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JEL Classification: C93, H41, J16, J33

Keywords:

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Gender differences in effects of goal-setting: Evidence from a fundraising field experiment

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December 2022

Abstract

We report findings from an intervention that presented a randomly selected group of fundraisers with varying default goal values. There is a striking gender difference in the effect of the intervention: Male fundraisers respond to higher default values by raising more funds; female fundraisers do not. The explanation is not that there is a gender difference in default effects on the setting of goals: high default values do not have a strong countervailing (negative) effect on goal-setting for female fundraisers. Instead, there is a gender difference in the causal effect of different value goals on funds raised: Setting higher goals causes male fundraisers to raise more money, but (counterintuitively) setting low goals causes them to raise less money than no goal. By contrast, setting low goals causes female fundraisers to raise more money than no goal, but (counterintuitively) they do not raise more money if they set a high goal. Gender differences in beliefs, specifically optimism and grit, are plausible explanations for these findings.

Key words: Goals; gender; beliefs; optimism; grit; fundraising
JEL codes: C93, H41, J16, J33

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1. Introduction

Widespread thinking that setting a goal improves performance encourages organisations to harness the power of goal-setting as a motivational device. This thinking is grounded in theory from both psychology and economics (Locke 1996; Heath, Larrick, and Wu 1999; Locke and Latham 2002; Koch and Nafziger 2011; Gómez-Miñambres 2012; Hsiaw 2013), but the experimental evidence on interventions to encourage goal-setting is mixed. Such interventions do not always have the positive effect on performance predicted by theory. Also, the performance of men and women often responds differently to goal-setting interventions.[1] These mixed results indicate that there is much unknown about how goal-setting interventions actually work. Without that knowledge, the power of goal-setting as a motivational device cannot be realized. Even worse, without that knowledge, there is the possibility that well-intentioned goal-setting interventions may backfire and adversely affect performance.

Our study reports novel findings from an intervention to encourage goal-setting. We consider the context of peer-to-peer charity fundraising, i.e. individual (non-professional) fundraisers raising money for charity through donations from their friends and family. This is a commonplace activity in the UK and the US and an important source of charitable funds.[2] However, in contrast to professional fundraising, charities have limited tools to motivate volunteer fundraiser effort. Monetary rewards may be ineffective and even counterproductive (Gneezy, Meier and Rey-Biel 2011), while pro-social rewards (i.e. rewards that benefit the organisation) may also have a limited effect (Imas 2013). Encouraging goal-setting is not only a feasible tool for charities to motivate peer-to-peer fundraisers, but charities think that goal-setting unambiguously causes fundraisers to raise more money. This thinking is based on the observation that fundraisers who set goals raise more money than fundraisers who do not, a misleading comparison that does not take account that goal-

[1] In workplace settings, Brookins, Goerg, and Kube (2017) found that telling people to set themselves output goals increases performance (also see Goerg and Kube 2012), but Dalton, Gonzalez, and Noussair (2016) find an effect only for men. Van Lent (2019), Dobronyi, Oreopoulos, and Petronijevic (2019), and Clark, Gill, Prowse, and Rush (2020) find no overall effect for education output goals (i.e. encouraging students to set themselves goals for exam performance), although van Lent finds some evidence of a counterintuitive negative effect on males, while van Lent and Souverijn (2020) find a positive effect for female students. Investigating "input goals" (i.e. goals for completing practice exams), Clark et al (2020) find a positive effect for male students, but not female students. Other studies have found positive effects of exogenously assigned goals, combined with financial incentives (Corgnet, Gómez-Miñambres, and Hernán-González 2015; Fan, Gómez-Miñambres, and Smithers 2020). Smithers (2015) finds a gender difference in effects.

[2] An estimated 3.5 million people took part in the top 25 peer-to-peer fundraising events in the UK in 2019. https://tfn.scot/news/revealed-top-25-mass-fundraising-events. About three million people took part in the top 30 events in the US in 2021 (https://pppf.memberclicks.net/index.php?option=com_mcform&view=ngforms&id=2119093#!/; accessed November 26, 2022). The intervention we investigate was carried out by JustGiving, the UK's largest fundraising platform.

setting is endogenous.[3] The intervention studied here provides a unique opportunity to estimate causal goal effects in this setting.

The intervention involved a small change to a form that peer-to-peer fundraisers use to create an online fundraising page. On the form, there is an option to set a fundraising goal. Normally, the goal box is blank. The intervention inserted a default value in the goal box for a randomly-selected treatment group (the control group saw the normal blank box). Further, the default value was also randomly varied between £50 and £950 in increments of £50.

The design of the intervention allows us to make two contributions. First, previous studies report the overall effect of an intervention to set a goal on performance. By contrast, the intervention studied here did not just encourage people to set a goal (rather than no goal), it encouraged people to set different value goals. This allows us to estimate "slope effects", i.e. the effect of encouraging people to set high goals versus low goals.

Second, in addition to observing the fundraising goals that are set by the treatment group (as in previous papers), we also observe goal-setting in the control group. This allows us to go beyond intention-to-treat (ITT) estimates (i.e. the effect of the intervention on performance), to separately identify the effect of the intervention on goal-setting behavior ("default slope effects") and the causal effect of setting different-value goals on performance ("goal slope effects").

The results indicate a striking gender difference in the ITT slope effects. Specifically, male fundraisers respond to higher default values by raising more funds; female fundraisers do not. There are two possible explanations for this. The first is that there is a gender difference in default slope effects, for example, because high default values have a stronger countervailing (negative) effect on goal-setting for female fundraisers. The evidence rules this out: the default slope effect is almost identical for male and female fundraisers (goal values are around £20 higher for each £100 increase in the default value).[4]

Instead, the ITT gender difference arises because of different goal slope effects. Setting themselves high goals causes male fundraisers to raise more money. However, counter to theoretical

[3] For example, JustGiving encourage fundraisers to set a goal (and aim high) on the basis that pages with a goal raise 17% more than those without. https://www.justgiving.com/fundraise/tips/top-10-fundraising-tips

[4] By "countervailing effects" we mean the kind of backfire responses to default suggestions often seen in the charitable donation literature in which high defaults reduce donations; see Adena, Huck, and Rasul (2014), Edwards and List (2014), Goswami and Urminsky (2016), and Altmann, Falk, Heidhues, Jayaraman, and Teirlinck (2019). There is a countervailing effect of high default values on whether or not female fundraisers set a goal, but this effect is small.

predictions, setting a low goal causes them to raise less money than no goal. For female fundraisers, by contrast, setting a low goal results in more money being raised compared to no goal, but again counterintuitively, setting a high goal does not further increase funds raised. The difference in goal slope effects provides an evidentiary explanation for why the goal-setting intervention was ineffective in one respect (nudging female fundraisers to set a high goal), and adversely affected performance in another (nudging male fundraisers to set a low goal). This evidence is important because it contradicts two basic premises in theories of goal-setting: that setting a goal improves performance (compared to no goal) and that performance is monotonically increasing in the value of the goal that has been set.

There is a further difference in the goal-setting behaviour of male and female fundraisers. Although there is no gender difference in default slope effects induced by the intervention, male fundraisers in both the treatment and control groups are more likely to set a goal, and to set higher-goal values. We assess several theoretical explanations of this gender difference, using the model of goal-setting introduced by Clark et al (2020) as a framework, and conclude that the most plausible explanation is that, compared to female fundraisers, male fundraisers believe that fundraising outcomes are due more to the return to their effort, rather than to random factors outside of their control, i.e. rather than to luck. Such beliefs are akin to Moore and Healy's (2008) definition of "precision" in beliefs and Alan and Ertac's (2019) definition of "optimistic" beliefs.[5] Our conclusion that male fundraisers have more precise/ more optimistic beliefs is in line with earlier findings that men's over-precision of beliefs causes them to trade more heavily than women in the stock market (Barber and Odean 2001) and that women tend to assign a greater role to luck, as opposed to effort, in explaining successful outcomes (Fisman and O'Neill 2009).

The gender differences in goal slope effects, i.e. the counterintuitive responses to low goals (for male fundraisers) and high goals (for female fundraisers), cannot easily be explained by current theory. In theories of goal-setting, and the Clark et al (2020) model is no exception, setting even a low goal should improve performance compared to no goal (holding beliefs constant), while higher goals should improve performance compared to low goals. However, there is a plausible explanation that focuses on the updating of beliefs in response to the default values. Suppose that the default

[5] Moore and Healy's (2008) conceptualization of "confidence" distinguishes between "estimation", which in our context would be the belief about the deterministic return to effort and which we term "confidence in ability", and "precision", which in our context would be a belief (conditional on confidence in ability) about how much random luck might alter the actual outcome away from the deterministic estimation. We use the terms precision/ optimism to refer to this second belief. Alan and Ertac (2019) define optimistic beliefs as: ". . . optimistic view[s] about future success provided that one works hard." Clark et al (2020) use "over-confidence" to refer to the first belief ("confidence in ability") and "low performance uncertainty" to refer to the second belief ("precision/optimism").

values affect beliefs about the returns to fundraising effort at the point at which goals are set. Once fundraising starts, however, many of the people who have been nudged to set a goal may subsequently update their beliefs in the light of experience. Suppose that male fundraisers are nudged to set a goal that they subsequently perceive to be too low. After they begin fundraising, they may see this low goal as so easy to achieve that it is not worth putting in the effort. Similarly, suppose that female fundraisers are nudged to set a goal that they subsequently perceive to be too high. After they begin fundraising they may prefer not to increase effort to achieve the too high goal, rather than trying and failing.

The plausibility of beliefs as an explanation—both of the gender difference in optimism about goal-setting and of the different counterintuitive goal slope effects—suggests a direct connection to the concept of "grit", defined as optimistic beliefs about returns to effort plus perseverance in the face of performance feedback (Duckworth, Peterson, Matthews, and Kelly 2007; Alan and Ertac 2019). Our experiment was not designed to test hypotheses about the role of beliefs, updating, and grit in goal-setting but we suggest these are important areas for future goal-setting research, both theoretical and experimental.

In summary, our investigation makes three contributions to knowledge of how goal-setting interventions work (or don't work). First, we expand the range of goal-setting interventions considered and identify goal-setting interventions that are likely to be effective (nudging male fundraisers to set high goals and female fundraisers to set low goals), some that are ineffective (nudging female fundraisers to set high goals) and some that even backfire (nudging male fundraisers to set low goals). Second, we separate the effect of the goal-setting intervention into its effect on goal-setting itself and the subsequent effect of goal-setting on performance. In doing so, we determine that the gender difference in the goal-setting intervention (the different ITT slope effects) is not because of a gender difference in the default slope effects, but because of a difference in causal goal slope effects. Finally, we argue that a plausible candidate explanation for our findings is a difference in beliefs (and updating of beliefs). This suggests the importance for goal-setting research and practice to go beyond just focusing on incentives and nudges to consider also how to affect beliefs.

The plan of the rest of the paper is as follows. The next section discusses the context of peer-to-peer fundraising and the experimental design. Section 3 presents the results. Section 4 contains an intuitive explanation of the model and discusses alternative candidate explanations for the observed gender differences. Section 5 discusses the generalizability of the findings. Section 6 concludes.

2. Experimental Design

2.1 Peer-to-peer fundraising

We study goal setting in the context of peer-to-peer fundraising. Peer-to-peer fundraisers raise money for a charity, typically off the back of a fundraising challenge, by soliciting donations from their friends and family (Scharf and Smith 2016; Payne, Scharf, and Smith 2017). Most fundraisers use an online fundraising platform to create a fundraising page and collect donations. The platform then passes the money to the charity.

The intervention was carried out by JustGiving. Founded in 2001, JustGiving has enabled fundraisers to raise £5 billion for more than 25,000 charities via their fundraising platform.[6] A fundraiser creates their individual fundraising page on JustGiving's platform using the online form shown in Figure 1. The form specifies the charity and the "what/ why", i.e. what activity the fundraiser is doing and (briefly) why they are raising money. Fundraisers are also given an opportunity to personalise their page – to "tell supporters [their] story" and to choose a personal photo or image. Fundraisers are also able to set themselves fundraising goals.

In this context, almost all donors have a personal relationship with the fundraiser and give money only because they are asked to give by the fundraiser. Fundraisers must therefore put effort into raising money, by, for example, promoting their fundraising activities and contacting friends and family who are potential donors. It is generally assumed that setting a fundraising goal affects this effort.

2.2 The intervention: Default values

Fundraisers can set themselves a fundraising goal for the amount of money that they want to raise by entering an amount into a box on the online form ("What's your fundraising goal?"). Note that this is a purely notional goal; money is passed to the charity whether the goal is met or not.[7] The box is blank. If fundraisers enter a value into the box, the fundraising goal value appears on their webpage together with information on the proportion of the goal value that has been raised. This is updated after each donation. If the box is left blank, then no goal appears on the fundraising page.

[6] Statistics retrieved on 04 October 2022 https://www.justgiving.com/about

[7] The public goods being funded through JustGiving's platforms are not threshold public goods. Other fundraising platforms, such as DonorsChoose and GlobalGiving, are used to fund a specific project or meet a specific need, and consequently the fundraising is to provide a threshold public good. For a natural field experiment investigating a threshold public good, see Rondeau and List (2008).

Nearly half of fundraisers in the control group (who see a blank goal box) set a goal; they raise 23 per cent more money than fundraisers who do not set themselves a goal. This difference is not a causal effect of setting a goal, but it is the kind of difference that motivated the platform to intervene to encourage more fundraisers to set goals.

The experimental intervention involved the fundraising goal box. For a ten-week period, a randomly selected group of fundraisers (the control group) saw the blank box as usual, while another randomly selected group of fundraisers (the treatment group) saw a default value as in Figure 1. There were 19 different default values from £50 to £950, in £50-increments; these were randomly assigned from a uniform distribution to people in the treatment group. Randomization was done at the level of the individual fundraising page.

This was a natural field experiment (e.g., List and Lucking-Reiley 2002), involving only one, small change to the usual environment. People creating fundraising pages for the first time during the ten-week period, who would not previously have seen a blank box, would not have been aware they were in an experiment. Returning fundraisers could have been aware of a change from the last time they used the platform – our main analysis therefore focuses on first-time fundraisers.

2.3 Descriptive statistics

Our analysis sample consists of a control group of 6,535 first-time fundraisers who saw a blank box and a treatment group of 6,707 first-time fundraisers who saw one of the 19 randomly selected default values in the box. There is a fairly even gender split: 54 per cent of the sample of fundraisers are women. The shares of female fundraisers in the control and treatment groups are nearly identical, indicating no differential attrition by gender during the page set-up process, e.g. after fundraisers were met with a default value. In Appendix A, we show that other characteristics (age, fundraising months, fundraising event types, charities supported) are also broadly balanced across treatment/ control groups, both across the whole sample and within gender. In the main body of the paper, we report regression results without additional controls; further results, including additional controls, are reported in Appendix A.

3. Main Findings

This section reports our main findings. We separately report three types of effects – (1) ITT effects, i.e. the effect of the default values on the amount of money raised; (2) Default effects, i.e. the effect of the default values on the goals that are set; and (3) Goal effects, i.e. the causal effect of goals on the amount of money raised.

3.1. Intention to Treat Effects

In previous experimental studies on goal-setting, a randomly-selected group of participants is encouraged to set a goal and their outcomes are compared to those of a group of participants who are not encouraged to set a goal. The results capture the effect of the intervention on outcomes, equivalent to an ITT level effect. In our setting, we can estimate a similar ITT level effect ("*what is the effect of seeing a(ny) default value on money raised*") by comparing fundraising outcomes among the treatment group (who see a default value) with fundraising outcomes in the control group (who do not see a default value). Table 1, column i indicates the overall ITT level effect is £14.30 more money raised (p=.050), around 5 per cent more than the control group. This is much smaller than the 23 per cent endogenous difference. The ITT level effects for male (£15.20, p=.216) and female (£15.00, p=.075) fundraisers are similar to each other: positive, but small.

Arguably more interesting in our setting than this ITT level effect, however, is the ITT slope effect: i.e., the effect of higher default values, compared to lower default values, on money raised. This is shown graphically in Figure 2. Panel A, which pools male and female fundraisers, shows no clear ITT slope effect: Table 1, column ii indicates that a £100 higher default goal value caused only a £2.20 (*n.s.*) increase in money raised. The pooled ITT slope is essentially flat.

However, Figure 2, panel B shows that this nil pooled effect masks different slope effects for male and female fundraisers. For male fundraisers, the ITT slope effect is positive – the coefficient from the corresponding regression results in Table 2, column iv, implies an increase in £8.40 raised for each £100 increase in default value (p=.008). For female fundraisers, however, the panel b regression curve and the Table 2 column vi result (−.021, *n.s.*) suggest that, if anything, the amount of money raised by female fundraisers is decreasing in the value of the default goal. Higher default values cause male fundraisers to raise more money; they do not have the same effect for female fundraisers.

There are two potential explanations for the gender difference in ITT slope effects. One explanation is a gender difference in default slope effects, i.e. male and female fundraisers react differently to default values when they set fundraising goals. Specifically, the explanation would be that male fundraisers respond positively to higher default values by setting higher goals, while female fundraisers do not. Previous studies have suggested that high default values can have countervailing effects (Goswami and Urminsky 2016; Altmann et al 2019). For example, Altmann et al show that higher default donation suggestions can lower the amount donated. We investigate whether countervailing effects are stronger for female fundraisers in Section 3.2, but find little support for

this explanation. The second explanation is that there is a gender difference in goal slope effects, i.e. higher goal values differentially affect money raised for male and female fundraisers. We show this in Section 3.3.

3.2 Default effects

Figure 3 shows the effects of each of the 19 default values on goal-setting outcomes. We look separately at whether a goal is set (panel a) and the value of the goal (panel b). Corresponding regression results (estimated separately for male and female fundraisers) are in Table 2, i.e.:

(1) $$G_i = \pi_{10} + \pi_{11} \mathrm{D}_i + \pi_{12} \mathrm{D}_i.d_i + e_{i1}$$

(2) $$g_i = \pi_{20} + \pi_{21} D_i + \pi_{22} \mathrm{D}_i.d_i + e_{i2}.$$

where G_i is a binary indicator of whether fundraiser *i* has set a goal, g_i is the goal value, D_i is a binary indicator of whether the fundraiser sees any default value (i.e., is assigned to treatment), and d_i is the (continuous) default value that they see. Our primary interest is in the default slope effects in goal setting (π_{12}) and in goal value (π_{22}), in whether these default slope effects are different for male and female fundraisers, and in particular, whether there are stronger countervailing default effects for female fundraisers that can explain the difference in ITT slope effects.

3.2.1 Effects of the default values on goal-setting (0/1)

Absent a default value, male fundraisers are more likely than female fundraisers to set a goal (61.8% compared to 50.1% in the control group, p<0.010). The treatment has a sizeable positive effect on goal-setting for both male and female fundraisers. The regression results in Table 2 (cols i and iv) show that the effect of seeing a default is bigger for female fundraisers than male fundraisers (+0.336 compared to +0.419). However, it is not enough to close completely the gender gap in goal-setting (91.9% compared to 95.4% in the treatment group, p<0.010). Female fundraisers are more likely, in response to seeing a default, to opt out of goal-setting than male fundraisers – and the gap is widest at high default values, as shown in Figure 3, panel a.

