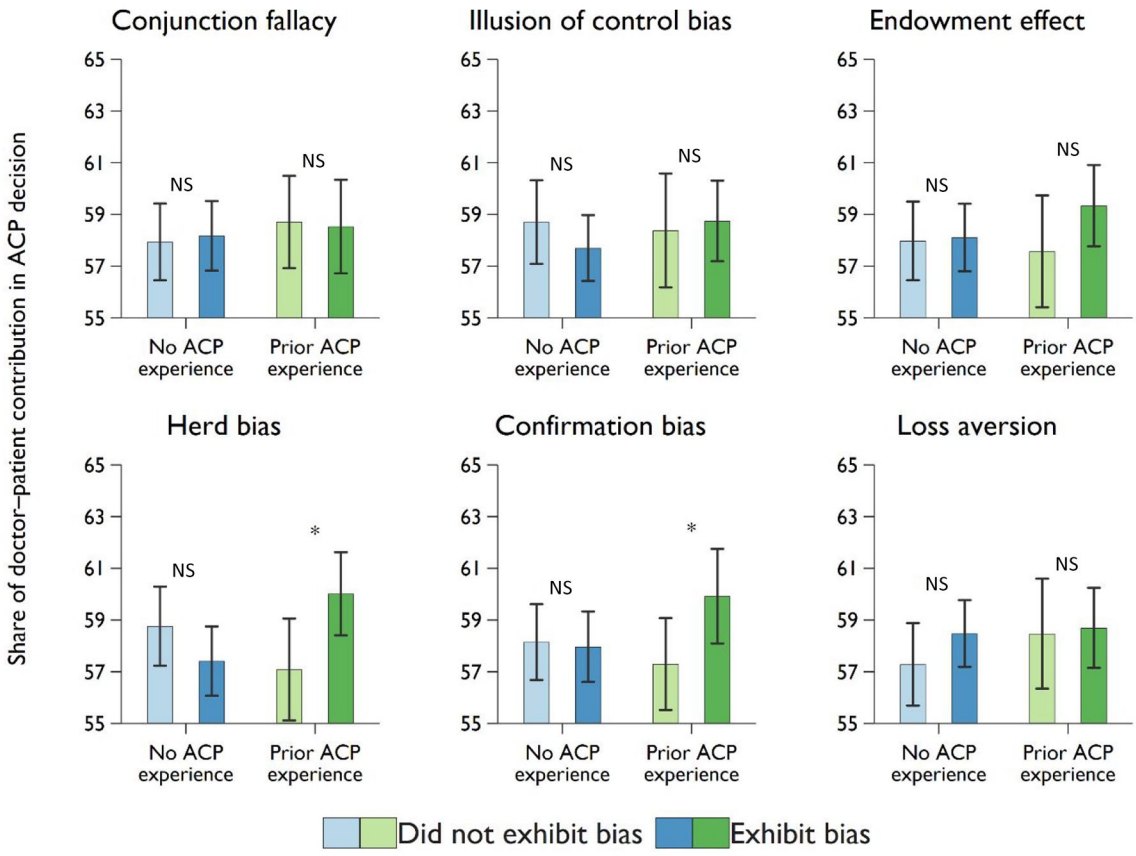


**Figure 6.** ACP experience and bias interaction for first age of ACP discussion – General Pop.
Proportion presented with 95% confidence intervals. †, *, ** and *** represent 10%, 5%, 1% and 0.1% levels of significance with Bonferroni's correction for multiple comparison, respectively. NS represents not statistically significant. Dark (light) bars represent participants who (do not) exhibit the specific behavioural bias.

family impact as more important factor for ACP uptake than hospital transfers, while this share drops by 7% point when reasons were negatively framed ($p = 0.004$). Similarly, we also observe a 4.9% point shift in preference rank order for optimal EOL care compared to financial costs ($p = 0.044$).

## Discussion

Previous research exploring factors impacting EOL decision-making have primarily focussed on sample populations of the seriously ill, as well as the elderly,[9,22,23] and did not explore the role of bias in decision-making. Our study instead provides new and novel empirical findings from both frontline healthcare professionals and potential future patients relating to ACP communication and preference.

Triggers for engaging an ACP discussion are most often related to a significant new or ongoing health issue. That said, our study shows that the mean age where people consider starting discussion about ACP is 57, 58 and 42 years among general population, GPs and nurses, respectively. Nurses state a distinctly younger priority for the age of first ACP discussion with a patient (by 15.26 to the public and 14.71 to GPs, on average ($p < 0.0001$ in both cases), which is not surprising given the extensive involvement of nurses in day to day provision of EOL care. While the public's preference exhibits a positive correlation with age, GPs and nurses show no such related age bias. The fact that the public prioritise EOL care decision-making primarily dependent on their own age [0.3677 ($p < 0.001$)] sheds possible light on why ACP uptake appears conditional on diagnosis, as well as significant health deterioration, rather than a conscious awareness of its future priority.

