Experiments on Goal-setting, Self-control and Performance

Basim Abdulaziz Alandijany

PhD Supervisors: Fabio Tufano, Martin Sefton & Silvia Sonderegger

Thesis submitted to The University of Nottingham
for the Degree of Doctor of Philosophy

School of Economics
University of Nottingham

14 October 2024

Acknowledgements

First and foremost, I would like to express my deepest gratitude to my supervisors, Professor Fabio Tufano, Professor Martin Sefton, and Professor Silvia Sonderegger. Their unwavering support, encouragement, and dedication throughout my PhD journey have been invaluable. They have consistently gone above and beyond their duties, offering guidance that I cannot adequately express in words. The years spent under their supervision have been truly enriching and have shaped me both academically and personally.

I am grateful for the learning opportunities provided by the various seminars I attended and the generous funding from the Centre for Decision Research and Experimental Economics (CeDEx) at the University of Nottingham.

My heartfelt thanks go to my wife, Rahaf Moazin. Your constant support, kindness, and patience during challenging times have been my anchor throughout this journey. We have been together for 12 wonderful years, and I am grateful every day for your presence in my life. I extend my gratitude to your parents, Jamal Moazin and Saleha Aqeel, for their support and for blessing me with such an incredible life partner.

To my wonderful daughters, Rafeef and Lana—you are my greatest joys. Rafeef, your bright spirit and smile have been my constant source of inspiration, always lifting my spirits. And Lana, my precious little one, born during the final stages of this thesis, your arrival filled my heart with renewed energy and love.

I owe an immense debt of gratitude to my mother, Aisha Taj. She is truly the person behind all my success. Her dedication to raising me, educating me, and always prioritizing knowledge has shaped who I am today. My father, Abdulaziz Alandijany, has been a pillar of support and a model of hard work in ensuring our well-being.

To my siblings - my eldest sister Dr.Tahani, my eldest brother Dr.Thamir, my younger sisters Shahad and Lina, and my youngest brother Majed - thank you for your love and encouragement.

A special thanks to my friend, Dr. Hani Ojaymi. Your support, especially during the final year of my PhD, has been invaluable. Your inspiration and friendship have made this journey much easier.

Contents

List of Figures

List of Tables

Chapter 1

1.1 General Introduction

Goal-setting has long been recognised as a powerful tool for enhancing performance (Locke, 1968; Locke & Latham, 1990, 2002). More recently, theoretical economic models have been used to propose that self-set non-binding goals can serve as reference points, leveraging psychological mechanisms such as loss aversion to motivate individuals (Hsiaw, 2013; Koch & Nafziger, 2011; Suvorov & Van de Ven, 2008). However, empirically, the effectiveness of goal-setting interventions can vary significantly based on individual differences and contextual factors (e.g., Clark et al., 2020; Corgnet et al., 2015, 2018; Smithers, 2015). The current study examines the nuanced dynamics of goal-setting through a series of experiments. It contributes to our understanding of how factors such as self-control, loss aversion, gender and goal meaningfulness influence the impact of goal-setting on performance. The aim is to demonstrate both the potential and limitations of goal-setting as a strategy for improving its associated outcomes.

This thesis is structured around three self-contained studies, each focusing on different aspects of goal-setting: Chapter 2 examines the interaction between goal-setting, self-control and gender in a lab experiment. Chapter 3 tailors the goal-setting intervention to better resonate with women by connecting goals to charitable donations. Chapter 4 investigates the effects of goal-setting through a field experiment

with university students, examining both the short- and long-term impacts on academic performance.

Chapter 2 utilises a real-effort task, whereby the participants are paid based on their effort and are randomly assigned to either a control or goal-setting treatment. The main findings reveal that goal-setting effectively enhances performance for men with low self-control. Moreover, it is found that the interaction between goal-setting and loss aversion has a negative impact: goal-setting is less effective among more loss averse individuals.

Chapter 3 extends the investigation by exploring how manipulating the meaningfulness of work moderates goal effectiveness across genders. Motivated by research suggesting that women often derive more meaning from prosocial and communal aspects of work (e.g., Burbano et al., 2023; Konrad et al., 2000), we introduce a charitable donation element to the benefits of work, so that in addition to generating their own income, additional effort generates benefits for others. This approach provides insight into how aligning goals with gender-specific values may enhance the effectiveness of goal-setting. The key findings from this study reveal a complex interaction between gender and goal type. While setting goals alone remains effective for men, a significant gender difference emerges when goals are combined with charitable donations. In this condition, women significantly outperform men. However, among women, the difference between those who set regular goals and those who set goals with donations was not statistically significant.

Chapter 4 investigates the effects of goal-setting on academic performance through a field experiment with first-year undergraduate economics students. Unlike previous studies which instructed students to set goals for the final exam (e.g., Clark et al., 2020; van Lent & Souverijn, 2020), this experiment asked students to set goals for a practice exam. This approach allows students to adjust their study strategies by retaking the exam multiple times if their initial goal is not met. The findings reveal that treated students, particularly male students, were approximately five times more likely to attempt the practice exam compared to the control group. On the practice exam, goal-setting students outperformed the control group, with those exhibiting lower self-control benefiting more from the intervention. However, this positive effect did not persist to the final exam, in which goal-setting students unexpectedly underperformed relative to the control group. Interestingly, the interaction between goal-setting and self-control reversed from the practice to the final exam.

In summary, this thesis adds to the existing body of literature which demonstrates that self-set non-binding goals can offer a promising and practical solution for improving performance across various domains. At the same time, the current study demonstrates that goal-setting is not always effective and its efficacy is sensitive to numerous factors. As such, this thesis aims to deepen our understanding of how such a simple yet powerful tool can be optimised, considering factors such as self-control, loss aversion and gender.

1.2 References

Burbano, V. C., Folke, O., Meier, S., & Rickne, J. (2023). The Gender Gap in Meaningful Work. *Management Science*.

Clark, D., Gill, D., Prowse, V., & Rush, M. (2020). Using goals to motivate college students: Theory and evidence from field experiments. *Review of Economics and Statistics*, *102*(4), 648-663.

Corgnet, B., Gómez-Miñambres, J., & Hernán-Gonzalez, R. (2015). Goal setting and monetary incentives: When large stakes are not enough. *Management Science*, *61*(12), 2926-2944.

Corgnet, B., Gómez-Miñambres, J., & Hernán-Gonzalez, R. (2018). Goal setting in the principal–agent model: Weak incentives for strong performance. *Games and Economic Behavior*, *109*, 311-326.

Hsiaw, A. (2013). Goal-setting and self-control. *Journal of Economic Theory*, *148*(2), 601-626.

Koch, A. K., & Nafziger, J. (2011). Self-regulation through goal setting. *Scandinavian Journal of Economics*, *113*(1), 212-227.

Konrad, A. M., Ritchie Jr, J. E., Lieb, P., & Corrigall, E. (2000). Sex differences and similarities in job attribute preferences: a meta-analysis. *Psychological Bulletin*, *126*(4), 593.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, *3*(2), 157-189.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall, Inc.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, *57*(9), 705.

Smithers, S. (2015). Goals, motivation and gender. *Economics Letters*, *131*, 75-77. https://doi.org/10.1016/j.econlet.2015.03.030

Suvorov, A., & Van de Ven, J. (2008). Goal setting as a self-regulation mechanism. *Available at SSRN 1286029*.

van Lent, M., & Souverijn, M. (2020). Goal setting and raising the bar: A field experiment. *Journal of Behavioral and Experimental Economics*, *87*, 101570.

CHAPTER 2

Exploring the Role of Self-Control and Loss Aversion in Goal-Setting[1]

2.1 Introduction

It is common for individuals to have good intentions to realise certain long-term outcomes but they frequently become distracted by more enjoyable and immediate pursuits. One can think of an employee who believes that working hard towards an essential project is optimal. However, whilst undertaking the work, they come across many other activities which are more pleasurable than working. Unless the employee can exert self-control, they may give in to temptation and shirk from what was believed to be optimal.

One's ability to exercise self-control can prevent one from being impulsive and increase one's chances of achieving more desirable outcomes. There is robust evidence of the correlation between self-control and success in various life domains such as education, healthy behaviours, financial success, task persistence and general well-being (e.g., Barber et al., 2012; Cadena & Keys, 2015; Cobb-Clark et al., 2019; Stavrova et al., 2020; Tangney et al., 2004). A similar association has been found in younger people. Adolescents with high levels of self-control are more likely to achieve better

[1] This chapter is based on collaborative work with Fabio Tufano and Martin Sefton. I am grateful to CeDEx (Centre for Decision Research and Experimental Economics) for funding this research

school grades and strike a good balance between their studies and leisure activities (Kuhnle et al., 2012).

On the other hand, the self-control failure is associated with low performance, bad habits, poor health conditions and deception (e.g., Fan et al., 2020; Miller et al., 2011; Schmeichel & Zell, 2007; Sutter et al., 2013). Furthermore, Duckworth et al. (2015) argue that self-control may help to explain the gender gap in academic attainment. The authors demonstrated that male and female students are not significantly different in several characteristics. However, male students frequently fall behind their counterparts because they fail to exert adequate levels of self-control.

Researchers and policymakers strive to find ways to attenuate self-control failures. Goal-setting has long been considered a pivotal motivational instrument in both academic and professional domains. By simply setting a non-binding personal goal, individuals are able to self-motivate themselves to overcome self-control failures (Locke & Latham, 1990, 2002). Economists have recently proposed theoretical models to suggest mechanisms by which goal-setting may attenuate issues with self-control (e.g., Hsiaw, 2013; Koch & Nafziger, 2011; Suvorov & Van de Ven, 2008). They argue that when an individual who suffers from self-control issues sets a goal for themselves, the goal acts as a reference point. Because people are generally averse to experiencing losses, failing to achieve the reference point can cause psychological distress. Therefore, a goal-setter is likely to be motivated and persist in their pursuit of achieving the goal to avoid experiencing such psychological pain. It is worthy of note that according to the theoretical models, loss aversion is essential to activate the goal-setting

intervention. However, the empirical evidence is mixed, with some studies demonstrating varying degrees of effectiveness depending on the context and underlying incentives (e.g., Brandts et al., 2021; Corgnet et al., 2018; Dalton et al., 2016).

The current research aims to experimentally investigate whether goal-setting is able to enhance an individual's performance and how the efficacy of goal-setting is related to the degree of self-control and loss aversion. By exploring heterogeneity in self-control and loss aversion, one can gain insight into how goal-setting interventions can be tailored to meet individual needs. In addition, part of the study addresses gender differences in the self-control trait and how each gender behaves when asked to set a goal. Investigating gender differences in self-control and goal-setting behaviour can help to develop gender-specific interventions to enhance the efficacy of goal-setting.

2.2 Literature Review

2.2.1 Self-Control & Goal-Setting

The literature on present bias has extensively demonstrated that individuals tend to overestimate the value of immediate benefits and underestimate the value of future benefits (Laibson, 1997). This tendency can be attributed to the existence of two selves with differing preferences within the same individual. The doer-self is heavily present-oriented, whereas the planner-self represents the standard person (Thaler, 1981). A common observation is that people tend to seek instant benefits and circumvent costs in a way that neglects the planner-self (O'Donoghue & Rabin, 1999).

This time inconsistency between the two selves creates the need for self-control. Duckworth et al. (2019) define self-control as one's ability to regulate feelings, thoughts and actions when one encounters dissension between the more alluring immediate desires and the distal more enduring desires. Hence, an individual exhibits a lack of self-control when choosing the more alluring options at the expense of the more enduring ones. The literature has dedicated considerable attention to exploring interventions intended to reduce self-control issues. Goal-setting is one of those interventions that has flourished in recent decades. A central principle of goal-setting is that ambitious and specific goals yield better performance relative to the setting of indefinite goals, such as urging one to do one's best (Locke & Latham, 1990). A specific goal is believed to lead an individual to adopt/abandon activities that are more/less relevant to the goal (Locke & Latham, 2002).

Economists have recently proposed an extensive goal-setting mechanism which includes self-control failures and loss aversion as critical elements. Suvorov and Van de Ven (2008) state that low self-control or impatience may result in acting in the present-oriented self's interest, resulting in a deviation from the optimal choice. This behaviour is particularly pronounced when individuals encounter unpleasant tasks such as saving, following a diet or studying. When an individual sets a salient goal, the specified goal becomes a reference point. Due to loss aversion, falling short of the specified reference point results in a psychological loss. The produced loss looms larger than any gains and counteracts the tendency to shirk due to impatience. Consequently, an enhanced motivation is created, encouraging the individual to keep striving towards

the goal. In such as framework, it is the interaction between loss aversion and impatience that creates the demand for goal-setting and makes it an effective strategy. One can think of loss aversion as a hook for the reference point. Neither loss aversion nor self-control issues per se are sufficient to generate a significant effect on performance. Koch and Nafziger (2011) further contribute to this discussion by introducing the concept of goal acceptance which moderates the relationship between goal difficulty and motivation. The two studies were later combined and extended in a comprehensive framework by Koch et al. (2014). This comprehensive framework offers novel insights into endogenous goal-setting, whereby individuals set goals as a deliberate strategy to manage self-control problems. The model also examines how self-rewards interact with goal-setting to reinforce their effectiveness in overcoming self-control issues.

Although, as will be shown in the next section, several experiments have determined the efficacy of goal-setting on performance, few studies have examined the roles that self-control and loss aversion play in determining the effectiveness of self-set goals. If the mentioned theoretical models are valid, it is expected that the intervention will be effective on a specific subgroup: individuals exhibiting both self-control issues and some degree of loss aversion.

The current study aims to move beyond general experimentation of the effectiveness of goal-setting on subsequent performance. Rather, it focuses on analysing

the factors that moderate the intervention's impact. This approach provides a more nuanced understanding of the conditions under which goal-setting is most effective.

2.2.2 Goal-Setting & Performance

Several lab and field experiments have been conducted to determine the causal relationship between goal-setting and performance. In a lab experiment, Smithers (2015) focused on the effects of non-binding goals, revealing that such goals significantly enhanced performance by improving speed and accuracy. Smithers (2015) also observed a notable gender difference. Men responded more positively to goal-setting than women, whose performance remained relatively stable across different goal conditions.

In a related study, Dalton et al. (2016) tested the efficacy of a goal-setting component in performance contracts. Participants were tasked with counting zeros in tables and were randomly assigned to one of three payment schemes: two piece-rate contracts (low and high rates) and a self-chosen goal contract with a piece-rate component and a conditional bonus. In the last treatment, the higher the goal, the greater the bonus earned upon achieving the goal. Remarkably, the self-chosen goal contract was found to effectively boost male performance in a way comparable to the higher piece rate contract. Similar to Smither's study, no effect was observed among the female participants.

In another principal-agent lab experiment, Corgnet et al. (2018) examined how the performance of agents changes when non-binding performance goals are introduced

alongside traditional monetary incentives. The study simulated a real-world setting whereby the participants engaged in a tedious summation task while having access to leisure activities (e.g., Internet browsing) to mimic workplace distractions. Over six periods, the participants were randomly assigned to two roles ('principal' or 'agent') and two treatments ('goal' or 'no goal'). At the beginning of each period, the principals were endowed with a certain amount of money and could propose a contract to their assigned agents. In the goal treatment, principals could also set a wage-irrelevant performance goal for the agent. The study revealed that when principals were able to set non-monetary goals, they offered less generous monetary incentives. The researchers found that this approach enabled the principals to reduce their agency costs by using goals as a partial substitute for monetary rewards. Remarkably, even with these reduced monetary incentives, agents in the goal-setting condition exhibited better productivity compared to those without goals. This increased effort from agents resulted in greater overall earnings for the principals. Goerg and Kube (2012) revealed a similar observation in their field experiment. They demonstrated that both self-set and principal-set goals are effective in enhancing performance. In addition, they extended this finding by showing that goal level plays a crucial role in this causal relationship. These studies in the realm of workers' productivity illustrate that better performance can be achieved with a low-cost goal-setting intervention.

Goal-setting has also been explored from other more nuanced perspectives. For instance, Kaiser et al. (2024) suggest that self-set goals are more likely to be revised during the goal-pursuit process. This argument stems from the non-binding nature of

such goals. In one of their treatments, the participants were allowed to modify their goals before starting the task. It was found that goals were effective at enhancing performance, regardless of whether or not they were revised. Another study by Brandts et al. (2021) considered gender differences in the setting of private and public goals. Their experiment followed a between-subject design whereby participants were randomly allocated to a control, private or public treatment. In the private and public treatments, the participants set goals that were either undisclosed or disclosed to others. The findings demonstrate that male participants set higher goals and outperformed their female counterparts across both treatments. However, unlike previous studies, the goal-setting intervention failed to improve performance in any treatment. Moreover, the performance of females was significantly lower in the public treatment compared to the private treatment. It is important to note that performance in this experiment was publicly observable across all treatments, including the control group. This design feature introduces a potential confounding factor. The public nature of performance may induce additional effort due to reputation concerns or social image considerations. The potential confounding may add a more complex dynamic to goal-setting.

Collectively, these studies suggest that goal-setting interventions may offer a cost-effective mechanism for enhancing individual performance in various economic contexts. The following section examines the potential limitations and unintended consequences of goal-setting, highlighting the need for a nuanced understanding of its application.

2.2.3 Goal-Setting Pitfalls

While goal-setting has demonstrated potential benefits, it is essential to acknowledge its associated drawbacks. Gill and Prowse (2012) examined the impact of disappointment resulting from being short of expectations. In a sequential-move tournament, they found that not achieving the expected reference point can be detrimental to performance in subsequent tasks. In a lab experiment, Schweitzer et al. (2004) highlighted that goal-setting can unintentionally motivate unethical behaviours. Similar to other studies concerning goal-setting, the participants were involved in a real-effort task. The participants were randomised to either a control treatment or a goal-setting treatment whereby a goal was set for the performance they aimed to achieve. This experiment introduced a unique aspect by allowing the participants to self-report their performance and potentially cheat. The authors were not primarily concerned with the actual performance achieved in the task. Instead, they were interested in the prevalence of cheating among each group. It was concluded that, compared to other treatments, goal-setters engage in more cheating behaviour. In another multi-round lab experiment, it was also found that individuals cheat more when they are required to meet consecutive high-performance goals (Welsh & Ordóñez, 2014). From a wider perspective, Ordóñez et al. (2009) reported some additional negative behaviours which stem from goal-setting. They stated that people have multiple objectives to achieve, particularly in real-life scenarios. Besides, achieving targets may entail other considerations such as quality, ethics and social responsibility. Narrowing attention to precise goals may lead to the larger context being neglected.

Additionally, in certain contexts, people may develop a distorted perception of risk. When people do not meet their targets, they may act in a highly risky manner to realise their goals. All of the mentioned side effects associated with goal-setting have been emphasised in a study by Goerg (2015) in the realm of workers and productivity. That is to say, despite the known benefits of encouraging people to set goals, it may not be ideal to over-prescribe this intervention.

To this end, it is proposed that theoretical economic models may offer valuable insights into the goal-setting mechanism. In short, those models argue that goal-setting is effective in a specific subgroup; namely, individuals with self-control issues and some degree of loss aversion. Understanding the characteristics of those who can benefit the most from goal-setting interventions can help this strategy to be used more judiciously. By tailoring goal-setting interventions to specific individuals, it is possible to maximise their effectiveness and reduce unintended negative consequences. This approach it likely to be more effective and beneficial than a one-size-fits-all approach.

2.3 Theoretical Framework

The goal-setting model applied in the current study draws on that of Koch and Nafziger (2020). In this model, an individual sets an effort goal, g, at date 0, makes an effort decision and incurs effort costs at date 1, and accrues benefits from their effort at date 2. The first key ingredient of the model is quasi-hyperbolic discounting which leads to a time inconsistency problem (Laibson, 1997; O'Donoghue & Rabin, 1999). It is worthy of note that the general hyperbolic discounting model typically uses a beta-delta framework, where beta captures present bias and delta governs the conventional

discounting of future costs/benefits. For the purpose of the current analysis, this model is simplified by assuming that delta equals 1. This approach allows us to focus solely on the effects of present bias, as captured by beta. This simplification aligns with our research objectives while maintaining the essential features of time inconsistency in decision-making. To see how the time inconsistency arises, for the moment, ignore the goal-setting element.

Utility at date 1 is given by:

$$U_1(e) = \beta b(e) - c(e)$$

where $e \in [0, \infty)$ represents effort, $b(e)$ represents the benefits derived from effort (we assume $b' > 0, b'' < 0$), and $c(e)$ represents the cost of effort (we assume $c' > 0, c'' > 0$). Because the benefits accrue at a later date, these are discounted by the present bias parameter $\beta \in (0, 1)$. At date 1, the individual chooses effort and the (present-biased) optimal effort, e_1, solves $\beta b'(e_1) = c'(e_1)$.

From the perspective of the individual planning at date 0, utility is:

$$U_0(e) = \beta b(e) - \beta c(e)$$

Both benefits and costs are experienced at a later date, so both are discounted. The optimal effort, e_0, solves $b'(e_0) = c'(e_0)$. This is illustrated in Figure 2.1.

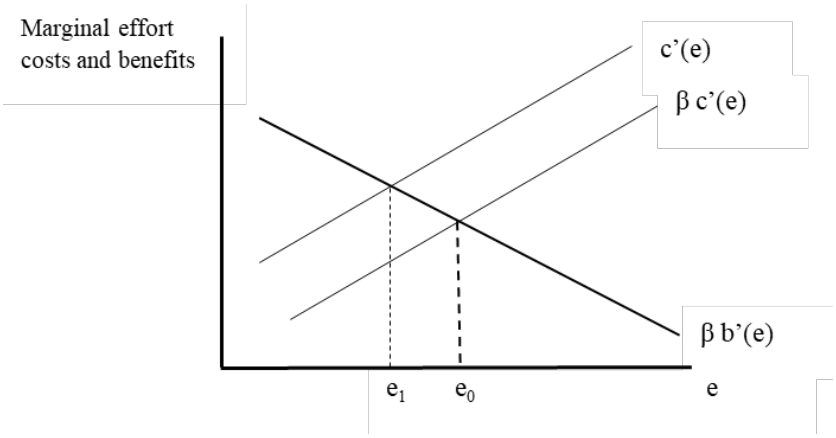


Figure 2.1: Marginal Utility and Optimal Effort Levels

Thus, the individual has a time-inconsistency problem in that at date 0 they would like to commit to e_0 but at date 1 the immediate costs of effort loom larger than the future benefits, so the individual is tempted to choose the lower effort level e_1. The difference is driven by the present-bias parameter β, which can be viewed as measuring self-control, with higher values of β reflecting more self-control.

The second key ingredient of the model is loss aversion. We now assume that the individual sets an effort goal, g, at date 0 which acts as a reference point. At date 1, as well as incurring direct effort costs, the individual experiences additional utility which depends on the comparison between actual effort and the goal. We assume the additional utility is given by $\alpha\, min\,\{0, e - g\}$. Thus, if the individual attains or exceeds the goal, there is no additional utility and if effort falls short of the goal, the individual experiences disutility proportional to the shortfall. The parameter α captures the degree of loss aversion. The goal augmented utility at date 1 is given by:

$$U_1(e; g) = \beta b(e) + \alpha\, min\,\{0, e - g\} - c(e)$$

We assume that the individual at date 1, with preference parameters β and α and taking the goal set at date 0 as given, chooses effort to maximise this utility. For effort levels short of the goal, marginal utility is given by:

$$MU_1(e; e < g) = \beta b'(e) + \alpha - c'(e)$$

For effort levels attaining or surpassing the goal, marginal utility is given by:

$$MU_1(e; e \geq g) = \beta b'(e) - c'(e)$$

This is illustrated in Figure 2.2(a), where the higher marginal utility curve is relevant for effort levels below a goal and the lower marginal utility curve is relevant for effort levels above a goal. Not all goals can be implemented. If the goal is set too high, the individual will supply more effort than e_1 in order to reduce the loss associated with not reaching the goal but will not fully attain the goal because, at some point, the additional benefit does not justify the effort costs. The maximum implementable effort is denoted by e_{max} , where the marginal utility of effort for efforts levels below g is zero:

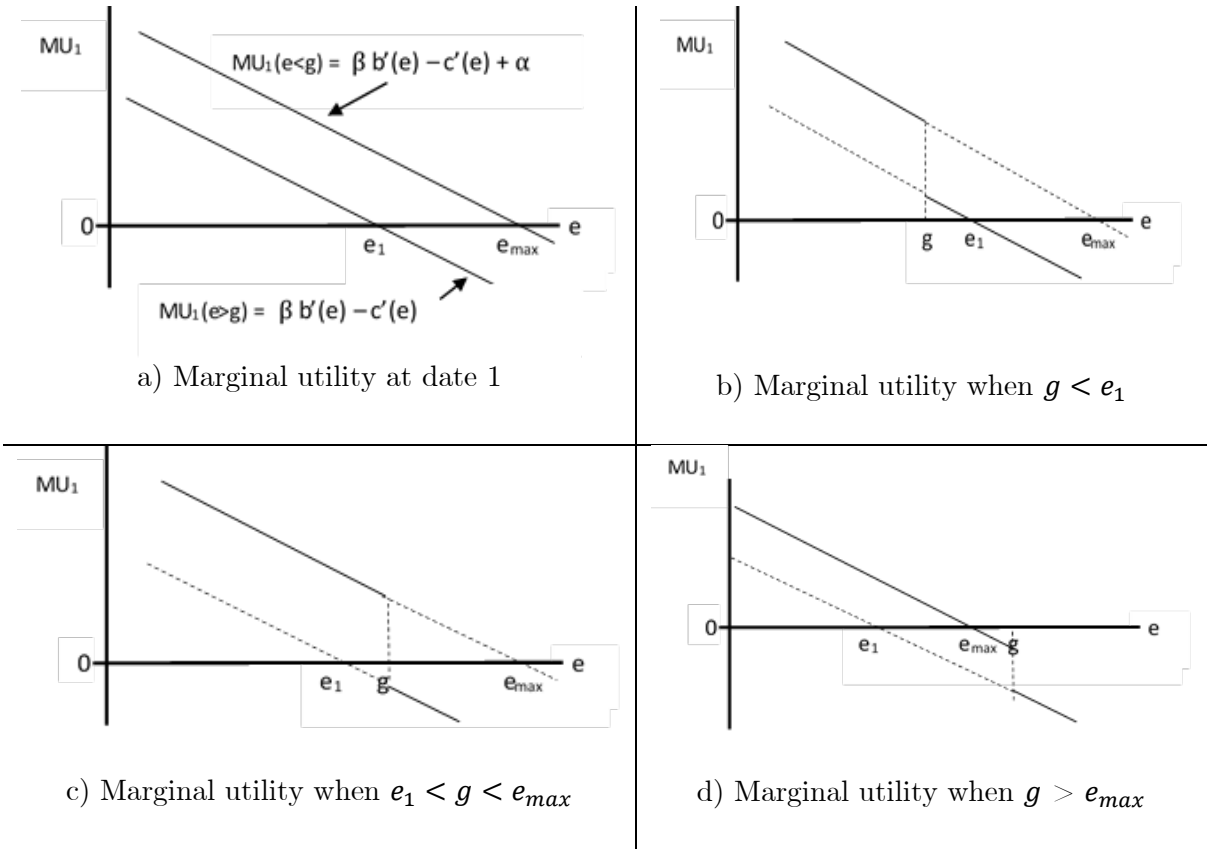
$$\beta b'(e_{max}) + \alpha - c'(e_{max}) = 0$$

In Figure 2.2(b), $g < e_1$; the individual at date 1 maximises utility by choosing effort e_1 and the individual's behaviour is unaffected by the weak goal. In Figure 2.2(c), $e_1 \leq g \leq e_{max}$; the individual at date 1 finds it optimal to attain the goal. In Figure 2.2(d), $g > e_{max}$; the individual maximises utility by choosing e_{max} and falls short of the goal. To summarise, at date 1 the individual chooses:

$$e = e_1 \; if \; g < e_1, e = g \; if \; e_1 \leq g \leq e_{max}, e = e_{max} \; if \; g > e_{max} \; [*]$$

Next, we assume that the individual at date 0 sets the goal to maximise date 0 utility, anticipating that at date 1 they will choose an effort level given in [∗]. Clearly, goals exceeding e_{max} are dominated by setting $g = e_{max}$ because in either case, the date 1 individual chooses e_{max} but setting a goal exceeding this will result in disutility from failing to attain the goal. Goals below e_1 are weakly dominated by setting $g = e_1$. Thus, without loss of generality, we can restrict attention to goals $g \in [e_1, e_{max}]$. If the optimal effort from the perspective of the individual at date 0 is implementable, $e_0 \leq e_{max}$, the individual will set a goal $g_0 = e_0$ which the individual at date 1 will choose to meet. If the optimal effort from the perspective of date 0 is not implementable, $e_0 > e_{max}$, the optimal goal will be $g_0 = e_{max}$ (n.b., in this formulation, individuals will always attain their goal and observations of individuals failing to meet their goal may be explained by extending the model to allow for stochastic effort costs).