The default slope effect in goal-setting for male fundraisers is essentially nil; the proportion of male fundraisers setting a goal is not sensitive to the default value: the Figure 3 panel a curve is nearly flat, and the column ii estimate is close to zero. By contrast, female fundraisers' goal-setting is weakly (negatively) sensitive to the default value: the panel a curve is slightly negative-sloping and the −.006 estimate (column v, *p*=.003) suggests a little more than half a percentage point drop per £100 higher default value. In other words, there is a countervailing effect – female fundraisers are

more likely than males to opt out at higher default values, but it is weak: going from no default in the control group to a £950 default value still raises goal-setting by female fundraisers by 39 percentage points.

3.2.2 *Effects of the default values on goal values (£)*

There is no evidence of countervailing default slope effects in goal value for female fundraisers. Both male and female fundraisers respond in a similar positive way to default values; by setting higher goals if they see higher default values, compared to seeing lower default values. The Figure 3 panel b curves are parallel, and the estimates in Table 2 cols iii and vi indicate the effect of a £100 increase in default value is to increase the value of the goal that is set by £23.20 ($p < 0.001$) in the case of male fundraisers and £20.40 ($p < .001$) in the case of female fundraisers.

The key take-away from this analysis of default effects is that the gender difference in the ITT slope effects (i.e. positive ITT slope effects for male fundraisers but not female fundraisers) is not explained by countervailing effects of high default values for female fundraisers. This points to there being a gender difference in goal slope effects, which we confirm in section 3.3. Before doing so, however, we analyse individual compliance with the default values.

3.2.3 *Compliance with default values: Passive and active*

The 33.6 and 41.9 percentage point increases in goal-setting (male and female fundraisers respectively) indicate a high proportion of compliers in response to the default values, i.e. people who set a goal because they see a default goal value, who would otherwise not have set a goal. In some cases, the response by the compliers may have been passive (i.e. the defaults affected goal-setting without any conscious engagement by the fundraiser). But we argue in this section that the response by most compliers was active, i.e. the defaults nudged some fundraisers to consciously select a goal they thought at the time was right for them.

The distinction between passive and active compliance is important for two reasons. First, it affects the interpretation of estimated goal slope effects in section 3.3, which use default values as an instrument for goal values and are therefore estimated for the group of compliers. If fundraisers passively accept the default values, then the interpretation of the estimated goal slope effects would be as if the goals were exogenously set by the experimenters and passively accepted by the participants. By contrast, if the default values act as a nudge for fundraisers actively to set their own goal, then the estimated goal slope effects capture the causal effect of endogenously set goals. The second reason the passive-active compliance distinction is important is that active responses allow

us to interpret the goal-setting results, and the observed gender difference in estimated default effects, using a model of optimal goal-setting, which we do in section 4.

In our goal-setting environment, inattention and transaction costs are *a priori* possible passive compliance channels. Fundraisers may simply not see the default value (inattention) or they may simply go with the default value because they perceive that it is too costly, in terms of cognitive effort, to think at all about setting a goal value (transaction costs).[8] Figure 4, panel A is evidence that some passive responding is happening: the modal response of goal values (the "spike") moves with the default value. However, the size of the spike also varies by default value (for male fundraisers the range is 17.8% at default = £50 to 47.0% at default = £200; for female fundraisers the range is 15.7% at default = £700 to 50.2% at default = £200) whereas we would expect the share of passive responders to be roughly constant (there is no obvious reason why someone would notice a goal box with £200 and not a goal box with £500). The minimum size of the spike (17.8% of male and 15.7% female fundraisers) is our best (upper bound) guess of the share of passive compliers. It is an upper bound because some of the fundraisers at the spike might consciously be choosing that default value.

By this logic, the rest of the compliers are active responders who exercise some degree of conscious choice over their goal value. An explanation is that the default value provides information to fundraisers about the return to fundraising effort. For example, a high default value may signal than a high goal is achievable. A lower bound on the share of active compliers is the total share of compliers (33.6% male and 41.9% female fundraisers) minus the share of passive compliers (17.8% male and 15.7% female fundraisers). This would imply that at least 47% of the male, and 63% of the female, compliers are active compliers. These estimates of the share of active compliers are conservative since some people who would have set a goal absent a default value, may be nudged by the default value to set a different goal value.

3.2.4 *A gender difference in active responses*

Figure 3, panel b shows that male fundraisers choose to set systematically higher goals than female fundraisers, for the same default value. Although the default slope effects are the same (the effect of high defaults compared to low defaults is the same for male and female fundraisers), the default level effects are higher for male fundraisers (the same default value results in a higher goal being set

[8] The experiment was not designed to pinpoint the specific passive and/or active channels through which defaults affect goal-setting behaviour. See Altmann et al (2019), including their supplementary materials, for an excellent summary discussion of specific passive and active channels through which defaults might affect choice behaviour.

by male fundraisers than by female fundraisers). This implies that there are different active responses to the same default values by male and female fundraisers.

Figure 4 panel b shows this in more detail. It summarizes the range of possible responses to different default values: **no** goal, **lower** than the default value, **stick** with the default, **higher** than the default. Female fundraisers are more likely than male fundraisers to set a goal that is *lower* than the default value (49.8 per cent of female fundraisers choose to decrease, compared to 42.3 percent of male, *p*-value of the difference = .000), and they are less likely than male fundraisers to set a goal value *higher* than the default (13.3 per cent of female fundraisers choose to increase, compared to 24.3 percent of male, *p*-value of the difference = .000).

A potential explanation for this difference is that it is rational for male fundraisers to set higher goal values because they anticipate raising more money than female fundraisers. However, the right-hand side of Figure 4, panel b is inconsistent with this explanation. It presents the no/ lower/ stick/ higher responses to the default values for second-time fundraisers, sorted by the amount of money that they previously raised (not sorted by default goal value). For example, second-time male fundraisers who raised £450-£500 last time, are this time more likely to set goals *higher* than the default and less likely to set goals *lower* than the default, compared to second-time female fundraisers who also previously raised £450-£500 last time. Section 4 uses a goal-setting model developed by Clark et al (2020) to discuss candidate explanations for this gender difference.

3.3. Goal effects

In order to explain the gender difference in ITT slope effects in the absence of a gender difference in default slope effects, it must be the case that there is a gender difference in goal slope effects, i.e. higher goal values must differentially affect money raised by male and female fundraisers. To show this, we first estimate goal slope effects using a linear specification, i.e.:

(3) $$f_i = \gamma_0 + \gamma_1 G_i + \gamma_2 G_i . g_i + u_i$$

Where f_i is the money raised as a linear function of whether a goal is set (G_i), and the goal value (g_i). γ_2 (the goal slope effect) is the behavioural effect of interest, capturing the effect of higher goals on money raised.

OLS estimation of (3) potentially suffers from endogeneity bias. The error term u_i may include pre-determined factors such as average income among the fundraiser's peer-donors, or the cost of fundraiser's effort, as well as endogenous factors such as the effort the fundraiser expends, that are

correlated both with the amount raised and with the fundraiser's decision to set a goal/ goal value. We therefore use the default values as instruments for G_i and g_i, as in equations (1) and (2), to identify goal slope effects. Both OLS and TSLS estimates are reported in Table 3.

For male fundraisers, the causal goal slope effect in col ii is that a £100 higher goal value results in an additional £37.10 being raised (p=.005). This is smaller than the col i OLS estimate but the endogeneity test fails to reject. For female fundraisers, by contrast, the causal slope effect is insignificant and, if anything, negative. This contrasts with the (biased) positive OLS slope effect in col iii.

Setting higher goals does not cause female fundraisers to raise more money, but the positive constant term in column iv suggests that female fundraisers who set very low goals raise more money than female fundraisers who do not set any goal (p=.109]. This is also different to male fundraisers: the negative constant term in column ii implies that male fundraisers who set very low goals raise less than male fundraisers who do not set any goal.

We estimate a further specification in which we relax the assumption of linearity in the effect of goal value and estimate the effect of "Low", "Medium" and "High" goals (relative to no goal), i.e.:

$$f_i = \gamma_{01} + \gamma_{11}\, Low_i + \gamma_{21}\, Med_i + \gamma_{31}\, High_i + u_i \quad (4)$$

where "Low", "Medium" and "High" goals are defined relative to gender-specific mean goal values in the control group ("Low" is less than half the gender-specific mean, "Medium" is 0.5 – 1.5 times the gender-specific mean and "High" is more than 1.5 times the gender-specific mean.[9]) These are instrumented with equivalent low/ medium/ high default values. The estimated coefficients are plotted in Figure 5. A summary of the findings:

- Male fundraisers who set low goals raise less money than those who set no goals (p=.029).
- Male fundraisers who set medium and high goals raise more money than those who set no goals (p=.076, p=.023) and more money than those who set low goals (p=.007, p=.001).
- Female fundraisers who set low goals raise more money than those who set no goals (p=.073).

[9] For male fundraisers, a low goal is £1 - £215, a medium goal is £216 - £647 and a high goal is £648+. For female fundraisers the ranges are £1 – 140, £141 - £420 and £421+.

- Female fundraisers who set medium and high goals do not raise more money than female fundraisers who set no goals (p=.451, p=.614), nor do they raise more money than those who set low goals (p=.413, p=.491).

3.4 A postscript: Goals and fundraiser effort

In the next section, we use Clark et al's (2020) model of goal-setting to evaluate candidate explanations for the observed gender differences. In their model, as in other models of goal-setting, a goal acts as a commitment device, causing people to increase effort (in our context for example, by promoting their fundraising and contacting friends and family). In the case of peer-to-peer fundraising where the goals are made public, however, an alternative possibility is that fundraising goals provide social information to donors about how much they are expected to donate, with a higher fundraising goal indicating a higher expected donation amount (Shang and Croson 2009; Smith, Windmeijer, and Wright 2015). In this case, donors respond directly to the goals, not to the effort of the fundraisers. Therefore, to motivate application of the Clark et al model to our context, we provide evidence that the fundraising goals worked through an effort channel.

We consider the effect of goal value on four measures designed to capture fundraiser effort: the number of days to first donation, whether the page collects zero donations, the total number of days' fundraising and the total number of donations. We also look at average donation size as an indicator of the social information channel.

Results for each of the five measures are shown in Figure 6. Each panel is for a different measure and plots the coefficients on Low, Medium, or High goal (relative to no goal) estimated by TSLS using the Low, Medium, and High default values as instruments, as in Figure 5. The results show that male fundraisers with medium/ high goals take fewer days to get their first donation than those with a low/ no goal (Panel A) and are more likely to collect some donations (Panel B). Thus, male fundraisers with medium/high goals are quicker off the fundraising block, consistent with the notion that higher goals lead to more effort. For female fundraisers, the effects of different value goals on *days to first* and *zero donations* are muted, while the positive effect of low goals on amount raised can be attributed to them attracting more donations (Panel D) and larger donations (Panel E). For both male and female fundraisers, there is, perhaps surprisingly, little effect of goals on total days spent fundraising (Panel C). Nevertheless, taken together the results are consistent with the idea that goal-setting works through fundraiser effort.

As already noted, mean donation size is higher for female fundraisers with low goals (compared to higher/ no goals) but mean donation size is lower for male fundraisers with low goals. The fact that the direction of low goal effects differs between male and female fundraisers rules out a simple information effect story in which low goals are a signal for small donations.[10]

4. Interpretation

In this section, we assess theoretical explanations for the observed gender differences. The assessment uses the goal-setting model developed by Clark et al (2020) as a framework. In the model, there are three elements that determine goal setting: 1. the degree of present bias, 2. the degree of loss aversion and 3. beliefs about the return to fundraising effort in two dimensions: both the deterministic return to effort (confidence in ability) and the role of luck (precision/optimism). Section 4.1 explains how the model works, and section 4.2 explains why a gender difference in the precision of beliefs about the roles of effort versus luck is a plausible candidate explanation for why male fundraisers are more likely to set a goal (finding 1A) and set higher-value goals (finding 1B). The explanations are intuitive; readers interested in the formal analysis behind the intuition and claims made in sections 4.1 and 4.2 can find it in Appendix B.

Even with a gender difference in the precision of beliefs, however, the model cannot explain the two gender differences in goal effects: male fundraisers respond negatively to low-value goals (finding 2A) and female fundraisers do not raise more money with high goals than low goals (2B). Instead, in section 4.3. we turn to the idea of grit (Duckworth et al 2007; Alan and Ertac 2019) which combines precision of beliefs about the roles of effort versus luck with perseverance in the face of performance feedback.

4.1 A model of goal-setting

The elements of Clark et al's (2020) goal-setting model applied to the fundraising context are that present bias creates a tension between how much costly fundraising effort the fundraiser (as planner) would ideally like when they decide to fundraise and the effort that the fundraiser (as actor) exerts once they start fundraising. Anticipating this, a fundraiser who is subject to loss

[10] It is possible that male and female donors respond differently to social information – for example, male donors interpret a high goal as a sign to make a large donation, while female donors do not. In conjunction with the fact that male donors are a higher share of donors to male fundraisers, this might explain the observed responses in mean donation amounts. However, the goal slope effects are positive for both male donors who give to male fundraisers as for female donors who give to male fundraisers, and are negative for both male donors who give to female fundraisers and female donors who give to female fundraisers. This suggests that donors respond to the differences in the way male and female fundraisers behave, irrespective of their (the donors') gender.

aversion can use goal-setting as a commitment device to mitigate their present bias problem. The fundraiser planner sets their optimal level of fundraising as a goal and this becomes a reference point. Once the goal has been set, the fundraiser will suffer a utility cost proportional to their loss aversion if they put in low effort and fail to meet the goal.[11] The goal therefore causes the fundraiser actor to put in additional effort (compared to no goal).

In the model, goal value (£*y*) is (i) larger if present bias is less severe (because with less severe present bias, fundraisers will put in more effort, with or without having set a goal), and (ii) monotonically increasing in loss aversion (because greater loss aversion increases the utility cost from a goal being missed, making goal-setting a more powerful tool for motivating effort) and (iii) monotonically increasing in the deterministic return to fundraising effort.[12]

Result (ii), that the goal value is monotonically increasing in loss aversion, obtains where fundraisers believe that fundraising effort *x* will result in money £*y* being raised with zero role for luck (i.e., infinite precision in beliefs). In this case, all fundraisers will set a goal.[13] The fact that not all fundraisers in our sample set a goal implies that fundraisers do not have infinitely precise beliefs, and believe luck plays a role in determining fundraising outcomes. The belief that bad luck can happen leads the fundraiser to dampen goal-setting: If fundraisers believe that money raised is determined in part by luck, rather than (just) effort, they will set a lower goal (than if they believed that effort was all that mattered) because there is a chance that they will fail to meet the goal despite putting in effort and will suffer the utility cost from failure. Luck also makes the relationship between goal-setting and loss aversion non-monotonic. Furthermore, a fundraiser who believes that luck plays a role, and who is subject to a very high loss aversion, will not set a goal at all, preferring to accept their present bias problem, rather than set even a low-value goal and risk failure.

4.2 Gender differences in goal-setting

Against this framework, which of the three elements might explain findings 1A and 1B– namely that male fundraisers are more likely to set goals and set higher value goals?

[11] This cost could be a standard psychological cost from feeling bad about oneself having failed to meet a goal, and/or a psychological cost from the shame of public failure because the goal is posted. Allen, Dechow, Pope, and Wu (2017) refer to these as intrinsic and audience costs pointing out that they are common in all goal settings.

[12] The intuition drawn from the model is similar to that drawn from other goal-setting models, such as Koch and Nafziger (2011). These models are built on a foundation theory of reference dependence (Kőszegi and Rabin 2006), which in turn is based on loss aversion utility (Kahneman and Tversky 1979).

[13] The exception would be fundraisers with zero loss aversion (which would make goals completely ineffective) or zero present bias (which would make goals unnecessary).

We can rule out a difference in **present bias**. It is the case that female fundraisers with less present bias would have less need for goal-setting, and consequently fewer would set goals (consistent with 1A). However, the fact that female fundraisers set lower value goals requires a different explanation. If female fundraisers have lower present bias then, if they decided to set goals, they would set higher goal values because their lower present bias would imply that their effort levels were already higher, even without goal-setting (inconsistent with 1B).

What about differences in **beliefs**? Recall there are two dimensions to beliefs: confidence in ability (i.e. the deterministic return to fundraising effort), and precision/optimism about the relative roles of effort and luck in determining the outcome. If male fundraisers are more confident in their fundraising ability, they will set higher goals (consistent with 1B), but they will not be any more likely to set a goal (inconsistent with 1A). However, if male fundraisers are more precise in their beliefs, such that (compared to female fundraisers) they believe that luck plays a relatively small role in determining money raised, then they would both set a higher goal and also be more likely to set a goal. While we cannot formally test for differences in precision of beliefs, there is evidence of such differences in beliefs in other settings (Barber and Odean 2001; Fisman and O'Neil 2009).

Higher levels of **loss aversion** could also explain 1A and 1B: if the possibility of bad luck is anticipated, higher loss aversion would mean that female fundraisers prefer to set no, or a low, goal to avoid the risk of failure. However, there is a theoretical qualification to the loss aversion explanation.[14] In addition, although higher loss aversion among female fundraisers is a theoretically consistent explanation, evidence on whether women exhibit greater loss aversion is mixed (Bouchouicha et al 2019).[15]

4.3 Gender differences in goal effects

Findings 2A (male fundraisers with low goals raise less money than those with no goals) and 2B (female fundraisers with high goals do not raise more money than those with low goals) are a puzzle for optimal goal-setting models. Irrespective of the degree of present bias, degree of loss aversion, and beliefs about returns to fundraising, the Clark et al (2020) model, and other goal-setting models,

[14] Two additional maintained assumptions are necessary: (a) male fundraisers' loss aversion cannot be too much less than females, otherwise goals become less effective, causing male fundraisers to set no/ low goals; (b) female fundraisers' loss aversion must be high enough (relative to male fundraisers' loss aversion), otherwise female fundraisers would set higher goal-values than male fundraisers. See Appendix B Proposition 8.

[15] Allen et al (2010) show that reference-dependence produces bunching just above a reference point and that the amount of bunching is weakly increasing in the degree of the discontinuity at the reference point. In Appendix A we show that there is no evidence of female fundraisers exhibiting greater bunching in the distribution of money raised at exactly the goal value which also suggests that they do not exhibit significantly greater loss aversion.

predict that under optimal goal-setting, effort will be a monotonic function of the goal value that is set, and therefore it follows that fundraising outcomes will also be a monotonic function of goal value. In the fundraising experiment, this would imply that setting a goal will increase money raised compared to no goal and that higher goals increase money raised compared to low goals, predictions inconsistent with the evidence 2A and 2B.