Our ACP shared decision-making analysis shows distinct differences between preferences of

**Table 6.** ACP experience and bias interaction for share of ACP decision – General Pop.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| Experience with ACP | 3.339 (2.546) | −1.165 (2.95) | −2.224 (2.845) | 0.9507 (2.458) | −1.831 (2.558) | 2.795 (2.968) | −8.626 (5.27) |
| ACP experience × Conjunction fallacy | −1.819 (3.505) | | | | | | −1.675 (3.519) |
| ACP experience × Illusion of control bias | | 5.551 (3.682) | | | | | 4.697 (3.686) |
| ACP experience × Endowment effect | | | 7.763* (3.614) | | | | 6.65† (3.637) |
| ACP experience × Herd bias | | | | 2.769 (3.509) | | | 2.5 (3.513) |
| ACP experience × Confirmation bias | | | | | 8.484* (3.506) | | 7.638* (3.523) |
| ACP experience × Loss aversion | | | | | | −0.5872 (3.668) | −0.3728 (3.656) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| *N* | 1138 | 1138 | 1138 | 1138 | 1138 | 1138 | 1138 |
| $R^2$ | 0.168 | 0.169 | 0.171 | 0.168 | 0.172 | 0.167 | 0.176 |
| Adjusted $R^2$ | 0.140 | 0.141 | 0.143 | 0.140 | 0.144 | 0.139 | 0.145 |
| AIC | 10,925.8 | 10,923.8 | 10,921.3 | 10,925.5 | 10,920.2 | 10,926.1 | 10,923.9 |
| BIC | 11,117.2 | 11,115.2 | 11,112.8 | 11,116.9 | 11,111.6 | 11,117.5 | 11,140.5 |

ACP, advance care planning; AIC, Akaike information criterion; BIC, Bayesian information criterion.
Dependent variable: Share of input contributed by the doctor. Standard errors (robust) in parentheses.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

healthcare professionals and the public, with GPs (mean age = 54.1 years; mean years of experience = 24.3) and nurses (mean age = 55.7 years; mean years of experience = 27.3) stating (on average) approximately 20% greater patient contribution compared to what the public states they prefer. This finding that patients prefer substantially less input in such an important EOL health decision demonstrates the challenges associated with shared decision-making in practice and lends weight to critics of a shared decision-making model.[10,11] It also speaks to patient preference for paternalism[24] in credence markets[14,15] where frontline healthcare workers are the far more experienced medical experts. In such a large-scale health context (EOL decision-making), these empirical findings are novel and confirmatory, leading to conclusions that can have clinical meaning and inform future practices as they highlight the potential for conflict in decision-making and poor patient and carer experiences if expectations are not met. These findings raise concerns relating to patient expectation and guidance, and particularly relating to informed consent, and the practicalities of achieving shared decision-making when perspectives, knowledge and power differentials exist.

Key group differences in the way ACP stakeholders (patients, GPs and nurses) process and communicate information present challenges for efficient healthcare provision. Our cognitive bias analysis shows significant differences between GPs and patients for five of the six behavioural tests administered. For the general public, we find varying relationships (all $p < 0.05$) between both preferred age for first ACP discussion, and level of shared decision-making in ACP for five of six cognitive tests. However, for health professionals, only those who exhibit confirmation bias show differences in preference for patient's input (8.4% higher; $p = 0.035$). That said, when we controlled for all factors in our multivariate regression analysis, we find only age, gender and