Consider the parametric example used in Koch and Nafzinger (2020): $b(e) = e, c(e) = \frac{1}{2}e^2$. Then, $e_0 = 1, e_1 = \beta$ and $e_{max} = \alpha + \beta$. In the absence of goal effort = β, while with goals effort = $min\{1, \alpha + \beta\}$, goal-setting increases effort when individuals are loss-averse ($\alpha > 0$) and present-biased ($\beta < 1$).



a) Marginal utility at date 1

b) Marginal utility when $g < e_1$

c) Marginal utility when $e_1 < g < e_{max}$

d) Marginal utility when $g > e_{max}$

Figure 2.2: Marginal Utility and Effort Choices Under Various Goal Levels

Based on this theoretical framework, the following hypotheses are proposed:

Hypothesis 1*:* Goal-setting will significantly increase effort and performance among individuals who have low self-control (low β).

This hypothesis is grounded in the premise that individuals with a pronounced present bias (low β) are prone to suboptimal effort allocation. However, when coupled with high loss aversion (high α), the utility cost of failing to meet a set goal is sufficiently substantial to offset the present bias, resulting in increased effort.

Hypothesis 2: For individuals with high self-control (high β), goal-setting will be less critical because these individuals are likely to exert near-optimal effort regardless of whether or not a goal is set.

Given that high β corresponds to lower present bias, these individuals are inherently more capable of aligning their effort with the optimal level. Consequently, the marginal utility of setting a goal is diminished because these individuals are likely to achieve near-optimal outcomes without the need for external motivation.

Hypothesis 3: The interaction between loss aversion (α) and goal-setting will be significant, with greater loss aversion amplifying the effectiveness of goals in driving performance.

As loss aversion intensifies, the perceived cost of not meeting a goal increases. This heightened disutility from potential losses serves as a powerful motivator, especially in individuals with a tendency towards present bias, thereby making goal-setting a more effective intervention.

Hypothesis 4: Individuals with low loss aversion (low α) will demonstrate smaller improvements in effort and performance with goal-setting because the perceived loss for not meeting the goal is less impactful.

When α is low, the psychological impact of falling short of a goal is relatively minor. As a result, the incentive to increase effort in response to goal-setting is weaker, leading to smaller improvements in performance.

2.4 Experimental Design and Procedures

Due to the intersection of several aspects between the current study and the experiment by Kaiser et al. (2024) on goal-setting, their experimental design was used as a guide in the timing of the goal-setting intervention, the real-effort task and other aspects. However, adjustments were made to better serve the objectives of the current research[2]. For instance, Kaiser et al. (2024) sought to investigate the impact of allowing subjects to revise their initial goals on subsequent performance. However, the current study aims to explore the influence that a goal-setting intervention can generate when it interacts with the levels of self-control and loss aversion. Therefore, the current experiment incorporates more personality trait measures and eliminates treatments targeting goal revision. Another core difference is that Kaiser et al. (2024) excluded females from their study, citing the need for greater statistical power and referencing prior findings which suggest that goal-setting may be less effective for females due to generally higher levels of self-control. In the current study, both genders were invited to participate in the experiment because, following the economic models, loss aversion is another vital element in activating goals' effectiveness. Accordingly, using gender as a proxy for both self-control and loss aversion can be less accurate in our context. In addition, both genders are expected to be present in real-life environments. Therefore, excluding females would limit the ability to recommend practical policies.

[2] The study received ethical approval from the Nottingham School of Economics Research Ethics Committee on 08/05/2022. In addition, it was pre-registered in the AEA RCT Registry with the ID AEARCTR-0009560 on 29/06/2022.

This online experiment was conducted during July 2022 using the Qualtrics platform. Participants were recruited from the University of Nottingham CeDEx pool. The experiment comprised of two parts which were conducted on two separate days, referred to as 'Day 1' and 'Day 2' with a week-long interval between them. A between-subject design was utilised, whereby the participants were randomly assigned to either the control or treatment group. Regardless of which group they were assigned to, all of the participants were given a real-effort online task but only those in the treatment group were instructed to set a goal for their performance. The randomisation was stratified based on the self-control measure and gender. To create the stratification, the participants were first divided by gender. Then, within each gender group, we used the median BSCS score as a cut-off point to classify the participants as having either high or low self-control. This approach resulted in four strata: males with high self-control, males with low self-control, females with high self-control and females with low self-control.

This was to ensure that the initial sample had an adequate number of participants with high/low self-control status from each gender in each treatment group. Subsequently, the regressions were split and compared by gender and self-control status. This comparison is crucial to answer the research questions.

Invitation emails were sent at random to 1,000 people registered in the CeDEx pool. The targeted number of participants was 200 subjects recruited on a first-come basis. That is, 200 people accessed the link provided in the invitation email and

reserved their place in the experiment. All of the participants attended on Day 1 but there was a 15% attrition rate on Day 2. Thus, only data for 170 participants (those who participated on both days) are considered in the empirical analysis reported in the next section. Table 2.1 provides an overview of the study sample. The majority of the final sample are female participants (54%), with a mean age of 23 years (Std. Dev. = 4). Note that the initial sample was recruited equally from each gender but attrition was greater among the male participants. Approximately half of the participants were white, which is unsurprising given that the recruitment pool was a university campus in the UK. The second most dominant ethnicity was Asian, representing approximately 32% of the sample. The participants are enrolled on a wide variety of degree courses: 58.82% on a Bachelor's programme, 25.88% on a Master's programme and 15.29% on a PhD programme.

Table 2.1: General Characteristics of the Sample

	FREQUENCY	PERCENTAGE (%)	CUMULATIVE PERCENTAGE (%)
GENDER			
MALE	78	45.88	45.88
FEMALE	92	54.12	100
ETHNICITY			
ASIAN	55	32.35	32.35
BLACK	17	10	42.35
MIXED	5	2.94	45.29
WHITE	81	47.65	92.94
OTHER	12	7.06	100
ACADEMIC DEGREE			
BACHELOR'S	100	58.82	58.82
MASTER'S	44	25.88	84.71
PHD	26	15.29	100
OBSERVATIONS	170		

Day 1 sought to elicit general demographics, personality traits and productivity measures (by means of a shortened version of the real-effort task). At the end of Day

1, only the treated subjects were asked to set a goal for the real-effort online task which is similar to the productivity task but lasted for an extended period. On Day 2, all of the subjects were allowed to work on the real-effort task as much as they wanted. The participants were paid for participating on both days after they completed Day 2 of the experiment. As shown in Section 2.4.2, the assigned task was easy, boring and monotonous. The experiment's set-up imitates real-life situations where people are prone to various temptations when they need to perform an unpleasant task. The tension between what one should do (performing the task) and what one wants to do (giving in to temptation) creates a need for self-control. Figure 2.3 illustrates the sequence of activities during the experiment. In the following sub-sections, each component of the experiment is described in greater detail.

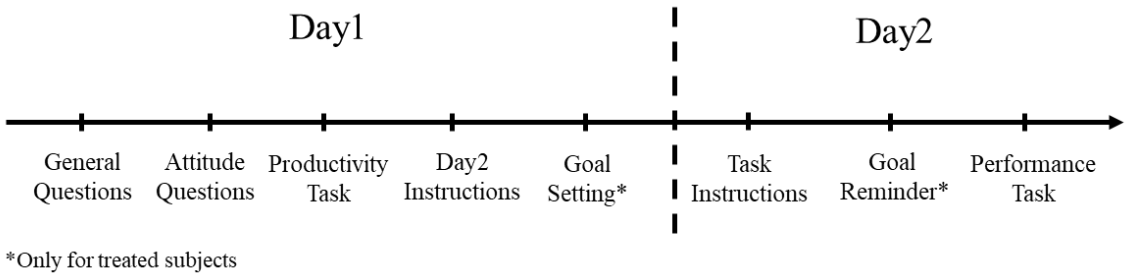


Figure 2.3: Experimental Design

2.4.1 Procedures for Day 1

On Day 1, the participants received an email sent via Qualtrics. They were instructed to click on the provided link to complete a 30 minute-long survey. The survey consisted of three stages: (1) general questions, (2) attitude questions, and (3) an online task. The participants were paid a fixed amount for the first two stages,

while for the online task their earnings depended on their task performance. Information about the stages and earnings was displayed on the experiment's main page. In the first stage, the participants were asked general questions such as their gender, age and ethnicity.

In the second stage, the participants were asked about self-control, loss aversion and their risk preferences. The Brief Self-Control Scale (BSCS) developed by Tangney et al. (2004) was used as a proxy for the present bias parameter, β. Lower BSCS scores are interpreted as representing greater present bias (lower β). This measure has been extensively utilised to elicit self-control in various fields, such as research concerning financial decisions (Gerhardt et al., 2017; Strömbäck et al., 2017), unhealthy practices (Cobb-Clark et al., 2023), life satisfaction (Hofmann et al., 2014), entrepreneurship (Van Gelderen et al., 2015) and education (Unger et al., 2016). It is a self-reported questionnaire comprising 13 items rated on a scale from 1 (not at all like me) to 5 (very much like me). Individuals rate themselves against every item in a way that describes how typical they are in real life. One example of an item on the questionnaire is: 'Sometimes I cannot stop myself from doing something, even if I know it is wrong.' The scale is named 'brief' because it has undergone multiple stages of development. The earliest version consisted of 93 items but the authors strived to reduce this as much as possible to make it more practical to use. They state that the brief scale can be confidently adopted because it is highly correlated (0.93) with the extended one. The strength of the BSCS for measuring the trait of self-control emanates from two features. First, it shows a high internal consistency (Cronbach's alpha > 0.8) in a

considerable number of studies. Second, the authors relied on Baumeister and Newman (1994) extensive research on self-control as a guide when they formulated the scale's questionnaire. The measure is intended to cover several major components of self-control, including controlling thoughts, emotions, impulses and performance.

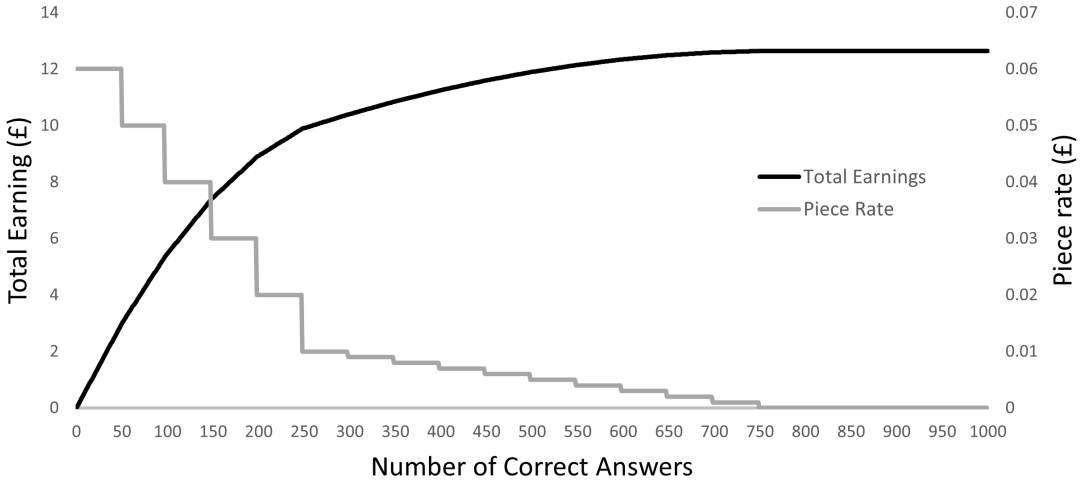
Additionally, the participants completed a patience measure (Falk et al., 2016) which evaluates time preferences. This measure focuses on intertemporal choices through a series of hypothetical questions. The participants were asked to choose between smaller, immediate rewards and larger, delayed rewards[3].

To elicit loss aversion, Bibby and Ferguson (2011) measure, which was inspired by Gächter et al. (2007), was implemented but with minor changes to the wording of the questions for simplicity. Each participant was exposed to ten hypothetical lotteries and they could indicate whether they would 'accept' it (i.e., play the lottery with its chance of winning or losing) or 'reject' it (i.e., not win or lose anything). While the losing value ranges from £2 to £11, the winning value is constant at £10. Depending on the decisions taken in the lotteries, every participant was evaluated on a scale from 0 (extremely loss-seeking and accepts playing every lottery) to 10 (extremely loss-averse and rejects playing any lottery). The last measure in this stage was the willingness to take risks. This variable could be of interest if it correlates with the difficulty of the goals that the subjects set for themselves. Risk preferences were measured using the popular question 'On a scale from 0 (not willing to take risks) to

[3] The patience measure was included to explore its potential correlation with self-control. While it captures a specific aspect of time preferences, it did not significantly correlate with the BSCS or contribute to the analysis.

10 (very willing to take risks), how willing are you to take risks, in general?' (Dohmen et al., 2011). After completing this stage, the participants started the productivity task.

Following the approach of Kaiser et al. (2024), the real-effort task, which was displayed as the 'online task' for the participants, was to count the number of zeros in tables of zeros and ones. On Day 1, the productivity task had a time limit of 3 minutes and there were 40 tables to complete. A participant earned 10p for every correct answer. The task's structure allowed for maximum potential earnings of £4 if all of the answers were correct. This initial task sought to establish a baseline measure of the participants' ability to complete a counting task. Following the completion of the productivity task, the participants were asked to rate how much they enjoyed the task on a 5-point Likert scale. Next, the participants were briefed on the structure of the task they would perform on Day 2. They were told that they would be doing the same online task but that there would be certain differences in terms of the time limit for the task, the number of tables generated and the associated earnings. The time window for the task on Day 2 was 24 hours, starting from 00:00 a.m. until 11:59 p.m. of the same day. The software generates up to 1,100 random tables of zeros and ones. The associated payment was based on a declined piece rate scheme. For instance, for every correctly answered table from table 1 to table 50, the participants earned 6p per correct answer. This declined to 5p per correct answer from table 51 to table 100, and so on. The incentive scheme is graphically represented in Figure 2.4.



Note: This figure illustrates the participants' payment structure during Day 2 of the real-effort task. The piece rate begins at 6p per correct table for tables 1 to 50, decreases to 5p per correct table for tables 51 to 100 and continues declining at subsequent thresholds. The participants' total earnings depend on the number of correct answers.

Figure 2.4: Declining Piece-Rate Payment Scheme for the Productivity Task

To enhance participant comprehension, a dynamic visualisation tool was implemented in the form of a slider. The slider enabled the participants to see their potential earnings based on the number of correct answers submitted. In addition, they also saw an estimate of the time required to complete the task, calibrated to each participant's productivity, as measured on Day 1. The control group was then directed to the end page of the experiment. Only the treatment group had an additional step whereby they were prompted to set a goal regarding how many correct answers they aimed to submit on Day 2. The non-binding nature of these goals was explicitly stated in the instructions. The participants were clearly informed that they had complete autonomy over their effort allocation, regardless of their stated goal. Both groups concluded Day 1 at an identical end page which displayed their earnings from the day's activities and reminded them of the date for Day 2 of the experiment.

2.4.2 Procedures for Day 2

A week later, the participants were invited to participate in Day 2. Before commencing the task, all of the participants were reminded about which task they should perform. Furthermore, only the treated subjects were reminded about the goals they had set for themselves on Day 1. The task could be completed in one of three ways. First, voluntary completion by pressing the 'End the Task' button. This action triggered a confirmation prompt to prevent accidental termination. Second, the task would automatically terminate if a participant was inactive (did not submit an answer) for more than 30 minutes. Third, the task would also conclude automatically if the time limit (11:59 p.m.) was reached. The variable 'Performance' was operationalised as the number of correct answers submitted by each participant. This measure provides a clear, quantifiable task performance metric directly tied to the experimental incentives. At the end of Day 2, all of the earnings from Day 1 and Day 2 were displayed to the participants. Subject payments were made via PayPal by the next day. Table 2.2 provides a summary of the experiments' main variables.

Table 2.2: Summary of the Variables and Measures Used

VARIABLE	MEASURE
SELF-CONTROL (BSCS)	13-item self-reported survey questions (Tangney et al., 2004).
LOSS AVERSION	Ten hypothetical lotteries with a 50% chance to win/lose (Bibby & Ferguson, 2011; Gächter et al., 2007)
RISK	A general question regarding the willingness to take risks on a scale from 1 to 10 (Dohmen et al., 2011).
PRODUCTIVITY	The number of correct answers submitted in the 3-minute counting task.
TASK PLEASURE	A question regarding how much the participant enjoyed the counting task.
GOAL	Treated subjects' responses to how many correct answers they sought to submit in the counting task on Day 2.
PERFORMANCE	The number of correct answers submitted in the more extended counting task on Day 2.

2.5 Results

2.5.1 Descriptive Statistics

Table 2.3 provides details of the measured variables. The final sample includes 82 participants in the treatment group and 88 participants in the control group. The slight difference in these numbers is due to attrition on Day 2. Table 2.4 presents a balance check for randomisation. As can be seen, there is no significant difference between the treatment group and the control group in terms of general characteristics or experimental variables. This indicates that the stratified randomisation was successful. The following subsections reflect more thoroughly on the descriptive statistics.

Table 2.3: Descriptive Statistics of Key Variables

	MEAN	SD	MIN	MAX
AGE	22.64	4.33	18	38
RISK	5.58	1.99	1	10
LOSS AVERSION	6.61	1.73	0	10
TASK PLEASURE	3.28	1.03	1	5
PRODUCTIVITY	15.16	3.78	3	25
BSCS	41.24	8.36	17	61
PATIENCE	17.18	10.72	1	32
PERFORMANCE	167.66	159.68	1	1101
OBSERVATIONS	170			

Note: BSCS refers to the Brief Self-Control Scale and performance is measured as the number of correct tables submitted during the real-effort task.

Table 2.4: Balance Check Table for Treatment Groups

	CONTROL		TREATMENT		DIFF.	
	MEAN	SD	MEAN	SD	Δ	P-VALUE
AGE	22.85	4.43	22.41	4.24	0.44	0.51
RISK	5.50	1.95	5.66	2.04	-0.16	0.61
LOSS AVERSION	6.45	1.83	6.78	1.62	-0.33	0.22
TASK PLEASURE	3.31	0.99	3.24	1.07	0.06	0.69
PRODUCTIVITY	15.27	4.22	15.05	3.26	0.22	0.70
BSCS	41.44	8.70	41.02	8.03	0.42	0.74
PATIENCE	17.91	11.19	16.39	10.21	1.52	0.36
PERFORMANCE	174.20	186.55	160.63	125.39	13.57	0.58
OBSERVATIONS	88		82			

Note: 'Δ' is the difference between the control and treatment groups. The p-value assesses the statistical significance of the differences between the two groups. The balance check indicates no significant differences between the control and treatment groups across key variables.

Self-Control Measure

The BSCS measure has high internal consistency with a Cronbach's alpha of 0.82. The overall mean of this measure is 41.24 (Std. Dev. = 8.36). As presented in Figure 2.5, the female participants' self-control scores (Mean = 41.64, Std. Dev. = 8) are higher than those of the male participants (Mean = 40.77, Std. Dev. = 8.79), which is consistent with the findings in the previous literature (e.g., Buechel et al., 2014; Duckworth et al., 2015), albeit that the gender difference is insignificant in the current study. In further analysis, the data sample was categorised into two groups: a high self-control subsample which includes those whose self-control score is greater than the median and a low self-control subsample comprising those with a self-control score lower than the median.

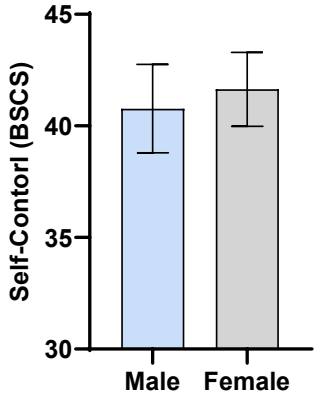


Figure 2.5: Self-Control Levels by Gender

Loss Aversion and Risk Measures

The average loss aversion score is 6.61 (Std. Dev. = 1.73) and the willingness to take risks is 5.58 (Std. Dev. = 1.99). As illustrated in Figure 2.6, there is no difference between the two genders in any of these traits. This supports our analysis plan whereby, unlike previous studies, it is believed that splitting the regressions by gender is inadequate to determine the impact of goal-setting. Even if it is assumed that males have more self-control failures, it is not known how each gender is characterised by other relevant factors such as loss aversion.

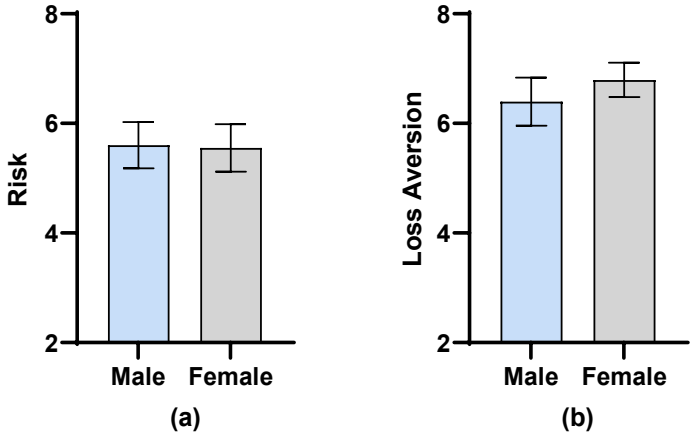


Figure 2.6: Willingness to Take Risk & Loss Aversion by Gender

Real-effort Tasks & Task Pleasure

On average, the participants submitted approximately 15 correct answers (Std. Dev. = 3.77) in the 3-minute counting task. Female participants performed significantly better (t = -2.47, p-value < 0.05) than their male counterparts. Similarly, those whose self-control score was high submitted a greater number of correct answers. Both results are represented graphically in Figure 2.7. The average evaluation of the task's pleasure was 3.28, which indicates a neutral feeling towards the task. One should bear in mind that this is a concise counting task. When the time window for the task becomes longer, task pleasure is likely to shift downwards. It can be confidently claimed that the task is unpleasant. This is a critical aspect of the experiment's setup because the need for self-control is more pronounced when the task is tedious.

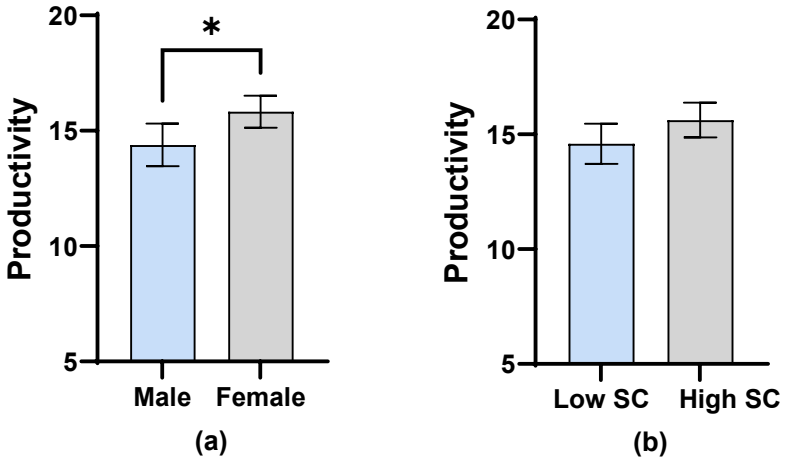


Figure 2.7: Productivity by Gender & Self-Control Levels

The average overall performance in the more extended counting task on Day 2 was approximately 168 correct answers (Std. Dev. = 159.67). The male participants (Mean = 168.85, Std. Dev. = 159.91) and those categorised as having high self-control (Mean = 179.76, Std Dev. = 153.59) outperformed relative to their counterparts (Mean

= 166.65, Std Dev. = 160.34 & Mean = 152.33, Std. Dev. = 166.85, respectively), albeit none of the differences in performance were significant (see Figure 2.8).

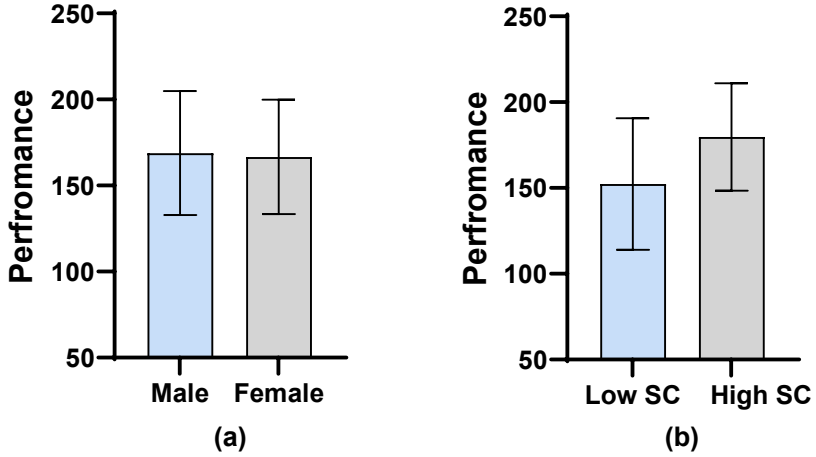


Figure 2.8: Performance by Gender & Self-Control Levels

Goals

As previously stated, goals should be ambitious yet attainable to stimulate motivation. In the treated group, the participants set, on average, a goal of approximately 175 correct answers. Nevertheless, the average actual performance (Mean = 161) lagged somewhat behind the goal average. Only a minority of the participants (38%) who set goals were able to achieve them. This indicates that the goals were generally ambitious. However, the difference between the goals and actual performance was insignificant, meaning that the goals were ambitious but realistic.