However, there is a difference between models of optimal goal-setting and our setting, which is that the default values play a role in affecting goal-setting behaviour. A plausible mechanism is that the default value provides information that affects beliefs about the return to fundraising (either confidence in ability or precision/optimism) at the point at which the goal is set. For example, a high default value may signal that fundraising is easy and/or with little role for luck, while a low goal value may signal that fundraising is hard and/or luck plays a large role. Once they start fundraising, however, male and female fundraisers may differentially update their beliefs in response to performance feedback (i.e. their experience of fundraising). Suppose that, once male fundraisers start raising money, they become more optimistic about achieving a low goal. They may see a low goal as something that is not worth bothering about (i.e. they wouldn't suffer any utility loss if they missed it). They would consequently put in little effort, consistent with the evidence in Figure 6 that male fundraisers with low goals take their foot off the gas. By contrast, female fundraisers may become more pessimistic about achieving a high goal. They may rather not try hard than try hard and fail, and may therefore be less inclined to put in the extra effort to reach the high goal. In line with this, Figure 7 shows the proportion of fundraisers who achieve their fundraising goal, broken down by suggested goal value. The overall proportions of male and female fundraisers in the treatment group who meet their goal are very similar (42.4 per cent versus 41.8 per cent respectively, p=.678). However, a higher share of female fundraisers than male fundraisers who are nudged to set a low goal achieve it, while the reverse is true for high goals.

The concept of grit, introduced by Duckworth et al (2007) and investigated by Alan and Ertac (2019) combines beliefs about returns to effort with the notion of perseverance. Duckworth et al (2007) define a gritty individual as someone who "tends to set ambitious performance goals with the belief that these goals are attainable through persistent effort, and tends to persevere after initial failure." Building on this, Alan and Ertac (2019) define a gritty individual in terms of their beliefs regarding the role of effort in the performance process and their response to performance feedback: a gritty person believes "that ambitious goal-setting and perseverance have higher returns than previously thought." The idea that male fundraisers display more grit than female fundraisers is a potential explanation for finding 2B. We cannot formally test this explanation but suggest that a promising

area for future research would be to develop formal models of goal-setting with belief-updating and experimental designs to test them.

5. External validity

This was a natural field experiment run by the world's largest giving platform that is used by millions of people to raise money for thousands of charities. This suggests that the findings are externally valid; specifically that, among the wider population of peer-to-peer fundraisers, male fundraisers are more optimistic in setting goals and are more responsive (in terms of the effect on money raised) to setting themselves high goals. Consequently, our findings have practical relevance: charities should encourage fundraisers to set goals, but encourage male fundraisers to set high goals, while encouraging female fundraisers to set low goals.

A second question of interest is: Can we extrapolate beyond the fundraising setting and conclude more generally that there are goal-setting differences among men and women in the population? The answer depends on the selection from the population of men and women into the population of fundraisers. To ease discussion, consider a population of just two types of people – "optimistic and gritty" types, and, their opposite, "pessimistic" types. Our findings that male fundraisers tend to be optimistic, while female fundraisers tend to be pessimistic is consistent with a population in which all men tend to be optimistic and all women are more pessimistic (i.e. the results generalize). But it is also consistent with selection: men and women in the population have the same mix of optimistic and pessimistic types, but optimistic men and pessimistic women self-select into the population of fundraisers (i.e. the results do not generalize).

There are several pieces of evidence within the study suggesting that there has not been this type of differential selection of men and women into fundraising. The gender split in our sample of fundraisers is nearly 50/50; a more uneven split might have indicated differential selection.[16] Likewise, the age distributions among male and female fundraisers are similar, ruling out a selection story in which (for an example) younger, optimistic types are more likely to be male. Male and female fundraisers also fundraise for a very similar set of charities. They tend choose slightly different events; for example, female fundraisers are more likely to do walking events while male fundraisers are more likely to do cycling events. However, we find the same gender differences—

[16] For instance, if the ratio of optimistic to pessimistic people in the population was 2:1, and optimistic men (only) and pessimistic women (only) self-selected into fundraising, then we would expect a gender split in our sample of 2:1 (male fundraisers to female fundraisers). The only way this would not happen would be if the ratio of optimistic to pessimistic people in the population also happened to be 50/50.

male fundraisers are more optimistic/female fundraisers are more pessimistic—within fundraising events (results available in Appendix A).

Moreover, our findings are also in line with previous ITT studies on the effects of nudges to set goals which also find gender differences, and stronger effects for men. This includes a field experiment on goal-setting in an education-setting (Clark et al 2020), and also a lab experiment about compensation (Dalton et al 2016), in which selection of participants is almost certainly random according to type. The gender differences in counterintuitive findings 2A and 2B also have parallels with a lab experiment about how men and women respond differently to large/small loses in a competitive environment (Gill and Prowse 2014).[17] Occam's razor works against an argument that selection explains the fundraising results, and only the fundraising results.[18]

6. Conclusion

In a peer-to-peer fundraising setting, men are more optimistic fundraisers than women. After goals have been set, and consistent with a fundamental premise of goal-setting theory, men who set high goals raise more than men who set low goals, and women who set low goals raise more than women who did not set a goal. Not consistent with the theoretical premise, however, men who set low goals raise less than men who did not set a goal, and women who set high goals raise no more than women who set low goals. The last result, and the result that men are more optimistic fundraising goal-setters, are new evidence about gender differences in goal-setting.

Our interpretation that differences in optimism and grit are a likely explanation ties the evidence of gender differences in goal-setting to the wider literature on gender differences in related behaviours, such as in the willingness to compete (Niederle and Vesterlund 2007). Accordingly, readers of the literature on gender differences in willingness to compete will not be surprised by our findings.

The results have practical implications for goal-setting interventions in fundraising contexts: encourage men to set high goals rather than low goals, but do not encourage them to set a low goal in place of not setting a goal at all. And for women: encourage women to set a low goal, rather than

[17] Gill and Prowse (2014) find that in 10 repeated tournaments, women who lose even a small prize in one round respond in the next round by putting in less effort; men who lose a small prize, in contrast, do not reduce next round effort. This suggests that small prizes do not matter to men, but do matter to women, and parallels our result that low goals do not matter for men, but do matter for women. Gill and Prowse also find that for men the larger the prize they lose, the less effort they put in next round; not so for women. This suggests that large prizes matter to men, but not to women, and parallels our result that high goals matter for men, but not for women.

[18] More complicated arguments would be either that all field studies are picking up selection despite the similarity of their results to lab results, or that all field studies are picking up a population-based gender difference, except for the present fundraising field study.

no goal, but use caution about setting high goals. The case for external validity is strong enough, we think, to be mindful of these different practical implications for men and women when designing goal-interventions in other contexts. Of course, whether the gender differences in goal-setting obtain in other contexts is an important question for future research.

The conceptual implication of our results is that goal-setting theory needs to be developed, and predictions need to be generated, that incorporate a central role for beliefs and the updating of beliefs. Optimism in one's future performance, and how one responds to feedback about performance—in short, grit—may emerge as a key determinant of goal-setting behaviour.

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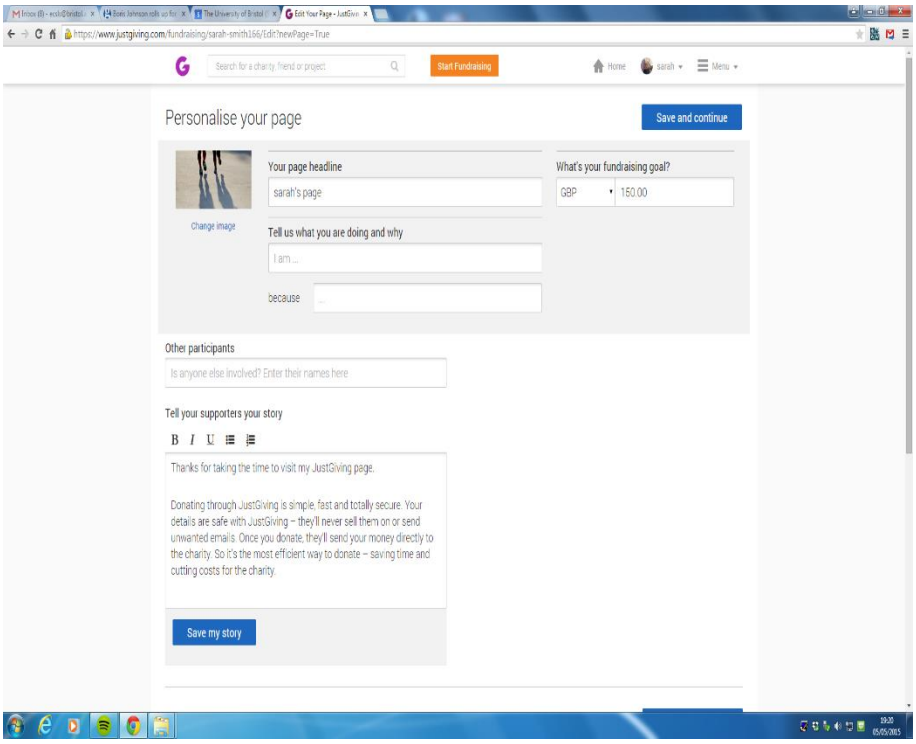
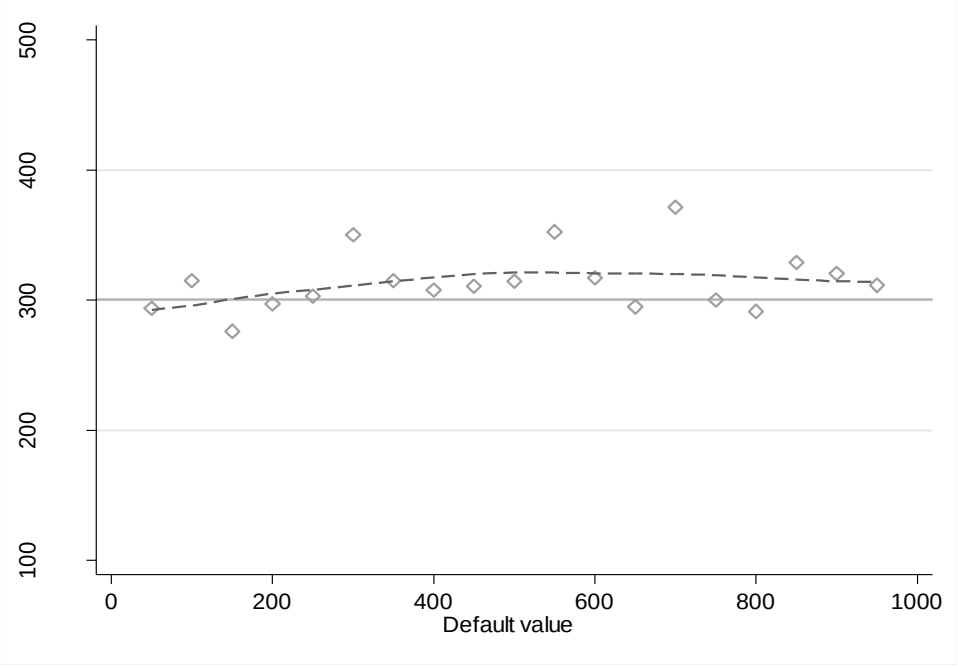
Figure 1: Online form for fundraising page set-up



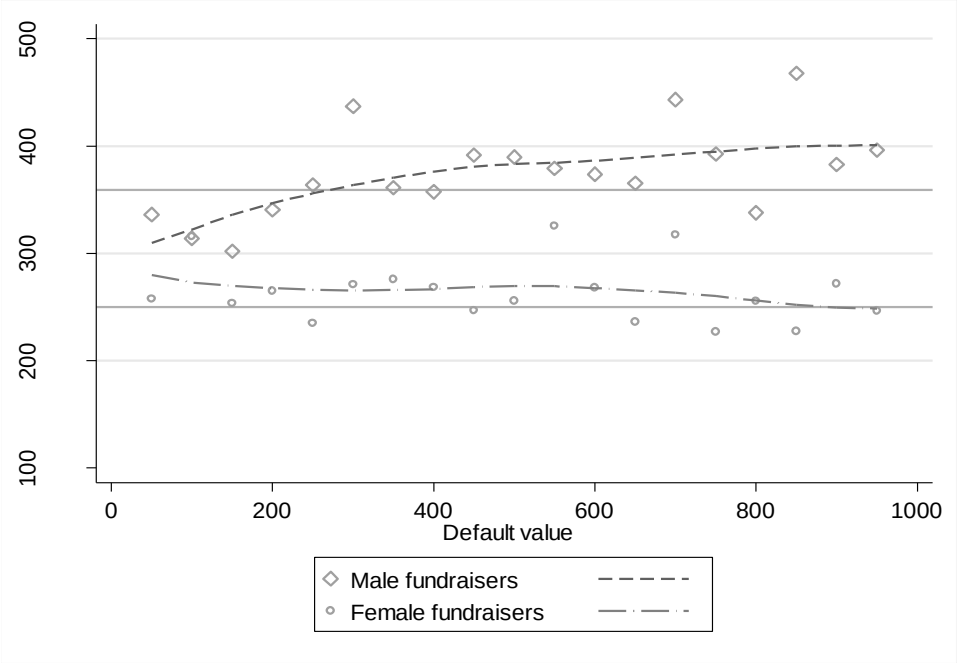
Note: Fundraisers must complete this form order to populate their fundraising page. The experiment involved a change to the fundraising goal box (top right-hand corner). In the control group, the box was blank. In the treatment group, the box contained a value, as shown here, randomly chosen from the range £50-£950 in £50 increments.

Figure 2: Amount of money raised, by default value (ITT effects)

Panel A: Pooled male and female fundraisers



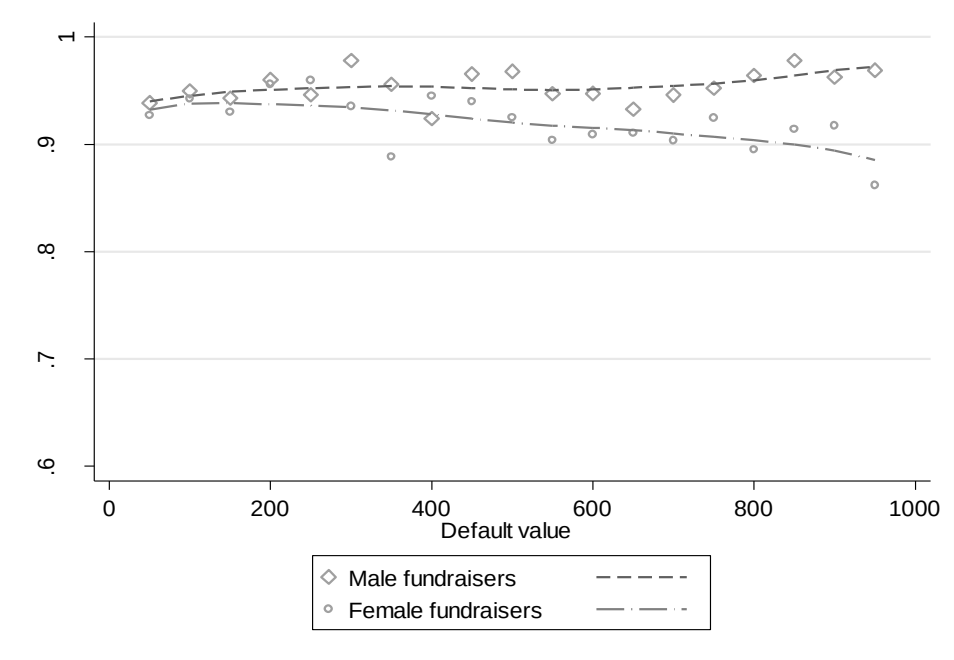
Panel B: Split by gender



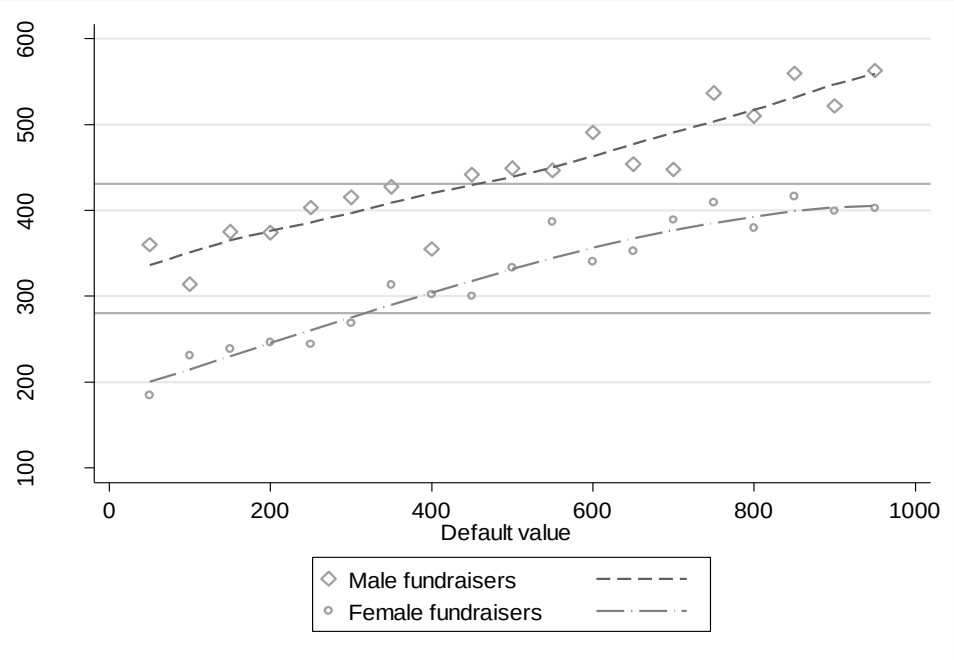
Note: Figures shows the mean amounts of money raised, for each of the 19 randomly-assigned default values, together with lowess smoothed estimators. Treatment group only. The horizontal lines indicate the gender-specific mean values among the control group (>0 only). Corresponding regression results are reported in Table 1.