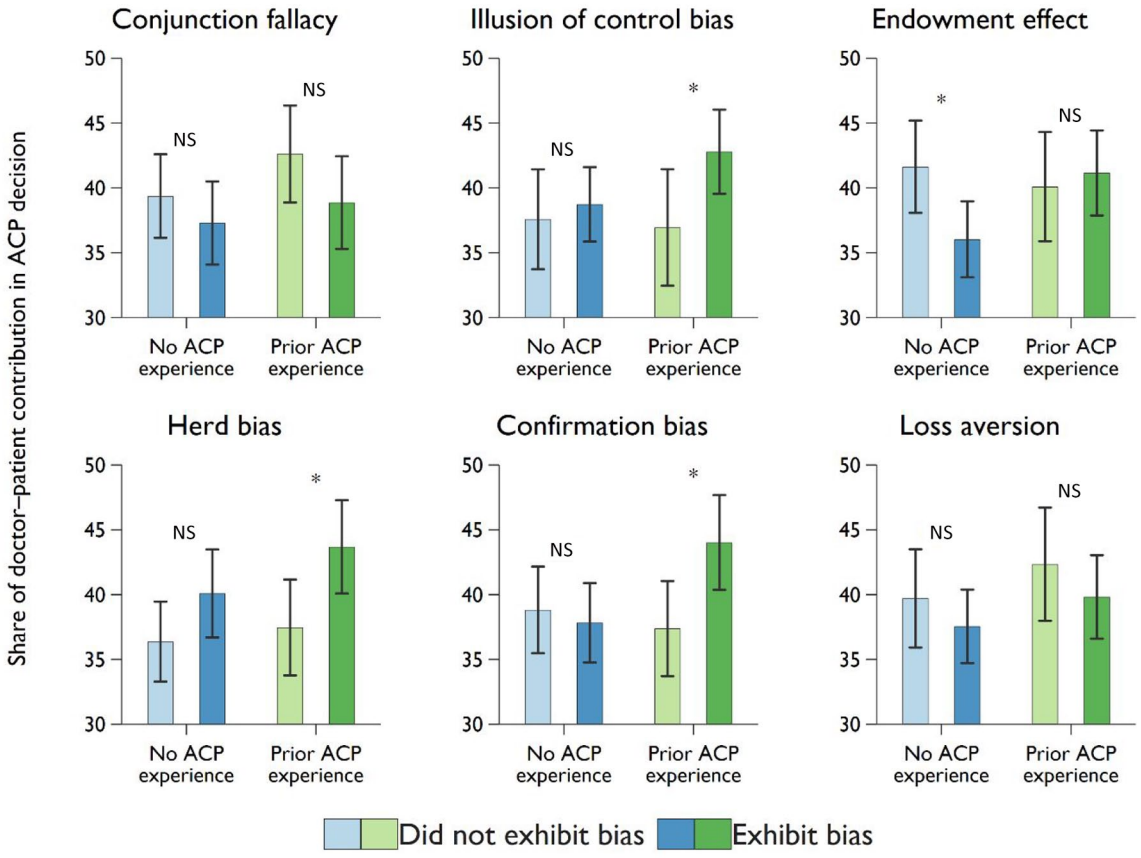


**Figure 7.** ACP experience and bias interaction for share of ACP decision – General Pop.
Proportion presented with 95% confidence intervals. †, *, ** and *** represent 10%, 5%, 1% and 0.1% levels of significance with Bonferroni's correction for multiple comparison, respectively. NS represents not statistically significant. Dark (light) bars represent participants who (do not) exhibit the specific behavioural bias.

herding bias as statistically significant factors in the general public preference for both age of first discussion and shared decision-making.

From a practical standpoint, our study provides evidence to support alternative ways to increase awareness of ACP through targeted communications based on the identification of key group differences in preference. For example, our framing experiment demonstrates that when ACP outcomes are presented in different ways, the general public and GPs show malleable preferences for more acute health-related issues like exact medical care ($p = 0.012$) and hospital transfers ($p = 0.034$), while nurses instead show changes in priority for more palliative or interpersonal related issues such as family impact ($p = 0.015$). Our pairwise comparisons take this a step further demonstrating the possibility of preference reversal in some cases, where differences in positive *versus* negative framing can result in as much as 4.9–7% change in general public preference for particular factors most relevant to ACP uptake. Practically, these findings demonstrate the importance of providing the appropriate examples in educational development and teaching aids for nurses, decision-making tools and counselling support services for patients.

This study is not without limitations, first, although our study collected a large sample of GP and nurse cognitive bias data from the GPCE conference, it was a convenience sample it may lack generalisability to all healthcare professionals. The nurse sample was also very small. Voluntary participation is another limitation of this study, as is the sample source, which includes people who are registered with a professional survey company. In addition, participant responses for content relating to ACP are stated preference, not revealed preference and reflect a point in time. Preferences for ACP and EOL decisions may, of course, change over time, depending on a range of social, clinical and environmental

**Table 7.** Framing effect on priority of preference for engaging advance care planning.

| Sample | Framing | Positive | | Negative | | z-statistics | *p*-value |
|---|---|---|---|---|---|---|---|
| | Option | Mean | SD | Mean | SD | | |
| General public | Exact medical care | 1.86 | 1.14 | 2 | 1.17 | −2.52* | 0.012 |
| | Optimal EOL care | 2.49 | 1.15 | 2.55 | 1.2 | −0.77 | 0.442 |
| | Family impact | 2.79 | 1.15 | 2.85 | 1.21 | −1.03 | 0.302 |
| | Hospital transfers | 3.9 | 1.06 | 3.76 | 1.15 | 1.87† | 0.062 |
| | Financial cost | 3.97 | 1.26 | 3.84 | 1.37 | 1.11 | 0.268 |
| GP | Exact medical care | 2.39 | 1.54 | 3 | 1.58 | −1.76† | 0.079 |
| | Optimal EOL care | 2.26 | 1.16 | 2.43 | 1.39 | −0.4 | 0.692 |
| | Family impact | 2.76 | 1.21 | 2.5 | 1.3 | 1.12 | 0.264 |
| | Hospital transfers | 4.07 | 1.08 | 3.65 | 1.04 | 2.12* | 0.034 |
| | Financial cost | 3.52 | 1.19 | 3.41 | 1.36 | 0.27 | 0.791 |
| Nurse | Exact medical care | 2.77 | 1.88 | 2 | 1.35 | 0.84 | 0.4 |
| | Optimal EOL care | 3 | 1.47 | 2 | 0.74 | 1.77† | 0.078 |
| | Family impact | 2.31 | 0.95 | 3.5 | 1.24 | −2.44* | 0.015 |
| | Hospital transfers | 3.46 | 1.39 | 4.17 | 1.11 | −1.2 | 0.229 |
| | Financial cost | 3.46 | 1.13 | 3.33 | 1.3 | 0.17 | 0.865 |

EOL, end of life; GP, general practitioner.
Wilcoxon rank-sum test (two-tailed).
†, *, ** and *** represent 10%, 5%, 1% and 0.1% levels of significance, respectively.