2.5.2 Is Goal-setting Effective?

OLS regressions were used to analyse the effect of goal-setting on performance. The dependent variable is performance and the intervention dummy is called GoalSet (coded as 0 for the control group and 1 for the goal-setting group). Following the

theoretical predictions, goal-setting is expected to significantly affect the performance of loss-averse individuals who lack self-control. In the literature, the regression analysis was split by gender with the belief that the impact would be more pronounced in the male group (e.g., Clark et al., 2020). Thus, the analysis was split by gender. This step is intended to determine whether the findings are consistent with other studies that have applied this approach. The intervention was assessed for each gender, as seen in Table 2.5. Goal-setting does not have a significant effect on performance for either gender. Indeed, none of the variables are predictive of performance. From this finding, it can be inferred that either gender is not a highly accurate proxy for self-control or that goal-setting is not an effective tool to alleviate self-control failures.

Table 2.5: Goal-setting Treatment Effect on Performance by Gender

	(1) MALE	(2) FEMALE
GOALSET	13.65	-216.41
	(129.08)	(188.71)
LOSS AVERSION	4.32	-58.67
	(30.9)	(37.85)
GOALSET * LOSS AVERSION	-4.62	29.21
	(19.3)	(26.95)
_CONS	273.43	605.07
	(292.35)	(355.22)
OBSERVATIONS	78	92
CONTROLS	YES	YES
R^2	0.12	0.08

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Next, the central interest of the current study is tested. As shown in Table 2.6, the regression analysis is split by the level of self-control, with all of the dependent and independent variables remaining the same. No significant effect of goal-setting has been

revealed on the subjects with high self-control. More importantly, a similar result has been found with the low self-control subsample.

Table 2.6: Goal-setting Treatment Effect on Performance by Self-Control Status

	(1) LOW SC	(2) HIGH SC
GOALSET	-41.92	-54.98
	(182.81)	(126.35)
LOSS AVERSION	-32.52	0.99
	(40.31)	(27.9)
GOALSET * LOSS AVERSION	8.42	2.96
	(26.23)	(18.58)
_CONS	372.67	306.38
	(313)	(283.38)
OBSERVATIONS	75	95
CONTROLS	YES	YES
R^2	0.09	0.13

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

This result contradicts Hypothesis 1. A possible explanation is that because most of those who dropped out of the experiment after Day 1 have low self-control, the treatment effect has been minimised. Another possibility is that gender may still be a relevant factor even after splitting the sample by level of self-control. Therefore, further analysis was conducted by splitting the sample based on both self-control levels and gender.

In Table 2.7, the sample has been split in terms of self-control status. Under both statuses, a further split has been implemented on the basis of gender. In three of the four models (models 2, 3 and 4), the treatment effect indicated insignificant results. The goal-setting intervention does not influence females, regardless of their self-control status. The same is true for males with high self-control. However, a significant effect

of goal-setting on performance is observed when considering males with low self-control. The regression results reveal that loss aversion has a significant positive impact on performance (p-value < 0.1). Similarly, the goal-setting treatment significantly affects performance, recording the largest coefficient among all of the variables (Coef. $= 566.94$, p-value < 0.05).

Table 2.7: Goal-Setting Treatment Effect on Performance by Gender & Self-Control Level

	MALE		FEMALE	
	(1)	(2)	(3)	(4)
	LOW SC	HIGH SC	LOW SC	HIGH SC
LOSS AVERSION	103.46*	5.68	-103.86	14.8
	(51.75)	(41.44)	(62.17)	(49.04)
GOALSET	566.94**	-88.86	-444.35	85.27
	(221.87)	(177.63)	(307.75)	(252.65)
GOALSET * LOSS AVERSION	-68.97**	2.03	54.48	-14.08
	(30.72)	(26.7)	(44)	(36.07)
_CONS	-315.94	517.76	1006.5*	-89.94
	(425.55)	(452.25)	(559.68)	(437.92)
OBSERVATIONS	34	44	41	51
CONTROLS	YES	YES	YES	YES
R^2	0.4	0.22	0.21	0.15

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01.

Strikingly, the interaction between the treatment and loss aversion variables results in a significant negative effect on performance (p-value < 0.05). This finding reveals a nuanced interaction between goal-setting and loss aversion which deviates from Hypothesis 3 and 4. Initially, goal-setting was expected to be more effective for individuals with higher levels of loss aversion, based on the assumption that these individuals would be more motivated to avoid losses and, thus, be more responsive to goal-setting. However, the results indicate that while goal-setting is indeed effective, its positive effect on performance diminishes as loss aversion increases. This suggests

that while some degree of loss aversion can enhance the effectiveness of goal-setting, too much loss aversion may undermine this effect. One possibility is that highly loss-averse individuals are already intrinsically motivated by their desire to avoid losses, thereby making additional goal-setting interventions redundant. Therefore, the effectiveness of goal-setting may be contingent not only on the presence of loss aversion but also on its magnitude.

2.5.3 Women's Responses to Goal-Setting

The findings from the previous section trigger an important question: why were females not affected by the intervention? Previous studies suggest that the reason may be that females do not have self-control issues. Targeting them with an intervention which attenuates their lack of self-control would not change their performance. The current experiment measures self-control using the BCSC scale and finds: i) small gender differences in measured self-control, and ii) even for low self-control females, goal-setting has no effect.

A possible explanation for this is based on the slider that was introduced for the subjects on Day 1 to calculate how much they could earn. The slider was displayed for all subjects, regardless of their treatment group or gender. It is possible that the slider may have encouraged some subjects to set goals even when they were not explicitly asked to do so. The question can be reframed as: could it be that the introduction of the slider led females to set goals? In this manner, there is a possibility that females in the control group exhibited behaviour that was similar to those in the

treatment group. Fortunately, the experiment software makes it possible to monitor whether a participant interacted with the slider and at what point they stopped adjusting the number of tables. The corresponding value is stored and called 'ControlSlider' and 'GoalSlider' for the control and treatment groups, respectively.

Evidently, the introduction of the slider was intended to help the treatment group set their goals. In Table 2.8, the 'Goal Level' variable is regressed on the GoalSlider and other control variables. The regression results confirm that the primary determinant of the goals for both genders is GoalSlider (p-value < 0.01).

Table 2.8: Determinants of Goal Levels for the Treatment Group by Gender

	(1)	(2)
	MALE	FEMALE
AGE	-4.02	-0.62
	(4.91)	1.84)
TASK PLEASURE	-4.46	28.08**
	(15.06)	(10.87)
LOSS AVERSION	-5.96	3.67
	(8.13)	(5.69)
RISK	-2.02	1.67
	(9.29)	(3.21)
PRODUCTIVITY	-4.94	-2.98
	(4.73)	(2.93)
BSCS	0.15	-3.00**
	(2.08)	(1.2)
GOALSLIDER	0.46***	0.79***
	(0.12)	(0.08)
_CONS	297.77	93.91
	(184.4)	(90.94)
OBSERVATIONS	38	42
R^2	0.36	0.9

Note: The dependent variable is the goal level set by the participants. They used the GoalSlider to see their potential earnings based on the number of tables completed, thereby helping them to determine their goal. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Conversely, because the control group was not asked to set a goal, it was not anticipated that they would do so without explicit guidance. In fact, the slider was available to help them comprehend the calculation of earnings. Subsequently, the same regression analysis was conducted for the control group (see Table 2.9). For the male subjects, ControlSlider does not lead the performance. However, surprisingly, the ControlSlider has a significant positive impact on the female subjects' performance (p-value < 0.1). This suggests that females in the control group used the slider on Day 1 and set goals for themselves, even though they were not asked to do so. For this explanation to be complete, females in the control group would also have to remember their goal a week later on Day 2 and exert effort accordingly [4].

[4] This finding raises an intriguing question regarding whether females set goals privately. It is possible that we might have detected a significant effect of goal-setting on female subjects if the slider had not been provided. This could be an interesting avenue for future research to investigate whether goal-setting is indeed a habit for females.

Table 2.9: Determinants of Performance for the Control Group by Gender

	(1) MALE	(2) FEMALE
AGE	-12.72	9.42
	(8.39)	(15.96)
TASK PLEASURE	15.24	-2.9
	(32.93)	(34.92)
LOSS AVERSION	-0.57	-20.96
	(16.83)	(19.72)
PRODUCTIVITY	11.57*	8.91
	(6.67)	(10.58)
BSCS	1.68	-4.1
	(4.36)	(4.08)
CONTROLSLIDER	-0.04	0.21*
	(0.13)	(0.12)
_CONS	187.04	96.48
	(292.09)	(504.65)
OBSERVATIONS	38	47
R^2	0.24	0.15

Note: The dependent variable is performance. The participants interacted with a slider (ControlSlider) for the control group to view potential earnings based on the number of tables completed but were not required to set a goal. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

2.5.4 Does the Goal Level Matter?

The psychology literature emphasises the effect that a goal's difficulty has on subsequent performance. It is believed that there is a positive correlation between performance and goal ambition. This section determines whether this pattern is present in the current experiment. In Table 2.10, the model demonstrates that once one sets a goal, it becomes the main predictor of performance at the 1% level (p-value < 0.01). Furthermore, the goal level is driven by how much the subject enjoys the counting task. Figure 2.9 shows that the goal level is highest when the subjects give a response of 4 (like a great deal) or 5 (like somewhat) to the task pleasure question.

Table 2.10: Determinants of Performance After Setting a Goal

	PERFORMANCE
GOAL LEVEL	0.69***
	(0.11)
LOSS AVERSION	-1.99
	(7.61)
RISK	-9.06
	(5.94)
TASK PLEASURE	-8.46
	(13.36)
PRODUCTIVITY	-2.11
	(4.04)
BSCS	-0.25
	(1.6)
_CONS	198.02
	(133.66)
OBSERVATIONS	82
R^2	0.41

Note: The dependent variable is performance. The independent variable of interest is Goal Level, which refers to the goal set by participants for the number of tables they sought to complete. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

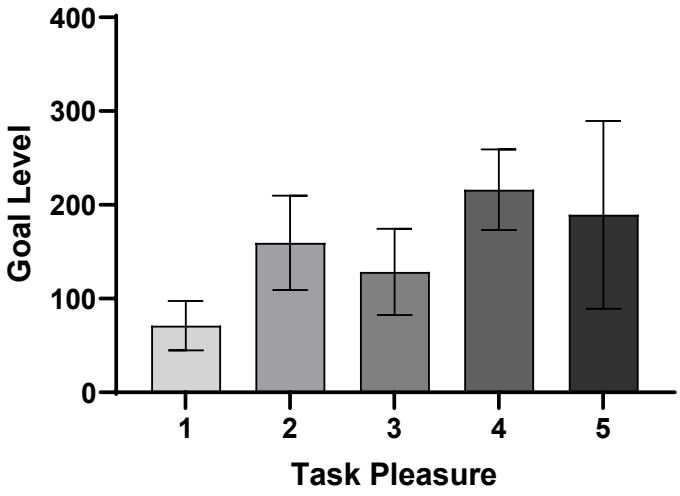


Figure 2.9: Goal Level Means by Task Pleasure

2.6 Replication

A second wave was conducted in May 2024 to validate the findings revealed in the initial study in July 2022. The experimental design, procedures and participant pool remained consistent across both waves to ensure comparability. The sample size for this wave was 161 participants. Table 2.11 provides an overview of the study sample.

Table 2.11: Sample General Characteristics (Wave 2)

	FREQUENCY	PERCENTAGE (%)	CUMULATIVE PERCENTAGE (%)
GENDER			
MALE	83	51.6	51.6
FEMALE	78	48.4	100
ETHNICITY			
ASIAN	66	41	41
BLACK	14	8.7	49.7
MIXED	8	5	54.7
WHITE	66	41	95.7
OTHER	7	4.3	100
ACADEMIC DEGREE			
BACHELOR	89	55.3	55.3
MASTER	69	42.9	98.2
PhD	3	1.8	100
OBSERVATIONS	161		

The gender distribution is almost balanced with a slight majority of male participants (51.6% of the sample). More than 80% of the participants' ethnicity is White or Asian. Nearly all of the participants are students studying for various degrees: 55% on a Bachelor's programme, 43% on a Master's programme and 2% on a PhD programme.

Table 2.12 presents the descriptive statistics for the key variables from Wave 2. This replication has been treated independently rather than pooling the data. The rationale for this approach is that there was a two-year gap between the two waves.

In addition, as shown in Table 2.13, the differences between Wave 1 and Wave 2 are significant for the majority of key variables including age, risk preferences, loss aversion and productivity.

Table 2.12: Descriptive Statistics of Key Variables (Wave 2)

	MEAN	SD	MIN	MAX
AGE	21.4	3.57	18	47
RISK	6.35	1.79	2	10
LOSS AVERSION	6.27	1.79	0	10
TASK PLEASURE	3.11	1.04	1	5
PRODUCTIVITY	16.43	4.62	3	30
BSCS	40.25	8.55	20	63
PATIENCE	14.8	10.78	1	32
PERFORMANCE	177.81	158.62	1	1010
OBSERVATIONS	161			

Table 2.13: Comparative Analysis of Key Variables Between Wave 1 and Wave 2

	WAVE 1		WAVE 2		DIFF.	
	MEAN	SD	MEAN	SD	Δ	P-VALUE
AGE	22.64	4.33	21.4	3.57	-1.24***	0.003
RISK	5.58	1.99	6.35	1.79	0.77***	0.001
LOSS AVERSION	6.61	1.73	6.27	1.79	-0.34*	0.077
TASK PLEASURE	3.28	1.03	3.11	1.04	-0.17	0.133
PRODUCTIVITY	15.16	3.78	16.43	4.62	1.27***	0.006
BSCS	41.24	8.36	40.25	8.55	-0.99	0.285
PATIENCE	17.18	10.72	14.8	10.78	-2.38**	0.042
PERFORMANCE	167.66	159.68	177.81	158.62	10.15	0.563
OBSERVATIONS	170		161			

Note: This table compares key variables between Wave 1 (July 2022) and Wave 2 (May 2024) using a two-sample t-test. The differences are shown as the mean difference (Δ) and their respective p-values. Statistically significant differences are marked with * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2.14 presents a balance check comparing the treatment and control groups in the second wave. Most of the key variables indicate no significant differences between the groups. This balance confirms that the randomisation process was largely

effective. However, there is a slight difference in risk preferences which is significant at the 10% level (p = 0.08). To account for this, risk and other key variables are controlled for in the subsequent regression analysis. Overall, the balance check confirms that the treatment and control groups are well-matched for comparison.

Table 2.14: Balance Check Table for Treatment Groups (Wave 2)

	CONTROL		TREATMENT		DIFF.	
	MEAN	SD	MEAN	SD	Δ	P-VALUE
AGE	21.41	3.70	21.4	3.46	-0.01	1.00
RISK	6.59	1.77	6.12	1.80	-0.47	0.08
LOSS AVERSION	6.28	1.87	6.26	1.73	-0.02	0.94
TASK PLEASURE	3.14	1.09	3.09	1.00	-0.05	0.73
PRODUCTIVITY	16.29	4.73	16.56	4.53	0.27	0.7
BSCS	40.22	9.05	40.28	8.10	0.07	0.96
OBSERVATIONS	79		82			

The analysis continues to use OLS regressions to examine the effect of goal-setting on performance, with the intervention dummy GoalSet coded as 0 for the control group and 1 for the goal-setting group. Similar to the analysis of Wave 1, the process starts by splitting the analysis by gender. In Wave 1, goal-setting was found to be effective for males with low self-control. As shown in Table 2.15, Wave 2 extends this finding by showing that the intervention is effective for men regardless of their self-control level (coefficient = 201.87, p-value < 0.05). This finding aligns more closely with the previous studies, suggesting the general effectiveness of goal-setting for men (e.g., Clark et al., 2020; Smithers, 2015). Crucially, the significant interaction between loss aversion and goal-setting for men was replicated (coefficient = -33.07, p-value $<$ 0.05). This finding indicates that the effect of goal-setting diminishes as loss aversion increases. The consistent replication of this effect provides strong evidence of the nuanced relationship between goal-setting and loss aversion.

Table 2.15: Goal-setting Treatment Effect on Performance by Gender (Wave 2)

	(1) MALE	(2) FEMALE
GOALSET	201.87**	-431.80**
	85.09	214.12
LOSS AVERSION	53.12**	-87.68**
	21.96	43.47
GOALSET * LOSS AVERSION	-33.07**	58.08*
	13.7	30.97
_CONS	-142.08	485.35
	182.52	403.98
OBSERVATIONS	83	78
CONTROLS	YES	YES
R^2	0.27	0.25

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

With regards to the women, it was found that goal-setting has a negative effect on performance (coefficient = -431.80, p-value < 0.05). This finding is partially in accordance with the findings of Brandts et al. (2021). However, it is important to note that Brandts et al. found such an effect specifically for public goals, whereas the experiment in the current study involved private goals. In the current study, the participants may have perceived some external influence given that the researchers were monitoring their goals and performance. This may have contributed to a similar detrimental effect on female performance as seen in the public goal-setting in Brandts et al.'s experiment. As indicated by the interaction term between GoalSet and Loss Aversion (coefficient = 58.08, p-value < 0.10), the detrimental impact of goal-setting on performance for females diminishes as loss aversion increases.

In Table 2.16, the analysis is split by self-control levels to examine Hypothesis 1. No significant effect of goal-setting was revealed on the subjects regardless of their self-control levels.

Table 2.16: Goal-setting Treatment Effect on Performance by Self-Control Levels (Wave 2)

	(1)	(2)
	LOW SC	HIGH SC
GOALSET	20.2	-110.89
	130.88	119.36
LOSS AVERSION	10.19	-29.99
	31.43	28.00
GOALSET * LOSS AVERSION	-6.61	13.66
	20.45	17.98
_CONS	-6.96	419.23
	246.32	330.46
OBSERVATIONS	81	80
CONTROLS	YES	YES
R^2	0.31	0.23

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

To further explore these results and maintain consistency with the Wave 1 analysis, an additional analysis was conducted which split the sample based on both self-control levels and gender (see Table 2.17). The findings from this analysis align more closely with the Wave 1 findings, indicating that goal-setting has a significant effect on males with low self-control (coefficient = 314.28, p-value < 0.05). A significant interaction between goal-setting and loss aversion was also observed for males with low self-control (coefficient = -51.55, p-value < 0.05). Consistent with the findings in Wave 1 and the gender-based analysis in Wave 2, this interaction again indicates that the effectiveness of goal-setting decreases as loss aversion increases.

Table 2.17: Effect of Goal-setting Treatment on Performance by Gender & Self-Control Levels (Wave2)

	MALE		FEMALE	
	(1)	(2)	(3)	(4)
	LOW SC	HIGH SC	LOW SC	HIGH SC
GOALSET	314.28**	162.93	-564.02	-443.67
	137.25	136.39	354.82	283.82
LOSS AVERSION	90.33**	36.62	-125.76*	-87.42
	35.92	35.23	65.59	66.17
GOALSET * LOSS AVERSION	-51.55**	-26.65	80.75	61.26
	20.95	22.95	50.3	41.86
_CONS	-167.69	-276.34	1386.67*	1070.92*
	332.97	244.66	782.82	593.19
OBSERVATIONS	38	45	35	43
CONTROLS	YES	YES	YES	YES
R^2	0.33	0.27	0.43	0.44

Note: Controls for age, BSCS, task pleasure, risk preferences and productivity are included but not shown here. Full regression results are provided in Appendix A. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As part of the investigation into goal-setting in Wave 2, it was examined whether the participants in the treatment group effectively used the goal-setting slider to set their performance goals for Day 2. In addition, analysis was conducted to establish whether female participants in the control group may have implicitly set private goals by looking at whether the ControlSlider was predictive of their performance. Finally, an attempt was made to determine whether the level of goals set by participants was predictive of their actual performance.

Table 2.18 presents the determinants of the goal levels for the treatment group. Both males and females used the goal slider to set their goals, as indicated by the highly significant coefficients for the "GoalSlider" variable. This suggests that the participants actively engaged with the slider to set their performance goal.

Table 2.18: Determinants of Goals Levels for the Treatment Group by Gender (Wave 2)

	(1) MALE	(2) FEMALE
AGE	-3.4	2.31
	(5.34)	(4.68)
TASK PLEASURE	3.23	-33.28*
	(17.29)	(18.36)
LOSS AVERSION	-7.18	-7.97
	(9.34)	(13.56)
RISK	23.04*	5.61
	(13.64)	(8.84)
PRODUCTIVITY	-0.18	-0.72
	(4.66)	(3.95)
BSCS	-0.64	1.48
	(2.53)	(1.89)
GOALSLIDER	0.72***	0.86***
	(0.13)	(0.09)
_CONS	42.6	55.61
	(232.24)	(176.9)
OBSERVATIONS	40	39
R^2	0.56	0.81

Note: The dependent variable is the goal level set by the participants. They used the GoalSlider to see their potential earnings based on the number of tables completed, thereby helping them determine their goal. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 2.19 examines whether females in the control group might have implicitly set private goals by interacting with the slider. The results suggest that the slider is not predictive of performance for either males or females, as indicated by the insignificant coefficients for the ControlSlider variable. This finding contradicts the previous assumption in Wave 1, where it was assumed that females in the control group possibly used the slider to set goals.

Table 2.19: Determinants of Performance for the Control Group by Gender (Wave 2)

	(1) MALE	(2) FEMALE
AGE	-11.96	12.54
	(8.49)	(7.64)
TASK PLEASURE	31.4	83.12**
	(19.18)	(36.17)
LOSS AVERSION	22.97**	-36.08*
	(10.25)	(19.96)
RISK	11.4	-11.74
	(12.14)	(20.8)
PRODUCTIVITY	8.70**	8.42
	(3.98)	(7.82)
BSCS	-5.50**	-2.62
	(2.13)	(4.22)
CONTROLSLIDER	0.07	-0.09
	(0.09)	(0.11)
_CONS	155.03	13.16
	(200.73)	(314.84)
OBSERVATIONS	40	37
R^2	0.35	0.43

Note: The dependent variable is performance. The participants interacted with a slider (ControlSlider) for the control group to view potential earnings based on the number of tables completed. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Finally, Table 2.20 presents the determinants of performance after setting a goal. The results indicate that the level at which the goal is set is the most significant predictor of performance (coefficient = 0.37, p-value < 0.01).

Table 2.20: Determinants of Performance After Setting a Goal (Wave 2)

GOAL	0.37***
	(0.09)
LOSS AVERSION	-0.31
	(8.62)
RISK	-2.17
	(8.9)
TASK PLEASURE	23.83
	(14.98)
PRODUCTIVITY	2.69
	(3.33)
BSCS	0.05
	(1.82)
_CONS	149.02
	(188.82)
OBSERVATIONS	82
R^2	0.29

Note: The dependent variable is performance. The independent variable of interest is Goal Level, which refers to the goal set by the participants for the number of tables they sought to complete. Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The findings from Wave 2 reinforce the initial findings and suggest that the interaction between gender, self-control, loss aversion and goal-setting is complex and may be best understood when these factors are considered in combination.

2.7 Discussion and Conclusion

This chapter aims to experimentally investigate the effect that goal-setting has on an individual's performance. Unlike prior studies, the current research explores the interplay between goal-setting intervention and self-control, loss aversion and gender.

The online experiment was conducted in two days with a week-long gap between. The participants were divided into a control and treatment group. They were tasked with a real-effort counting task which could be freely performed within a 24-hour window. Day 1 was primarily to elicit the participants' self-control, loss aversion and certain other characteristics. In addition, the treated participants were instructed to set a goal for their performance in Day 2's real-effort task. All of the participants were provided with a slider which displayed their potential earnings based on the number of correct answers submitted. This was believed to also assist the treated subjects to set their goals.

It has been found that goal-setting is only effective in terms of enhancing performance for a specific subgroup, namely, males with low self-control. Moreover, loss aversion has been revealed to have a positive and significant effect on performance. Nonetheless, the interaction between goal-setting and loss aversion results in a significantly negative impact on performance. Initially, goal-setting was expected to be more effective for individuals with higher levels of loss aversion, based on the assumption that these individuals would be more motivated to avoid losses and, thus, more responsive to goal-setting. However, the results indicate that while goal-setting is indeed effective, its positive impact on performance diminishes as loss aversion

increases. This suggests that while some degree of loss aversion can enhance the effectiveness of goal-setting, too much loss aversion may undermine this effect. One possibility is that highly loss-averse individuals are already intrinsically motivated by their desire to avoid losses, thereby making additional goal-setting interventions redundant. Therefore, the effectiveness of goal-setting may be contingent not only on the presence of loss aversion but also on its magnitude.

The absence of a goal-setting effect among the female participants required further investigation. Prior studies state that goal-setting interventions tend to be ineffective for females because they exhibit fewer self-control issues. Nevertheless, the current experiment did not support this notion because no significant difference in self-control levels was observed between the genders. An alternative explanation was suggested for the ineffectiveness of goal-setting among the female participants. Upon further analysis, it was revealed that the females in the control group may have used the earnings slider to set goals. Consequently, their behaviour was typical of their treatment group counterpart. This argument is supported by regression results indicating that the slider values were a significant determinant of female performance in the control group. However, it was not possible to replicate this observation in an extra wave of the study.

The study also provided insight into the relationship between goal difficulty and performance. The psychology literature emphasises that goals should be difficult yet attainable in order to be effective. By viewing the participants' goals, it was concluded that even without being prompted, the participants set ambitious goals. This has been

confirmed by the fact that only a minority of them achieved their goals. Despite this, the difference between the goals and actual performance was insignificant. This provides an indication that although the goals were difficult, they were feasible. Remarkably, no external intervention was needed to raise the participants' ambition. Consistent with previous research, goal difficulty was positively correlated with performance. It is worthy of note that the most significant determinant of goal difficulty was the degree to which the participants found the task to be pleasurable.

It is important to acknowledge a limitation of the current study. The sample sizes in both waves of the experiment were relatively small (170 participants in Wave 1 and 161 in Wave 2). While these sample sizes were sufficient to detect some significant effects and provide valuable insights, they may have limited the ability to detect smaller effects or more nuanced interactions. The small sample size also necessitates caution when generalising the findings to broader populations. Future research with a larger sample could provide greater statistical power.