Figure 3: Goal-setting, by default value (Default effects)

Panel A: Whether the fundraiser sets a goal (0/1)



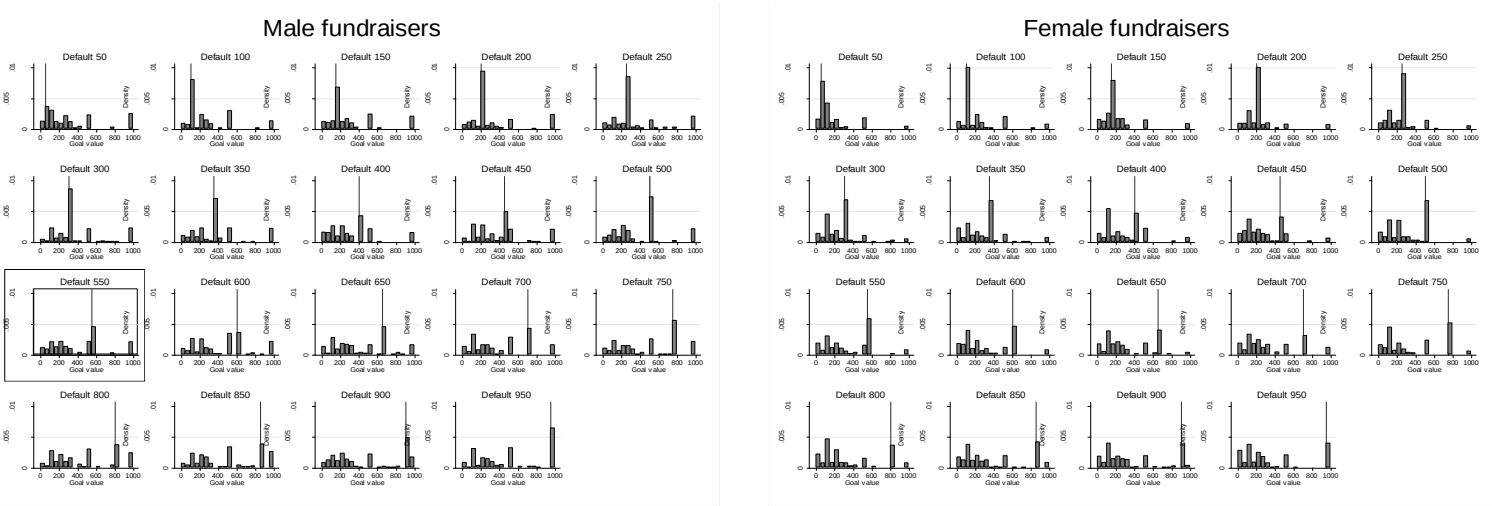
Panel B: The value of the goal that is set (£)



Note: Figures shows share of fundraisers with a goal (panel A.) and mean goal value (panel B. >£0 only), for each of the 19 randomly-assigned default values, together with lowess smoothed estimators. Treatment group only. The horizontal lines in panel B indicate the gender-specific mean goal values among the control group (>£0 only). Corresponding regression results are reported in Table 2.

Figure 4: Individual responses to the defaults

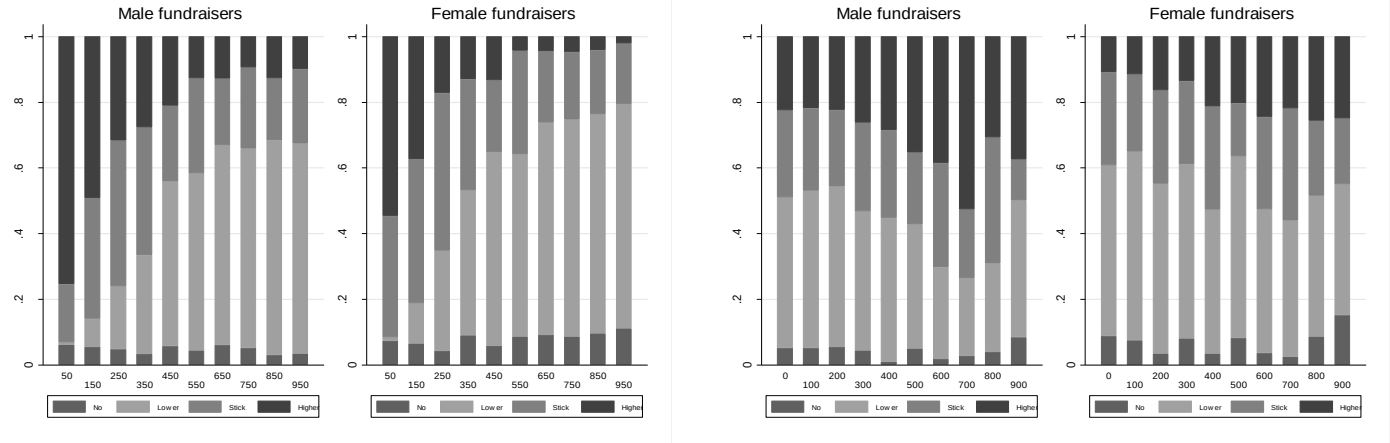
Panel A: Distribution of goal values, by default value



Panel B: Summary responses to default values

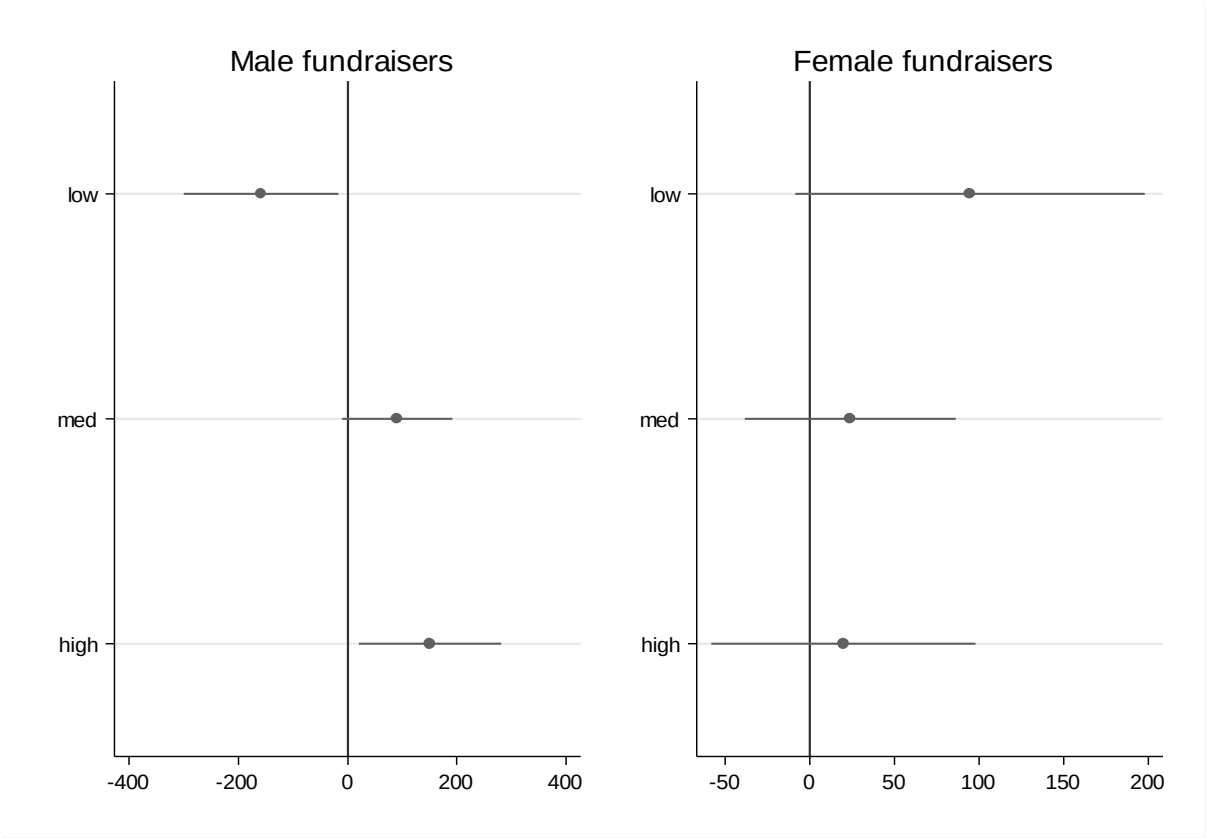
First-time fundraisers (by default value)

Repeat fundraisers (by previous amount raised)



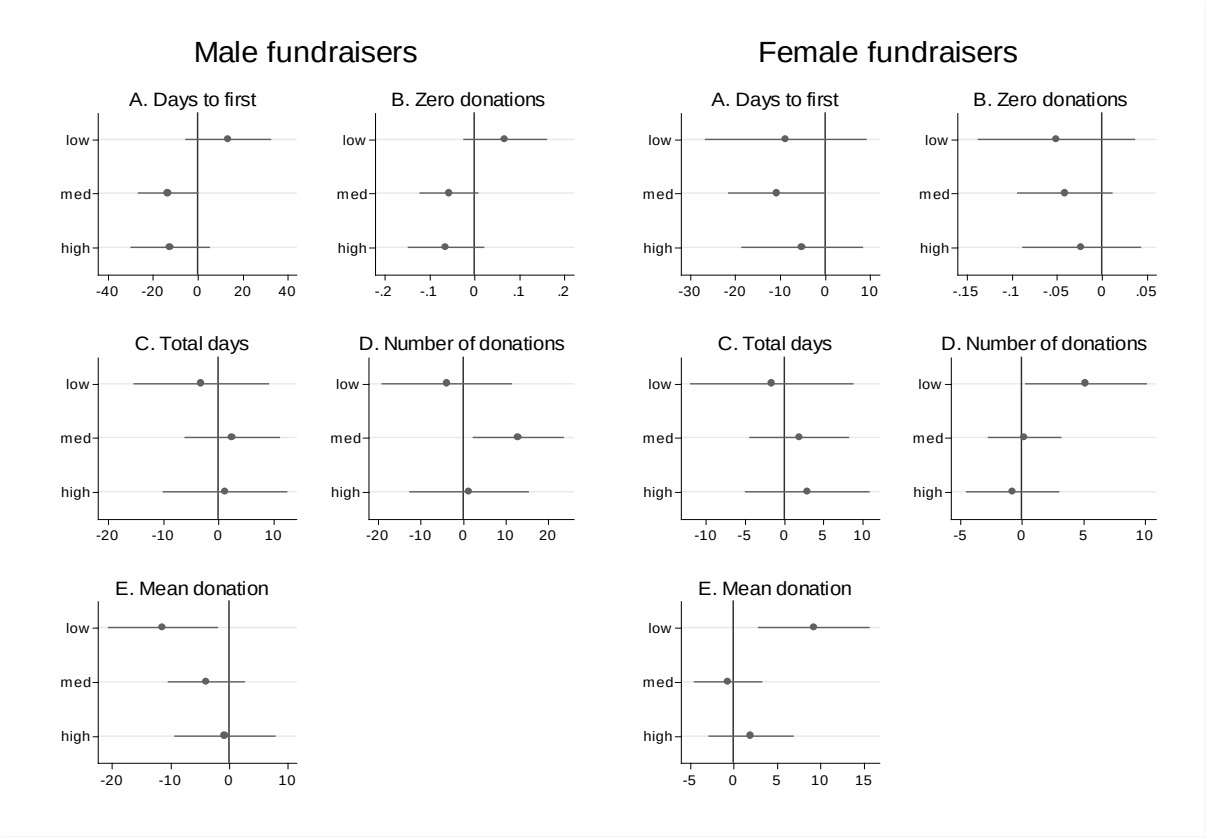
Note: Panel A shows the distribution of goal values, for each of the 19 randomly-assigned default values. Panel B summarizes the responses to the default values: "None" indicates that no goal is set, "Lower" indicates that the goal value is below the default value, "Accept" indicates that the goal value is equal to the default value, "Higher" indicates that the goal value is above the default value. The left hand figure shows responses according to the default value. Note that, with the exception of the highest suggestion (£950), the default values are grouped in pairs (£50 refers to £50 and £100 and so on). The right-hand figure shows the responses among repeat fundraisers, according to the amount of money they raised the last time, again in £100 bands.

Figure 5: Effects of low, medium and high goals on amount of money raised (Goal effects)



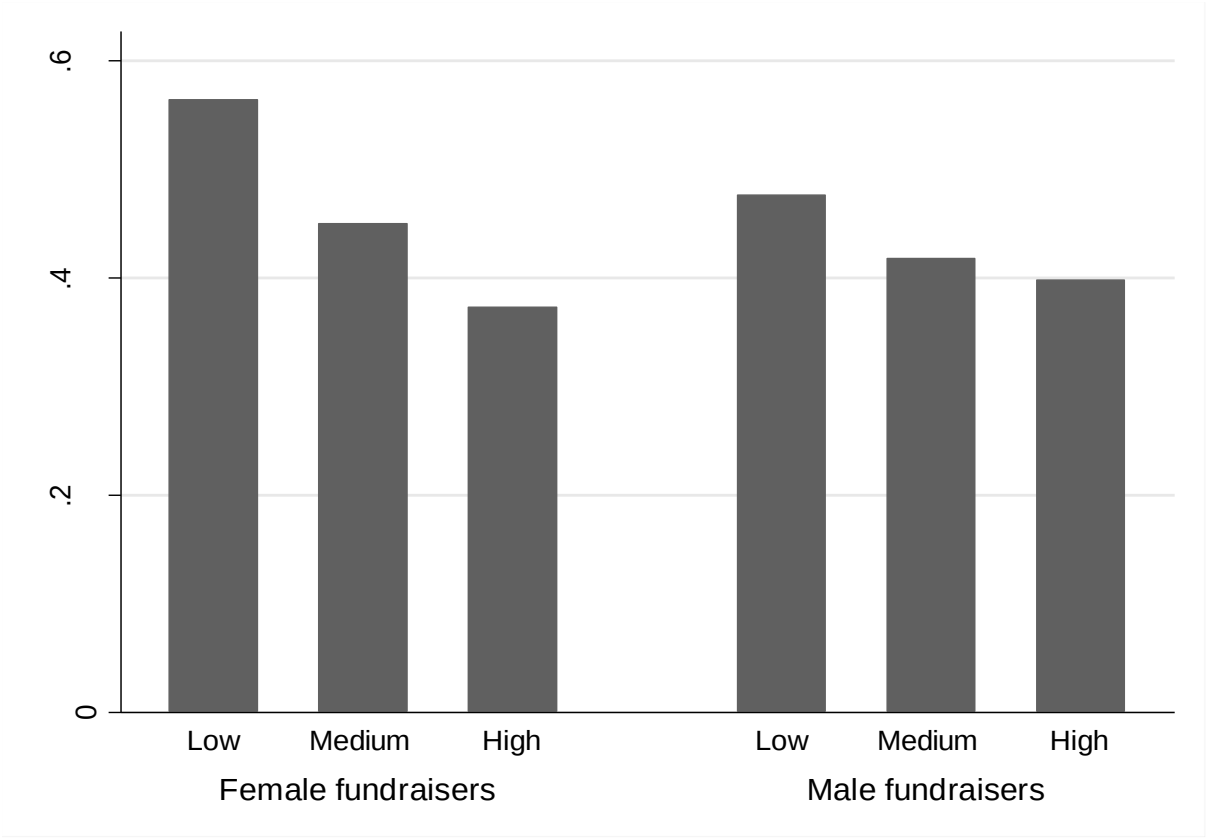
Note: TSLS coefficients and 95% confidence intervals for Low/ Medium/ High goals (relative to no goal). Low, medium and high goals are defined relative to gender-specific mean goal values. (Low < 0.5 x mean, Medium 0.5 – 1.5 x mean, High > 1.5 x mean). Instruments are a corresponding set of Low/ Medium/ High default values. Amount raised is the total amount of money raised by the fundraiser.

Figure 6: Other effects of low, medium and high goals



Note: TSLS coefficients and 95% confidence intervals for Low/ Medium/ High goals (relative to no goal). Low, Medium and High goals are defined relative to gender-specific mean goal values. (Low < 0.5 x mean, Medium 0.5 – 1.5 x mean, High > 1.5 x mean). Instruments are a corresponding set of Low/ Medium/ High default values. Amount raised is the total amount of money raised by the fundraiser. Days to First is the number of days until the first donation is received; Zero donations is an indicator which takes the value 1 if the page receives no donations; Total Days is the total number of days between page set up and the last donation received; Number donations (>0) refers to the total number of donations received by a fundraiser; Mean donation refers to the mean amount (per fundraiser) donated

Figure 7: Share of fundraisers meeting their goal



Note: The share of fundraisers who meet (or exceed) their fundraising goal, according to the suggested goal value. Low/ Medium/ High refer to the suggested goal values and are defined relative to gender-specific mean goal values among the control group as before: Low < 0.5, Medium 0.5 – 1.5, High > 1.5.

Table 1: Intention to Treat Effects (effect of default values on amount of money raised)

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Dependent variable = Amount raised (£'00)						
	Pooled	**Pooled**	**Men**	**Men**	**Women**	**Women**
D(efault) (0/1)	0.143**	0.035	0.152	-0.258	0.150*	0.254*
	(0.073)	(0.116)	(0.123)	(0.191)	(0.084)	(13.909)
D x default_value (£'00)		0.022		0.084**		-0.021
		(0.019)		(0.032)		(0.022)
Constant	3.002**	3.002**	3.593**	3.593**	2.498**	2.498**
	(0.051)	(0.051)	(0.086)	(0.086)	(0.058)	(0.058)
N	13242	13242	6051	6051	7191	7191

*Note: Default (0/1) is an indicator that takes the value 1 if the fundraiser is in the treatment group (i.e. sees any one of the 19 suggested goal values). Default_value (£'00) is the default value that is suggested to the fundraiser. Amount raised (£'00) is the total amount of money raised by the fundraiser. * p < 0.1, ** p < 0.05*

Table 2: Default effects (effect of default values on goals that are set)

	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Dependent variable =	**Goal (0/1)**	**Goal (0/1)**	**Goal (£'00)**	**Goal (0/1)**	**Goal (0/1)**	**Goal (£'00)**
		Men			**Women**	
D(efault) (0/1)	0.336**	0.328**	0.425**	0.419**	0.447**	0.537**
	(0.010)	(0.012)	(0.171)	(0.010)	(0.012)	(0.102)
D x default_value (£'00)		0.002	0.232**		-0.006**	0.204**
		(0.001)	(0.028)		(0.002)	(0.018)
Constant	0.618**	0.618**	2.664**	0.501**	0.501**	1.406**
	(0.009)	(0.009)	(0.075)	(0.008)	(0.008)	(0.045)
N	6051	6051	6051	7191	7191	7191

*Note: Default (0/1) is an indicator that takes the value 1 if the fundraiser is in the treatment group (i.e. sees any one of the 19 suggested goal values). Default_value (£'00) is the default value that is suggested to the fundraiser. Goal (0/1) is an indicator that takes the value 1 if the fundraiser sets a fundraising goal. Goal_value (£'00) takes the value of the fundraising goal that is set. * p < 0.1, ** p < 0.05*

Table 3: Goal effects (effect of goal values on amount of money raised)

Dependent variable = Amount raised (£)

	Men		**Women**	
	OLS	TSLS	OLS	TSLS
G(oal) (0/1)	-2.072**	-1.269*	-1.219**	0.671
	(0.155)	(0.651)	(0.109)	(0.417)
G x Goal_value (£)	0.597**	0.371**	0.508**	-0.084
	(0.025)	(0.125)	(0.031)	(0.099)
Instruments				
Default (0/1)		✓		✓
Default_value (£'00)		✓		✓
Cragg Donald Wald F-statistic		39.782		105.87
Kleibergen Paap rk Wald F-statistic		33.961		82.116
Endogeneity test		3.966		42.281
		[p=.138]		[p=.000]
_cons	3.242**	3.390**	2.327**	2.280**
	(0.128)	(0.265)	(0.074)	(0.156)
N	6051	6051	7191	7191

*Note. Default (0/1) is an indicator that takes the value 1 if the fundraiser is in the treatment group (i.e. sees any one of the 19 suggested goal values). Default_value (£'00) is the default value that is suggested to the fundraiser. Goal (0/1) is an indicator that takes the value 1 if the fundraiser sets a fundraising goal. Goal_value (£'00) takes the value of the fundraising goal that is set. * p < 0.1, ** p < 0.05*

Appendix A. Additional specifications

Table A1: Descriptive statistics

	Pooled			Women			Men		
	Control	**Treatment**	**p-value**	**Control**	**Treatment**	**p-value**	**Control**	**Treatment**	**p-value**
Women (0/1)	.539	.547	[.830]						
Month									
April	.365	.351	[.187]	.369	.358	[.338]	.364	.347	[.161]
May	.435	.439	[.692]	.443	.440	[.778]	.424	.438	[.253]
June	.199	.207	[.279]	.188	.203	[.130]	.213	.215	[.798]
Event									
Running	.317	.328	[.171]	.355	.365	[.392]	.273	.283	[.370]
Walking	.253	.254	[.849]	.337	.334	[.787]	.155	.156	[.921]
Cycling	.229	.236	[.375]	.108	.123	[.043]	.371	.374	[.793]
Other	.200	.181	[.005]	.200	.178	[.018]	.201	.187	[.153]
Age									
<20	.184	.169	[.030]	.207	.191	[.099]	.160	.150	[.303]
20 – 29	.135	.139	[.510]	.131	.135	[.591]	.142	.147	[.559]
30 – 39	.143	.143	[.949]	.140	.143	[.766]	.149	.142	[.427]
40 – 49	.144	.151	[.278]	.139	.145	[.462]	.148	.159	[.230]
50 – 59	.137	.147	[.100]	.134	.146	[.156]	.138	.142	[.680]
60 – 69	.113	.107	[.253]	.107	.105	[.728]	.121	.111	[.230]
70+	.069	.067	[.653]	.070	.063	[.681]	.067	.070	[.681]
	6,535	6,707		3,525	3,666		3,010	3,041	

Notes.
Fundraisers assigned to the Treatment see one of the 19 default goal-values between £50 and £950.
P-values are from a t-test that the difference in means between Treatment and Control is zero.