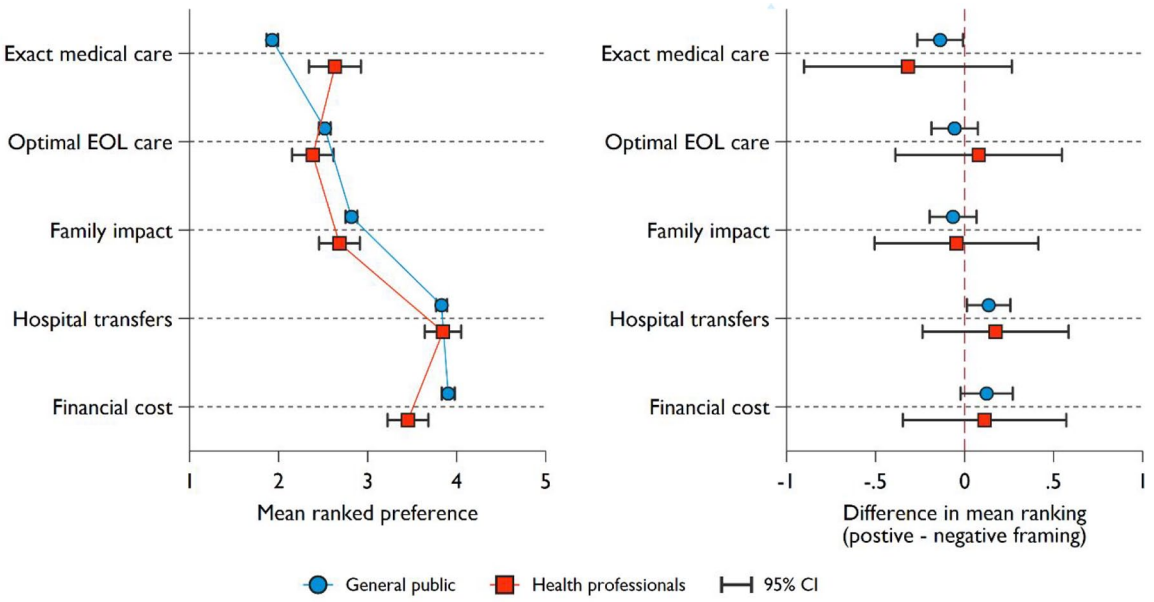


**Figure 8.** Framing effect on ranked order of reasons for ACP uptake, by group.
Mean ranking with 95% confidence intervals.

**Table 8.** Pairwise comparison framing experiment.

| Reasons for ACP uptake | General public ($n = 1248$) | | | Health professionals ($n = 117$) | | |
|---|---|---|---|---|---|---|
| | Negative framing (%) | Positive Framing (%) | Difference | Negative framing (%) | Positive framing (%) | Difference |
| Exact medical care > Optimal EOL care | 32.90 | 28.50 | 4.4† | 56.90 | 50.80 | 6.0 |
| Exact medical care > Family impact | 30.30 | 27.20 | 3.1 | 46.60 | 39.00 | 7.6 |
| Exact medical care > Hospital transfers | 16.40 | 12.60 | 3.7† | 36.20 | 27.10 | 9.1 |
| Exact medical care > Financial cost | 20.10 | 17.60 | 2.5 | 39.70 | 30.50 | 9.1 |
| Optimal EOL care > Family impact | 38.80 | 37.40 | 1.4 | 37.90 | 44.10 | −6.1 |
| Optimal EOL care > Hospital transfers | 22.00 | 18.20 | 3.8† | 25.90 | 20.30 | 5.5 |
| Optimal EOL care > Financial cost | 26.80 | 21.90 | 4.9* | 27.60 | 28.80 | −1.2 |
| Family impact > Hospital transfers | 27.60 | 20.60 | 7.0** | 24.10 | 18.60 | 5.5 |
| Family impact > Financial cost | 26.60 | 22.60 | 4.1† | 31.00 | 30.50 | 0.5 |
| Hospital transfers > Financial cost | 42.20 | 41.30 | 0.9 | 62.10 | 59.30 | 2.7 |

ACP, advance care planning; EOL, end of life.
†$p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

factors. Sex ratios and age for our GP and nurse samples are also highly skewed, although the demographic profile is broadly reflective of the current age and gender profiles for the related occupations. It is also important to note that other health professionals working in the ACP space may exhibit different cognitive processes and behaviours, for example, palliative care physicians. Furthermore, the study does not account for potential patient cognitive impairment, which is often the catalyst for initiating ACP discussions and processes. Finally, because the broader contextual complexity of ACP is so intricate (e.g. the role of culture, social norms, disease patterns, sex differences, etc), our study is exploratory in nature and seeks to offer a primer for the study of cognitive bias in ACP decision-making

Understanding how GPs, nurses and potential patients understand and communicate their preferences regarding ACP is of critical importance for efficient healthcare provision and future uptake. Overall, our study provides novel empirical evidence that cognitive bias plays a significant role both within and between (general public, GP and nurse) groups behaviour in the context of ACP. For the general public, age appears to be a robust and re-occurring factor associated with ACP preference and shared decision-making. This study can be a primer for future applied behavioural research in this important healthcare decision-making space.

## Author contribution(s)

**Stephen Whyte:** Conceptualisation; Data curation; Formal analysis; Investigation; Methodology; Project administration; Writing – original draft; Writing – review & editing.

**Joanna Rego:** Conceptualisation; Data curation; Methodology; Project administration; Writing – original draft; Writing – review & editing.

**Ho Fai Chan:** Data curation; Formal analysis; Methodology; Writing – original draft; Writing – review & editing.

**Raymond J. Chan:** Conceptualisation; Methodology; Writing – original draft; Writing – review & editing.

**Patsy Yates:** Conceptualisation; Methodology; Writing – original draft; Writing – review & editing.

**Uwe Dulleck:** Formal analysis; Funding acquisition; Methodology; Writing – original draft; Writing – review & editing.

## Conflict of interest statement

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Ethical approval

All research was conducted in accordance with QUT human research ethics committee approval no. 2021000128.