Despite this limitation, the current chapter has made two significant contributions to the existing body of literature concerning goal-setting. First, it provides an experimental validation for the economic mechanism of goal-setting. To the best of the author's knowledge, few such experimental studies have previously been conducted. Second, understanding how goals work can enhance the capability to design more effective interventions.

2.8 References

Barber, L. K., Grawitch, M. J., & Munz, D. C. (2012). Disengaging from a task: Lower self-control or adaptive self-regulation? *Journal of Individual Differences*, *33*(2), 76.

Baumeister, R. F., & Newman, L. S. (1994). Self-regulation of cognitive inference and decision processes. *Personality and Social Psychology Bulletin*, *20*(1), 3-19.

Bibby, P. A., & Ferguson, E. (2011). The ability to process emotional information predicts loss aversion. *Personality and Individual Differences*, *51*(3), 263-266.

Brandts, J., El Baroudi, S., Huber, S. J., & Rott, C. (2021). Gender differences in private and public goal setting. *Journal of Economic Behavior & Organization*, *192*, 222-247.

Buechel, B., Mechtenberg, L., & Petersen, J. (2014). *Peer effects and students' self-control*.

Cadena, B. C., & Keys, B. J. (2015). Human Capital and the Lifetime Costs of Impatience. *American Economic Journal: Economic Policy*, *7*(3), 126-153. https://doi.org/10.1257/pol.20130081

Clark, D., Gill, D., Prowse, V., & Rush, M. (2020). Using goals to motivate college students: Theory and evidence from field experiments. *Review of Economics and Statistics*, *102*(4), 648-663.

Cobb-Clark, D. A., Dahmann, S. C., Kamhofer, D. A., & Schildberg-Horisch, H. (2023). Self-control and unhealthy body weight: The role of impulsivity and restraint. *Econ Hum Biol*, *50*, 101263. https://doi.org/10.1016/j.ehb.2023.101263

Cobb-Clark, D. A., Dahmann, S. C., Kamhöfer, D. A., & Schildberg-Hörisch, H. (2019). Self-Control: Determinants, Life Outcomes and Intergenerational Implications. *SOEPpapers on Multidisciplinary Panel Data Research*(1047). https://ideas.repec.org/p/diw/diwsop/diw_sp1047.html

Corgnet, B., Gómez-Miñambres, J., & Hernán-Gonzalez, R. (2018). Goal setting in the principal–agent model: Weak incentives for strong performance. *Games and Economic Behavior*, *109*, 311-326.

Dalton, P. S., Gonzalez, V., & Noussair, C. N. (2016). Self-chosen goals: Incentives and gender differences.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the european economic association*, *9*(3), 522-550.

Duckworth, A. L., Shulman, E. P., Mastronarde, A. J., Patrick, S. D., Zhang, J., & Druckman, J. (2015). Will not want: Self-control rather than motivation explains the female advantage in report card grades. *Learning and individual differences*, *39*, 13-23.

Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual review of psychology*, *70*(1), 373-399.

Falk, A., Becker, A., Dohmen, T. J., Huffman, D., & Sunde, U. (2016). The preference survey module: A validated instrument for measuring risk, time, and social preferences.

Fan, W., Ren, M., Zhang, W., Xiao, P., & Zhong, Y. (2020). Higher Self-Control, Less Deception: The Effect of Self-Control on Deception Behaviors. *Advances in cognitive psychology*, *16*(3), 228.

Gächter, S., Johnson, J., & Herrmann, A. (2007). Individual-level loss aversion in riskless and risky choices. CeDEx Discussion Paper 2007-02.

Gerhardt, H., Schildberg-Hörisch, H., & Willrodt, J. (2017). Does self-control depletion affect risk attitudes? *European Economic Review*, *100*, 463-487.

Gill, D., & Prowse, V. (2012). A Structural Analysis of Disappointment Aversion in a Real Effort Competition. *American economic review*, *102*(1), 469-503. https://doi.org/10.1257/aer.102.1.469

Goerg, S. J. (2015). Goal setting and worker motivation. *IZA World of Labor*.

Goerg, S. J., & Kube, S. (2012). Goals (th) at work–goals, monetary incentives, and workers' performance. *MPI Collective Goods Preprint*(2012/19).

Hofmann, W., Luhmann, M., Fisher, R. R., Vohs, K. D., & Baumeister, R. F. (2014). Yes, but are they happy? Effects of trait self-control on affective well-being and life satisfaction. *Journal of Personality*, *82*(4), 265-277.

Hsiaw, A. (2013). Goal-setting and self-control. *Journal of Economic Theory*, *148*(2), 601-626.

Kaiser, J. P., Koch, A. K., & Nafziger, J. (2024). Does goal revision undermine self-regulation through goals? An experiment. *Experimental Economics*. https://doi.org/10.1007/s10683-024-09826-0

Koch, A. K., & Nafziger, J. (2011). Self-regulation through goal setting. *Scandinavian Journal of Economics*, *113*(1), 212-227.

Koch, A. K., & Nafziger, J. (2020). Motivational goal bracketing: An experiment. *Journal of Economic Theory*, *185*. https://doi.org/10.1016/j.jet.2019.104949

Koch, A. K., Nafziger, J., Suvorov, A., & van de Ven, J. (2014). Self-rewards and personal motivation. *European Economic Review*, *68*, 151-167. https://doi.org/10.1016/j.euroecorev.2014.03.002

Kuhnle, C., Hofer, M., & Kilian, B. (2012). Self-control as predictor of school grades, life balance, and flow in adolescents. *British Journal of Educational Psychology*, *82*(4), 533-548.

Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, *112*(2), 443-478.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Prentice-Hall, Inc.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American psychologist*, *57*(9), 705.

Miller, H. V., Barnes, J., & Beaver, K. M. (2011). Self-control and health outcomes in a nationally representative sample. *American journal of health behavior*, *35*(1), 15-27.

O'Donoghue, T., & Rabin, M. (1999). Doing it now or later. *American economic review*, *89*(1), 103-124.

Ordóñez, L. D., Schweitzer, M. E., Galinsky, A. D., & Bazerman, M. H. (2009). Goals gone wild: The systematic side effects of overprescribing goal setting. *Academy of Management Perspectives*, *23*(1), 6-16.

Schmeichel, B. J., & Zell, A. (2007). Trait self-control predicts performance on behavioral tests of self-control. *Journal of Personality*, *75*(4), 743-756.

Schweitzer, M. E., Ordóñez, L., & Douma, B. (2004). Goal setting as a motivator of unethical behavior. *Academy of management journal*, *47*(3), 422-432.

Smithers, S. (2015). Goals, motivation and gender. *Economics letters*, *131*, 75-77. https://doi.org/10.1016/j.econlet.2015.03.030

Stavrova, O., Pronk, T., & Kokkoris, M. D. (2020). Finding meaning in self-control: The effect of self-control on the perception of meaning in life. *Self and Identity*, *19*(2), 201-218. https://doi.org/10.1080/15298868.2018.1558107

Strömbäck, C., Lind, T., Skagerlund, K., Västfjäll, D., & Tinghög, G. (2017). Does self-control predict financial behavior and financial well-being? *Journal of Behavioral and Experimental Finance*, *14*, 30-38.

Sutter, M., Kocher, M. G., Glätzle-Rützler, D., & Trautmann, S. T. (2013). Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior. *American economic review*, *103*(1), 510-531. https://doi.org/10.1257/aer.103.1.510

Suvorov, A., & Van de Ven, J. (2008). Goal setting as a self-regulation mechanism. *Available at SSRN 1286029*.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, *72*(2), 271-324. https://doi.org/https://doi.org/10.1111/j.0022-3506.2004.00263.x

Thaler, R. (1981). Some empirical evidence on dynamic inconsistency. *Economics letters*, *8*(3), 201-207.

Unger, A., Bi, C., Xiao, Y. Y., & Ybarra, O. (2016). The revising of the Tangney Self-control Scale for Chinese students. *PsyCh journal*, *5*(2), 101-116.

Van Gelderen, M., Kautonen, T., & Fink, M. (2015). From entrepreneurial intentions to actions: Self-control and action-related doubt, fear, and aversion. *Journal of Business Venturing*, *30*(5), 655-673.

Welsh, D. T., & Ordóñez, L. D. (2014). The dark side of consecutive high performance goals: Linking goal setting, depletion, and unethical behavior. *Organizational Behavior and Human Decision Processes*, *123*(2), 79-89.

CHAPTER 3

Goal-Setting and the Value of Work[5]

3.1 Introduction

Economists have long recognised the importance of self-control in decision-making and its impact on economic outcomes (Laibson, 1997; Thaler, 1981). Thus, researchers and policymakers have actively explored strategies to address self-control failures. This trait can be defined as an individual's ability to regulate feelings, thoughts and actions when faced with conflicting immediate desires and distal enduring desires (Duckworth et al., 2019). There is robust evidence of the correlation between self-control and success in various life domains such as education, healthy behaviours, financial success, task persistence and general well-being (Barber et al., 2012; Cadena & Keys, 2015; Cobb-Clark et al., 2019; Tangney et al., 2004). On the other hand, self-control failure is associated with suboptimal performance, bad habits, poor health conditions and deception (e.g., Fan et al., 2020; Miller et al., 2011; Schmeichel & Zell, 2007; Sutter et al., 2013).

Self-control failures occur when individuals prioritise immediate gratification over enduring objectives. Exercising self-control is crucial to mitigate impulsivity and enhance the likelihood of attaining favourable outcomes. For example, consider an

[5] This chapter is based on joint work with Fabio Tufano and Martin Sefton. I am grateful to CeDEx (Centre for Decision Research and Experimental Economics) for funding this research

employee who initially believes that working hard to complete an essential project is optimal. However, whilst working, the individual encounters numerous alternative activities that are more pleasurable than working. Without the capacity to exercise self-control, yielding to temptation can result in a departure from what was believed to be optimal.

The economic literature concerning present bias and time inconsistency provides a theoretical foundation for understanding self-control issues. This literature extensively demonstrates individuals' tendency to overvalue immediate benefits and undervalue future ones. This phenomenon is modelled by assuming the presence of two distinct selves within individuals: the present-focused 'doer-self' and the future-oriented 'planner-self' (Thaler, 1981). Individuals commonly prioritise immediate gains, neglecting both the long-term consequences and the interests of their planner-self (O'Donoghue & Rabin, 1999). This time inconsistency between the two selves creates the need for self-control.

Considerable attention has been directed towards interventions aimed at mitigating self-control failures. Theoretical economic models propose that self-set non-binding goals are able to effectively attenuate self-control problems (e.g., Hsiaw, 2013; Koch & Nafziger, 2011; Koch et al., 2014; Suvorov & Van de Ven, 2008). In these models, poor self-control can cause individuals to make suboptimal decisions due to their tendency to favour immediate gratification over long-term objectives. However, goal-setting helps to establish a reference point that engages loss aversion, whereby

deviating from the goal is perceived as a psychological loss. This loss outweighs the short-term pleasure of giving in to impulses, thus motivating individuals to remain focused on their long-term goals.

Interestingly, some experimental studies find that self-set goals are effective among male but not female participants (e.g., Smithers, 2015). One possible explanation for this gender discrepancy is the assumption that female individuals have fewer self-control issues and, therefore, may not require commitment devices to the same extent as male individuals (Clark et al., 2020). Based on this assumption, Kaiser et al. (2024) chose to exclude female participants from their goal-setting experiment in an attempt to maximise statistical power. However, they acknowledged the need for further research on gender differences in goal responsiveness.

In Chapter 2, no significant gender difference was observed regarding the self-control measure. Nevertheless, the findings remained consistent with those of previous studies showing that goal-setting is primarily effective for male individuals. This implies that the gender-moderating effect in goal-setting effectiveness may not stem from differences in self-control. In the current research, we hypothesise that the effectiveness of goal-setting may depend on how individuals across genders perceive and internalise reference points.

The existing body of literature robustly documents gender disparities in the valuation and significance attributed to work. Research shows that male individuals prioritise advancement and achievement-oriented rewards such as monetary

compensation and promotion (e.g., Gneezy et al., 2003; Niederle & Vesterlund, 2007). In contrast, female individuals frequently demonstrate a heightened inclination towards altruistic pursuits and social impact (Diekman et al., 2011). This discrepancy raises important questions regarding the focus of previous goal-setting research, which has typically centred around outcomes tied to personal earnings (e.g., Corgnet et al., 2018; Dalton et al., 2016). A potential gap in the existing research is the limited investigation into whether improving goal-setting interventions is possible by aligning reference points with gender-specific perceptions of work value. When a goal is associated with an outcome that resonates with an individual's values, it can enhance the perceived meaningfulness of the goal. This, in turn, strengthens the reference point and can significantly increase individuals' commitment to achieving the goal.

In light of these considerations, it is proposed that strengthening reference points by integrating prosocial elements (e.g., charitable donations) may offer a novel approach to reinforcing goal commitment and motivation, especially among females. This hypothesis prompts a comprehensive investigation into the role of prosociality in making goals more meaningful and better aligned with broader value systems.

The current experimental research seeks to explore the gendered nuances of goal-setting, with a specific emphasis on modifying the scope of goal consequences. The current study introduces two types of goals: 1) Those primarily based on individual implications; and 2) Goals which extend benefits to both oneself and others. The former goals were introduced in the previous chapter and were found to be effective among male participants. This chapter emphasises the latter, especially how these goals relate

to female individuals due to their traditional association with valuing social impact (Burbano et al., 2023). It is noteworthy that given the multifaceted nature of the 'social impact,' we have chosen to explore charitable donations as a specific dimension of this border concept. Charitable donations serve as a tangible and concrete means of embodying social impact. In addition, several studies have found that women give more than men to charity (e.g., Eckel & Grossman, 1998, 2003; Kamas & Preston, 2015). Hence, we expect female participants to be more motivated and perform better when their goals have communal consequences. In contrast, male participants would not prefer either type of goal because their main motivator is self-achievement (e.g., Konrad et al., 2000).

The current study comprehensively explores the interactions among gender, goal-setting and performance outcomes. The investigation examines the alignment of goals with gender-specific perceptions and values, differentiating between personal gain and those aimed at delivering broader societal benefits. Building on previous findings that goal-setting is more effective for male individuals, this chapter investigates how modifying goals so that they resonate more with female individuals may enhance the broader applicability and effectiveness of non-binding goals.

3.2 Literature Review

3.2.1 The Meaning of Work

As part of our attempt to optimise the effectiveness of goal-setting strategies, it is imperative to understand which aspects of their work individuals consider to be

meaningful. We argue that designing goals in a way that resonates with individuals' values has the potential to enhance their efficacy. For simplicity, numerous studies connect goals to personal achievements and financial returns. However, such an approach may inadvertently overshadow the preferences and motivations of those prioritising different outputs. Contemporary studies indicate that pursuing meaning in one's occupation extends beyond financial remuneration. People often express a profound desire for their labour to transcend monetary gain. They seek a deeper sense of purpose and significance associated with their work (Cassar & Meier, 2018; Rosso et al., 2010).

In accordance with this perspective, Bryce (2018) conducted a study involving a substantial sample of employees from the UK and the US. Bryce (2018) sought to determine how different types of jobs contribute to the sense of finding meaningful work. In addition, Bryce examined the impact of meaningfulness at work on eudaimonic well-being. It was concluded that roles characterised by a combination of autonomy and a direct societal impact are perceived as being meaningful by individuals. Autonomy empowers workers to assume ownership of their tasks. This freedom imbues them with a sense of control over their labour. Simultaneously, the prospect of making positive changes to society amplifies the perceived significance of the job. Complementing these findings is a comprehensive survey conducted by Dur and Van Lent (2019) encompassing a large sample of 100,000 respondents from 47 countries. The results of this extensive survey underscore a sizable distinction in terms of meaningfulness between factors including country, job position and age group.

Nonetheless, there is a prevailing tendency for workers to derive their sense of meaningfulness from the social impact of their duties.

In addition to these insightful correlational studies, noteworthy causal studies highlight that manipulations of the perceived work significance can affect performance. Ariely et al. (2008) conducted a lab experiment in which participants were tasked with assembling Bionicle Lego models for a declining wage. The participants were allocated to the 'meaningful' or 'Sisyphus' conditions. In the former treatment, the participants could see their assembled models accumulating. This is assumed to give them a tangible sense of progress and achievement. In the latter treatment, each model was disassembled in front of the participant as soon as it was completed. Doing so was intended to render the task seemingly pointless. Although the nature of the task remained constant across the conditions, the subjects in the meaningful group exhibited a greater willingness to work and supplied more labour. It is interesting to observe such an impact, especially knowing that the authors advertently infused the task with only a minimal perceived meaning. Ariely et al. (2008) defined the meaning utilised in their study based on two basic components: recognition and purpose. Recognition means that some other person acknowledges the completion of the work, whereas purpose refers to the individual's realisation of how their work might be linked to a larger context. Hence, the findings of this study indicate that even small increments in the perceived meaningfulness of a task can significantly influence performance. However, it is necessary to note that all of the recruited individuals in this study were male participants.

Chandler and Kapelner (2013) conducted a field experiment in the context of crowdsourcing. The study defines crowdsourcing as recruiting a large group of people to complete tasks online. Amazon's Mechanical Turk (MTurk) is a popular platform for recruiting such workers. Therefore, the authors employed 2,500 MTurkers and instructed them to work on labelling medical images. Again, the task was framed to accommodate different levels of meaningfulness. The participants were exposed to one of three conditions: the 'meaningful,' the 'ignored' or the 'shredder' condition. Those allocated to the first condition were told that they were labelling tumour cells to help medical researchers. In the ignored condition, the workers had no idea why they were performing the task, whereas in the shredder condition, they were told that their work would be discarded. Workers given a purpose for their work outperformed their counterparts in the other conditions in terms of participation rate, quantity produced and quality. Furthermore, they were willing to work for less compensation. Aligned with these experiments, Grant (2008) adopted a similar approach and arrived at consistent results. An additional finding was the moderation of task significance by the subjects' level of prosocial values. This indicates the influential role of individual traits in perceived importance.

Within this realm of individual differences, gender emerges as a salient factor warranting further examination. The divergent preferences between genders in this matter are well-documented in the research. Females often prioritise work aspects related to social impact and helping others (Burbano et al., 2023; Konrad et al., 2000). Males also value social impact to some extent. However, they are predominantly driven

by achievement-oriented factors such as competition and promotion (Gneezy et al., 2003; Niederle & Vesterlund, 2007). The next section elaborates further on gender-specific perceptions of meaningfulness at work.

3.2.2 Gender and Work Motivation

It is crucial to acknowledge any gender gap in how people perceive meaningful work. A significant disparity in this regard can lead to divergent perceptions of the significance of the associated goals. That is, depending on the nature of the work related to these objectives, men and women may react to goals differently. This section explores the previous literature concerning the contrasting motivational factors that drive each gender within professional contexts. Developing effective goal-setting strategies requires a solid understanding of this matter.

In a meta-analysis encompassing more than 200 samples, Konrad et al. (2000) examined 40 job attributes among men and women. Their findings revealed gender differences in 33 of them. The authors concluded that while men value attributes such as promotion and power, women typically value nurturance job attributes such as helping others and interpersonal relationships. In another study, Warr (2008) also documented significant differences between men and women in terms of how they value specific job characteristics. Men exhibited a stronger preference for job characteristics related to good pay, the opportunity to achieve something, a responsible job, and good opportunities for promotion. On the other hand, women place greater importance on relational and work-life balance aspects such as pleasant people to work with, good hours and the opportunity to meet people. These results indicate that men particularly

value attributes associated with career progression and personal control over their work. Conversely, women are inclined towards a supportive work environment and job characteristics that facilitate social interaction and work-life integration.

Recent economic research has further explored these gender differences in the context of meaningful work. Burbano et al. (2023) provided evidence that women consistently feel that their jobs are more meaningful than those of their counterparts. Interestingly, this divergence has been widening between 1991 to 2019. Moreover, they reported that, regardless of gender, there is a positive correlation between the perception of meaningfulness and duties with a profound prosocial impact. This correlation is significantly stronger among women than it is amongst men. The study demonstrates that the observed gender gap in work meaningfulness has tangible implications for job sorting. The over-representation of women in certain kinds of roles involving caring and nurturing is not coincidental but rather a reflection of the gender gap in meaningful work. Indeed, Burbano et al. (2023) explored four sources of meaningfulness: autonomy, competence, relatedness and beneficence. Among all of these sources of meaningfulness at work, the most significant gender gap was observed in beneficence favouring women. This suggests that women derive more meaning from duties that enable them to contribute positively to others and society.

This insight holds particular relevance to the current study because we aim to enhance the effectiveness of goal-setting for females by making goals more meaningful. Given that social impact is multifaceted, we chose to leverage charitable donations as one strategy. Hence, performance non-binding goals were linked directly to charitable

contributions, which sought to instil a more profound sense of purpose in the female participants. It is important to note that donations are made separately without affecting the participants' earnings.

3.2.3 Gender and Prosocial Behaviour

While the literature in the previous sections suggests that females often derive greater meaning from social and altruistic pursuits, it is unclear whether this inclination translates into consistent prosocial behaviour in experimental economic settings. Several experimental studies concerning gender differences in altruism and charitable giving have been conducted.

Eckel and Grossman (1998) used double-anonymous dictator games to explore gender disparities in altruistic behaviour. They found that women were significantly more generous than men, donating about twice as much. Eckel and Grossman (2003) reported consistent findings when the recipient was a charity. In another study, Kamas and Preston (2015) discussed gender differences in social preferences, classifying individuals as being 'inequity averters' or 'surplus maximisers.' The former refers to individuals who prioritise fairness and reducing inequality. The latter type refers to those who maximise total output rather than fairness per se. In a charitable dictator game, the authors found that women were more likely to be inequity averters, so they tend to give more to charity than men. On the other hand, Andreoni and Vesterlund (2001) stated that there is no straightforward answer with regards to which gender is more altruistic. Using a modified dictator game, they manipulated the prices of altruism (i.e., the cost of giving). The main finding was that when giving is expensive,

women are more altruistic. However, as the price of giving decreases, men become more generous than women.

In the current study, the experimental setting diverges from the traditional trade-off of altruism. Participants in our experiment simultaneously earn for themselves whilst also benefiting a charity through separate payments. In this context, the personal earnings are not diminished by donations to charity. This design removes the zero-sum trade-off typically seen in dictator games and provides an opportunity to examine prosocial behaviour in a more mutually beneficial context. Tonin and Vlassopoulos (2010) provided an experimental design which closely aligns with that of the current study in this aspect. In their study, the participants performed a data entry task with the potential to earn both personal wages and contribute to a charity. The study sought to disentangle different sources of workers' pro-social motivation. Their key finding was that women increased their effort due to warm glow altruism, whereas pure altruism had no additional impact. Interestingly, the men in their sample were not responsive to either type of prosocial incentive.

A recent study by Cao et al. (2023) closely aligns with the objectives and experimental design of the current study. They investigated the effect of prosocial incentives on goal-setting and performance, with a particular focus on gender differences. Their online experiment involved participants completing two rounds of 10-minute real-effort tasks. The participants were randomly assigned to one of three treatments: a control with no goals, a goal-setting treatment without prosocial incentives and a goal-setting treatment with prosocial incentives. In the prosocial

incentive treatment, a bonus was donated to charity if they achieved their self-set goal. Cao et al. (2023) found that women set challenging yet achievable goals when incentives were prosocial, leading to enhanced performance. Men, in contrast, were less responsive to this kind of prosocial incentive.

We extend the study of Cao et al. (2023) in several ways. First, we employ a 2x2 factorial design, providing a more nuanced examination of the interaction between goal-setting and charitable donations. Second, our experiment spans two sessions with a week-long interval, thereby potentially capturing more sustained effects of the interventions. Third, and perhaps most critically, the current study implements truly non-binding goals, whereby not only are the goals themselves non-binding but the charitable donations are also not contingent upon goal achievement. Both personal earnings and charitable donations are based on a piece-rate system, regardless of whether or not the participant meets their self-set goal. By building upon and differentiating from the previous research, the current study aims to determine whether integrating a prosocial element via charitable donations enhances the meaningfulness of goals, particularly for women.

3.3 Experimental Design and Procedures

Similar to the approach in Chapter 2, we drew inspiration from Kaiser et al.'s (2024) experiment on goal-setting due to the appropriateness of various aspects for incorporation into the current study. A crucial distinction in this chapter is that we are primarily concerned about the responsiveness of each gender to goals when the perceived meaningfulness of these goals is being manipulated. As previously mentioned, there are several ways to vary the meaningfulness of work. In the current study, we do so by linking performance to charitable donations.

This online experiment was conducted during May 2024 using the Qualtrics platform[6]. A sample of 366 participants was recruited from the University of Nottingham CeDEx pool. The experiment comprised two parts which were conducted on two separate days, referred to as 'Day 1' and 'Day 2,' with a week-long interval between them. A thorough explanation follows for each part.

3.3.1 Procedures for Day 1

The participants were instructed to complete a 30-minute long survey. The survey was divided into four stages: (1) General questions; (2) Attitude questions; (3) An online task; and (4) Day 2 instructions. A fixed amount of money was paid for completing the first two stages. In the online task, the participants' earnings depended on their performance of the task. Day 1 commenced with participants answering

[6] The study received ethical approval from the Nottingham School of Economics Research Ethics Committee on 17/04/2024. In addition, it was pre-registered in the AEA RCT Registry with the ID AEARCTR-0012518 on 27/11/2023.

general questions about their gender, age, academic qualifications and ethnicity. Then, in the second section, four measures were incorporated to elicit loss aversion, self-control, social value orientation (SVO), and charity preferences. Similar to Chapter 2, self-control and loss aversion were evaluated using the measures used by Tangney et al. (2004) and Bibby and Ferguson (2011), respectively.

A notable control variable measured in this chapter is SVO, as introduced in Murphy et al. (2011). It is important to account for this variable due to the presence of the social dimension in our manipulation. It essentially captures the extent to which individuals prioritise their outcomes versus others' outcomes. The participants were presented with six different hypothetical allocations of money. Each allocation represented a differing distribution between themselves and others. The statements varied in terms of the degree of self-interest versus prosocial concern.

In addition, the participants were directed to indicate the charity that they identified with the most from a selection of three charities. It is important to note that the primary objective of including the charitable donation element was to amplify the social impact. Thus, we argue that matching individuals' donations to causes they care about is imperative. Achieving this would require the selection of charities which are more likely to resonate with the participants. Therefore, the most prominent fields of charitable giving within the UK were identified. According to the Charities Aid Foundation (2023), the top three causes that people donate to concern animal welfare, support for children or young people, and medical research. Based on this insight, the leading charity for each cause in the UK was selected. By introducing these leading

charities, we sought to ensure that the participants felt a personal connection to their chosen causes, thereby enhancing their work's perceived social impact.

In the online task stage, the participants were presented with 40 tables of zeros and ones and tasked with counting the zeros within 3 minutes. For each correct answer, the participants earned 10p, with the potential to earn £4 if all of the answers were correct. This productivity task was designed to measure and account for the participants' abilities. It also served another purpose by familiarising the participants with the counting task, which would be administered in an extended format on Day 2 of the experiment.