Table A2: Top 20 charities, by number of fundraisers, male and female fundraisers

	Female fundraisers		Male fundraisers	
		#pages		#pages
1	Cancer Research UK	912	British Heart Foundation	857
2	Macmillan Cancer Support	473	Macmillan Cancer Support	461
3	British Heart Foundation	446	Cancer Research UK	399
4	Breast Cancer Care	195	Alzheimers Society	157
5	Alzheimers Society	160	Marie Curie Cancer Care	130
6	Marie Curie Cancer Care	136	Christie	91
7	Walk The Walk Worldwide	90	Leukaemia & Lymphoma Research	78
8	Christie	68	CLIC Sargent	65
9	Stroke Association	63	PROSTATE CANCER UK	63
10	CLIC Sargent	62	Stroke Association	61
11	St Barnabas Hospices (Sussex) Ltd	58	Help for Heroes	60
12	Leukaemia & Lymphoma Research	57	Diabetes UK	57
13	Parkinsons UK	52	Shelter	52
14	Diabetes UK	50	MS Society	48
15	Breakthrough Breast Cancer	49	Great Ormond Street Hospital Children's Charity	42
16	MS Society	47	Parkinsons UK	37
17	St Luke's (Cheshire) Hospice	46	Teenage Cancer Trust	36
18	Help for Heroes	45	Breakthrough Breast Cancer	34
19	Shelter	44	Yorkhill Children's Charity	28
20	Women V Cancer - RIDE THE NIGHT	41	NSPCC	26

Table A3: ITT Effects (effect of default values on amount of money raised)

Dependent variable Amount raised (£'00)	**Male fundraisers**				**Female fundraisers**			
D(efault) (0/1)	0.152	0.129	-0.258	-0.228	0.150*	0.101	0.254*	0.181
	(0.123)	(0.121)	(0.191)	(0.188)	(0.084)	(0.082)	(0.139)	(0.138)
D x default_value (£'00)			0.084**	0.073**			-0.021	-0.016
			(0.032)	(0.031)			(0.022)	(0.021)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Constant	3.593**	1.849**	3.593**	1.864**	2.498**	2.240**	2.498**	2.239**
	(0.086)	(0.163)	(0.086)	(0.163)	(0.058)	(0.120)	(0.058)	(0.120)
N	6051	6051	6051	6051	7191	7191	7191	7191

Note: Corresponds to Table 1. Amount raised (£'00) is the total amount of money raised by the fundraiser. Default (0/1) is an indicator that takes the value 1 if the fundraiser is in the treatment group (i.e. sees any one of the 19 suggested goal values). Default_value (£'00) is the default goal value that is suggested to the fundraiser. Controls are (sets of indicator variables for) fundraiser age, month, event type and charities with 10 or more pages. * $p < 0.1$, ** $p < 0.05$

Table A4: Default effects (effect of default values on goals that are set)

MALE FUNDRAISERS	**(i)**	**(ii)**	**(iii)**	**(iv)**	**(iii)**	**(vi)**
Dependent variable =	**Goal (0/1)**	**Goal (0/1)**	**Goal (0/1)**	**Goal (0/1)**	**Goal (£'00)**	**Goal (£'00)**
D(efault) (0/1)	0.336**	0.335**	0.328**	0.326**	0.425**	0.458**
	(0.010)	(0.010)	(0.012)	(0.012)	(0.171)	(0.168)
D x default_value (£'00)			0.002	0.002	0.232**	0.227**
			(0.001)	(0.001)	(0.028)	(0.027)
Controls	No	Yes	No	Yes	No	Yes
Constant	0.618**	0.664**	0.618**	0.665**	2.664**	1.741**
	(0.009)	(0.016)	(0.009)	(0.016)	(0.075)	(0.161)
N	6051	6051	6051	6051	6051	6051
FEMALE FUNDRAISERS	**(i)**	**(ii)**	**(iii)**	**(iv)**	**(iii)**	**(vi)**
Dependent variable =	**Goal (0/1)**	**Goal (0/1)**	**Goal (0/1)**	**Goal (0/1)**	**Goal (£'00)**	**Goal (£'00)**
D(efault) (0/1)	0.419**	0.419**	0.447**	0.445**	0.537**	0.545**
	(0.010)	(0.010)	(0.012)	(0.012)	(0.102)	(0.102)
D x default_value (£'00)			-0.006**	-0.005**	0.204**	0.205**
			(0.002)	(0.002)	(0.018)	(0.018)
Controls	No	Yes	No	Yes	No	Yes
Constant	0.501**	0.546**	0.501**	0.545**	1.406**	1.209**
	(0.008)	(0.015)	(0.008)	(0.015)	(0.045)	(0.092)
N	7191	7191	7191	7191	7191	7191

*Note: Corresponds to Table 2. Goal (0/1) is an indicator that takes the value 1 if the fundraiser sets a fundraising goal. Goal_value (£'00) takes the value of the fundraising goal that is set. All other variables as in Table A3. * p < 0.1, ** p < 0.05*

Table A5: Goal effects (effect of goal values on amount raised). TSLS results.

Dependent variable = Amount raised (£)

	(i)	(ii)	(iii)	(iv)
	Male	Male	Female	Female
G(oal) (0/1)	-1.269*	-1.167*	0.671	0.488
	(0.651)	(0.666)	(0.417)	(0.411)
G x Goal_value (£)	0.371**	0.332**	-0.084	-0.066
	(0.125)	(0.128)	(0.099)	(0.097)
Instruments: Default (0/1), Default_value (£'00)	✓	✓	✓	✓
Controls	No	Yes	No	Yes
_cons	3.390**	0.464	2.280**	1.724
	(0.265)	(1.245)	(0.156)	(1.283)
Low goal	0.945*	0.627	-1.584**	-1.337*
	(0.526)	(0.505)	(0.724)	(0.736)
Medium goal	0.240	0.145	0.907*	0.705
	(0.318)	(0.303)	(0.511)	(0.492)
High goal	0.200	0.162	1.505**	1.291**
	(0.398)	(0.378)	(0.663)	(0.651)
Instruments: Recommended low, medium, high goal	✓	✓	✓	✓
Controls	No	Yes	No	Yes
Constant	2.240**	1.641	3.648**	0.959
	(0.166)	(1.014)	(0.298)	(1.357)
N	6051	6051	7191	7191

*Note: Corresponds to Table 3, Fig 5. Low/ Medium/ High are binary indicators for actual goals that are set, defined relative to gender-specific mean actual goal values among the control group as follows – Low < 0.5, Medium 0.5 – 1.5, High > 1.5. Instruments are a corresponding set of Low/ Medium/ High indicators for default goal values. All other variables as in Table A3. * p < 0.1, ** p < 0.05*

Table A6: Goal-setting, within event types

	(i)	(ii)	(iii)	(iv)
	Running	Cycling	Walking	Other

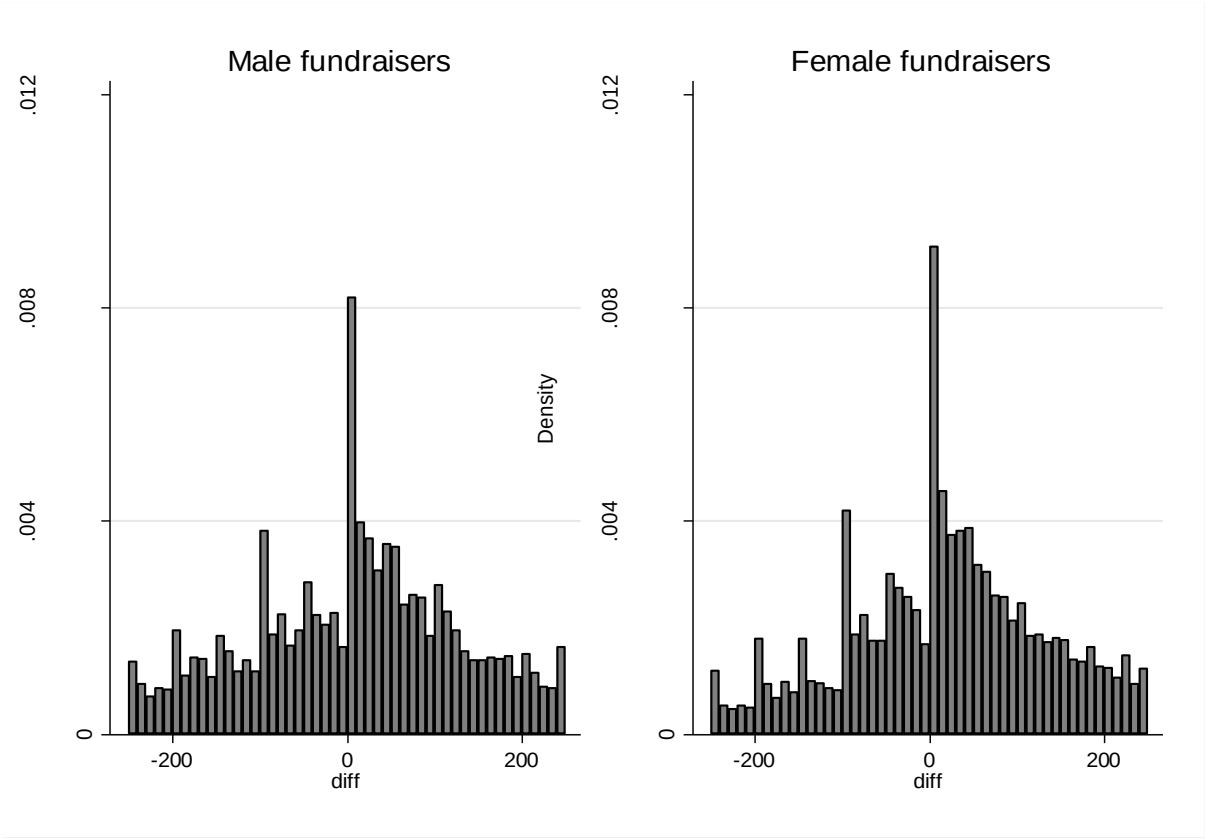
G(oal) (0/1)				
Control Group: Female	0.485	0.549	0.477	0.544
Control Group: Male	0.608	0.615	0.634	0.623
p-value	[.000]	[.002]	[.000]	[.004]
Treatment Group: Female	0.922	0.940	0.908	0.924
Treatment Group: Male	0.955	0.953	0.953	0.956
p-value	[.002]	[.280]	[.003]	[.020]
Goal value (£)				
Control Group: Female	237.3	362.6	250.1	350.3
Control Group: Male	305.7	477.7	479.4	471.7
p-value	[.000]	[.002]	[.000]	[.000]
Treatment Group: Female	287.8	387.1	312.9	365.0
Treatment Group: Male	371.4	456.5	444.1	525.1
p-value	[.000]	[.002]	[.000]	[.000]
N	4277	3077	3356	2532

Table A7: Goal effects, within event types. TSLS results.

Male fundraisers	(i)	(ii)	(iii)	(iv)
	Running	Cycling	Walking	Other
G(oal) (0/1)	-1.112	-1.722*	-0.077	-1.293
	(1.124)	(0.996)	(2.246)	(2.055)
G x Goal_value (£)	0.468**	0.388**	-0.038	0.408
	(0.208)	(0.192)	(0.538)	(0.299)
Instruments:				
Default (0/1)				
Default_value (£'00)	✓	✓	✓	✓
_cons	2.473**	4.044**	3.936**	3.317**
	(0.446)	(0.451)	(0.923)	(0.733)
N	1683	2253	940	1175
Female fundraisers	(i)	(ii)	(iii)	(iv)
	Running	Cycling	Walking	Other
G(oal) (0/1)	-0.071	1.744	0.321	2.626
	(0.617)	(1.456)	(0.577)	(1.697)
G x Goal_value (£)	0.109	-0.322	-0.030	-0.517
	(0.164)	(0.281)	(0.131)	(0.413)
Instruments:				
Default (0/1)				
Default_value (£'00)	✓	✓	✓	✓
_cons	2.473**	4.044**	3.936**	3.317**
	(0.446)	(0.451)	(0.923)	(0.733)
N	2594	824	2416	1357

Notes: As in Table A5

Fig. A1: Difference between amount raised and fundraising goal



Note: Difference between amount raised and fundraising goal, £50 bands. The graph indicates bunching at the goal value, consistent with loss aversion. The degree of bunching is similar for male and female fundraisers.

Appendix B. Proofs of claims made in Sections 4.1 and 4.2

Appendix B analyses goal-setting in the linear-quadratic model of present bias and loss aversion developed by Clark, Gill, Prowse, and Rush (2020). Specifically, we use the model to investigate how heterogeneity in preference parameters (present bias and loss aversion) and heterogeneity in beliefs—about both the deterministic return to effort (confidence in ability) and the role of luck (precision/optimism)—map to differences in the fraction of people who set goals and the magnitudes of goal values chosen by people who do set goals. An intuitive discussion of these results was provided in the main text, Section 4.1.

Then we use the results to prove the claims made in the main text Section 4.2 about whether differences between male and female fundraisers in preference parameters and/or beliefs can, or cannot, explain the evidence of gender differences:

Finding 1A: male fundraisers (compared to female fundraisers) are more likely to set a goal.

Finding 1B: male fundraisers who set goals (compared to female fundraisers who set goals) set higher-value goals.

Clark et al (2020) originally proved Propositions 1, 2.1 and 2.2 below; Appendix B provides geometric visualizations of their proofs. Appendix B then proves that imprecise beliefs are necessary (and sufficient) in the model for there to be people who do not set goals (Proposition 3), and that imprecise beliefs imply that goal-setting becomes non-monotonic in loss aversion (Proposition 4). Appendix B Propositions 5-8 prove the comparative statics needed to back-up the claims made in Section 4.2.

B.1. Linear-quadratic model of loss aversion

A linear-quadratic model was presented by Clark, Gill, Prowse, and Rush (2020) to explain the gender differences they found in an experiment about a college student who plans in advance to take practice exams in order to do better on the exam that counts, but who, when it comes time to act (work on the practice exams), shirks. The model describes how this student, when planning, can set a goal to motivate themself to exert more effort (i.e., not shirk) when it comes time to work on the practice exams. In our paper, a fundraiser sets a goal to motivate themself to exert more effort in raising funds, when it comes time to raise those funds.

The fundraiser's utility in the planning phase $u_{\text{planner}}(e) = \beta\,\delta^2\,f(e) \;-\; \beta\,\delta\;\; C(e)$ is a function of their effort e that they will exert fundraising one period in the future (the fundraising phase) at a utility cost to themself of $C(e)$, and the fundraising outcome $f(e)$ that will be realized two time-periods into the future (the donation phase): $f(e) = \theta\, e$ is linear and $C(e) = \frac{c}{2} \cdot e^2$ is quadratic. δ is the time-consistent discount factor, and $\beta \in [0, 1]$ is present bias. $\beta \to 0$ models more severe present bias.

The fundraiser-planner's optimal effort level is straightforwardly found by maximizing $u_{\text{planner}}(e)$ with respect to e: $\hat{e} = \delta\,\theta/c$. Think of $\hat{e}$ as the planner's "type": it summarizes the fundraiser's ability to raise funds θ and the marginal cost $c \cdot e$ of fundraising. It is the effort level the planner would have themself put in as the actor when the fundraising phase arrives. At that effort level, $f(\hat{e}) = \theta\,\hat{e}$ would be raised.

However, the fundraiser-actor's utility is: $u_{\text{actor}}(e) = \beta\,\delta\,[\theta\, e] \;-\; \frac{c}{2} \cdot e^2$. The actor will not choose effort $\hat{e}$, but will instead choose $e^*_{\text{Low}} = \beta\,[\delta\,\theta/c] = \beta\,\hat{e}$. Present bias results in the actor exerting less effort than the planner would have had the actor choose: $\beta\,\hat{e} < \hat{e}$.

Knowing this about themself, the planner can induce themself as actor to put in more effort than $\beta\,\hat{e}$ by setting themself a goal. This puts the actor in the position of suffering a

utility loss if they fail to meet that goal. The goal value having been set by the planner, the actor's utility $u_{\text{actor}}(e)$ becomes $\beta\,\delta\,[\theta\,e\;-\;\lambda\,\max\{g-\theta\,e,0\}]\;-\;\frac{c}{2}\cdot e^2$, where $\lambda\,\max\{g-\theta\,e,0\}$ models the loss in utility the actor suffers if they fail to meet the goal value g:, that is if $\theta\,e < g$.