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## Data availability statement

Data and code are available from the corresponding author on request.

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## Appendix 1

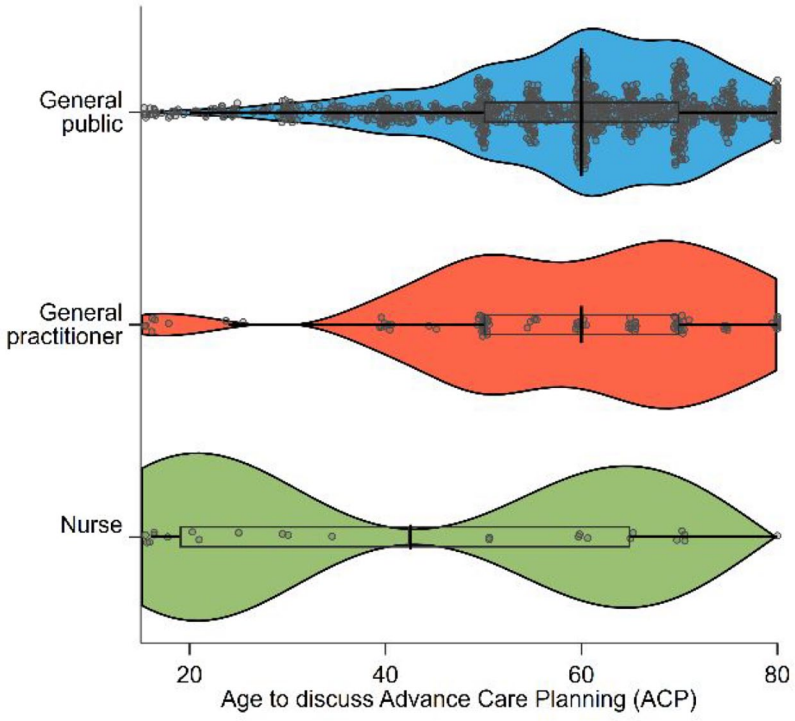


**Figure 9.** Distribution of ideal age for initial ACP discussion, by group.

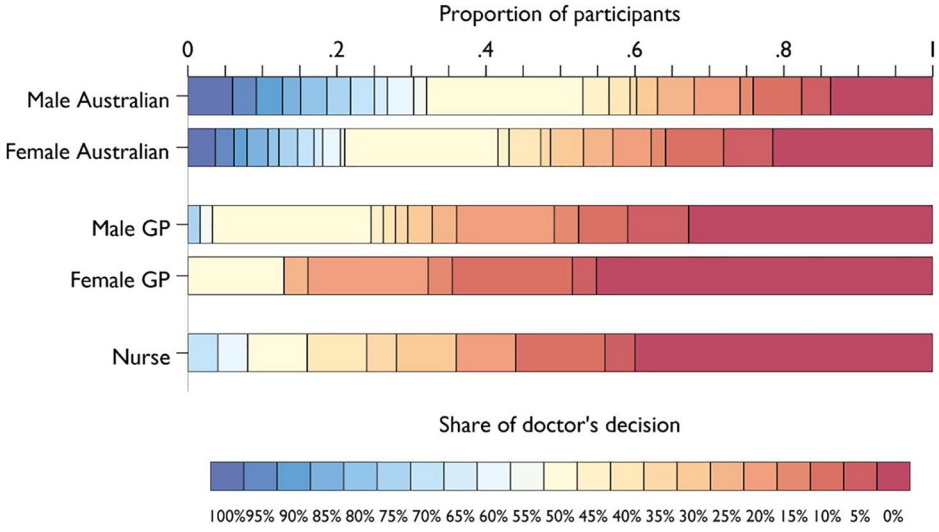