Next, the participants were told that they had completed all of the stages related to Day 1 of the experiment and were about to start reading the instructions for Day 2. However, before they proceeded, they were randomised into different treatments. A between-subject design was utilised whereby the participants were randomly assigned to one of the following treatments:

- **Control (C):** Subjects in this treatment were not instructed to set a goal and there were no charitable donations.
- **Donation-Only (D):** The participants' performance was linked to charitable donations but they were not instructed to set a goal for their performance.
- **Goal-Only (G):** The participants were asked to set a goal for their performance and there was no donation.

- **Goal & Donation (GD):** The subjects in this treatment set a performance goal and their performance was linked to charitable donations.

As shown in Table 3.1, this experiment follows a 2x2 factorial design incorporating goal-setting (presence or absence) and charitable donation (presence or absence). By varying these factors, we aim to highlight their individual and combined effects on participants' performance.

Table 3.1: Experimental Groups in a 2x2 Design

FACTOR	DONATION	NO DONATION
GOAL	GD	G
NO GOAL	D	C

Regardless of their treatments, the participants read instructions about the details of the task they would perform on Day 2. They were told that they would perform the same online task within a 24-hour time window. The associated payments were represented in a table and followed a declining piece rate scheme. Simply, a table of two columns was displayed: the number of counted tables and the associated payment. One additional column showing the associated charitable donations was displayed to the D and GD treatments. Moreover, at the end of the instructions for Day 2, the G and GD treatments could use a goal-setting tool. This was an interactive slider showing their potential earnings based on the number of correct answers submitted. They could play around with the slider to indicate different levels of performance, earnings and, for the GD treatment, generated donations. This slider was intended to help them assign their goals regarding how many tables they aimed to

count on Day 2. At the end of Day 1, the participants were able to see how much they had earned on Day 1 and the date of Day 2.

3.3.2 Procedures for Day 2

At first, all of the participants were reminded about the instructions for the task on Day 2. Furthermore, the G and GD treatment participants were reminded about the goals they had set for themselves on Day 1. The task could be ended by clicking the "End the Task" button, being inactive for half an hour or exceeding the time limit. The number of correct answers submitted by a participant was considered to be their task performance. At the end of Day 2, all of their earnings from the two days were displayed to the participants. Payments were transferred to the participants' PayPal accounts.

3.4 Results

3.4.1 Descriptive Statistics

As demonstrated in Table 3.2, there was a near-equal gender distribution because 169 were female (46.2%) and 197 were male (53.8%). The ethnicity of the participants was diverse. The largest ethnic group was Asian, representing 50.8% of the sample. This was followed by White (32.2%), Black (9.3%) and Mixed (2.5%). Most of the subjects were Asian or White, collectively accounting for 83% of the sample. The participants were enrolled on a wide variety of degree courses: 48.4% on a bachelor's programme, 50.3% on a Master's programme and 1.37% on a PhD programme.

Table 3.2: Sample General Characteristics

CATEGORY	SUBCATEGORY	FREQUENCY	PERCENTAGE (%)	CUMULATIVE PERCENTAGE (%)
GENDER	MALE	197	53.8	53.8
	FEMALE	169	46.2	100.0
ETHNICITY	ASIAN	186	50.8	50.8
	BLACK	34	9.3	60.1
	MIXED	9	2.5	62.6
	WHITE	118	32.2	94.8
	OTHER	19	5.2	100
ACADEMIC DEGREE	BACHELOR'S	177	48.4	48.4
	MASTER'S	184	50.3	98.6
	PhD	5	1.37	100
TOTAL		366		

Table 3.3 provides comprehensive descriptive statistics for the participant pool. The average age suggests a young adult sample with an average age of 22.19 years (Std. Dev. = 3.60). The average loss aversion was moderate at approximately 5.39 (Std. Dev. = 2.07). SVO averaged 21.57 (Std. Dev. = 14.58), task pleasure was 3.31 (Std. Dev. = 1.10), productivity was 15.23 (Std. Dev. = 4.34), and the brief self-control score (BSCS) was 40.98 (Std. Dev. = 8.20).

Table 3.3: Key Variable Descriptive Statistics

VARIABLE	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
AGE	18	42	22.19	3.60
LOSS AVERSION	0	10	5.39	2.07
SVO	-15.00	52.50	21.57	14.58
TASK PLEASURE	1	5	3.31	1.10
GOAL	10	750	262.66	190.96
PRODUCTIVITY	3	28	15.23	4.34
BSCS	15	65	40.98	8.20

In Table 3.4, subsequent treatment-specific descriptive statistics are displayed. To ensure the validity of the selected experimental design, it is crucial that these treatments are balanced in terms of the key participant characteristics. This balance

assures that any observed effects can be attributed to the experimental manipulation rather than any pre-existing differences between the treatments.

Table 3.4: Variable Descriptive Statistics by Group

GROUP	STATS	AGE	LOSS AVERSION	SVO	TASK PLEASURE	PRODUCTIVITY	BSCS
C	MEAN	22.22	5.24	22.27	3.17	14.97	40.24
	N	95	95	95	95	95	95
	STD. DEV.	3.24	2.17	14.05	1.1	4.85	8.84
D	MEAN	21.85	5.68	20.3	3.25	15.07	41.44
	N	87	87	87	87	87	87
	STD. DEV.	3.38	1.88	15.89	1.03	4.59	7.6
G	MEAN	22.13	5.37	22.44	3.43	16.2	41.18
	N	92	92	92	92	92	92
	STD. DEV.	3.24	2.03	15.01	1.13	3.92	7.5
GD	MEAN	22.52	5.3	21.2	3.38	14.7	41.09
	N	92	92	92	92	92	92
	STD. DEV.	3.87	2.04	13.46	1.14	3.83	8.78

Note: C, D, G and GD refer to the four different treatments: C = Control (No Goal, No Donation), D = Donation-Only, G = Goal-Only, and GD = Goal & Donation.

The variable averages by treatment are similar and for a formal analysis of significance we use Analysis of Variance (ANOVA) to assess the balance across the experimental groups. As shown in Table 3.5, no significant differences were found among the treatments for these variables except for productivity. The results for productivity indicate a marginally significant difference across the treatments. However, this potential imbalance was controlled for in the subsequent analysis to ensure the robustness of the findings.

Table 3.5: Balance Test Across Groups in Key Variables

FACTOR	SOURCE	SUM OF SQUARES	DF	MEAN SQUARE	F	P-VALUE
AGE	Between Groups (Combined)	20.55	3	6.85	0.53	0.66
	Within Groups	4702.78	361	13.03		
	Total	4723.33	364			
LOSS AVERSION	Between Groups (Combined)	10.01	3	3.34	0.78	0.51
	Within Groups	1557.33	362	4.30		
	Total	1567.34	365			
SVO	Between Groups (Combined)	268.01	3	89.34	0.42	0.74
	Within Groups	77286.94	362	213.50		
	Total	77554.95	365			
TASK PLEASURE	Between Groups (Combined)	4.08	3	1.36	1.12	0.34
	Within Groups	438.04	362	1.21		
	Total	442.11	365			
PRODUCTIVITY	Between Groups (Combined)	120.81	3	40.27	2.16	0.09
	Within Groups	6750.45	362	18.65		
	Total	6871.26	365			
SC SCORE	Between Groups (Combined)	74.78	3	24.93	0.37	0.78
	Within Groups	24454.00	362	67.55		
	Total	24528.78	365			

Note: The table displays results from an ANOVA assessing the balance of key variables across the four treatments. Productivity shows a marginally significant difference at the 10% level which was controlled for in further analysis. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The participants were asked to indicate their preferred charities. The distribution of charity selections is shown in Figure 3.1. The modal choice was the NSPCC (39.89%), followed by Cancer Research UK (31.70%). A smaller proportion chose the RSPCA (28.41%). Gender-wise, female participants primarily chose the NSPCC, whereas the male participants predominantly selected Cancer Research UK.

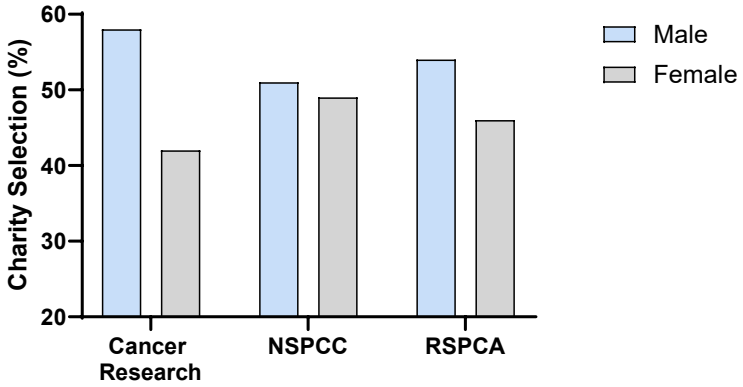
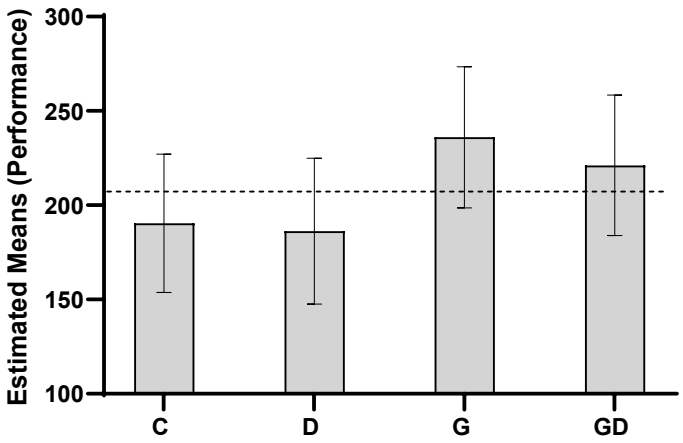


Figure 3.1: Charity Selection Percentages

3.4.2 Comparative Analysis of Treatment Performance

The impact of the experimental conditions on performance was assessed across the four treatments using Analysis of Covariance (ANCOVA). Figure 3.2 graphically shows that the G (M = 239.09, SE = 17.40) and GD (M = 219.93, SE = 19.07) treatments exhibited higher estimated marginal means than the C (M = 186.91, SE = 18.40) and D (M = 186.29, SE = 21.03) treatments. The most substantial performance discrepancy was observed between the G and D treatments at a marginal significance level.



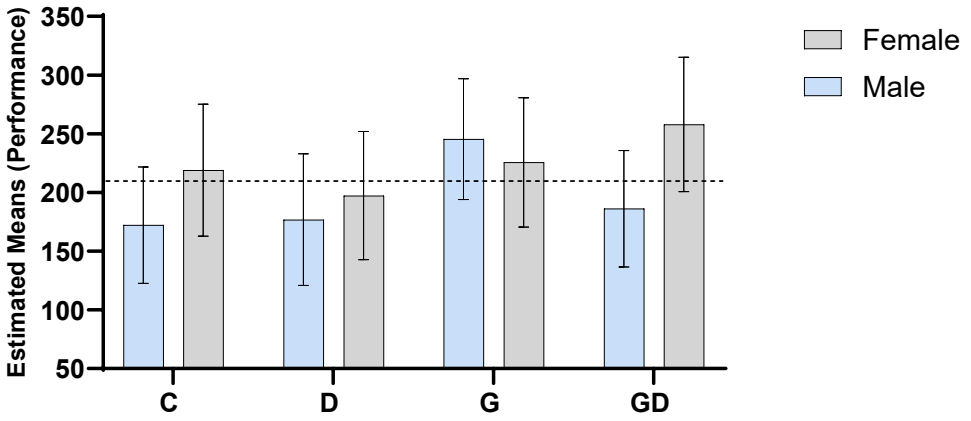
Note: C = Control, D = Donation-Only, G = Goal-Only, GD = Goal & Donation. Performance differences between G and D were marginally significant. The dotted line represents the overall mean performance across all treatments.

Figure 3.2: Estimated Marginal Means of Performance Across Treatments with 95% CI

In pursuit of the current study's central aim to discern gender differences in the impact of goal meaningfulness on performance, a stratified analysis was conducted. Figure 3.3 and Table 3.6 demonstrate the estimated marginal performance means for both male and female participants within each experimental condition. Among the female participants, the performance levels were relatively consistent across the C and D treatments, with mean performances of 218.92 and 197.37, respectively. A slight

increase can be observed in the G treatment performance, with a mean of 225.61. The GD treatment achieved the highest level of performance at a mean of 257.94. This initial analysis suggests that adding the prosocial element to the goal-setting intervention may have been adequate to make the goals more effective for the female participants. It is important to note that the observed trends, whilst intriguing, are statistically insignificant. Hence, these findings are suggestive rather than confirmatory and warrant a conservative interpretation.

Conversely, in accordance with the prior literature and the previous chapter of the current study, male participants demonstrated significantly (p-value < 0.05) elevated performance when they set goals (M = 245.53) compared to the baseline (M = 172.19). Interestingly, when goals were paired with the donation element in the GD group, performance decreased substantially to a mean of 186.21.



Note: C = Control, D = Donation-Only, G = Goal-Only, GD = Goal & Donation. Error bars represent 95% CI. The dotted line indicates the overall mean performance across all participants.

Figure 3.3: Estimated Marginal Means of Performance Across Groups by Gender

Table 3.6: Pairwise Comparisons of Group Performance by Gender

GENDER	(I) GROUP	(J) GROUP	MEAN DIFFERENCE (I-J)	STD. ERROR	P-VALUE
MALE	C	D	-4.70	36.97	0.90
		G	-73.34**	35.46	0.04
		GD	-14.02	34.95	0.69
	D	G	-68.64	37.80	0.07
		GD	-9.32	37.11	0.80
	G	GD	59.31	35.53	0.10
FEMALE	C	D	21.56	38.61	0.58
		G	-6.69	38.83	0.86
		GD	-39.02	39.51	0.32
	D	G	-28.25	38.31	0.46
		GD	-60.58	39.08	0.12
	G	GD	-32.33	39.35	0.41

Note: Treatments: C = Control, D = Donation-Only, G = Goal-Only, GD = Goal & Donation. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 3.7 presents the pairwise performance comparisons between males and females across the experimental groups. This analysis helps to identify any significant gender differences in terms of performance within each treatment. The primary aim of the current research was to identify ways in which goals could be made more effective for females. The results indicate that more meaningful goals represented by the GD condition resulted in significantly enhanced performance for the female rather than the male participants within the same group.

These findings suggest that integrating prosocial elements (e.g., donations) into goal-setting frameworks could be particularly motivational for female individuals. This supports our hypothesis that women may be more responsive to goals when paired with a prosocial dimension. However, the fact that this effect was significant when

comparing gender differences within the GD treatment, rather than when comparing women across treatments, indicates a nuanced interaction which warrants further investigation.

Table 3.7: Pairwise Comparisons of Gender Differences in Group Performance

GROUP	(I) GENDER	(J) GENDER	MEAN DIFFERENCE(I-J)	SE	P-VALUE
C	MALE	FEMALE	-46.74	37.56	0.21
D	MALE	FEMALE	-20.48	39.11	0.60
G	MALE	FEMALE	19.92	37.56	0.60
GD	MALE	FEMALE	-71.73**	37.68	0.05

Note: Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01

3.4.3 Treatment-Based Regression Analysis

It is crucial to conduct a more comprehensive analysis to determine the impact of the experimental conditions on performance. Hence, ordinary least squares (OLS) regression analysis was conducted, with performance being the dependent variable. The variable "Treatment" was included as the primary independent variable which encompasses the four experimental groups. Table 3.8 presents the results of three models: (1) The overall regression; (2) The regression for males; and (3) The regression for females.

Table 3.8: OLS Regression Analysis of Performance by Experimental Treatment & Gender

	(1) ALL	(1) MALE	(3) FEMALE
TREATMENT			
D	-10.35	1.67	-23.73
	(27.71)	(34.61)	(43.48)
G	45.99*	79.14**	9.04
	(27.02)	(33.38)	(43.08)
GD	24.02	17.12	31.52
	(27.03)	(32.39)	(43.92)
_CONS	-1.18	-76.5	85.18
	(95.99)	(116.9)	(155.16)
OBSERVATIONS	365	196	169
R^2	0.08	0.1	0.06

Note: Dependent variable: Performance. Controls include Productivity, Loss Aversion, Risk and BSCS. Standard errors are in parentheses. Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01

Model (1) reveals that being in the G treatment has a positive but only marginally significant effect on performance (coefficient = 45.99, p-value < 0.10). The D and GD treatments do not significantly affect performance. In Model (2), the results indicate that the G treatment significantly affects the performance of males (coefficient = 79.14, p-value < 0.05). Conversely, in Model (3), none of the experimental conditions demonstrate a statistically significant impact on performance among the female participants. These results underscore the complexity of designing effective goal-setting interventions. While goal-setting alone appears to be effective for males, integrating prosocial elements may require further refinement to achieve significant performance improvements for females.

3.4.4 Goal Ambition and Performance

The previous literature has established that goal ambition is essential for goals to be effective (Locke & Latham, 2002). Hence, the correlation between goal levels and performance has been examined to evaluate this in the current context. A Pearson correlation analysis revealed a significant positive relationship between goal levels and performance ($r = 0.57$, p-value < 0.01), thereby indicating a strong positive relationship between the two variables (see Figure 3.4).

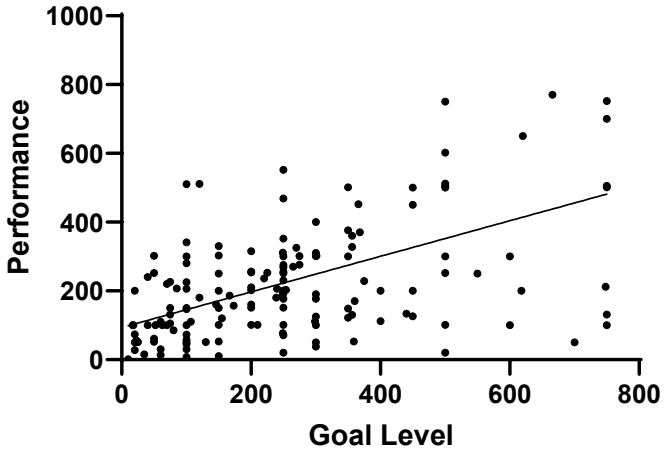


Figure 3.4: Correlation between goal level and performance

Moreover, the results of a similar analysis conducted into gender are presented in Figure 3.5. For the male participants, the correlation coefficient is 0.63 (p-value $<$ 0.01), whereas for the female participants, it is 0.49 (p-value < 0.01). These results indicate a relatively stronger correlation between goal level and performance for the male compared to the female participants.

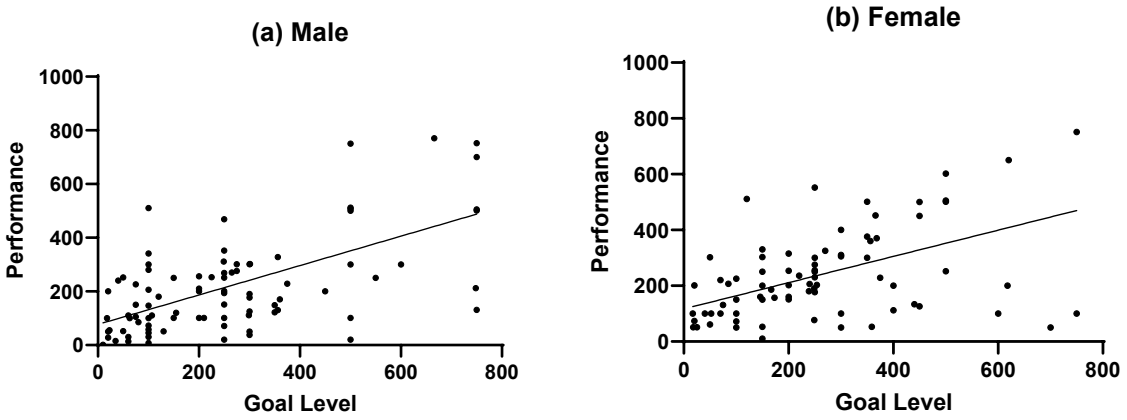


Figure 3.5: Correlation between goal level and performance by gender

We also analysed the correlation within the G and GD treatments, as displayed in Figure 3.6. The correlation coefficient for the G group is 0.42 (p-value < 0.01), whereas for the GD group, it is notably higher at 0.69 (p-value < 0.01). This substantial difference suggests that the combination of goal-setting with a donation element significantly enhances the correlation between goal level and performance. Table 3.9 summarises all of the correlations, showing that the highest correlation coefficient was achieved in the GD experimental condition.

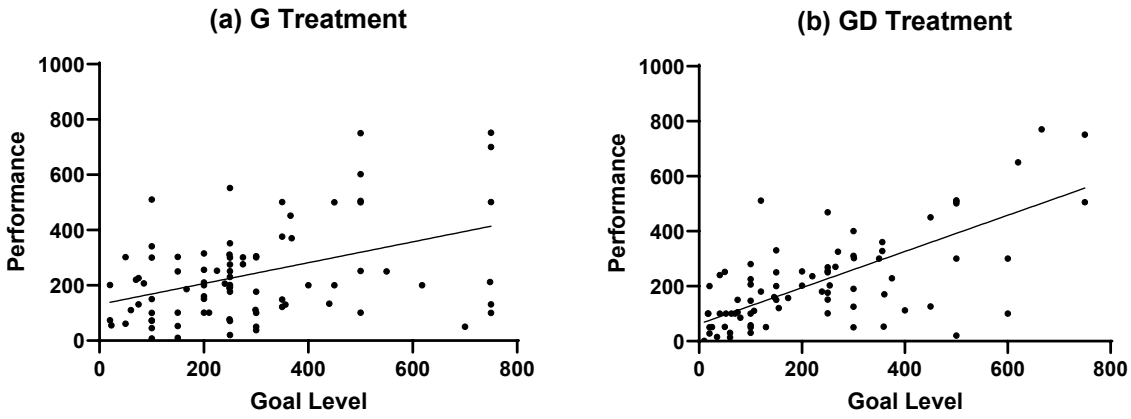


Figure 3.6: Correlation between goal level and performance by groups with goal element

Table 3.9: Summary of correlations between goal level and performance

CATEGORY	CORRELATION COEF.	P-VALUE
OVERALL	0.57	<0.001
MALE	0.63	<0.001
FEMALE	0.49	<0.001
GOAL-ONLY	0.43	<0.001
GOAL & DONATION	0.69	<0.001

Following the correlation analysis, we performed regression analyses to explore the relationship between goal level and performance whilst controlling for productivity. There are two reasons for selecting this approach. First, goal levels can be greatly affected by productivity. In the context of the current study, individuals who are more productive at counting may set higher goals, thereby affecting their performance. Second, as previously demonstrated in the balance check analysis, a marginally significant difference in productivity was recorded between treatments. By controlling for productivity in the regression models, we account for these differences and ensure that the observed relationship between goal level and performance is not driven by pre-existing differences in productivity across treatments.

The results of the regression analysis are presented in Table 3.10 below. We ran five models, the first of which included all of the participants. The second and third models focused on the male and female participants, respectively. The fourth and fifth models separately analysed the participants in the G and GD treatments. The findings

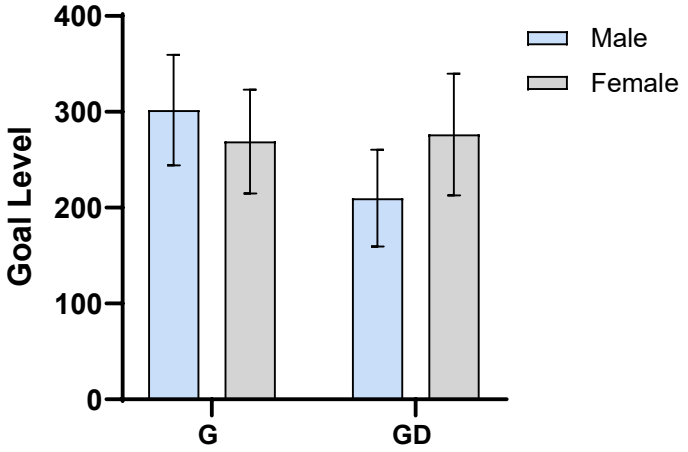
from the regression analysis further support the results of the correlation analysis, indicating a robust and significantly positive relationship between goal level and performance.

Table 3.10: Regression Analysis of Goal Level on Performance, Controlling for Productivity

	(1) ALL	(1) MALE	(3) FEMALE	(4) G	(5) GD
GOAL LEVEL	0.52***	0.54***	0.48***	0.38***	0.66***
	(0.06)	(0.07)	(0.09)	(0.08)	(0.07)
PRODUCTIVITY	3.4	3.2	2.77	2.87	3.84
	(2.71)	(3.6)	(4.26)	(4.08)	(3.65)
_CONS	41.47	30.8	71.19	83.66	7.08
	(45.36)	(56.53)	(76.92)	(73.18)	(57.45)
OBSERVATIONS	184	101	83	92	92
R^2	0.33	0.4	0.24	0.19	0.48

Note: Dependent Variable: Performance. Standard errors are in parentheses. * p< 0.1, ** p< 0.05, *** p< 0.01

The correlation and regression analysis reveals the importance of the goal level in influencing performance. To further understand how different experimental conditions affected the goal-setting behaviour of the genders, we analysed the goal levels set by the male and female participants in the G and GD treatments. Figure 3.7 illustrates the mean goal level values set by the male and female participants in the G and GD treatments. The data reveal notable differences in goal-setting behaviour between genders across the experimental conditions.



Note: Mean goal levels set by male and female participants in the G and GD treatments. Error bars represent 95% confidence intervals.

Figure 3.7: Comparison of Goal Ambition Between G and GD Groups by Gender

The analysis shows that the female participants set slightly higher goals in the GD treatment (M = 276.35, SE = 40) than the female participants in the G treatment (M = 269.00, SE = 43). However, this was not the case for the male participants, where participants in the G treatment (M = 301.94, SE = 49) set significantly higher goals compared to the males in the GD treatment (M = 209.87, SE = 52). This gender disparity could reflect underlying differences in how prosocial incentives are internalised and converted into motivation.

3.5 Discussion and Conclusion

The primary objective of the current study was to examine the influence of gender on the relationship between goal-setting, charitable donations and performance outcomes. We hypothesised that integrating a prosocial element via charitable donations would enhance the meaningfulness of goals. This approach was intended to make goal-setting effective, especially for women, based on the premise that women highly value the ability to make a positive social impact. In contrast, we expected this

approach to have less of an impact on males, who are typically more motivated by self-achievement than social outcomes.