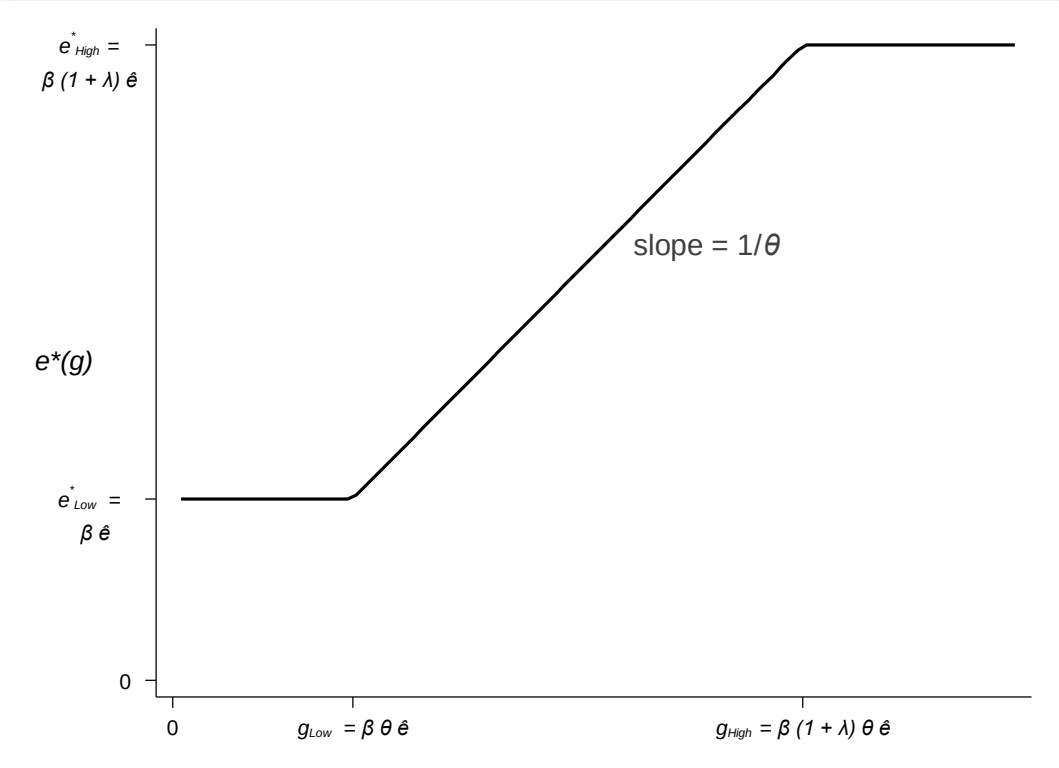
The linear-quadratic model as presented follows the presentation by Clark et al (2020). They prove:

Proposition 1. In the linear-quadratic model, with linear loss aversion, the actor's optimal effort-reaction to the goal value g is monotonically increasing in g, with lower bound $\beta\,\hat{e}$ and upper bound $\beta\,(1+\lambda)\,\hat{e}$.

The effort-reaction function is illustrated in Figure B1.1:

(Figure B1.1 on the next page)

Figure B1.1. Actor's optimal effort reaction to goal values set by the planner.

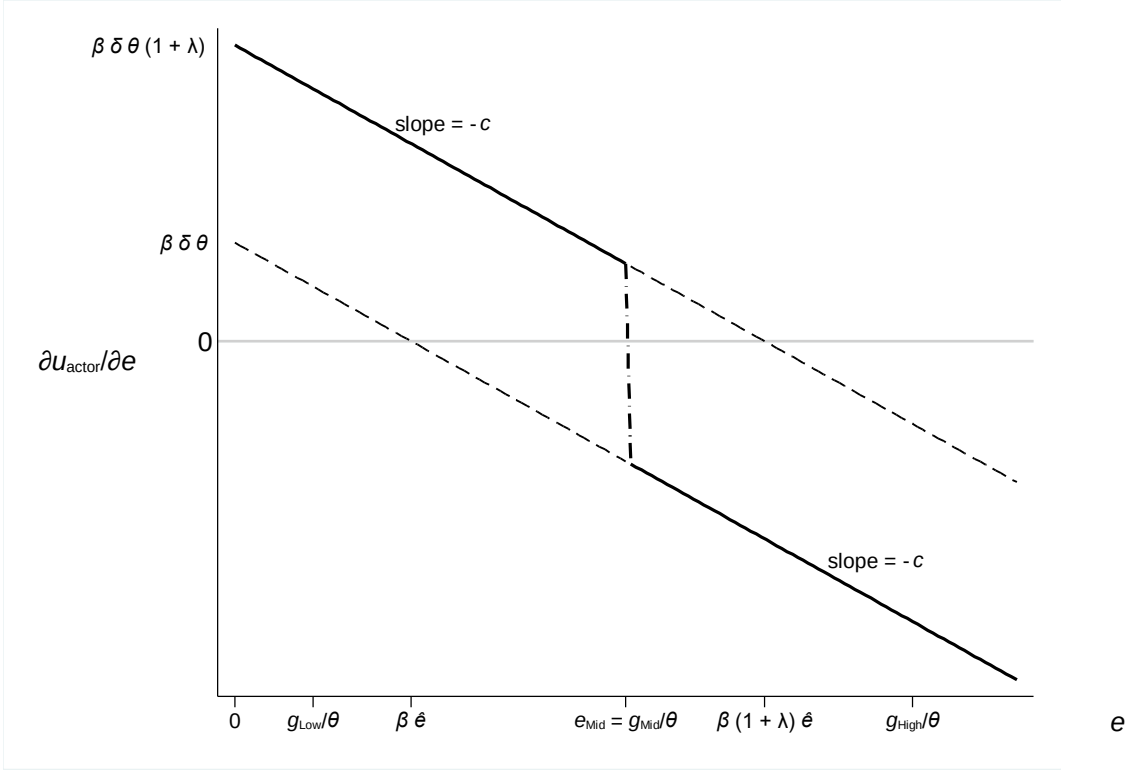


The proof by Clark et al is algebraic. The proof below is graphical. The actor's marginal utility is:

$$\frac{\partial u_{actor}(e\,|g)}{\partial e} = \begin{cases} \beta\ \delta\ \theta\ (1 + \lambda)\ -\ c\ e & \text{if } e < g/\theta \quad \text{(goal not met)} \\ \beta\ \delta\ \theta\ -\ c\ e & \text{if } e \geq g/\theta \quad \text{(goal met).} \end{cases} \qquad \text{(B.1)}$$

The aversion to loss in the presence of a goal induces a discrete increase in the marginal utility of effort, when effort is less than what is necessary to meet the goal. The discrete increase is proportional to λ. However, that increase vanishes as soon as effort meets the goal: Figure B1.2 below shows the discrete increase starting on the y-axis, and then vanishing at the effort level $e_{\text{Mid}} = g_{\text{Mid}}/\theta$, where in the figure the planner has set the goal value equal to g_{Mid}. The figure is drawn to illustrate a situation in which $\beta\ \hat{e}$ is less than the effort necessary to meet g_{Mid}, and the effort necessary to meet g_{Mid} is less than $\beta\ (1 + \lambda)\ \hat{e}$.

Figure B1.2. Actor's marginal utility after a goal value equal to g_{Mid} has been set by the planner.



The goal value having been set by the planner at g_{Mid}, the actor's optimal response would be to exert effort $e^* = e_{\text{Mid}}$, because if they exerted less effort $\partial u_{actor}/\partial e > 0$ and if they exerted more effort $\partial u_{actor}/\partial e < 0$.

However, if the planner sets a goal value at $g_{\text{Low}} < \beta\,\theta\,\hat{e}$, then the discrete increase in marginal utility vanishes at that point (at an effort level to the left of $\beta\,\hat{e}$; the vertical dotted-line would be re-drawn where the x-axis = g_{Low}/θ) implying that $\partial u_{actor}(e|g_{\text{Low}})/\partial e = \beta\,\delta\,\theta - c\,e = 0$ at $e^*(g_{\text{Low}}) = \beta\,\hat{e}$; this is the lower bound to the actor's effort-response.

Furthermore, if the planner sets a goal value at $g_{\text{High}} > \beta\,\theta\,(1 + \lambda)\,\hat{e}$, then the discrete increase in marginal utility vanishes at that point (at an effort level to the right of $\beta\,(1 + \lambda)\,\hat{e}$; the vertical dotted-line would be re-drawn where the x-axis = g_{High}/θ) implying that $\partial u_{actor}(e|g_{\text{High}})/\partial e = \beta\,\delta\,\theta\,(1 + \lambda) - c\,e = 0$ at $e^*(g_{\text{High}}) = \beta\,(1 + \lambda)\,\hat{e}$; this is the upper bound to the actor's effort-response.

Accordingly, the optimal reaction response of the actor to a goal value set by the planner is the $e^*(g)$ shown in Figure B1.1.

■

Proposition 2.1 In the linear-quadratic model, with linear loss aversion:

(a) If loss aversion λ is small, so that modified present bias $\beta\,(1 + \lambda) < 1$, then the planner will set a goal value $g^* = \beta\,(1 + \lambda)\,\theta\,\hat{e}$. In this case, the present bias problem is mitigated, but not completely undone.

(b) If loss aversion λ is larger, so that modified present bias $\beta\,(1 + \lambda) \geq 1$, then the planner will set a goal value $g^* = \theta\,\hat{e}$, and in so-doing completely undo the present bias problem.

Again, the original proof is in Clark et al (2020). Plug the reaction function from Figure B1.1 into the planner's utility:

$$u_{\text{planner}}(g \mid e^*(g)) = \beta\,\delta\,\Big[\,\delta\,[\theta\;\; e^*(g)\;\; - \lambda \max\{g - \theta\, e^*(g),\, 0\}]\;\; - \;\frac{c}{2}\;\cdot [e^*(g)]^2\;\Big]$$

(B.2)

Start with Part (b): consider the planner setting a goal value g_{Mid} such that $g_{\text{Mid}} \in [\beta\,\theta\,\hat{e}\,,\,\beta\,(1 + \lambda)\,\theta\,\hat{e}]$. According to Figure B1.1 reaction function, the actor will respond with effort $e^*(g_{\text{Mid}}) = g_{\text{Mid}}/\theta$ and meet the goal. Plug that into (B.2), and then maximize with respect to the goal value g_{Mid}. The planner's optimal goal value is then $g^*_{\text{Mid}} = \theta\,\hat{e}$. If that goal value $\theta\,\hat{e}$ is inside the interval $[\beta\,\theta\,\hat{e}\,,\,\beta\,(1 + \lambda)\,\theta\,\hat{e}]$ with which we started, the argument in this paragraph is internally consistent. The condition is $\theta\,\hat{e} \in [\beta\,\theta\,\hat{e}\,,\,\beta\,(1 + \lambda)\,\theta\,\hat{e}]$ iff $\beta\,(1 + \lambda) \geq 1$. This proves part (b). Note that the actor's effort to meet g^*_{Mid} is $\hat{e}$, the effort than the planner would have had the actor choose in the first place: the present bias problem has been completely undone.

Although the planner would always prefer the actor exert effort $\hat{e}$, if $\beta\,(1+\lambda) < 1$ then the planner knows that the actor's effort will hit the upper bound $\beta\,(1+\lambda)\,\hat{e}$ in Figure B1.1. The best the planner can do is $g^*_{\text{High}} = \beta\,(1+\lambda)\,\theta\,\hat{e}$. If the planner attempts to set a goal value $g > g^*_{\text{High}}$ the actor will not exert additional effort (because in that region of the reaction function $\partial e^*(g)/\partial g = 0$), and the loss aversion will reduce utility by $-\beta\,\delta^2\,\lambda\,\{g - \beta\,(1+\lambda)\,\theta\,\hat{e}\}$. Note that this loss is increasingly negative in the magnitude of the goal value that exceeds the upper bound, so $g^*_{\text{High}} = \beta\,(1+\lambda)\,\theta\,\hat{e}$, right at the upper bound, is optimal from the planner's perspective. This proves part (a). Note that at $g^*_{\text{High}} = \beta\,(1+\lambda)\,\theta\,\hat{e}$, the present bias problem is mitigated because $\beta\,(1+\lambda) > \beta$, but not completely undone (because $\beta\,(1+\lambda) < 1$). ∎

There are two implications of the linear-quadratic model as presented to this point that turn out to be incompatible with the evidence observed in the fundraising experiment. This incompatibility can be resolved by introducing (less than infinitely precise) beliefs about the roles of effort versus luck in determining the fundraising outcome. First we explain the two implications in the form of two remarks. Then we introduce imprecise beliefs (Section B.2). Then as we investigate heterogeneity (Section B.3) it will become clear why the following two remarks are incompatible with the fundraising evidence.

Remark 1. *The goal value set is monotonically increasing (weakly) in the magnitude of loss aversion* λ.

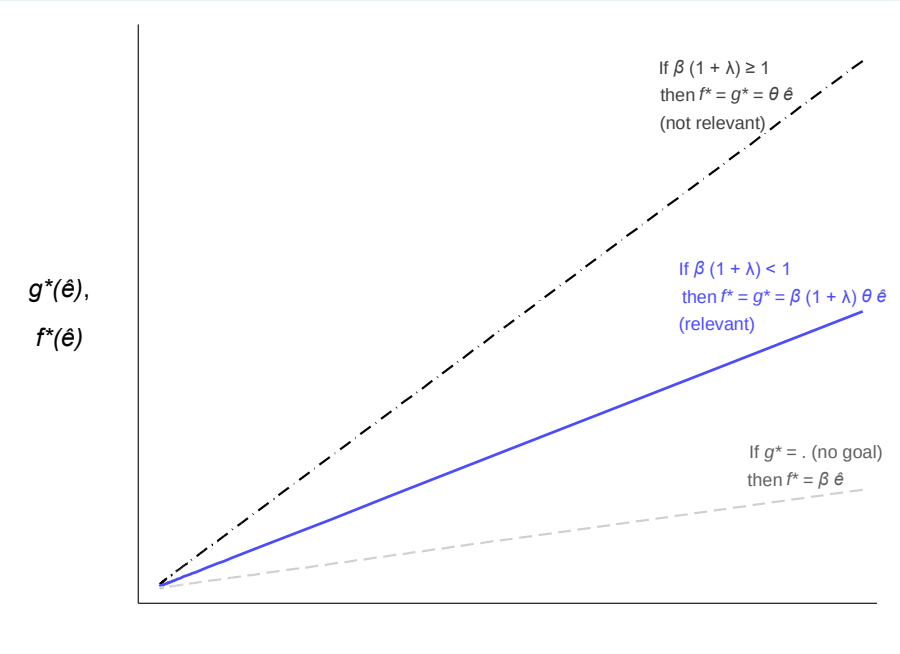
To see this, note that Proposition 2.1 implies that the goal value set by the planner is monotonically increasing in their type $\hat{e}$: people with higher fundraising ability θ, and/or a lower cost of fundraising c, set higher goal values. This is true regardless of the magnitude of loss aversion λ, as illustrated in Figure B.2 below. Panel A describes a low magnitude of loss aversion such that $\beta\,(1 + \lambda) < 1$, and Panel B describes high magnitude loss aversion such that $\beta\,(1 + \lambda) \geq 1$.

In Panel A the blue solid line is relevant: it illustrates the optimal goal value set by the planner as a function of their type. According to Propositions 1 and 2, this is also the outcome level $f^*(\hat{e})$ achieved by the actor. The grey dashed line below that is the outcome level achieved by the actor if the planner does not set a goal. The black dashed line that is northern most is the outcome level the planner would have the actor achieve if there was no present bias. That the relevant blue line is above the grey line, but below the black line, again illustrates that at a low magnitude of loss aversion, the planner can set a goal value that increases outcome above what it would be with no goal, but cannot completely undo their present bias problem.

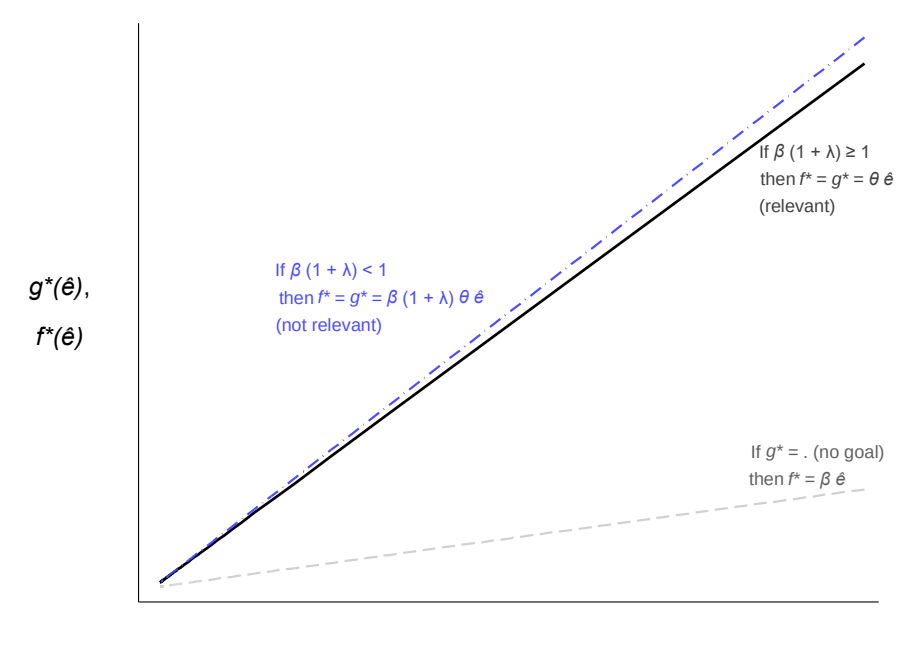
(next page)

Figure B.2. Goal values set by the planner are monotonic in type $\hat{e}$ and loss aversion λ.

Panel A. Low magnitude of loss aversion such that $\beta\,(1 + \lambda) < 1$.



Panel B. High magnitude loss aversion such that $\beta\,(1 + \lambda) \geq 1$.



In Panel B the black line is relevant: the planner can set a goal value that completely undoes their present bias problem. The blue dashed line to the north is the upper bound to the

actor's effort reaction at each value of $\hat{e}$, but it is not relevant because it is everywhere greater than the outcome level the planner would have the actor achieve if there was no present bias.

At the smallest magnitude of loss aversion, $\lambda = 0$, Panel A indicates that the blue solid line and the grey dashed line will be co-linear. As loss aversion in Panel A is increased the blue line rotates counter-clockwise, indicating that higher goal values will be set at each type $\hat{e}$. When loss aversion reaches $\lambda = (1 - \beta)/\beta$, the blue line will be co-linear with the black dashed line. Further increases in λ after that lead to the situation described in Panel B: increases in loss aversion in the range $\lambda > (1 - \beta)/\beta$ do not result in higher goal values being set.

Remark 2. *All planners set goals. Also, all planners would be indifferent between setting a goal at values less than* $g^*_{\text{Low}} = \beta\, \theta\, \hat{e}$, *and not setting a goal at all.*

As long as loss aversion is non-zero ($\lambda > 0$) the planner sets a goal. This follows immediately from Proposition 2.1, and is clear from Figure B.2.

To see the planner's indifference between very low goals and no goals, consider a planner who contemplates setting a goal at value $g_{\text{VeryLow}} < \beta\, \theta\, \hat{e}$, a goal value the actor could meet by exerting less effort than they would have if no goal had been set. According to Figure B1.1, the actor's effort reaction would be at the lower-bound $e^*(g_{\text{Low}}) = \beta\, \hat{e}$, the corresponding fundraising outcome would be $f(e^*(g_{\text{Low}})) = \beta\, \theta\, \hat{e}$, and the very low goal would be surpassed ($f(e^*(g_{\text{Low}})) > g_{\text{VeryLow}}$). Because any goal value set at $g_{\text{VeryLow}} < \beta\, \theta\, \hat{e}$ will be surpassed by the actor, the planner is indifferent between setting a goal at that very low value or not setting a goal at all.