**Figure 10.** Distribution of ideal age for initial ACP discussion, by group.

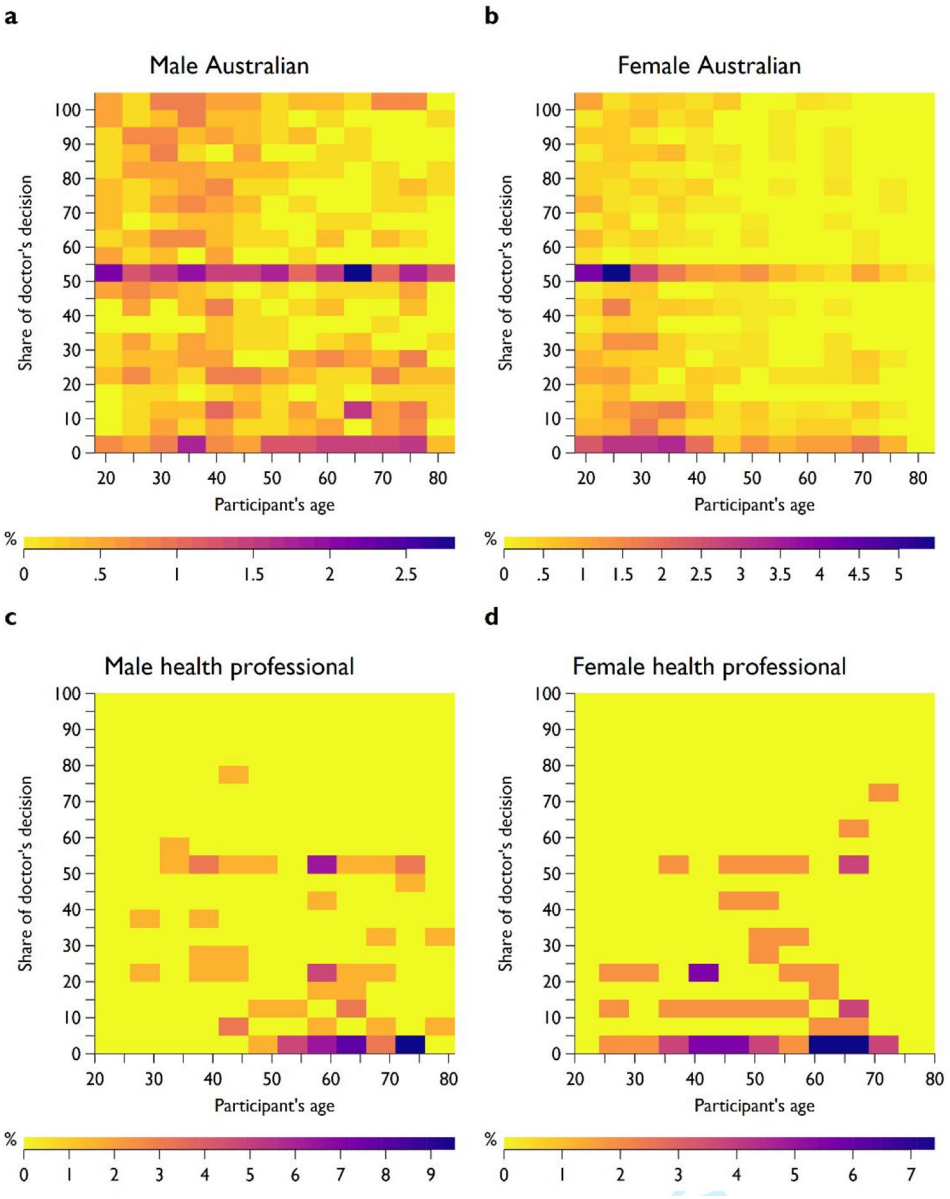


**Figure 11.** Correlation between doctor–patient ACP contribution and participant age, by group and sex. Colour shows the proportion of participants.

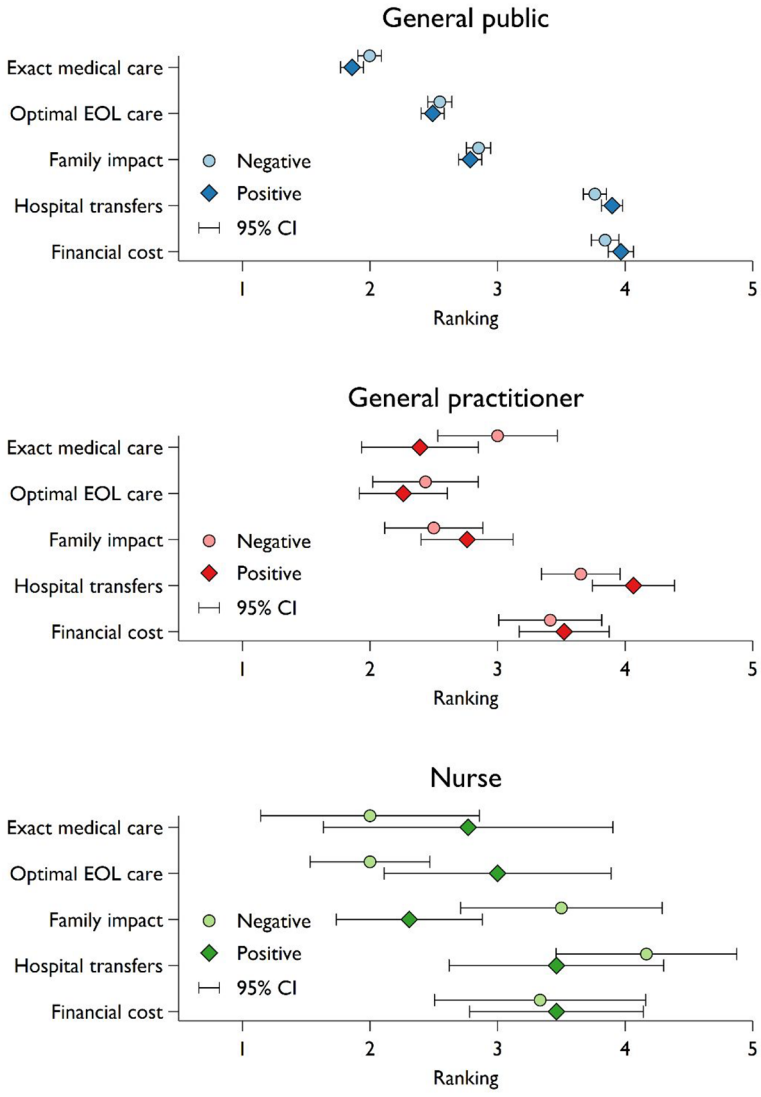


**Figure 12.** Framing effect on ranked order of reasons for ACP uptake, by group.
Mean ranking with 95% confidence intervals.