The results reaffirm the efficacy of goal-setting as a motivational tool, especially for men. This aligns with the theoretical framework proposed by several previous economics studies (e.g., Hsiaw, 2013; Koch et al., 2014). The significant improvement in male performance observed in the G condition supports this theory and is consistent with the prior research (e.g., Clark et al., 2020; Smithers, 2015)

Our attempt to enhance goal effectiveness for females by incorporating a prosocial element (charitable donations) yielded intriguing, albeit statistically insignificant, results. Women in the GD condition exhibited a slight improvement in performance compared to the G condition, thereby indicating that prosocial incentives may resonate more with them, as suggested by Burbano et al. (2023). This finding aligns with the notion that women tend to derive more meaning from beneficence in their work, highlighting a potential avenue for future research into gender-sensitive goal-setting strategies.

One possibility to explain the discrepancy in goal-setting behaviour between the genders across the G and GD conditions is through the lens of intrinsic and extrinsic motivation. In our experimental design, the self-set non-binding goals can be primarily viewed as tapping into intrinsic motivation. This aligns with Self-Determination Theory (SDT) (Ryan & Deci, 2000) which posits that autonomy is a key factor in fostering intrinsic motivation. The non-binding nature of these goals suggests that

participants are driven by internal factors such as personal challenge rather than external pressure. On the other hand, the charitable donation element can be considered an extrinsic motivator. While it does not provide personal material gain, it introduces an external outcome tied to performance. In other words, it provides an additional reason for engaging in the task beyond personal achievement. The interaction between these intrinsic and extrinsic motivational elements appears to differ between genders, offering a compelling explanation for our observed results.

Another possible interpretation for the gender discrepancy in the GD condition is Motivation Crowding Theory (Frey & Jegen, 2001). For male participants, we observed what appears to be a crowding-out effect. The introduction of the extrinsic motivator (charitable donation) appears to have diminished the intrinsic motivation derived from personal goal-setting, which explains the lower goal ambition observed in the GD condition for males. This could be due to reduced feelings of autonomy or a shift in focus away from personal achievement, leading to a net reduction in motivation. Conversely, we observed what could be described as a crowding-in effect for the female participants. The charitable donation appears to have enhanced rather than undermined the intrinsic motivation from goal-setting, aligning with the slight increase in goal ambition observed for female participants in the GD condition. This suggests that the prosocial aspect might have resonated more strongly with women's values or preferences, complementing rather than conflicting with their intrinsic motivations.

Our findings also relate to the non-monotonic relationship between incentives and performance observed by Gneezy and Rustichini (2000) in their seminal paper "Pay Enough or Don't Pay at All." The relatively small amount of charitable donations in our study (averaging approximately £1) may be a critical factor in explaining the observed gender differences. This small sum may fall into what Gneezy and Rustichini would consider the "don't pay at all" category rather than the "pay enough" category. The introduction of a small prosocial incentive might have changed how the participants (especially the males) perceived the task without being large enough to enhance their motivation. For the female participants, even this small prosocial element appeared to have a slight positive effect, possibly due to their greater sensitivity to beneficence in work contexts.

These findings suggest that introducing prosocial elements to goal-setting frameworks may have unintended consequences. This underscores the complexity of designing motivational systems that effectively balance personal and prosocial incentives, particularly across genders.

While the current study provides valuable insights, it is important to note that there are also several limitations. Some of the findings lack significance, particularly regarding the effect of prosocial incentives on female performance. The lack of significance makes these findings suggestive rather than confirmatory and warrants a conservative interpretation. Future research could explore several directions. One possible path would be to vary the donation amounts. One could experiment with

different levels of donation linked to performance or fixed donations at various levels. Doing so could help to identify whether there is a threshold at which the prosocial incentive becomes motivating for both genders. Another approach would be to examine other sources of extrinsic motivation. The current study explored charitable donations as one channel but there may be other more effective extrinsic channels which can amplify the effectiveness of performance goals.

The current study contributes to the existing body of literature by highlighting the complex interplay between gender, goal-setting and prosocial incentives. While reaffirming the general effectiveness of goal-setting, the current findings underscore the need for more nuanced, gender-sensitive approaches. The potential for prosocial elements to enhance goal effectiveness, particularly for females, presents an exciting avenue for future research.

3.6 References

Andreoni, J., & Vesterlund, L. (2001). Which is the fair sex? Gender differences in altruism. *The Quarterly Journal of Economics*, *116*(1), 293-312.

Ariely, D., Kamenica, E., & Prelec, D. (2008). Man's search for meaning: The case of Legos. *Journal of Economic Behavior & Organization*, *67*(3-4), 671-677.

Barber, L. K., Grawitch, M. J., & Munz, D. C. (2012). Disengaging from a task: Lower self-control or adaptive self-regulation? *Journal of Individual Differences*, *33*(2), 76.

Bibby, P. A., & Ferguson, E. (2011). The ability to process emotional information predicts loss aversion. *Personality and Individual Differences*, *51*(3), 263-266.

Bryce, A. (2018). *Finding meaning through work: eudaimonic well-being and job type in the US and UK*.

Burbano, V. C., Folke, O., Meier, S., & Rickne, J. (2023). The Gender Gap in Meaningful Work. *Management Science*.

Cadena, B. C., & Keys, B. J. (2015). Human Capital and the Lifetime Costs of Impatience. *American Economic Journal: Economic Policy*, *7*(3), 126-153. https://doi.org/10.1257/pol.20130081

Cao, Y., Capra, C. M., & Su, Y. (2023). Do prosocial incentives motivate women to set higher goals and improve performance? *Journal of Economic Psychology*, *99*, 102659.

Cassar, L., & Meier, S. (2018). Nonmonetary incentives and the implications of work as a source of meaning. *Journal of Economic Perspectives*, *32*(3), 215-238.

Chandler, D., & Kapelner, A. (2013). Breaking monotony with meaning: Motivation in crowdsourcing markets. *Journal of Economic Behavior & Organization*, *90*, 123-133.

Charities Aid Foundation. (2023). *UK Giving Report*. https://www.cafonline.org/about-us/research

Clark, D., Gill, D., Prowse, V., & Rush, M. (2020). Using goals to motivate college students: Theory and evidence from field experiments. *Review of Economics and Statistics*, *102*(4), 648-663.

Cobb-Clark, D. A., Dahmann, S. C., Kamhöfer, D. A., & Schildberg-Hörisch, H. (2019). Self-Control: Determinants, Life Outcomes and Intergenerational Implications. *SOEPpapers on Multidisciplinary Panel Data Research* (1047). https://ideas.repec.org/p/diw/diwsop/diw_sp1047.html

Corgnet, B., Gómez-Miñambres, J., & Hernán-Gonzalez, R. (2018). Goal setting in the principal–agent model: Weak incentives for strong performance. *Games and Economic Behavior*, *109*, 311-326.

Dalton, P. S., Gonzalez, V., & Noussair, C. N. (2016). Self-chosen goals: Incentives and gender differences.

Diekman, A. B., Clark, E. K., Johnston, A. M., Brown, E. R., & Steinberg, M. (2011). Malleability in communal goals and beliefs influences attraction to stem careers: evidence for a goal congruity perspective. *Journal of Personality and Social Psychology*, *101*(5), 902.

Duckworth, A. L., Taxer, J. L., Eskreis-Winkler, L., Galla, B. M., & Gross, J. J. (2019). Self-control and academic achievement. *Annual Review of Psychology*, *70*(1), 373-399.

Dur, R., & Van Lent, M. (2019). Socially useless jobs. *Industrial Relations: A Journal of Economy and Society*, *58*(1), 3-16.

Eckel, C. C., & Grossman, P. J. (1998). Are women less selfish than men? Evidence from dictator experiments. *The Economic Journal*, *108*(448), 726-735.

Eckel, C. C., & Grossman, P. J. (2003). Rebate versus matching: does how we subsidize charitable contributions matter? *Journal of Public Economics*, *87*(3-4), 681-701.

Fan, W., Ren, M., Zhang, W., Xiao, P., & Zhong, Y. (2020). Higher Self-Control, Less Deception: The Effect of Self-Control on Deception Behaviors. *Advances in Cognitive Psychology*, *16*(3), 228.

Frey, B. S., & Jegen, R. (2001). Motivation crowding theory. *Journal of Economic Surveys*, *15*(5), 589-611.

Gneezy, U., Niederle, M., & Rustichini, A. (2003). Performance in competitive environments: Gender differences. *The Quarterly Journal of Economics*, *118*(3), 1049-1074.

Gneezy, U., & Rustichini, A. (2000). Pay enough or don't pay at all. *The Quarterly Journal of Economics*, *115*(3), 791-810.

Grant, A. M. (2008). Does intrinsic motivation fuel the prosocial fire? Motivational synergy in predicting persistence, performance, and productivity. *Journal of Applied Psychology*, *93*(1), 48.

Hsiaw, A. (2013). Goal-setting and self-control. *Journal of Economic Theory*, *148*(2), 601-626.

Kaiser, J. P., Koch, A. K., & Nafziger, J. (2024). Does goal revision undermine self-regulation through goals? An experiment. *Experimental Economics*. https://doi.org/10.1007/s10683-024-09826-0

Kamas, L., & Preston, A. (2015). Can social preferences explain gender differences in economic behavior? *Journal of Economic Behavior & Organization*, *116*, 525-539.

Koch, A. K., & Nafziger, J. (2011). Self-regulation through goal setting. *Scandinavian Journal of Economics*, *113*(1), 212-227.

Koch, A. K., Nafziger, J., Suvorov, A., & van de Ven, J. (2014). Self-rewards and personal motivation. *European Economic Review*, *68*, 151-167. https://doi.org/10.1016/j.euroecorev.2014.03.002

Konrad, A. M., Ritchie Jr, J. E., Lieb, P., & Corrigall, E. (2000). Sex differences and similarities in job attribute preferences: a meta-analysis. *Psychological Bulletin*, *126*(4), 593.

Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, *112*(2), 443-478.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, *57*(9), 705.

Miller, H. V., Barnes, J., & Beaver, K. M. (2011). Self-control and health outcomes in a nationally representative sample. *American Journal of Health Behavior*, *35*(1), 15-27.

Murphy, R. O., Ackermann, K. A., & Handgraaf, M. J. (2011). Measuring social value orientation. *Judgment and Decision making*, *6*(8), 771-781.

Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *The Quarterly Journal of Economics*, *122*(3), 1067-1101.

O'Donoghue, T., & Rabin, M. (1999). Doing it now or later. *American Economic Review*, *89*(1), 103-124.

Rosso, B. D., Dekas, K. H., & Wrzesniewski, A. (2010). On the meaning of work: A theoretical integration and review. *Research in Organizational Behavior*, *30*, 91-127.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68.

Schmeichel, B. J., & Zell, A. (2007). Trait self-control predicts performance on behavioral tests of self-control. *Journal of Personality*, *75*(4), 743-756.

Smithers, S. (2015). Goals, motivation and gender. *Economics Letters*, *131*, 75-77. https://doi.org/10.1016/j.econlet.2015.03.030

Sutter, M., Kocher, M. G., Glätzle-Rützler, D., & Trautmann, S. T. (2013). Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior. *American Economic Review*, *103*(1), 510-531. https://doi.org/10.1257/aer.103.1.510

Suvorov, A., & Van de Ven, J. (2008). Goal setting as a self-regulation mechanism. *Available at SSRN 1286029*.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, *72*(2), 271-324. https://doi.org/https://doi.org/10.1111/j.0022-3506.2004.00263.x

Thaler, R. (1981). Some empirical evidence on dynamic inconsistency. *Economics Letters*, *8*(3), 201-207.

Tonin, M., & Vlassopoulos, M. (2010). Disentangling the sources of pro-socially motivated effort: A field experiment. *Journal of Public Economics*, *94*(11-12), 1086-1092.

Warr, P. (2008). Work values: Some demographic and cultural correlates. *Journal of Occupational and Organizational Psychology*, *81*(4), 751-775.

CHAPTER 4

Goal-Setting, Self-Control and Academic Performance[7]

4.1 Introduction

Self-control can be defined as the ability to manage and direct one's cognitive, emotional and behavioural impulses to attain long-term objectives (Duckworth et al., 2015). The importance of self-control is especially evident in academic settings where it has been associated with better grades, attendance and interpersonal relationships (e.g., Duckworth & Seligman, 2005; Tangney et al., 2004; Zettler, 2011). Students with greater self-control are typically better able to balance their studies with their leisure activities, resulting in better academic achievement and well-being (Kuhnle et al., 2012).

Conversely, self-control failures are associated with various negative behaviours which can undermine academic success. For instance, they are linked to poor performance, bad habits, poor health conditions and deception (e.g., Fan et al., 2020; Miller et al., 2011; Schmeichel & Zell, 2007). Interestingly, despite being a non-intellectual attribute, Duckworth and Seligman (2005) found that self-control can predict academic performance more accurately than the intelligence quotient (IQ) score. Furthermore, Duckworth et al. (2015) propose that female students may

[7] This chapter is based on joint work with Fabio Tufano and Martin Sefton.

outperform male students in terms of academic achievement due to the fact that they have fewer self-control issues. The authors suggest that self-control could be a significant factor influencing the gender gap in academic attainment.

Economic models provide a theoretical basis for understanding how self-set goals can serve as an effective strategy to mitigate self-control issues (e.g., Hsiaw, 2013; Koch & Nafziger, 2011; Suvorov & Van de Ven, 2008). Individuals exhibiting present bias tend to overvalue immediate rewards and undervalue future benefits, leading to suboptimal decision-making. However, when a self-imposed goal is set, it functions as a reference point that triggers loss aversion. Deviations from the goal are perceived as losses, which loom larger than the gains associated with immediate gratification. This psychological cost of falling short of the goal often outweighs the short-term utility derived from impulsive behaviour, thereby incentivising individuals to allocate effort towards their long-term objectives.

Several experiments have examined the causal impact of goal-setting in education (e.g., Clark et al., 2020; Dobronyi et al., 2019; Saha & Roy, 2019; van Lent & Souverijn, 2020) but the findings of these studies differ considerably. In addition, there are concerns regarding some potentially harmful consequences. It has been established that when students are presented with challenging goals, they may resort to unethical behaviours such as cheating in an attempt to achieve the goal (e.g., Anderman et al., 2009; Murdock & Anderman, 2006; Niiya et al., 2008). Moreover, some tend to procrastinate because individuals tend to put off difficult tasks in order to avoid the possibility of failing to achieve the goal (Deemer et al., 2018). Besides, in

some cases, too narrow goals can lead to reduced creativity because individuals tend to focus on achieving the goal rather than exploring new ideas (Shalley, 1991). These concerns highlight the importance of tailoring goal-setting interventions to the specific needs of individuals rather than adopting a one-size-fits-all approach.

The current study is based on a field experiment aimed at addressing the role of self-control in moderating the effectiveness of goal-setting interventions in an educational setting. Based on insights gleaned from the previously mentioned theoretical economic models, we hypothesise that goal-setting will be particularly beneficial for students who have lower levels of self-control. Understanding these dynamics offers practical implications for educators and policymakers seeking to improve academic outcomes.

4.2 Literature Review

4.2.1 Goal Types

The economics and psychology literature have extensively investigated the concept of goal-setting. It has been established that goal-setting has non-trivial effects on individuals' performance. However, not all goals are created equal. They are defined and adopted differently from one research study to another. Goals can be categorised into various types depending on factors such as their source and nature. A comprehensive overview of these nuances is required to make an informed decision regarding the appropriate type of goals to use in a particular context.

Nature of Goals Perspective

The previous literature encompasses several types of goals, such as proximal versus distal, challenging versus easy, and specific versus general goals. Each type presents distinct advantages and disadvantages. It is necessary to consider the characteristics of each type when designing and implementing goal-setting interventions. The following paragraphs provide a brief overview of these types.

Distal or long-term goals are set to be accomplished in the distant future. The ultimate destination is well-defined in these types of goals. Conversely, proximal goals serve as stepping stones towards long-term goals. Proximal goals may not provide a clear perception of the ultimate objectives. Nonetheless, they provide a sense of accomplishment and progress towards the long-term goal. In their study, Manderlink and Harackiewicz (1984) instructed students in the treatment groups to set either a distal or proximal goal for solving puzzles. There was a series of 10-word puzzles, each lasting for 3 minutes. In the distal goal condition, students were asked to indicate how many puzzles they would solve in the entire series (e.g., "I will find 60 words in all 10 puzzles"). In contrast, students in the proximal condition were instructed to set a specific performance goal for each puzzle before they started it (e.g., "I will find 6 words in this puzzle"). The authors concluded that proximal goals successfully encouraged satisfaction and students' confidence in their abilities. On the other hand, distal goals were found to effectively promote long-term persistence and effort towards the goals.

Challenging goals are those that are set to be accomplished with a high level of difficulty. According to Locke and Latham (2002), these goals provide a sense of

challenge and purpose, leading to increased motivation and engagement. On the other hand, easy goals may not sufficiently challenge individuals and may fail to stimulate motivation and engagement. Moreover, Locke and Latham (2002) emphasise that goals should be specific, which means that they are set with specific details and a clear outcome. Doing so can provide a clear direction and focus, leading to the desired result being achieved. However, specific goals can sometimes be too restrictive, particularly when creativity is required. As Shalley (1991) suggests, levels of creativity may be significantly reduced unless productivity goals are complimented with creativity goals.

Goal Source Perspective

Goals can be classified as self-set, other-set and group-set, all of which are distinguished by their source. The effectiveness of these types of goals in terms of motivating individuals and promoting achievement is contingent upon the source from which they originate. Recognising the distinct characteristics of each type is crucial in conceptualising and implementing goal-setting interventions.

Self-set goals can be described as goals that individuals personally establish for themselves. Those goals do not require high levels of external supervision. Despite this autonomy, previous research has demonstrated that self-set goals positively influence performance in various contexts. For instance, Toussaert (2016) demonstrated that individuals who used personal goals as commitment devices were more likely to adhere to weight loss regimens. Similarly, Harding and Hsiaw (2014) found that self-set energy conservation goals resulted in significant reductions in energy consumption. They conducted a field experiment in which households were randomly assigned to either a

treatment group which set a goal for reducing energy consumption or a control group which received information about energy conservation without setting a goal. The results demonstrated that households in the treatment group reduced their energy consumption significantly more than those in the control group. This reduction was more pronounced for consumers who set attainable goals.

A concern regarding self-set non-binding goals is the lack of necessary structures and guidance in the self-set goal process. Individuals may be prone to specifying goals that are either too easy or unattainable. Being extreme on either side can lead to suboptimal outcomes. While setting goals that are too easy may not challenge individuals to strive for more remarkable achievements, setting goals that are too difficult may result in frustration. Individuals need to strike a balance between setting challenging yet achievable goals which require thoughtful deliberation and preparation. Harkins and Lowe (2000) emphasised this by stating that the effectiveness of self-set goals is contingent on involving participants in a pre-test equivalent to the experimental task before setting their goals. This practice can help individuals to determine an appropriate level of goal to pursue.

Other-set goals, also referred to as externally set goals, are established by external sources such as educators, trainers or supervisors. In contexts where individuals lack the expertise to set their own goals, such as enrolling on a new level of education or employment, external goal-setting can ensure that goals are aligned with the individual's capabilities and progress. In a lab experiment, Corgnet et al. (2015) explored the effectiveness of externally set goals and found that challenging but

attainable goals set by managers led to improved worker performance. The study also showed that goal-setting was most effective when monetary incentives were strong. This finding suggests that goal-setting may provide intrinsic motivation and increase workers' performance beyond what is achieved when using solely monetary incentives. Nonetheless, when individuals are not engaged well with external sources, they may become demotivated. Deci and Ryan (2000) proposed a connection between SDT and the successful pursuit of a goal. SDT posits that individuals have three basic psychological needs: autonomy, competence and relatedness. Autonomy refers to individuals' sense of having control over their behaviour. Competence relates to individuals' feeling capable of achieving their goals, whereas relatedness refers to the perception of being supported while striving to attain those goals. When these psychological needs are unmet, externally set goals may be perceived as restrictive and reduce motivation and engagement.

Fan et al. (2020) proposed a hybrid approach in which both self-set and other-set goals are utilised. They examined the interaction effect of introducing both types of goals to a real-effort task. The participants performed the task under different goal conditions. Some of them were given goals assigned by the experiments, whereas others had to do a similar task after setting their own goals. The participants were exposed to four conditions where the type and difficulty of the goals varied. Another important aspect is that the participants were switched between self-set and externally set goals. The findings of this study indicate that goal-setting, regardless of the goal's source, is effective in enhancing motivation and performance. Additionally, goal-setting is most

practical when previous goals have been achieved. In other words, success generates success. However, personal goals play a moderating role in this relationship. In cases where the assigned goals are less ambitious than the personal goals, participants tend to perform better in the task. This result indicates that personal goals can affect individuals' efforts under assigned goals. The authors suggested that these findings have implications for goal-setting in organisations because assigning goals that are too difficult may lead to decreased motivation and performance, whereas setting goals that are too easy may not challenge employees to reach their full potential. One should seek to strike a balance between challenge and achievability to maximise motivation and performance.

Group-set goals are those set by a group of individuals, such as a team or a class. Locke et al. (1988) determined certain factors which can enhance the effectiveness of group goals. They mentioned that factors such as peer influence and rewards can influence the efficacy of such goals. Group-set goals can instil a sense of shared purpose and accountability. Similar to other types of external goals, group-set goals may also be prone to the potential risk of not considering the individual's values and interests. Thus, effective communication within the group becomes crucial. Another potential detrimental behaviour associated with this type of goal is the phenomenon of social loafing. This phenomenon occurs when individuals rely on the efforts of others and do not fully contribute to the goal (Karau & Williams, 1993).

4.2.2 Goal-Setting and Academic Performance

In academic settings, field experiments have been conducted to determine the effect of goal-setting on academic performance. For instance, Clark et al. (2020) asked treated students at the start of the semester to set a goal for their final course grade. The study could not detect any significant academic improvement. In another one-time intervention, Dobronyi et al. (2019) asked students to write about their personal life goals as part of an online task. At a later stage, half of the participants received a reminder about their goals. The results showed no significant difference in academic performance between the treated and the control groups. Meanwhile, van Lent and Souverijn (2020) extended this approach by introducing mentoring support. During a one-to-one mentoring session, mentors asked the treated students what grade they planned to achieve in a specific course. Another treatment encouraged the students to consider replacing their initial goal with a more ambitious one. While the first treatment positively affected performance, the more ambitious treatment did not demonstrate a significant difference from the control group. This result referred to the change in commitment and the social cost of rejecting the raised goal. Both can stem from the mentor's active presence during the decision. The presence of a mentor may have led students to agree to goals which they did not fully internalise.

One reason why performance-based goal-setting interventions may be ineffective is the timing of the intervention. Several studies encourage students to set distal academic goals at the start of the semester. Students may set unrealistic goals at this early stage due to their high uncertainty regarding the course's material and teaching

methods. A more practical approach may be to delay goal-setting until the students understand the course content more clearly.

Another line of experiments has introduced a task-based goal-setting approach. Instead of asking students to set goals for their final grade, they are encouraged to set goals for productive study activities which are believed to be critical inputs in the grade function. This approach has demonstrated a better impact on performance (e.g., Clark et al., 2020; Saha & Roy, 2019). Nonetheless, studying involves various actions such as class attendance, understanding the material, solving problem sets and forming study groups. Determining which study tasks to prioritise for reinforcement remains a challenge.

In the current study, the goal-setting intervention was integrated into one of the modules at the University of Nottingham. The design was deliberately structured to minimise alterations to the existing module framework. This approach avoided clashes with the university's regulations and made the intervention straightforward and applicable to academics and practitioners. The following section details the experimental design and the characteristics of the goals introduced in this field experiment.

4.3 Experimental Design and Procedures

The field experiment was conducted at the University of Nottingham in the UK[8]. The sample comprised first-year undergraduate economics students registered on an introductory economics module. This module lasts for a full academic year and consists of two consecutive parts. During the first semester, topics related to microeconomics were covered, whereas the second semester covered topics in macroeconomics. The scope of the current study was restricted to the first semester only, which started in October 2022 and ended in January 2023[9]. The module employs various teaching methods, including pre-recorded lectures, in-person lectures and in-person tutorial sessions. Recorded lectures and additional learning materials are made available through the university's learning management system (Moodle). The tutorial sessions are held bi-weekly and are led by graduate teaching assistants (GTAs). At the end of the first semester, students take an online multiple-choice exam to assess the microeconomics component. Approximately one month before that formal assessment, all of the students are given the opportunity to take a practice online multiple-choice exam. Like the formal assessment, the practice exam had 30 questions, with 5 possible answers for each question. Also, the practice exam was similar to the formal assessment in terms of the difficulty of the questions.

[8] The study received ethical approval from the Nottingham School of Economics Research Ethics Committee on 27/09/2022.

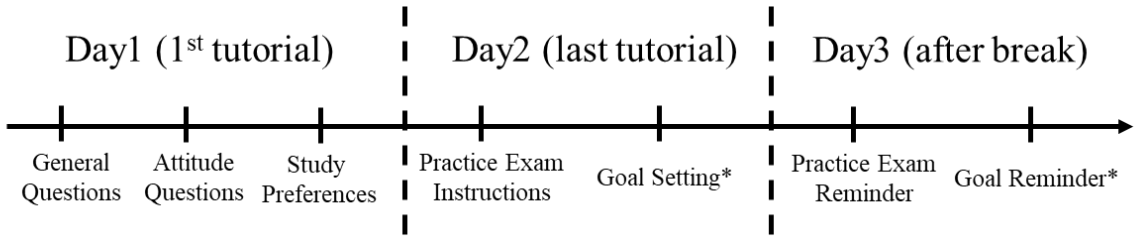
[9] It should be noted that in this year, tutorials returned to an in-person format because in the previous year tutorials had been conducted online due to the Covid-19 pandemic.

The total number of students registered on the module was 358. They were divided into tutorial groups of approximately 25 individuals each. The in-person tutorial sessions were ideal for implementing the goal-setting intervention because attendance was mandatory and this setting offers greater control over the intervention process. Apart from the routine communications related to the course, the students were contacted for experimental purposes on three distinct occasions. For clarity, we refer to these interactions as Day 1, Day 2 and Day 3, respectively. The primary intervention in our experiment involved instructing students to set performance goals for the practice multiple-choice exam, which was released before the formal assessment. The practice exam could be taken unlimited times, with students being shown their scores after each attempt. However, they were not informed about which specific answers (if any) were incorrect.

The goal-setting intervention differs from those applied in the prior research in several key aspects (e.g., Clark et al., 2020; Saha & Roy, 2019). First, instead of asking the students to set goals for the final exam, they were encouraged to set goals for the practice exam. This approach allowed students to take corrective action and repeatedly attempt the practice exam until they achieved their desired score. This feature is not feasible in the formal exam where results are final and there is no opportunity for study preparation adjustments. By repeating the study task, the students were able to adjust their study strategies, gain more knowledge and become better prepared for the final assessment. Furthermore, setting goals for the practice exam reduces the likelihood of cheating because the task is voluntary and does not carry any academic credit. Second,

the previous studies have tended to ask students to set goals at the commencement of the semester. As previously mentioned, a concern about this approach is that it may be too difficult for students to set realistic goals. At the start of the semester, there is usually considerable uncertainty regarding teaching materials and methods. This is particularly the case for a first-semester first-year module which will be the students' first experience of university teaching. Hence, the current intervention was designed to be implemented towards the end of the semester, while still providing sufficient study time before the final assessment.