B.2. Beliefs about the relative roles of effort and luck in determining outcomes

There are two dimensions to beliefs: confidence in ability and precision/optimism about luck. We focus on precision/optimism. If the fundraiser-planner believes that exerting

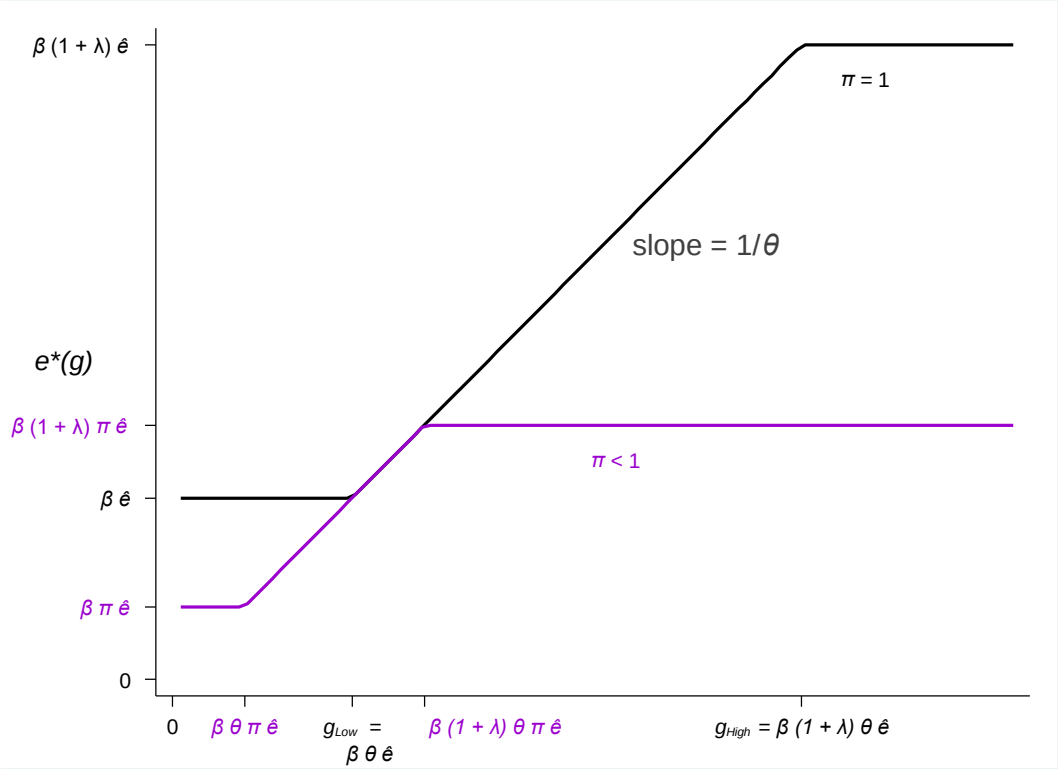
effort e will result in funds $f(e) = \theta\, e$ being raised with zero doubt about that outcome we say that the fundraiser has infinitely precise beliefs about the effort–outcome relationship; equivalently, we say the fundraiser is infinitely optimistic. We follow Clark et al (2020), by modelling less-than-infinitely optimistic beliefs as: $f(e) = \theta\, e$ occurring with probability π, but $f(e) = 0$ with probability $1 - \pi$.

The parameter π models how optimistic the fundraiser is: the strength of their belief that effort, relative to luck, determines outcomes. The fundraiser-planner then expects the outcome to be $\mathrm{E}[f(e)] = \theta\, \pi\, e$. Because utility is linear in the outcome via the linearity of $f(e)$—$u_{\text{planner}}(e) = \beta\, \delta^2\, f(e) \; - \; \beta\, \delta \;\; C(e)$—expected utility is obtained by replacing "θ" with "$\theta\, \pi$": $\pi < 1$ acts to reduce the planner's expectation of their ability to raise funds.[19]

The proof of Proposition 1 (that the actor's optimal effort-reaction is monotonically increasing in g) follows as before: just replace "$\beta\, \delta\, \theta$" with "$\beta\, \delta\, \theta\, \pi$" in equation (B.1) and multiply the four intercepts in Figure B1.2 by π; and similarly multiply the coordinates of the two knots in Figure B1.1 by π, as done in Figure B.3. Figure B.3 illustrates the actor's reaction function for $\pi < 1$. The reaction function under belief that effort <u>alone</u> determines outcomes ($\pi = 1$; infinitely optimistic beliefs) from Figure B1.1 is repeated.

[19] $\pi < 1$ also reduces the precision the fundraiser has about their confidence in ability. As discussed in the main text (footnote 5) Moore and Healy (2008) distinguish between over (or under) confident beliefs in one's ability (which Moore and Healy call "estimation"), from what they call the "precision" (i.e., the reciprocal of variance) one has about that over (or under) confidence (what Alan and Ertac (2019) call "optimism"). Clark et al model the first kind of beliefs, overconfidence, as a situation where the fundraiser sets a goal believing that $f(e) = \theta\, e$, whereas in reality the effort–outcome relationship is $f(e) = h \bullet \theta\, e$, with $h \in (0,\ 1)$. They model the second kind of beliefs as $f(e) = \theta\, e$ occurring with probability π and $f(e) = 0$ with probability $1 - \pi$, and call this "performance uncertainty." There are two differences between overconfidence in ability (h) and precision of beliefs (π). First, when setting a goal value, the fundraiser-planner does not take h into account (hence the overconfidence in ability), but does take π into account (hence the fundraiser-planner recognizes that they "might also get unlucky"; Clark et al, p. 659). Second, the mechanics of the comparative statics of h are no different than the mechanics of the comparative statics of θ, because changes in h (or θ) are changes in what actually is (or what the fundraiser believes is) the deterministic return to fundraising in the sense that changes in h (or θ) involve no change in what the fundraiser believes is the variance of outcomes. Changes in π change what the fundraiser believes is the variance of outcomes; in other words, changes in precision/optimism.

Figure B.3. Actor's optimal effort reaction to goal values set by the planner, when outcomes are believed to be subject to luck.



Belief that luck plays a larger role, compared to effort, in determining fundraising outcomes—smaller π—(weakly) reduces the actor's effort at each goal value g set by the planner because, despite exerting effort to fundraise, there is a $1 - \pi$ chance of a zero outcome.[20] Otherwise, the actor's optimal effort-reaction to the goal value is qualitatively similar to what it was under belief that effort alone determines outcomes: monotonically increasing in g, with a lower bound, now at $\beta\, \pi\, \hat{e}$, and an upper bound now at $\beta\, (1 + \lambda)\, \pi\, \hat{e}$.

The planner recognizes that belief in some role for luck will cause the actor to exert less effort. Accordingly the planner will set a lower goal value. However, there is a more important qualitative difference in the planner's goal-setting behaviour: the planner

[20] The "weakly" qualification is because there is a range of goal values ($\beta\, \theta\, \hat{e} \leq g \leq \beta\, (1 + \lambda)\, \theta\, \pi\, \hat{e}$) that would induce the same effort that the actor would have exerted under beliefs that effort alone determines outcomes ($\pi = 1$). For goal values in this range, reducing effort would cause expected marginal utility to become positive, and increasing effort would cause it to become negative. This range of goal values exists iff $(1 + \lambda)\, \pi \geq 1$.

recognizes that despite exerting effort, any goal that is set might not be met, if they are unlucky. This is a second consideration that will lead the planner to set a lower goal value. Here is the modification to Proposition 2.1 required by belief in some role for luck:

Proposition 2.2 In the linear-quadratic model, with linear loss aversion, and beliefs that the outcome will be $f(e) = \theta\, e$ with probability π and $f(e) = 0$ with probability $1 - \pi$:

(a) If loss aversion is small, $\lambda \in (0, \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}]$, then the planner will set a goal value $g^* = \beta\,(1 + \lambda)\,\theta\,\pi\,\hat{e}$. In this case, the present bias problem is mitigated, but not completely undone.

(b) If loss aversion is larger, $\lambda \geq \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}$, then the planner will set a goal value $g^* = \theta\,[\pi - (1 - \pi)\,\lambda]\,\hat{e}$. If $\pi < 1$, the present bias problem can be mitigated, but still not completely undone.

Plug the reaction function from Figure B.3 into the planner's utility:

$$E[u_{\text{planner}}(g \mid e^*(g))] = \beta\,\delta\,\big[\,\delta\,[\pi\,\theta\;\, e^*(g) + (1-\pi)\cdot 0 - \pi\,\lambda\,\max\{g - \theta\, e^*(g), 0\} \\ - (1-\pi)\,\lambda\,\max\{g - 0, 0\}] \;-\; \frac{c}{2}\cdot[e^*(g)]^2\,\big] \qquad \text{(B.3)}$$

where $[e^*(g)]$ is the actor's modified-by-π reaction function.[21]

Start with Part (b): consider the planner setting a goal value g_{Mid} such that $g_{\text{Mid}} < \beta\,(1 + \lambda)\,\theta\,\pi\,\hat{e}$. According to the modified-by-π reaction function, the actor will respond with effort $e^*(g_{\text{Mid}}) = g_{\text{Mid}}/\theta$ and meet the goal. Plug that into (B.3), and then maximize with respect to the goal value g_{Mid}:

[21] In the model without goal-setting (remove the loss aversion piece of utility from equation B.3) the planner's optimal effort level is $\pi\,\delta\,\theta/c = \pi\,\hat{e}$.

$$\frac{\partial \mathrm{E}[u_{planner}|e^*(g_{\mathrm{Mid}})]}{\partial g_{\mathrm{Mid}}} \quad = \quad \beta\,\delta\,\big[\,\delta\,[\pi - (1-\pi)\,\lambda] \;-\; c \cdot g_{\mathrm{Mid}}\,\frac{1}{\theta^2}\,\big]$$

(B.4)

The planner's optimal goal value is then $g^*_{\mathrm{Mid}} = \theta\,[\pi - (1-\pi)\,\lambda]\,\hat{e}$. If that goal value is such that $g^*_{\mathrm{Mid}} < \beta\,(1+\lambda)\,\theta\,\pi\,\hat{e}$, the inequality with which we started, the argument in this paragraph is internally consistent. That will be true iff $\lambda > \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}$, proving part (b).

Note that the actor's effort to meet g^*_{Mid} is $[\pi - (1-\pi)\,\lambda]\,\hat{e}$. This is <u>less</u> effort than the planner would have had the actor choose—that effort is $\pi\,\hat{e}$ (see footnote 3)—the effort to reach g^*_{Mid} is less by the term $-(1-\pi)\,\lambda\,\hat{e}$, which is strictly negative if $\pi < 1$. The term $-(1-\pi)\,\lambda$ arises in (B.4) because there is a $1-\pi$ chance that any goal value set will not be met, and that causes a loss in utility that is proportional to how high the goal value had been set. To mitigate this potential utility loss, the planner sets a lower goal value. That lower goal value mitigates, but cannot completely undo, the present bias problem.

The proof of part (a) is similar to that in Proposition 2.1. Trying to push the actor to exert effort above the upper bound at $\beta\,(1+\lambda)\,\pi\,\hat{e}$ by setting a goal value $g > \beta\,(1+\lambda)\,\theta\,\pi\,\hat{e}$ is pointless, because the actor will not exert effort above the upper bound, the outcome will fall short of the "too high" goal, and utility will be reduced because of the loss aversion (utility will be reduced even if the actor has good luck and the outcome is determined by effort). The utility loss is increasingly negative in the magnitude of the goal value that exceeds the upper bound, so $g^*_{\mathrm{High}} = \beta\,(1+\lambda)\,\theta\,\pi\,\hat{e}$, right at the upper bound, is optimal from the planner's perspective. The present bias problem is mitigated because effort at the upper bound $\beta\,(1+\lambda)\,\pi\;\hat{e}$ is greater than effort in the absence of a goal ($\beta\,\pi\,\hat{e}$), as long as $\lambda > 0$.

But the present bias problem is not completely undone because $\beta\,(1+\lambda) < 1$. We know this condition holds because λ is small: the range of loss aversion in part (a) is $\lambda \leq (1 -$

β) π /[(1 − π) + β π]. Over this range of λ: β (1 + λ) < β/[(1 − π) + β π] and the right-hand side is less than 1 (as long as β < 1).

∎

Remark. In the model with imprecise beliefs there is a weaker sense in which a planner with large enough loss aversion can set a goal that completely undoes the present bias problem.

In the model with belief that effort alone determines outcomes (π = 1), Proposition 2.1(b) indicates that a planner with large enough loss aversion, $\lambda \geq$ (1 − β)/β, would set a goal value $g^* = \theta \hat{e}$, and in so-doing completely undo the present bias problem in the sense that, with that goal value having been set, the actor would exert the effort level the planner would have wanted in the first place ($\hat{e}$). In the model with belief that effort alone determines outcomes, there is also a second, weaker sense in which the present bias problem had been "completely undone": the goal value $g^* = \theta \hat{e}$ itself, as well as the actor's subsequent effort level, does not depend on the magnitude of present bias. Similarly, in the model with belief in some role for luck, Proposition 2.2(b) indicates that a planner with large enough loss aversion, $\lambda \geq \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}$ would completely undo the present bias problem in this second weaker sense: the goal value $g^* = \theta [\pi - (1 - \pi) \lambda] \hat{e}$, and the actor's subsequent effort level, do not depend upon β.

B.3. Heterogeneity in goal-setting behaviour

The linear-quadratic model with imprecise beliefs has empirically relevant implications about heterogeneity in goal-setting behaviour. We begin with an implication about when goals will not be set:

Proposition 3. In the linear-quadratic model with linear loss aversion, and beliefs that the outcome will be $f(e) = \theta e$ with probability π and $f(e) = 0$ with probability $1 - \pi$, if loss aversion is very large, $\lambda \geq \frac{(1-\beta)\pi}{(1-\pi)}$, then the planner will not set a goal.

Recall from the proof of Proposition 2.2 part (b) that the planner will set a lower goal value because they recognize that the actor will exert less effort, but also because they want to mitigate the potential utility loss should they be unlucky and experience $f(e) = 0$ despite having exerted effort. Mitigating the potential utility loss is in proportion to the strength of loss aversion: the higher is λ, the lower is g^*_{Mid}. When the magnitude of loss aversion rises to $\lambda = (1 - \beta)\,\pi / (1 - \pi)$: $g^*_{\text{Mid}} = \beta\,\theta\,\pi\,\hat{e}$, and the effort necessary to reach that goal value is the same effort the actor would exert ($\beta\,\pi\,\hat{e}$) in the absence of goal-setting (see e^*_{Low} in footnote 2). At this magnitude of loss aversion the planner would get no additional effort from the actor by setting a goal value at $g^*_{\text{Mid}} = \beta\,\theta\,\pi\,\hat{e}$. If there is no additional effort to be gained there is only downside risk to setting a goal: the only result from setting a goal would be to set themself up for lower utility should they be unlucky and experience $f(e) = 0$. Therefore, the planner would not set goal. This argument holds for all $\lambda > \frac{(1-\beta)\pi}{(1-\pi)}$, because a planner who contemplates setting a goal at value $g_{\text{VeryLow}} < \beta\,\theta\,\pi\,\hat{e}$, realizes that the actor will respond with effort at the lower bound $\beta\,\pi\,\hat{e}$. With that effort response from the actor, the outcome will surpass g_{VeryLow}, unless they are unlucky (i.e., $f(e) = 0$), in which case it would have been better for the planner to have not set a goal. ∎

There are also several corollaries:

Corollary 3.1. $\frac{(1-\beta)\pi}{(1-\pi)}$ is also the upper bound to the range of loss aversion parameters over which Proposition 2.2 part (b) is applicable: $\lambda \in [\frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}, \frac{(1-\beta)\pi}{(1-\pi)})$.

Corollary 3.2. Holding β constant, and the distribution of λ across planners constant, the fraction of planners not setting goals increases as optimism decreases, that is as the belief increases that luck is a relatively more important determinant of outcomes (as $\pi \to 0$).

Corollary 3.3. Holding beliefs constant, and the distribution of λ across planners constant, the fraction of planners not setting goals is increasing as present bias becomes less severe (i.e., as $\beta \to 1$).

The empirical relevance of Proposition 3 and its corollaries is that they imply there will always be a non-negligible fraction of planners for whom it is optimal to not set a goal, even though the planners know they have present bias. This is because a planner is no longer indifferent between setting a very low goal and not setting a goal at all (recall Section B.2, Remark 2).[22]

The second implication of goal-setting in the presence of imprecise beliefs is that it links heterogeneity in loss aversion to goal-setting behaviour—the fraction of people who set goals and the magnitudes of goal values chosen by people who do set goals:

Proposition 4. In the linear-quadratic model with linear loss aversion, and beliefs that the outcome will be $f(e) = \theta\, e$ with probability π and $f(e) = 0$ with probability $1 - \pi$, goal values are non-monotonic in the magnitude of loss aversion. Specifically, goal values are:

(a) increasing in λ, for $\lambda \in \left(0, \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}\right]$,

(b) decreasing in λ, for $\lambda \in \left[\frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}, \frac{(1-\beta)\pi}{(1-\pi)}\right)$, and

(c) missing—i.e., goals are no longer being set—for all $\lambda \geq \frac{(1-\beta)\pi}{(1-\pi)}$.

The proof follows directly from Propositions 2 and 3. ∎

[22] Because Clark et al's (2020) experimental setting did not permit observing who did or did not set goals in the control group, a theoretical investigation of "non-goal setting" was not important to their work. However, they hypothesized in a footnote in their Supplementary Web Appendix that "when a student faces a lot of uncertainty [imprecise beliefs] . . . the student-planner could prefer not to set a goal at all" (the words in square brackets added by us). In fact, Proposition 3 shows that at any level of imprecise beliefs there is a threshold level of loss aversion above which the planner will prefer to not set a goal.

The proposition is illustrated in Figure B.4. The figure shows the range of goal values that would be set by planners with different magnitudes of loss aversion, holding constant β, θ, c, and π. To investigate heterogeneity imagine the probability density function of λ (among fundraisers) superimposed on Figure B.4. Let L(λ) represent the cumulative distribution function of λ. With this notation, the fraction of people who would set goals is L(λ_{No}), where $\lambda_{No} \triangleq \frac{(1-\beta)\pi}{(1-\pi)}$. The fraction of people who would not set goals is of course 1 − L(λ_{No}). The maximum goal value that would be set would be by people whose loss aversion is $\lambda = \lambda_{Max} \triangleq \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}$. At λ_{Max} the actor's effort would at the upper bound $\beta\,\pi\,\hat{e}$ /[(1 − π) + $\beta\,\pi$].

Figure B.4. Goal values are non-monotonic in λ, under belief that there is some role for luck in determining outcomes ($\pi < 1$).