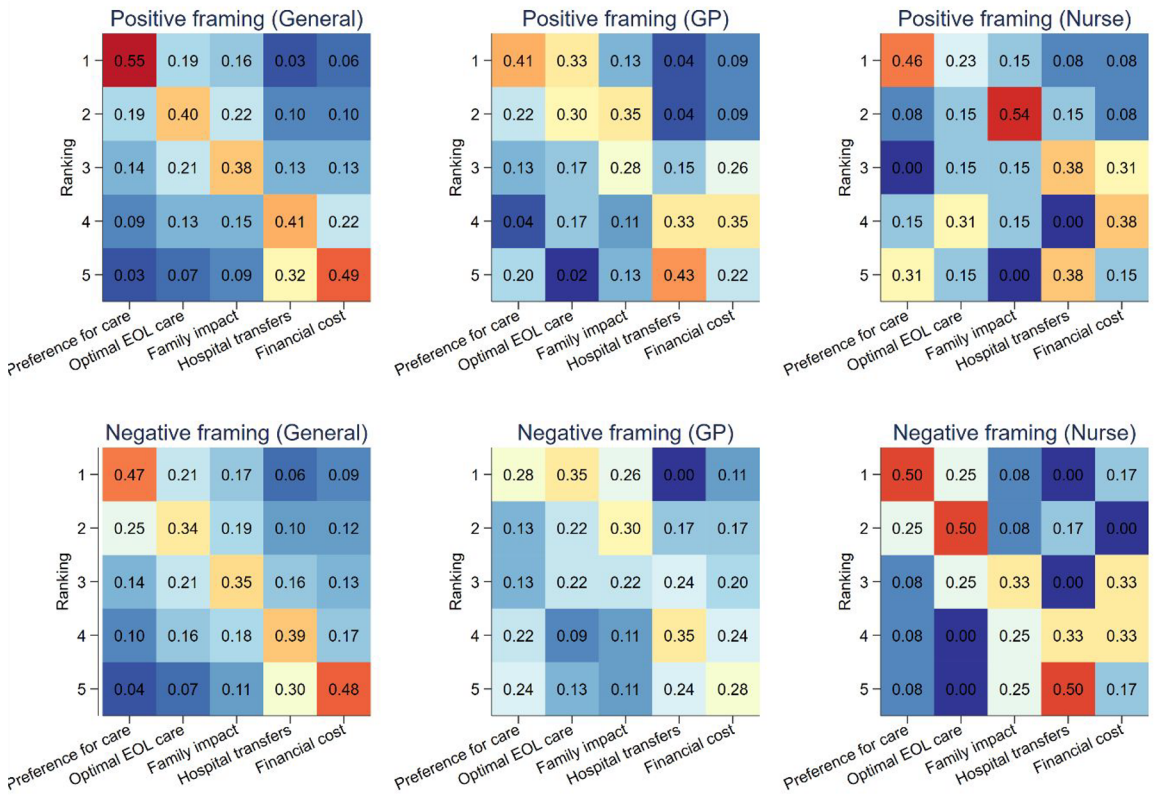


**Figure 13.** Framing experiment distribution of rank preference by ACP alternative.
Value labels represent sharing of participant rank selection.

Survey 1 (health professionals) and Survey 2 (general population)
Q1. My year of birth is:

_____

- *Page break* -

Q2. Please select your sex:

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)
- *Page break* -

Q3. My occupation would best be described as:

*Survey 1 only

- ○ General practitioner/Doctor (1)
- ○ Healthcare professional (2)
- ○ Nurse (3)
- ○ Other (4)
- *Page break* -

Q4: How many years of experience/work do you have working in this occupation:

*Survey 1 – only relevant for Q3 responses 1, 2 and 3.

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- *Page break* -

Now we will ask you some questions relating to psychological processes and cognition. There are no right or wrong answers. Please read each question carefully and answer honestly.

Q5. Jonathan is an ex-professional football player. After he finished playing professionally, Jonathan became a physical education teacher at a local high school. Jonathan has two sons, both of whom are excellent athletes. Which is more likely?

- ○ Jonathan coaches a local football team (1)
- ○ Jonathan coaches a local football team, and plays a little seniors football with the local team (2)
- *Page break* -

Q6. When you participate in games of chance that involve dice – such as Backgammon or Monopoly – do you feel more in control when you roll the dice yourself?

- ○ I feel more in control when i roll the dice myself (1)
- ○ I am indifferent as to who rolls the dice (2)
- *Page break* -

Q7. Assume that your dearly departed Aunt has bequeathed to you a small amount of shares (100) in a blue chip IT company. Your financial advisor tells you that you are too 'technology heavy' and recommends that you sell your Aunts shares. What is your most likely course of action?

- ○ I will likely hold the IT shares because my Aunt bequeathed them to me (1)
- ○ I will likely listen to my financial advisor and sell the shares (2)
- *Page break* -

Q8. You are on summer holidays at a beach you have never been to before. It is a hot day and you decide to buy an ice-cream to cool off. You come across two identical ice-cream shops side by side on the street, 'Ice-cream Shop A' and 'Ice-cream Shop B'. You have no information on the price or quality of the ice-cream being sold in either shop, but you do see that 'Ice-cream Shop A' has several customers already inside the shop, but 'Ice-cream Shop B' has no customers inside the shop. Which ice-cream shop do you choose to enter?

- ○ Ice-cream shop 'A' that has several customers inside the shop (1)
- ○ Ice-cream shop 'B' that has no customers inside the shop (2)
- *Page break* -

Q9. Suppose you have invested in a company stock/share after some careful research. Now, you come on a press release that states that the company you invested in may have a problem with its main product line. The second paragraph in the press release, however, describes a completely new product that the company might debut later this year. What is your natural course of action?