Figure 4.1 clarifies the sequence of the experiment's phases regarding their purpose and timing. In the subsequent sections, these phases are discussed in detail.



* Only for treated students

Figure 4.1: Experimental Design Phases

4.3.1 Procedures for Day 1

Day 1 was the initial tutorial session that students attended for this module. During this session, the students received general information about the module and were asked to complete a 15-minute survey. All of the students received a Qualtrics platform invitation link sent to their university email address. The first page of the survey included a consent form which outlined the purpose of the research and informed the students about their rights as participants. To encourage participation,

the students were also informed that a random selection from the participant pool would be awarded a £50 Amazon gift voucher as a token of appreciation. All 290 students who attended Day 1 consented to participate in the study. Table 4.1 below presents the gender and ethnicity distribution of the sample.

Table 4.1: General Characteristics of the Sample

	Frequency	**Percentage (%)**	**Cumulative Percentage (%)**
Gender			
Male	210	72.41	72.41
Female	80	27.59	100
Ethnicity			
Asian	89	30.69	30.69
Black	24	8.28	38.97
Mixed	34	11.72	50.69
White	131	45.17	95.86
Other	12	4.13	100
Observations	**290**		

Following the consent page, the survey comprised three distinct sections: (1) General questions; (2) Attitude questions; and (3) Study activity preferences[10]. In the first section, students were asked general questions about their gender, age and ethnicity. In the attitude stage, three measures were incorporated to elicit their self-control, loss aversion and willingness to take risks. First, the students completed the BSCS by Tangney et al. (2004). This was followed by the loss aversion measure of Bibby and Ferguson (2011), which was inspired by Gächter et al. (2007). Then, the students' willingness to take risks was elicited using the measure developed by Dohmen et al. (2011). The final section instructed the students to rank six common study activities based on their perceived importance. For instance, one of the activities was

[10] Experimental materials are reproduced in Appendix C

'Attend and pay attention in class.' Students were instructed to rank each activity from 1 (most important) to 6 (least important).

After obtaining data from Day 1, a between-subject design was utilised, with participants randomly assigned to either the control or treatment group. The randomisation process was stratified based on the BSCS and gender. We first divided the participants by gender and then used the BSCS median as a cut-off point to classify the participants as having either high or low self-control. This approach resulted in four strata: males with high self-control, males with low self-control, females with high self-control and females with low self-control. No manipulations were implemented for either of the experimental treatments until Day 2.

4.3.2 Procedures for Day 2

Day 2 marked the final tutorial session of the semester, held in the final week before the Christmas break. At this point, the module's microeconomics content had been fully covered. The students were about to begin a month-long break, with formal assessments scheduled to commence in January 2023 after the break. On Day 2, the students had an ordinary tutorial session led by their GTAs but the last 15 minutes were dedicated to the goal-setting intervention.

A QR code was displayed to enable the students to log into the Qualtrics survey link. Upon logging into the link, the students were reminded that the practice multiple-choice exam would be released by the end of the week. In addition, they were presented with a sample of three questions to give them an example of the type of questions that

they might expect. The students in the control group were directed to the end page immediately after completing the sample questions. In contrast, the treated students had one extra goal-setting question. These students were asked: "What mark (out of 30) do you aim to achieve in the practice multiple-choice exam?" Answering this question was optional and the students could skip it if they so wished and proceed to the end of the survey. It should be noted that the attrition rate on Day 2 was unexpectedly high. While the original sample consisted of 290 students, only 140 attended on Day 2.

4.3.3 Procedures for Day 3

The practice exam was made available for the students from the final teaching week in December 2022 until mid-January 2023. Day 3 took place immediately after the Christmas break. It involved sending reminders to all of the students (regardless of their experimental group) that the practice exam was still available. However, the students in the treatment group received an additional reminder about the specific goal they had set for themselves on Day 2.

Now that the experiment's design has been explained, we proceed to the results section. In this context, performance is measured by the practice and final multiple-choice exam marks. For the practice exam mark, the students' best score from their attempts was used.

4.4 Results

Table 4.2 provides a summary of the experiments' main variables. In the current section, the collected data are analysed to provide insights into the effectiveness of goal-setting with regards to academic performance.

Table 4.2: Summary of Variables and Measures Used in the Experiment

Variable	**Measure**
BSCS	13-item self-reported survey questions (Tangney et al., 2004).
Loss Aversion	Ten hypothetical lotteries with a 50% chance to win/lose (Bibby & Ferguson, 2011).
Risk	A general question regarding the willingness to take risks on a scale from 1 to 10 (Dohmen et al., 2011).
Goal	Treated subjects' responses to 'What mark (out of 30) do you aim to achieve in the practice multiple-choice exam?'
Practice Exam	Students' marks in the practice multiple-choice exam.
Final Exam	Students' marks in the final multiple-choice exam.

After collecting data from the 290 students who attended Day 1 of the experiment, there was a significant attrition of approximately 52%. Understanding the factors contributing to this attrition is crucial because systematic dropout could introduce bias into the results. We analysed whether participant characteristics affected the likelihood of students continuing to participate in the study. Because attrition leads to a binary outcome (i.e., whether a participant attended Day 2 or not), logistic regression is an appropriate tool to analyse which characteristics influenced this dropout. In Table 4.3, the dependent variable is 'AttendedDay2,' which takes a value of 1 if a participant attended Day 2 and 0 if they did not. The independent variables included in the model are participant characteristics that were measured prior to randomisation.

Table 4.3: Logistic Regression Analysis of Attrition (Day 2)

ATTENDEDDAY2	
GENDER	1.15
	(0.31)
AGE	0.91
	(0.17)
LOSS AVERSION	0.95
	(0.05)
BSCS	1.03*
	(0.02)
RISK	0.98
	(0.07)
_CONS	1.8
	6.29
OBSERVATIONS	290
R^2	0.01

Note: Dependent variable: AttendedDay2 (1 if the participant attended Day 2, 0 otherwise). Standard errors in parentheses. Significance levels: * p < 0.1, ** p < 0.05, *** p < 0.01.

The logistic regression results indicate that most of the participant characteristics did not significantly influence the likelihood of continuing to Day 2. However, BSCS were marginally more likely to continue participating (p-value <0.10). The characteristics of the 140 students who attended Day 2 are presented in Table 4.4.

Table 4.4: Descriptive Statistics of Key Variables

Variable	**N**	**Mean**	**Std. Dev**	**Min**	**Max**
Risk	140	6.44	1.73	1	10
Loss Aversion	140	6.01	2.32	0	10
SC Score	140	43.64	7.97	20	61
Goal	53	24.89	3.83	20	30
Practice Exam	68	20.52	7.18	1	30
Final Exam	140	19.08	4.37	2	28

Note: The sample size for the practice exam is smaller due to incomplete participation in the practice exam, whereas the final exam data represent the entire sample.

On a scale of 1 to 10, the average willingness to take risk score was 6.44 (Std Dev. = 1.73), thereby indicating moderate risk-taking propensity among the students. Similarly, loss aversion was recorded at moderate levels, with an average score of 6.01 (Std Dev. = 2.32). The BSCS had a mean value of 43.64 (Std Dev. = 7.97). The average mark in the practice exam was 20.52 out of a possible 30. Note that the sample size with regards to this variable was even smaller (n = 68) because not all of the students completed the practice exam. On the other hand, the final exam was completed by the entire sample and exhibited an average score of 19.08 (Std Dev. = 4.37).

Table 4.5 represents a balance check, ensuring the comparability of the experimental groups. As can be seen, there is no significant difference between the treatment and control groups regarding the general characteristics or experimental variables. This confirms that attrition did not introduce any bias that could compromise the validity of the randomisation.

Table 4.5: Balance Check of the Control and Treatment Groups

	Control Group		**Treatment Group**		**Diff.**	
Variable	**M**	**SD**	**M**	**SD**	**Δ**	**p-value**
Age	18.31	0.56	18.40	0.59	0.09	0.36
Risk	6.54	1.57	6.36	1.86	0.18	0.54
Loss Aversion	6.00	2.26	6.01	2.39	0.01	0.98
BSCS	42.71	8.29	44.44	7.65	1.73	0.20
Observations	**65**		**75**			

Note: Based on t-tests, the control and treatment groups show no statistically significant differences in key baseline characteristics, thereby confirming group comparability.

Having established the baseline characteristics and group comparability, we examine the effects of the goal-setting intervention on practice task engagement and

exam performance. Additionally, we explore whether individual differences, particularly gender and self-control, moderate the effects of the goal-setting intervention on academic performance.

4.4.1 Practice Task Engagement

We begin by assessing the impact of the goal-setting intervention on students' engagement with the practice task. A logistic regression model was employed to identify any differential patterns among the Control and Treatment groups, focusing on their likelihood of attempting the optional practice test (see Table 4.6). Students who attempted the test at least once were coded as '1,' whereas those who opted out completely were coded as '0.' This binary variable is referred to as 'practice status.' Moreover, the participants were further divided into two subgroups within the treatment group: the 'NoGoal' group, those who did not set a goal, and the 'GoalSet' group, those who set a goal. This distinction emerged because the participants were encouraged, but not required, to set goals.

Table 4.6: Logistic Regression Analysis on the Impact of Goal-Setting on Practice Task Engagement

	(1) ALL	(2) MALE	(3) FEMALE
GROUP			
NOGOAL	1.84	2.34	1.76
	(0.94)	(1.54)	(1.69)
GOALSET	2.05*	4.53***	0.36
	(0.79)	(2.26)	(0.29)
_CONS	0.96	2304.42	0.00
	(5.57)	(17382.32)	(0.00)
OBSERVATIONS	140	99	41
R^2	0.05	0.13	0.15

Note: Odds ratios are presented with standard errors in parentheses. Controls include age, BSCS, risk and loss aversion. See Appendix C for detailed results.

When the entire cohort is considered (Model 1), students in the Goal group had an odds ratio of 2.05 (p-value < 0.10), thereby indicating that they were approximately twice as likely to attempt the practice task compared to those in the control group. This result provides preliminary evidence that non-binding goals can motivate students to engage in study activities. The NoGoal group also had an odds ratio greater than one (1.84) but this was not statistically significant.

Previous studies, such as those by Smithers (2015) and Clark et al. (2020), have observed gender differences in response to goal-setting interventions. Building on these findings, we conducted a gender-specific analysis to explore potential differences in how males and females responded to the goal-setting intervention. When the sample was split by gender, the results indicated intriguing gender effects. In Model 2 of the table, which considers only male students, those in the Goal group had an odds ratio of 4.53 (p-value < 0.01). This indicates that males who set goals were nearly five times more likely to engage with the practice exam than the control group. Again, no treatment effect was observed among the students in the NoGoal group.

Interestingly, the female students demonstrated a different pattern. The odds ratio for those in the Goal group was less than one (0.36) and greater than one for those in the NoGoal group (1.76). However, neither of these ratios were significant. Thus, in accordance with the findings of previous studies, goal-setting interventions

may not have the same motivational effect on female students as they do on male students[11].

4.4.2 Is Goal-setting Effective in Terms of Performance?

The current experiment primarily investigates the effectiveness of goal-setting in terms of students' academic performance. After examining engagement with the practice task, we now use OLS regressions to determine whether students in the goal-setting treatment perform better in both the practice and final exams. However, we encountered further attrition because not all of the students who remained on Day 2 chose to take the practice test. Of the students who attended Day 2, only 68 attempted the practice test at least once. Before proceeding with the analysis, we examine whether this additional attrition introduces systematic bias.

The logistic regression results displayed in Table 4.7 examine the likelihood of students completing the practice test based on the participants' characteristics. The analysis includes 140 observations, representing all students who attended Day 2. The results indicate that none of the characteristics significantly predict whether students attempted the practice test at least once. These results indicate that the additional attrition is not driven by systematic differences in participants' characteristics. Therefore, the goal-setting intervention analysis can proceed without significant concerns regarding selection bias from this dropout.

[11] Note, however, that only 44 female students attended Day 2 and took the practice exam, so the lack of significance could reflect low statistical power.

Table 4.7: Logistic Regression Analysis of Practice Test Completion

COMPLETED_PRACTICE	
GENDER	0.95
	(0.36)
AGE	1.03
	(0.32)
LOSS AVERSION	1.12
	(0.09)
BSCS	1.01
	(0.02)
RISK	0.92
	(0.1)
_CONS	0.37
	(2.11)
OBSERVATIONS	140
R^2	0.02

Note: Dependent variable: Completed Practice (1 if the participant completed the practice test, 0 otherwise). Standard errors in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 4.8 presents the results, with Models (1) and (2) assessing performance in the practice exam, whereas Models (3) and (4) focus on the final exam.

Table 4.8: Goal-setting Treatment Effect on Practice and Final Exam Performance

	(1) PRACTICE EXAM	(2) PRACTICE EXAM	(3) FINAL EXAM	(4) FINAL EXAM
BSCS	0.34*	0.39**	-0.18	-0.13
	(0.19)	(0.2)	(0.11)	(0.11)
GROUPS				
NOGOAL	-24.75*	-25.43*	-8.61	-8.76
	(14.55)	(14.57)	(8.4)	(7.8)
GOAL	23.51**	23.03*	-15.45**	-13.52**
	(11.15)	(11.5)	(6.44)	(6.16)
GROUPS * BSCS				
NOGOAL	0.49	0.5	0.18	0.19
	(0.32)	(0.32)	(0.18)	(0.17
GOALSET	-0.53**	-0.55**	0.32**	0.25*
	(0.25)	(0.26)	(0.15)	(0.14)
_CONS	5.51	30.16	27.69***	62.60***
	(8.48)	(28.58)	(4.89)	(15.3)
CONTROLS	NO	YES	NO	YES
R2	0.2	0.28	0.1	0.31
N	68	68	68	68

Note: OLS regression standard errors in parentheses. Control variables in Models (2) and (4) include age, BSCS, risk and loss aversion. See Appendix C for full results.

Models (1) and (2) reveal that being in the GoalSet treatment has a significant positive effect on performance (coefficient = 23.51, p-value < 0.05 & coefficient = 23.03, p-value < 0.10, respectively). However, high self-control students appear to benefit less from the intervention, as suggested by the negative interaction between the GoalSet treatment and BSCS (coefficient = -0.53, p-value < 0.05). This could indicate that high self-control students may already have effective study habits and sufficient motivation to guide their performance.

The results for the final exam indicate a different pattern. Students in the GoalSet treatment performed worse than those in the control group, with a significant negative

effect (coefficient = -13.52, p-value < 0.05). One possible explanation for this is that while goal-setting may have helped students to focus on the practice test, it could have led them to over-prioritise the practice task at the expense of adequately preparing for the final exam. Interestingly, high self-control students interacted positively with the goal-setting intervention in the final exam (Model 4, coefficient = 0.25, p- value $<$ 0.10). This suggests that high self-control students were less likely to let the focus on the practice test undermine their preparation for the final exam.

4.5 Discussion & Conclusion

The current study investigates the effects of goal-setting interventions on academic performance. Particular attention was paid to how individual disparities such as self-control and gender moderate these effects. The experiment's results reveal a complex interplay between goal-setting, self-control and academic performance which fluctuates across different stages of study preparation.

The findings indicate that goal-setting can significantly increase students' engagement with practice tasks. Students in the Goal treatment were more than twice as likely to attempt the optional practice exam than those in the control group. However, this effect was not uniform across genders. Male students in the Goal treatment were nearly five times more likely to engage with the practice exam, whereas female students demonstrated no significant increase in engagement. This gender disparity aligns with the findings reported in the previous research (e.g., Clark et al., 2020; Smithers, 2015) suggesting that men and women may respond differently to goals.

In terms of performance, students in the Goal treatment outperformed the NoGoal and Control treatments in the practice exam. This suggests that goal-setting not only increased engagement with the practice exam but also translated into improved performance. However, this positive effect did not persist in the final exam. In fact, students in the Goal treatment underperformed in the final exam compared to both the Control and NoGoal treatments.

The interaction between goal-setting and self-control adds further nuance to the findings. Students with lower self-control scores appeared to benefit more from goal-setting during the practice phase. However, by the time of the final exam, the interaction between goal-setting and self-control reversed. Students with less self-control performed worse in the final exam. This reversal in performance could be explained by overconfidence. Herranz-Zarzoso and Sabater-Grande (2020) report that students who overestimate their abilities tend to perform worse. In the context of the current study, the initial success in the practice exam among the treated students may have led to an inflated sense of confidence in their ability. Consequently, this adversely affected their effort allocation for the final exam. In contrast, students with higher self-control scores performed better in the final exam, thereby suggesting that they could integrate the goal-setting intervention into their broader study strategies.

The findings suggest that goal-setting can be a powerful tool for increasing engagement and improving performance in the short-term but its long-term effectiveness is more nuanced. By tailoring goal-setting strategies to the needs of different student groups, educators can enhance the overall efficacy of these

interventions, thereby ensuring that they promote sustained academic success. However, it is important to note that the rate of attrition and the relatively small sample size overall may restrict the generalisability of our findings. A larger sample could have provided more robust insights, especially in terms of exploring how individual traits such as self-control and gender interact with goal-setting interventions.

4.6 References

Anderman, E. M., Cupp, P. K., & Lane, D. (2009). Impulsivity and academic cheating. *The Journal of Experimental Education*, *78*(1), 135-150.

Bibby, P. A., & Ferguson, E. (2011). The ability to process emotional information predicts loss aversion. *Personality and Individual Differences*, *51*(3), 263-266.

Clark, D., Gill, D., Prowse, V., & Rush, M. (2020). Using goals to motivate college students: Theory and evidence from field experiments. *Review of Economics and Statistics*, *102*(4), 648-663.

Corgnet, B., Gómez-Miñambres, J., & Hernán-Gonzalez, R. (2015). Goal setting and monetary incentives: When large stakes are not enough. *Management Science*, *61*(12), 2926-2944.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268.

Deemer, E. D., Yough, M., & Morel, S. A. (2018). Performance-approach goals, science task preference, and academic procrastination: Exploring the moderating role of competence perceptions. *Motivation and Emotion*, *42*, 200-213.

Dobronyi, C. R., Oreopoulos, P., & Petronijevic, U. (2019). Goal setting, academic reminders, and college success: A large-scale field experiment. *Journal of Research on Educational Effectiveness*, *12*(1), 38-66.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, *9*(3), 522-550.

Duckworth, A. L., & Seligman, M. E. (2005). Self-discipline outdoes IQ in predicting academic performance of adolescents. *Psychological Science*, *16*(12), 939-944.

Duckworth, A. L., Shulman, E. P., Mastronarde, A. J., Patrick, S. D., Zhang, J., & Druckman, J. (2015). Will not want: Self-control rather than motivation explains the female advantage in report card grades. *Learning and Individual Differences*, *39*, 13-23.

Fan, J., Gómez-Miñambres, J., & Smithers, S. (2020). Make it too difficult, and I'll give up; let me succeed, and I'll excel: The interaction between assigned and personal goals. *Managerial and Decision Economics*, *41*(6), 964-975.

Fan, W., Ren, M., Zhang, W., Xiao, P., & Zhong, Y. (2020). Higher Self-Control, Less Deception: The Effect of Self-Control on Deception Behaviors. *Advances in Cognitive Psychology*, *16*(3), 228.

Gächter, S., Johnson, J., & Herrmann, A. (2007). Individual-level loss aversion in riskless and risky choices. CeDEx Discussion Paper 2007-02.

Harding, M., & Hsiaw, A. (2014). Goal setting and energy conservation. *Journal of Economic Behavior & Organization*, *107*, 209-227.

Harkins, S. G., & Lowe, M. D. (2000). The effects of self-set goals on task performance. *Journal of Applied Social Psychology*, *30*(1), 1-40.

Herranz-Zarzoso, N., & Sabater-Grande, G. (2020). *Monetary incentives and overconfidence in academic performance: An experimental study*.

Hsiaw, A. (2013). Goal-setting and self-control. *Journal of Economic Theory*, *148*(2), 601-626.

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of personality and Social Psychology*, *65*(4), 681.

Koch, A. K., & Nafziger, J. (2011). Self-regulation through goal setting. *Scandinavian Journal of Economics*, *113*(1), 212-227.

Kuhnle, C., Hofer, M., & Kilian, B. (2012). Self-control as predictor of school grades, life balance, and flow in adolescents. *British Journal of Educational Psychology*, *82*(4), 533-548.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation: A 35-year odyssey. *American Psychologist*, *57*(9), 705.

Locke, E. A., Latham, G. P., & Erez, M. (1988). The determinants of goal commitment. *Academy of Management Review*, *13*(1), 23-39.

Manderlink, G., & Harackiewicz, J. M. (1984). Proximal versus distal goal setting and intrinsic motivation. *Journal of Personality and Social Psychology*, *47*(4), 918.

Miller, H. V., Barnes, J., & Beaver, K. M. (2011). Self-control and health outcomes in a nationally representative sample. *American Journal of Health Behavior*, *35*(1), 15-27.

Murdock, T. B., & Anderman, E. M. (2006). Motivational perspectives on student cheating: Toward an integrated model of academic dishonesty. *Educational Psychologist*, *41*(3), 129-145.

Niiya, Y., Ballantyne, R., North, M. S., & Crocker, J. (2008). Gender, contingencies of self-worth, and achievement goals as predictors of academic cheating in a controlled laboratory setting. *Basic and Applied Social Psychology*, *30*(1), 76-83.

Saha, B., & Roy, S. (2019). Goal setting as a motivator for student performance: evidence from lab experiments. *Journal of Higher Education Theory and Practice.*, *19*(3), 153-165.

Schmeichel, B. J., & Zell, A. (2007). Trait self-control predicts performance on behavioral tests of self-control. *Journal of Personality*, *75*(4), 743-756.

Shalley, C. E. (1991). Effects of productivity goals, creativity goals, and personal discretion on individual creativity. *Journal of Applied Psychology*, *76*(2), 179.

Smithers, S. (2015). Goals, motivation and gender. *Economics Letters*, *131*, 75-77. https://doi.org/10.1016/j.econlet.2015.03.030

Suvorov, A., & Van de Ven, J. (2008). Goal setting as a self-regulation mechanism. *Available at SSRN 1286029*.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High Self-Control Predicts Good Adjustment, Less Pathology, Better Grades, and Interpersonal Success. *Journal of Personality*, *72*(2), 271-324. https://doi.org/https://doi.org/10.1111/j.0022-3506.2004.00263.x

Toussaert, S. (2016). Connecting commitment to self-control problems: Evidence from a weight loss challenge. In *Technical Report*. mimeo, NYU.

van Lent, M., & Souverijn, M. (2020). Goal setting and raising the bar: A field experiment. *Journal of Behavioral and Experimental Economics*, *87*, 101570.

Zettler, I. (2011). Self-control and academic performance: Two field studies on university citizenship behavior and counterproductive academic behavior. *Learning and Individual Differences*, *21*(1), 119-123.

Chapter 5

Conclusion

This thesis is structured around three self-contained studies, each examining different aspects of self-set non-binding goals. Together, these studies provide a comprehensive exploration of how individual differences and contextual factors influence the impact of goal-setting interventions.

In Chapter 2, goal-setting had a more substantial positive effect on male individuals with low self-control. Moreover, the effectiveness of goal-setting may be contingent not only on the presence of loss aversion but also on its magnitude. In Chapter 3, the results showed that women performed better when goals were tied to charitable outcomes, whereas men responded more positively to traditional goal-setting without the prosocial element. In Chapter 4, it was found that students who set performance goals for a practice exam were more likely to engage with this study activity and achieve higher marks. However, the effect of goal-setting did not persist in the final exam. In fact, treated students underperformed in the final exam.

These findings have important implications for both theory and practice. The thesis contributes to the goal-setting literature by demonstrating that self-control, loss aversion and gender are key moderating variables. It also highlights the potential for prosocial goals to enhance performance, particularly for female participants. In

practice, these results suggest that customised goal-setting interventions are necessary to maximise performance.

One of the most intriguing findings was the pattern of individuals not achieving their goals. Theoretical models, particularly those relying on loss aversion, suggest that participants should exert increased effort to avoid the psychological cost of falling short. However, many participants did not meet their goals, which partially contradicts these expectations. Additionally, the relationship between loss aversion and effort in this experiment did not align with the predictions of the theoretical model. Rather than increasing effort to avoid losses, participants with higher loss aversion did not exert as much effort as expected in the goal-setting condition.

From a practical standpoint, one of the most important contributions of this research is the demonstration that goal-setting is a relatively cost-effective and straightforward intervention that can still yield significant impacts. Implementing self-set non-binding goals requires minimal financial investment and can be easily integrated into educational, professional, and personal development contexts.

In conclusion, while this thesis offers valuable insights into the factors influencing goal-setting and performance, it also highlights the need for continued theoretical and empirical development. By refining the current models and expanding the research into diverse contexts, we can enhance our understanding of goal-setting interventions and their practical applications.