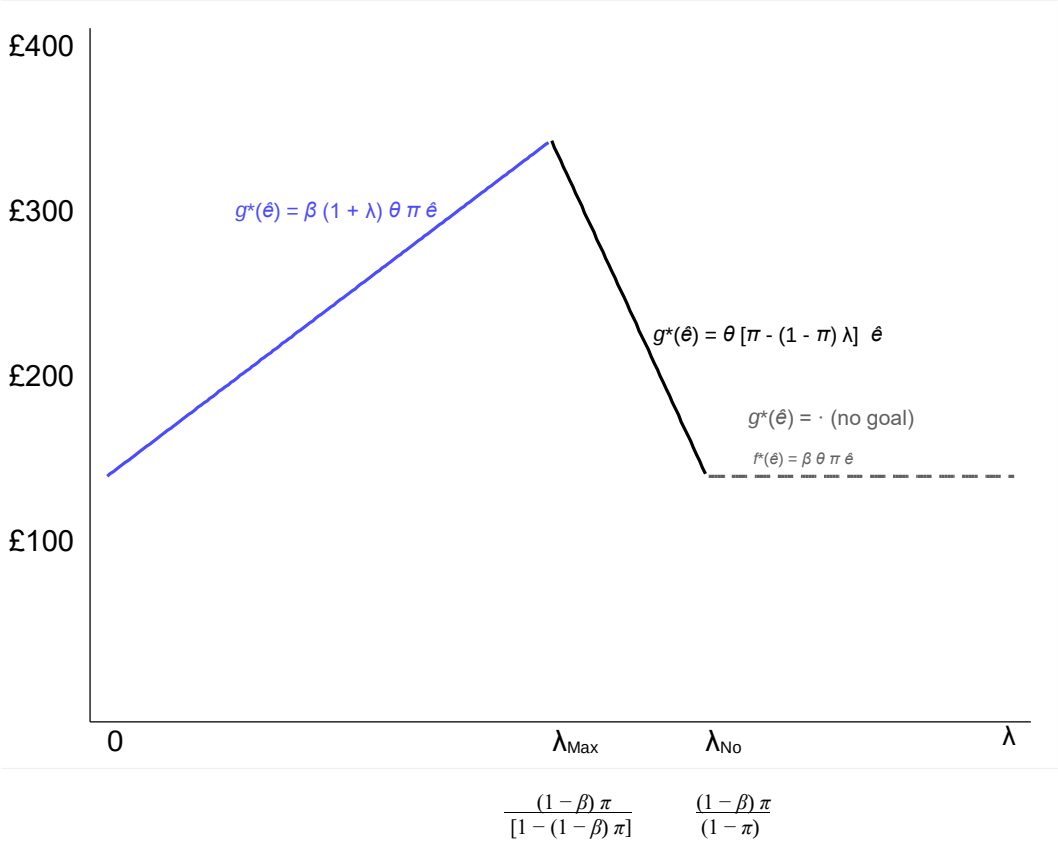


Figure B.4 facilitates the investigation of heterogeneity, beliefs, and goal-setting behaviour. We begin with present bias:

Proposition 5. In the linear-quadratic model with linear loss aversion and belief that there is some role for luck in determining outcomes ($\pi < 1$), people with less severe **present bias**:

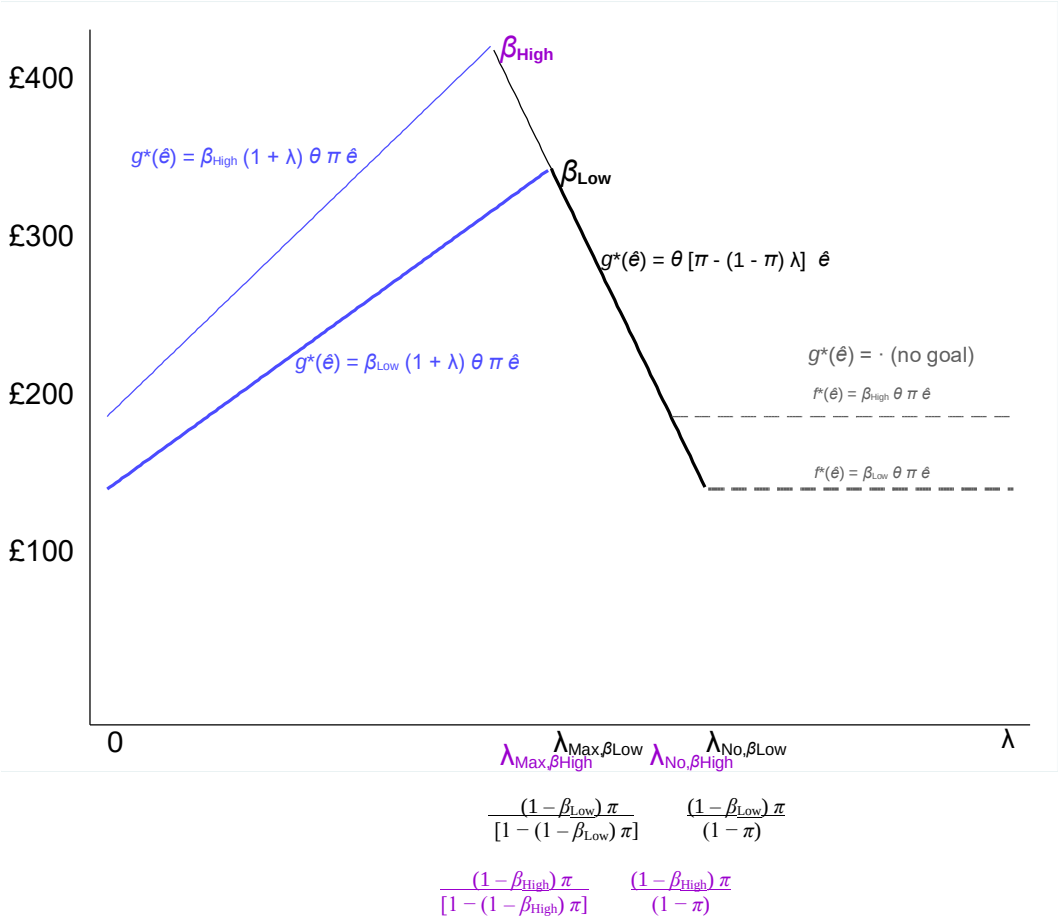
(a) are less likely to set a goal, but

(b) when they do set a goal:
(i) those with weak loss aversion set higher goal values (than people with the same loss aversion but more severe present bias), and
(ii) those with strong loss aversion set equal goal values (to people with the same loss aversion but more severe present bias).

The proof of part (a) is straightforward: as $\beta \to 1$, $\lambda_{No} \to 0$, which in turn implies that, holding the distribution of loss aversion L(•) constant, the fraction of people who set goals

L(λ_{No}) gets smaller. Figure B.5 illustrates. To prove part (b) note that the y-intercept ($\beta\ \theta\ \pi\ \hat{e}$) for the β_{High} graph is necessarily higher than for the β_{Low} graph. The implication is that $g^*_{High}(\lambda) = \beta_{High}\ (1 + \lambda)\ \theta\ \pi\ \hat{e}$ lies above $g^*_{Low}(\lambda) = \beta_{Low}\ (1 + \lambda)\ \theta\ \pi\ \hat{e}$ (despite the steeper slope of $g^*_{High}(\lambda)$). In addition, the people with loss aversion in the range $\lambda \in [\lambda_{Max,\ \beta_{High}}, \lambda_{Max,\ \beta_{Low}}]$ set higher goal values than do their β_{Low}-counterparts. Hence β_{High}-people with loss aversion in the range $\lambda \in (0, \lambda_{Max,\ \beta_{Low}}]$ set higher goal values than do their β_{Low}-counterparts. β_{High}-people with loss aversion in the range $\lambda \in [\lambda_{Max,\ \beta_{Low}}, \lambda_{No,\ \beta_{High}}]$ set goal values equal to their β_{Low}-counterparts. ∎

Figure B.5. Goal values as functions of λ: Heterogeneity in present bias, $\beta_{Low} < \beta_{High}$.



Heterogeneity in **effort cost, ability, and confidence in ability** is straightforward:

Proposition 6. In the linear-quadratic model with linear loss aversion and belief that there is some role for luck in determining outcomes ($\pi < 1$):

(a) the decision to set a goal is not affected by **effort cost**, but

(b) among people who do set goals, those with smaller effort cost set higher goal values.

The proof is trivial. For part (b): smaller c implies larger $\hat{e}$, and the graph in Figure B.4 shifts vertically up. λ_{Max} and λ_{No} are not affected, proving part (a). ∎

Remark. Lower effort cost implies that the planner would want the actor to exert a higher effort level, even in the absence of present bias.

Corollary 6.1. The same result holds for a higher fundraising ability θ. Compare two people who have different fundraising ability: $\theta_{High} > \theta_{Low}$. The two people will be equally likely to set a goal (recall λ_{No} is not affected by θ), but the θ_{High} person will set a higher goal value.

Corollary 6.2. A person **overconfident in their ability** sets higher goal values. Consider two people with the same actual fundraising ability, but one person is overconfident in their ability ($h_{over} < 1$), while the other person has accurate self-confidence ($h_{accurate} = 1$). Having the same actual fundraising ability means the actual abilities are $h_{over} \bullet \theta_{over} = \theta_{accurate}$, which in turn implies that beliefs about ability are different: $\theta_{over} > \theta_{accurate}$. Goal-setting is based on beliefs about ability. Therefore Corollary 6.2 implies that the two people are equally likely to set a goal, but the overconfident person will set a higher goal value.

Finally, we consider **imprecise beliefs**:

Proposition 7. In the linear-quadratic model with linear loss aversion, people with more optimistic beliefs that luck plays a relatively smaller role in determining outcomes:

(a) are more likely to set a goal, and

(b) among those who do set goals, people set higher goal values.

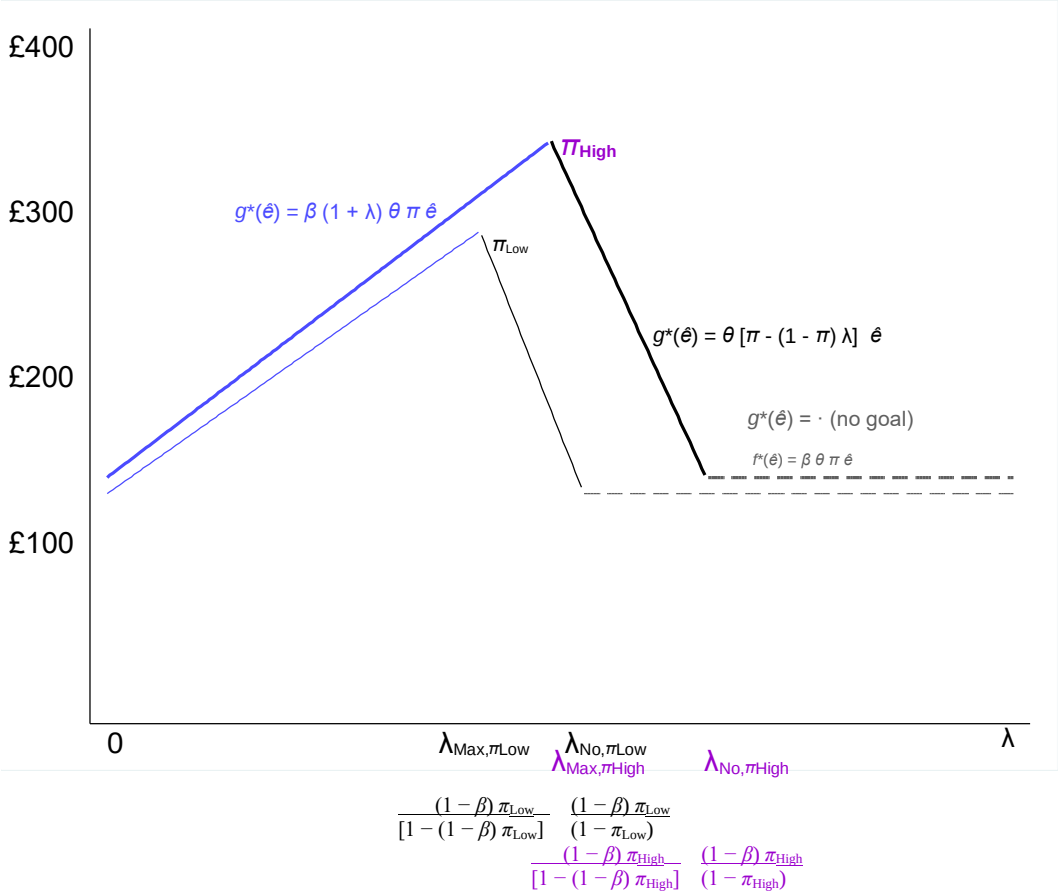
The proof of part (a) is again straightforward: as $\pi \rightarrow 0$, $\lambda_{Max} \rightarrow 0$, which in turn implies that the fraction of people who do not set goals gets larger, as Figure B.6 illustrates.

The proof of part (b) again begins by noticing that the y-intercept for the π_{Low} graph is necessarily lower than for the π_{High} graph. And the slope of the $g^*_{Low} = \beta (1 + \lambda) \theta \pi_{Low} \hat{e}$ portion of the graph is less steep (than the corresponding slope of the g^*_{High} graph), and the

downward slope of the $g^*_{Low} = \theta\,[\pi_{Low} - (1 - \pi_{Low})\,\lambda]$ is steeper. (Note that $\lambda_{Max,\,\pi_{Low}} < \lambda_{Max,\,\pi_{High}}$). Hence, among the π_{Low}-people who set goals (i.e., those with $\lambda < \lambda_{No,\,\pi_{Low}}$), the goal values set are lower than their π_{High}-counterparts.

∎

Figure B.6. Goal values as functions of λ: Precision of beliefs such that $\pi_{Low} < \pi_{High}$.



There is a corollary to Proposition 7:

Corollary 7.1. If people update beliefs to become less optimistic—that is, to think that luck is more important in determining outcomes ($\pi \downarrow$)—people with weak loss aversion make smaller downward revisions to goals.

For people with weak loss aversion $\lambda \in (0, \frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}]$, the downward revision in goal is according to $\partial g^* / \partial \pi = \beta (1 + \lambda)$ $(\theta \hat{e})$. For people with higher loss aversion $\lambda \in \left[\frac{(1-\beta)\pi}{(1-\pi)+\beta\pi}, \frac{(1-\beta)\pi}{(1-\pi)}\right)$, the downward revision is $\partial g^* / \partial \pi = (1 + \lambda)$ $(\theta \hat{e})$. With $\beta < 1$, it follows that $\partial g^* / \partial \pi_{|\lambda \text{ weak}} < \partial g^* / \partial \pi_{|\lambda \text{ strong}}$. The intuition is that if beliefs are updated to put more weight on luck, people with strong loss aversion face larger utility costs if they miss their goal—a possibility they now think is more likely—so they make a larger downward revision in their goal value. People with weak loss aversion would face smaller utility costs, and therefore make smaller revisions to their goal values.

B.4. Explaining gender differences in goal-setting behaviour

Propositions 5-7 establish how heterogeneity in preference parameters (present bias, loss aversion) and heterogeneity in beliefs (overconfidence, imprecision) are linked to differences in goal-setting behaviour. In this section we use these propositions to explain how heterogeneity in preferences and beleifs can, and cannot, explain the evidence of gender differences in goal-setting observed in the fundraising experiment (Findings 1A and B).

Proposition 5 implies that differences in **present bias** cannot explain the findings. Proposition 5a does imply that if female fundraisers had less present bias, $\beta_{\text{female fundraisers}} > \beta_{\text{male fundraisers}}$, they would have less need for goal-setting, and consequently a smaller proportion would set goals (consistent with 1A), but 5b implies that female fundraisers who do set goals would set higher goal values (inconsistent with 1B). The intuition that goal-setting female fundraisers would set higher goal values is that their lower present bias implies that their effort levels were already higher, even without goal-setting.

Can a gender difference in either of the two dimensions of **beliefs** explain the findings? First consider **confidence in ability**. Corollary 6.1 implies that male fundraisers having more confidence in their ability can explain 1B but not 1A. Corollary 6.1b implies

that if male fundraisers are more confident, $\theta_{\text{male fundraisers}} > \theta_{\text{female fundraisers}}$, they would set higher goal values (consistent with 1B), but 6.1a implies they would not be any more likely than female fundraisers to set a goal (inconsistent with 1A).[23]

However, a gender difference in the **precision of beliefs** can explain both findings. If male fundraisers (compared to female fundraisers) believe that luck plays a relatively small role in determining money raised, $\pi_{\text{male fundraisers}} > \pi_{\text{female fundraisers}}$, then Proposition 7 says their more precise beliefs would lead male fundraisers to be more likely to set goals (finding 1A) and to set higher goal values (1B).

Gender differences in **loss aversion**, in which female fundraisers have higher aversion to loss, also can explain 1A and 1B, but two additional maintained assumptions are required. The additional assumptions are that (a) male fundraisers' loss aversion cannot be too much lower than female fundraisers' loss aversion and (b) female fundraisers' loss aversion must be high enough relative to male fundraisers' loss aversion. We state this formally as:

[23] Corollary 6.2 similarly implies overconfidence by male fundraisers can explain finding 1B but not 1A.

Proposition 8. Differences in the degree of loss aversion, with female fundraisers having higher loss aversion on average than male fundraisers ($\bar{\lambda}_{\text{female fundraisers}} > \bar{\lambda}_{\text{male fundraisers}}$) would imply that:

(a) female fundraisers are less likely to set a goal than male fundraisers, and

(b) female fundraisers who set goals set lower goal values than male fundraisers who set goals, but

only under two additional assumptions about the heterogeneity of loss aversion among male and female fundraisers:

Assumption 8.a: Male fundraisers' loss aversion cannot be too much lower than female fundraisers' low aversion.

Assumption 8.b: Female fundraisers' loss aversion must be high enough, relative to male fundraisers' loss aversion.

The proof requires superimposing two densities of loss aversion on Figure B.4, the density for female fundraisers to the right of the density for male fundraisers, roughly speaking. More specifically, the density for female fundraisers has to be to the right far enough so that more of the density falls to the right of λ_{No} than does the density for the female fundraisers. This establishes part (a).

For part (b) the density of loss aversion for female fundraisers has to be concentrated around the lower portion of the $g^* = \theta\,[\pi - (1 - \pi)\,\lambda]$ graph, just to the left of λ_{No}, to ensure that the female fundraisers who do set goals chose low goal values; if instead the female fundraisers' density is concentrated around λ_{Max}, then the female fundraisers who do set goals would set higher goal values (than male fundraisers who set goals). The intuition is that in this case (concentration around λ_{Max}) the loss aversion of female fundraisers is not high enough for the dampening effect of beliefs that bad luck might occur to sufficiently reduce their goal values; Assumption 8.b rules this out.

Assumption 8a is needed so that male fundraisers' the density of loss aversion is concentrated around λ_{Max}; this would ensure that male fundraisers set high goal values. If instead male fundraisers' density was concentrated near the lower portion of the $g^* = \beta (1 + \lambda) \theta \pi \hat{e}$ graph (just to the right of $\lambda = 0$) then the male fundraisers who do set goals would set lower goal values (than female fundraisers who set goals). The intuition is that if male fundraisers' loss aversion is too low, then goal-setting is not a very effective tool for them in the first place.

Said succinctly, what the additional assumptions 8.a and 8.b do is rule out (a) male fundraisers' loss aversion being concentrated near $\lambda = 0$, and (b) female fundraisers' loss aversion being concentrated around λ_{Max}. ∎