- ○ I will typically take notice of the new product announcement and research that item further (1)
- ○ I will typically take notice of the problem with the company's product line and research that item further (2)
- *Page break* -

Q10. Choose one of these two outcomes:

- ○ An assured loss of US$725 (1)
- ○ A 75% chance of losing US$1000 and a 25% chance of losing nothing (2)
- *Page break -*

Q11. Finally, we ask you some questions about advance care planning (ACP). Do you know what an ACP is?

- ○ Yes (1)
- ○ No (2)
- *Page break -*

*Advance care planning information* Please take a few seconds to read the following information.

Advance care planning (ACP) is the process of planning for your future healthcare. It relates to healthcare you would or would not like to receive if you were to become seriously ill or injured and are unable to communicate your preferences or make decisions. This often relates to the care you receive at the end of your life. ACP gives you the opportunity to think about, discuss and record your preferences for the type of care you would receive and the outcomes you would consider acceptable. It helps to ensure your loved ones and doctors know what your health and personal preferences are and that these preferences are respected. ACP benefits everyone: you, your family, carers and health professionals. It helps to ensure you receive the care you actually want. It improves ongoing and end-of-life care, along with personal and family satisfaction. Families of people who have undertaken ACP have less anxiety, depression, stress and are more satisfied with care. For healthcare professionals and organisations, it reduces unnecessary transfers to acute care and unwanted treatment. If you have not documented your preferences or identified a substitute decision-maker, and you become seriously ill or injured, doctors will make treatment decisions based on their assessment of your best interests. This may include treatments that you would not want.

*– Advanced Care Planning Australia*

- *Page break -*

Q12. Have you completed an Advance Care Plan (ACP) yourself?

*Survey 2 only

- ○ Yes (1)
- ○ No (2)
- *Page break -*

Q13. Have you assisted with or participated in an Advance Care Plan (ACP) for another friend, loved one, or family member?

*Survey 2 only

- ○ Yes (1)
- ○ No (2)
- *Page break -*

Q14. All things considered, what age is the best time for a general practitioner (GP) or healthcare professional to open a discussion with someone regarding Advance Care Planning (ACP)?

| | 16 years of age | | | | | | 80 years of age | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 16 | 22 | 29 | 35 | 42 | 48 | 54 | 61 | 67 | 74 | 80 |
| Right age for a GP or health professional to discuss ACP with a patient () | | | |  | | | | | | | |

-Page break -

Q15. In relation to choosing an Advance Care Plan (ACP), all things considered, who do you feel has or should have the most input into deciding the content of the ACP?

- 0% my decision to 100% Doctor's decision (1)
- 5% my decision to 95% Doctor's decision (2)
- 10% my decision to 90% Doctor's decision (3)
- 15% my decision to 85% Doctor's decision (4)
- 20% my decision to 80% Doctor's decision (5)
- 25% my decision to 75% Doctor's decision (6)
- 30% my decision to 70% Doctor's decision (7)
- 35% my decision to 65% Doctor's decision (8)
- 40% my decision to 60% Doctor's decision (9)
- 45% my decision to 55% Doctor's decision (10)
- 50% my decision to 50% Doctor's decision (11)
- 55% my decision to 45% Doctor's decision (12)
- 60% my decision to 40% Doctor's decision (13)
- 65% my decision to 35% Doctor's decision (14)
- 70% my decision to 30% Doctor's decision (15)
- 75% my decision to 25% Doctor's decision (16)
- 80% my decision to 20% Doctor's decision (17)
- 85% my decision to 15% Doctor's decision (18)
- 90% my decision to 10% Doctor's decision (19)
- 95% my decision to 5% Doctor's decision (20)
- 100% my decision to 0% Doctor's decision (21)

- *Page break* -

Q16a – (Negative Frame)

Advance Care Plans (ACP) are one option for those with ongoing health issues.

Here are a list of five different reasons someone may establish an ACP. If you had to recommend ACPs to a friend that was deciding, what order would you place the following points in relation to their importance?

1 = most relevant/important at the top

5 = least relevant/important at the bottom

**Please note: There are no right or wrong answers, the researchers are simply interested in the order of your personal preference.

_____ Without an ACP you may not receive the exact health and medical care you want. (1)

_____ Without an ACP you may not receive the optimal ongoing and end-of-life care. (2)

_____ Without an ACP there may be increased anxiety, depression and stress for your family and loved ones. (3)

_____ Without an ACP you may experience unnecessary transfers to hospital. (4)

_____ Without an ACP you may experience unwanted financial costs. (5)

Q16b – (Positive Frame)

Advance Care Plans (ACP) are one option for those with ongoing health issues.

Here are a list of five different reasons someone may establish an ACP. If you had to recommend ACPs to a friend that was deciding, what order would you place the following points in relation to their importance?

1 = most relevant/important at the top

5 = least relevant/important at the bottom

**Please note: There are no right or wrong answers, the researchers are simply interested in the order of your personal preference.

_____ An ACP may ensure you receive the exact health and medical care you want. (1)

_____ An ACP may improve your ongoing and end-of-life care. (2)

_____ An ACP may reduce the anxiety, depression and stress of your family and loved ones. (3)



_____ An ACP may reduce unnecessary transfers to hospital. (4)

_____ An ACP may reduce unwanted financial costs. (5)