APPENDICES

A Chapter 2

A.1 Additional Analysis

Table A.1: Goal-setting Treatment Effect on Performance by Gender

	(1) MALE	(2) FEMALE
AGE	-10.87	0.07
	(6.25)	(5.92)
BSCS	1.09	-3.15
	(2.35)	(2.33)
TASK PLEASURE	10.75	14.24
	(18.97)	(19.16)
RISK	-10.74	2.67
	(10.57)	(8.49)
PRODUCTIVITY	6.83	3.03
	(4.7)	(5.83)
GOALSET	13.65	-216.41
	(129.08)	(188.71)
LOSS AVERSION	4.32	-58.67
	(30.9)	(37.85)
GOALSET * LOSS AVERSION	-4.62	29.21
	(19.3)	(26.95)
_CONS	273.43	605.07
	(292.35)	(355.22)
OBSERVATIONS	78	92
R^2	0.12	0.08

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.2: Goal-setting Treatment Effect on Performance by Self-Control Status

	(1) LOW SC	(2) HIGH SC
GENDER	22.29	-39.96
	(41.26)	(33.95)
AGE	-6.79	-4.55
	(8.06)	(4.73)
TASK PLEASURE	3.5	7.96
	(19.31)	(18.98)
RISK	8.45	-10.95
	(11.09)	(8.54)
PRODUCTIVITY	0.73	7.73
	(5.74)	(4.83)
GOALSET	-41.92	-54.98
	(182.81)	(126.35)
LOSS AVERSION	-32.52	0.99
	(40.31)	(27.9)
GOALSET * LOSS AVERSION	8.42	2.96
	(26.23)	(18.58)
_CONS	372.67	306.38
	(313)	(283.38)
OBSERVATIONS	75	95
R^2	0.09	0.13

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.3: Goal-setting Treatment Effect on Performance by Gender & Self-Control Status

	MALE		FEMALE	
	(1)	(2)	(3)	(4)
	LOW SC	HIGH SC	LOW SC	HIGH SC
AGE	-10.43	-11.16	-6.61	4.8
	(10.2)	(8.12)	(12.11)	(6.89)
TASK PLEASURE	-12.77	-14.62	-18.27	10.26
	(21.11)	(32.78)	(34.83)	(24.44)
RISK	-10.99	-14.29	20.73	-12.25
	(14.52)	(14.81)	(15.79)	(10.71)
PRODUCTIVITY	-7.86	9.85	0.85	6.93
	(6.64)	(8.24)	(10.38)	(7.22)
LOSS AVERSION	103.46*	5.68	-103.86	14.8
	(51.75)	(41.44)	(62.17)	(49.04)
GOALSET	566.94**	-88.86	-444.35	85.27
	(221.87)	(177.63)	(307.75)	(252.65)
GOALSET * LOSS AVERSION	-68.97**	2.03	54.48	-14.08
	(30.72)	(26.7)	(44)	(36.07)
_CONS	-315.94	517.76	1006.5*	-89.94
	(425.55)	(452.25)	(559.68)	(437.92)
OBSERVATIONS	34	44	41	51
R^2	0.4	0.22	0.21	0.15

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: Determinants of Goals' Levels for the Treatment Group by Gender

	(1) MALE	(2) FEMALE
AGE	-4.02	-0.62
	(4.91)	1.84)
TASK PLEASURE	-4.46	28.08**
	(15.06)	(10.87)
LOSS AVERSION	-5.96	3.67
	(8.13)	(5.69)
RISK	-2.02	1.67
	(9.29)	(3.21)
PRODUCTIVITY	-4.94	-2.98
	(4.73)	(2.93)
BSCS	0.15	-3.00**
	(2.08)	(1.2)
GOALSLIDER	0.46***	0.79***
	(0.12)	(0.08)
_CONS	297.77	93.91
	(184.4)	(90.94)
OBSERVATIONS	38	42
R^2	0.36	0.9

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Goal-setting Treatment Effect on Performance by Gender (Wave 2)

	(1) MALE	(2) FEMALE
AGE	-9.16*	5.76
	(5.11)	(11.31)
BSCS	-2.55	-0.39
	(1.55)	(2.52)
TASK PLEASURE	22.46*	51.38**
	(12.24)	(23.89)
RISK	8.77	4.84
	(8.88)	(12.04)
PRODUCTIVITY	9.27***	4.52
	(2.91)	(4.91)
GOALSET	201.87**	-431.80**
	(85.09)	(214.12)
LOSS AVERSION	53.12**	-87.68**
	(21.96)	(43.47)
GOALSET * LOSS AVERSION	-33.07**	58.08*
	(13.7)	(30.97)
_CONS	-142.08	485.35
	(182.52)	(403.98)
OBSERVATIONS	83	78
R^2	0.27	0.25

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.6: Goal-setting Treatment Effect on Performance by Self-Control Status (Wave 2)

	(1) LOW SC	(2) HIGH SC
AGE	-7.7	-10.14
	(6.71)	(10.47)
GENDER	2.5	48.87
	(40.92)	(38.13)
TASK PLEASURE	38.57**	27.42
	(16.42)	(19.68)
RISK	-5.98	9.1
	(11.29)	(10.78)
PRODUCTIVITY	12.32***	0.48
	(3.65)	(3.92)
GOALSET	20.2	-110.89
	(130.88)	(119.36)
LOSS AVERSION	10.19	-29.99
	(31.43)	(28)
GOALSET * LOSS AVERSION	-6.61	13.66
	(20.45)	(17.98)
_CONS	-6.96	419.23
	(246.32)	(330.46)
OBSERVATIONS	81	80
R^2	0.31	0.23

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Goal-setting Treatment Effect on Performance by Gender & Self-Control Status (Wave2)

	MALE		FEMALE	
	(1)	(2)	(3)	(4)
	LOW SC	HIGH SC	LOW SC	HIGH SC
AGE	-17.91*	-5.16	-17.23	-27.77
	(10.47	(7.05)	(26.71)	(18.77)
TASK PLEASURE	-3.3	28.79	16.1	50.33
	(21.57	(23.28)	(40.11)	(30.14)
RISK	-1.81	11.29	14.29	-12.28
	(12.42	(21.83)	(18.85)	(15.39)
PRODUCTIVITY	9.08**	10.93**	-4.82	10.65
	(4.32	(4.42)	(7.13)	(6.49)
LOSS AVERSION	90.33**	36.62	-125.76*	-87.42
	(35.92	(35.23)	(65.59)	(66.17)
GOALSET	314.28**	162.93	-564.02	-443.67
	(137.25	(136.39)	(354.82)	(283.82)
GOALSET * LOSS AVERSION	-51.55**	-26.65	80.75	61.26
	(20.95	(22.95)	(50.3)	(41.86)
_CONS	-167.69	-276.34	1386.67*	1070.92*
	(332.97	(244.66)	(782.82)	(593.19)
OBSERVATIONS	38	45	35	43
R^2	0.33	0.27	0.43	0.44

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

A.2 Instructions

Day 1

Start of Block: Welcome

Welcome to **Day 1** of the research study "Working on Online Tasks".

Today's session will take around **30 minutes** and it consists of **3 stages**.

Stage 1: General Questions.
Stage 2: Attitude Questions.
Stage 3: Online Task.

Your earnings from Day 1 are summarised as follows:

Stage 1: £1.00
Stage 2: £3.00
Stage 3: Depending on your performance in the task, you can earn up to £4.00

You can only **participate in this session once**. Hence, only your first time responses will be considered.

Be careful! Do not use the back / forward / reload screen / close the browser / buttons on your browser toolbar.

Doing so will invalidate results, in which case you will not receive payments.

Please press the 'Next' button to move on to the next page.

End of Block: Welcome

Start of Block: ID & Email

Enter your University of Nottingham email

_____

Enter your PayPal email

_____

End of Block: ID & Email

Start of Block: General Characteristics

Stage 1: General Questions

Please answer the following questions:

1) What is your gender?

- Male
- Female
- Other
- Prefer not to say

2) What is your age (in years)?

_____

3) What is your ethnicity?

- Asian or Asian British
- Black, Black British, Caribbean or African
- Mixed
- White
- Other
- Prefer not to say

4) What type of degree are you studying for?

- Bachelor
- Master
- PhD
- Other

End of Block: General Characteristics

Start of Block: Attitude Questions

Stage 2: Attitude Questions

This stage consists of 4 sections: A, B, C & D. Please answer the questions carefully.

You will be paid £3 for completing this stage.

Please click the 'Next' button to start with section A.

Page Break

Stage 2

Section A

Imagine you were given the choice between receiving a payment today or a payment in 12 months.

We will now present to you 5 situations, where:

- The payment today is the same in each of these situations.

- The payment in 12 months is different in every situation.

- For each of these situations, we would like to know which you would choose.

Please assume there is no inflation, i.e. future prices are the same as today's prices.

Page Break

Please consider the following:

Would you rather receive £100 today or £154 in 12 months?

- Today
- In 12 months

Skip To: T7.17 If Please consider the following: Would you rather receive £100 today or £154 in 12 months? = Today

Skip To: T7.2 If Please consider the following: Would you rather receive £100 today or £154 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £125 in 12 months?

- Today
- In 12 months

Skip To: T7.10 If Please consider the following: Would you rather receive £100 today or £125 in 12 months? = Today

Skip To: T7.3 If Please consider the following: Would you rather receive £100 today or £125 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £112 in 12 months?

- Today
- In 12 months

Skip To: T7.7 If Please consider the following: Would you rather receive £100 today or £112 in 12 months? = Today

Skip To: T7.4 If Please consider the following: Would you rather receive £100 today or £112 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £106 in 12 months?

- Today
- In 12 months

Skip To: T7.6 If Please consider the following: Would you rather receive £100 today or £106 in 12 months? = Today

Skip To: T7.5 If Please consider the following: Would you rather receive £100 today or £106 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £103 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £103 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £103 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £109 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £109 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £109 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £119 in 12 months?

- Today
- In 12 months

Skip To: T7.8 If Please consider the following: Would you rather receive £100 today or £119 in 12 months? = Today

Skip To: T7.9 If Please consider the following: Would you rather receive £100 today or £119 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £122 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £122 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £122 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £116 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £116 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £116 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £139 in 12 months?

- Today
- In 12 months

Skip To: T7.14 If Please consider the following: Would you rather receive £100 today or £139 in 12 months? = Today

Skip To: T7.11 If Please consider the following: Would you rather receive £100 today or £139 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £132 in 12 months?

- Today
- In 12 months

Skip To: T7.13 If Please consider the following: Would you rather receive £100 today or £132 in 12 months? = Today

Skip To: T7.12 If Please consider the following: Would you rather receive £100 today or £132 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £129 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £129 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £129 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £136 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £136 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £136 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £146 in 12 months?

- Today
- In 12 months

Skip To: T7.16 If Please consider the following: Would you rather receive £100 today or £146 in 12 months? = Today

Skip To: T7.15 If Please consider the following: Would you rather receive £100 today or £146 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £143 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £143 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £143 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £150 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £150 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £150 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £185 in 12 months?

- Today
- In 12 months

Skip To: T7.18 If Please consider the following: Would you rather receive £100 today or £185 in 12 months? = Today

Skip To: T7.25 If Please consider the following: Would you rather receive £100 today or £185 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £202 in 12 months?

- Today
- In 12 months

Skip To: T7.22 If Please consider the following: Would you rather receive £100 today or £202 in 12 months? = Today

Skip To: T7.19 If Please consider the following: Would you rather receive £100 today or £202 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £193 in 12 months?

- Today
- In 12 months

Skip To: T7.20 If Please consider the following: Would you rather receive £100 today or £193 in 12 months? = Today

Skip To: T7.21 If Please consider the following: Would you rather receive £100 today or £193 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £197 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £197 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £197 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £189 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £189 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £189 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £210 in 12 months?

- Today
- In 12 months

Skip To: T7.23 If Please consider the following: Would you rather receive £100 today or £210 in 12 months? = Today

Skip To: T7.24 If Please consider the following: Would you rather receive £100 today or £210 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £215 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £215 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £215 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £206 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £206 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £206 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £169 in 12 months?

- Today
- In 12 months

Skip To: T7.29 If Please consider the following: Would you rather receive £100 today or £169 in 12 months? = Today

Skip To: T7.26 If Please consider the following: Would you rather receive £100 today or £169 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £161 in 12 months?

- Today
- In 12 months

Skip To: T7.28 If Please consider the following: Would you rather receive £100 today or £161 in 12 months? = Today

Skip To: T7.27 If Please consider the following: Would you rather receive £100 today or £161 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £158 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £158 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £158 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £165 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £165 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £165 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £177 in 12 months?

- Today
- In 12 months

Skip To: T7.31 If Please consider the following: Would you rather receive £100 today or £177 in 12 months? = Today

Skip To: T7.30 If Please consider the following: Would you rather receive £100 today or £177 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or 173 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or 173 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or 173 in 12 months? = In 12 months

Page Break

Please consider the following:

Would you rather receive £100 today or £181 in 12 months?

- Today
- In 12 months

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £181 in 12 months? = Today

Skip To: End of Block If Please consider the following: Would you rather receive £100 today or £181 in 12 months? = In 12 months

Page Break

End of Block: Time Preferences

Start of Block: Loss Aversion

Stage 2

Section B

Below are 10 hypothetical lotteries. Please indicate for each lottery whether you would 'accept' it - that is, play the lottery with its chance of winning or losing -, or 'reject' it - that is, not win or lose anything.

	Accept	Reject
50% chance of losing £2; 50% chance of winning £10	○	○
50% chance of losing £3; 50% chance of winning £10	○	○
50% chance of losing £4; 50% chance of winning £10	○	○
50% chance of losing £5; 50% chance of winning £10	○	○
50% chance of losing £6; 50% chance of winning £10	○	○
50% chance of losing £7; 50% chance of winning £10	○	○
50% chance of losing £8; 50% chance of winning £10	○	○
50% chance of losing £9; 50% chance of winning £10	○	○
50% chance of losing £10; 50% chance of winning £10	○	○
50% chance of losing £11; 50% chance of winning £10	○	○

End of Block: Loss Aversion

Start of Block: Self-Control Scale

Stage 2

Section C

In this section you will be presented with 13 statements. From 1 (not at all like me) to 5 (very much like me), please indicate how much each of the following statements reflects how you typically are.

1) I am good at resisting temptation.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

2) I have a hard time breaking bad habits.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

3) I am lazy.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

4) I say inappropriate things.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

5) I do certain things that are bad for me, if they are fun.

- 1 not at all like me
- 2
- 3

- 4
- 5 very much like me

6) I refuse things that are bad for me.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

7) I wish I had more self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

8) People would say that I have iron self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

9) Pleasure and fun sometimes keep me from getting work done.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

10) I have trouble concentrating

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

11) I am able to work effectively toward long-term goals.

- 1 not at all like me
- 2
- 3
- 4

- 5 very much like me

12) Sometimes I can't stop myself from doing something, even if I know it is wrong.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

13) I often act without thinking through all the alternatives.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

Page Break

End of Block: Self-Control Scale

Start of Block: Risk

Stage 2

Section D

On a scale from (0) to (10), how willing are you to take risks, in general?

- not willing to take risks
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 very willing to take risks

End of Block: Risk

Start of Block: Productivity Task

Stage 3: Online Task

Your task will now be to count zeros in a series of tables.

Such a table looks like follows and once you have counted the number of zeros in a table, you should enter the number of zeros in that table into a field below the table.

How many zeros are in the table above?

1	0	0	1	0
1	0	1	1	0
0	1	1	0	1
1	1	0	0	0
0	0	0	0	1
1	0	1	1	0

(**16** is the correct answer for this table)

Page Break

On the next page you will have **3 minutes to count zeros** in up to **40 tables**.

You earn 10 p for each table where you counted the number of zeros correctly.

Once you finish a table, please scroll down to access the next table.

The remaining time will be displayed. After the 3 minutes have elapsed, all your entered answers will be saved and you will automatically be redirected to the next screen.

Be careful! Do not use the back / forward / reload screen / close the browser / buttons on your browser toolbar.

Doing so will invalidate results, in which case you will not receive payments.

Please press the 'Next' button to move on to the next page.

Page Break

0 3 0 0

1	0	0	1	0
1	0	1	1	0
0	1	1	0	1
1	1	0	0	0
0	0	0	0	1
1	0	1	1	0

How many zeros in the table **above**?

*40 tables similar to this one

Page Break

You answered <number of correct answers> table(s) correctly.

End of Block: Productivity Task

Start of Block: Task Pleasure

How much do you like the task of counting zeros?

- 5 - Like a great deal
- 4 - Like somewhat
- 3 - Neither like nor dislike
- 2 - Dislike somewhat
- 1 - Dislike a great deal

End of Block: Task Pleasure

Start of Block: Day 2 instructions & Goal-setting

Congratulations! You have completed all Day 1 stages.

Please read the following important instructions about Day 2

On Day 2 of the study (28th July), between **0:00 and 23:59**, you will have the opportunity to count the number of zeros in as many tables as you like.

You will earn a piece rate, that is, a payment for each table in which you count the numbers of zeros correctly (for simplicity we call this a "correctly counted table").

The piece rate varies with the number of tables that you count as follows:

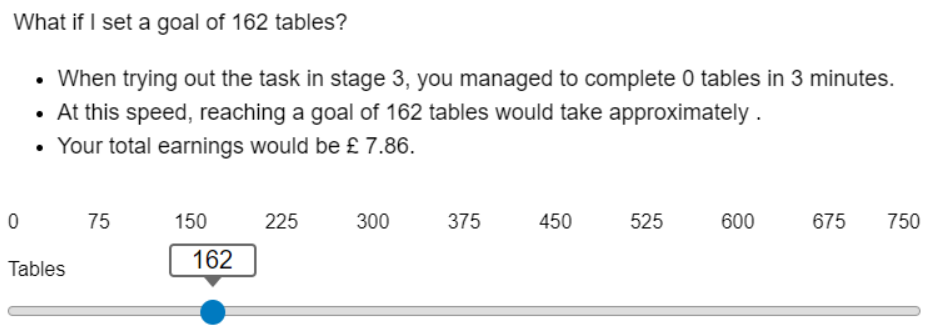
Number of Correclty Counted Tables	Piece Rate Earning (p)
1 to 50	6.0
51 to 100	5.0
101 to 150	4.0
151 to 200	3.0
201 to 250	2.0
251 to 300	1.0
301 to 350	0.9
351 to 400	0.8
401 to 450	0.7
451 to 500	0.6
501 to 550	0.5
551 to 600	0.4
601 to 650	0.3
651 to 700	0.2
701 to 750	0.1
751 and beyond	0.0

You will need to work on the task in "one go". That is, once you start, **if you are inactive for more than 30 minutes**, the computer will record the number of correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

Below, we give you feedback on your performance on the task today. Play around a bit with the slider below.

Use the slider to indicate different tables. The text above will then explain how much time you would need and what your earnings would be (if you worked at the same speed as when you tried out the task before).

Note: The slider stops at 750 because if you count more tables your earnings do not change.



Your Goal

We ask you to set a goal for yourself. But, of course you will be free to work as much as you want.

We will remind you of your goal in Day 2.

How many correct tables do you aim to submit Day 2 of the experiment (next week)?

_____

End of Block: Goal-setting

Start of Block: End Page

This is the end of Day 1. Thank you for your participation.

Your earnings for today are as follows:

Activity	Earning (£)
Stage 1	1
Stage 2	3
Stage 3	0
Total	**4**

As mentioned in the invitation email, all your earnings from Day 1 & Day 2 will be transfered to your PayPal account within a week after finishing Day 2.

You will receive a link via email on the 28th of July to gain access to Day 2.

Now you can close the browser.

Day 2 Instructions

Start of Block: Welcome Day 2

Welcome to Day 2 of the research study

"Working on Online Tasks"

Enter your University of Nottingham email

_____

Confirm your University of Nottingham email

_____

End of Block: Welcome_Day 2

Start of Block: instructions

Instructions Reminder

Today, you will have the opportunity to count the number of zeros in as many tables as you like until 23:59

You will earn a piece rate which varies with the number of tables that you count as follows:

Number of Correclty Counted Tables	Piece Rate Earning (p)
1 to 50	6.0
51 to 100	5.0
101 to 150	4.0
151 to 200	3.0
201 to 250	2.0
251 to 300	1.0
301 to 350	0.9
351 to 400	0.8
401 to 450	0.7
451 to 500	0.6
501 to 550	0.5
551 to 600	0.4
601 to 650	0.3
651 to 700	0.2
701 to 750	0.1
751 and beyond	0.0

You will need to work on the task in "one go". That is, once you start, **if you are inactive for more than 30 minutes**, the computer will record the number of correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

End of Block: instructions

Start of Block: Real-Effort Instructions

The Task Next, random tables with random zeros and ones will be displayed. There are up to 1,100 tables. Please insert the number of zeros in every table, and click the 'Next' button to move to the next table. You will see how many tables have been answered correctly. Please click 'End the Task' button only if you want to finish the task and do not want to solve any further questions. If you did not submit any answer for 30 minutes, your previous answers will be recorded and the task will be ended. You can only **participate in this session once**. Hence, only your first time responses will be considered.

Be careful ! do not use the back / forward / reload screen / close the browser / buttons on your browser toolbar.

Doing so may invalidate results, in which case you will not receive payments.

When you are ready to start, press the 'next' button.

Page Break

Goal Reminder (If Treatment Group)

Previously, you set a goal to submit <Goal> **tables**.

If you achieve your goal, you will earn **£** <Goal Associated Earnings>

End of Block: Real-Effort Instructions

Start of Block: Real-Effort Task

Display This Question:

If EndLoop != 1

And timeout != 1

Total Correct Answers: 0

1	0	0	1	1
0	0	0	0	1
1	0	1	0	1
0	1	1	0	0
1	1	1	0	0
1	0	0	0	0

How many zeros are there in the table?

End The Task Next

End of Block: Real-Effort Task

Start of Block: End Page

Congratulations! You have completed Day 2 of the experiment.

You submitted 0 correct tables in Day 2.

Your earnings in this experiment are as follows:

Sessions	Earning (£)
Day 1	
Day 2	
Total	

Your total earnings from Day 1 & Day 2 will be transferred to your PayPal account within one week.

Thank you for your participation in this experiment.

Now you can close the browser.

B Chapter 3

B.1 Additional Analysis

Table B.1: OLS Regression Analysis of Performance by Experimental Group & Gender

	(1) ALL	(1) MALE	(3) FEMALE
AGE	0.53	2.56	-1.73
	(3.61)	(4.98)	(5.22)
LOSS AVERSION	2.93	8.97*	-3.85
	(4.91)	(5.5)	(8.32)
SVO	-0.32	-0.16	-0.51
	(0.67)	(0.82)	(1.09)
PRODUCTIVITY	3.13	2.18	4.25
	(2.29)	(2.96)	(3.52)
BSCS	2.74**	2.88*	2.57
	(1.21)	(1.5)	(1.93)
GROUP			
D	-10.35	1.67	-23.73
	(27.71)	(34.61)	(43.48)
G	45.99*	79.14**	9.04
	(27.02)	(33.38)	(43.08)
GD	24.02	17.12	31.52
	(27.03)	(32.39)	(43.92)
_CONS	-1.18	-76.5	85.18
	(95.99)	(116.9)	(155.16)
OBSERVATIONS	365	196	169
R^2	0.08	0.1	0.06

B.2 Instructions

Day 1

Start of Block: Welcome

Welcome to **Day 1** of the research study "Working on Online Tasks".

Today's session will take around **30 minutes** and it consists of **3 stages**.

Stage 1: General Questions.
Stage 2: Attitude Questions.
Stage 3: Online Task.

Your earnings from Day 1 are summarised as follows:

Stage 1: £1.00
Stage 2: £3.00
Stage 3: Depending on your performance in the task, you can earn up to £4.00

You can only **participate in this session once**. Hence, only your first time responses will be considered.

Be careful! Do not use the back / forward / reload screen / close the browser / buttons on your browser toolbar.

Doing so will invalidate results, in which case you will not receive payments.

Please press the 'Next' button to move on to the next page.

End of Block: Welcome

Start of Block: ID & Email

Enter your University of Nottingham email

_____

Confirm your University of Nottingham email

_____

Enter your PayPal email

_____

Confirm your PayPal email

_____

End of Block: ID & Email

Start of Block: General Characteristics

Stage 1: General Questions

Please answer the following questions:

1) What is your gender?

- Male
- Female
- Other
- Prefer not to say

2) What is your age (in years)?

_____

3) What is your ethnicity?

- Asian or Asian British
- Black, Black British, Caribbean or African
- Mixed
- White
- Other
- Prefer not to say

4) What type of degree are you studying for?

- Bachelor
- Master
- PhD
- Other

End of Block: General Characteristics

Start of Block: Attitude Questions

Stage 2: Attitude Questions

This stage consists of 4 sections: A, B, C & D. Please answer the questions carefully. Please click the 'Next' button to start with section A.

Page Break

Start of Block: Loss Aversion

Stage 2

Section A

Below are 10 hypothetical lotteries. Please indicate for each lottery whether you would 'accept' it - that is, play the lottery with its chance of winning or losing -, or 'reject' it - that is, not win or lose anything.

	Accept	Reject
50% chance of losing £2; 50% chance of winning £10	○	○
50% chance of losing £3; 50% chance of winning £10	○	○
50% chance of losing £4; 50% chance of winning £10	○	○
50% chance of losing £5; 50% chance of winning £10	○	○
50% chance of losing £6; 50% chance of winning £10	○	○
50% chance of losing £7; 50% chance of winning £10	○	○
50% chance of losing £8; 50% chance of winning £10	○	○
50% chance of losing £9; 50% chance of winning £10	○	○
50% chance of losing £10; 50% chance of winning £10	○	○
50% chance of losing £11; 50% chance of winning £10	○	○

End of Block: Loss Aversion

Start of Block: SVO

Stage 2: Attitude Questions

Section B

In this task, **imagine** that you have been randomly paired with another person, whom we will refer to as **the other**. This other person is someone you do not know and will remain mutually anonymous. All of your choices would be completely confidential.

You will be making a series of decisions about allocating resources between you and this other person. For each of the following questions, please indicate the distribution you prefer most by **selecting the payoff allocations**. You can only make one selection for each question. Your decisions will yield money for both yourself and the other person. In the example below, a person has chosen to distribute the payoff so that he/she receives £50 , while the anonymous other person receives £40.

There are no right or wrong answers, this is all about personal preferences. After you have made your decision, select the resulting distribution of money by clicking on your choice. As you can see, your choices will influence both the amount of money you receive as well as the amount of money the other receives.

You Receive (£)	85	85	85	85	85	85	85	85	85
Other Receives (£)	85	76	68	59	50	41	33	24	15
You Receive (£)	85	87	89	91	93	94	96	98	100
Other Receives (£)	15	19	24	28	33	37	41	46	50
You Receive (£)	50	54	59	63	68	72	76	81	85
Other Receives (£)	100	98	96	94	93	91	89	87	85
You Receive (£)	50	54	59	63	68	72	76	81	85
Other Receives (£)	100	89	79	68	58	47	36	26	15
You Receive (£)	100	94	88	81	75	69	63	56	50
Other Receives (£)	50	56	63	69	75	81	88	94	100
You Receive (£)	100	98	96	94	93	91	89	87	85
Other Receives (£)	50	54	59	63	68	72	76	81	85

End of Block: SVO

Start of Block: Self-Control Scale

Stage 2

Section C

In this section you will be presented with 13 statements. From 1 (not at all like me) to 5 (very much like me), please indicate how much each of the following statements reflects how you typically are.

1) I am good at resisting temptation.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

2) I have a hard time breaking bad habits.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

3) I am lazy.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

4) I say inappropriate things.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

5) I do certain things that are bad for me, if they are fun.

- 1 not at all like me
- 2
- 3

- 4
- 5 very much like me

6) I refuse things that are bad for me.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

7) I wish I had more self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

8) People would say that I have iron self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

9) Pleasure and fun sometimes keep me from getting work done.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

10) I have trouble concentrating

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

11) I am able to work effectively toward long-term goals.

- 1 not at all like me
- 2
- 3
- 4

- 5 very much like me

12) Sometimes I can't stop myself from doing something, even if I know it is wrong.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

13) I often act without thinking through all the alternatives.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

Page Break

End of Block: Self-Control Scale

Start of Block: Risk

On a scale from (0) to (10), how willing are you to take risks, in general?

- not willing to take risks
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 very willing to take risks

End of Block: Risk

Start of Block: Charity Preferences

Stage 2

Section D

In this section, we want to learn about your preferences regarding three prominent UK charities. Please review the brief descriptions of each charity and choose the one you identify with the most.

- **The RSPCA (Royal Society for the Prevention of Cruelty to Animals):** the UK's largest animal welfare charity, focuses on animal rescue and improving animal welfare.
- **The NSPCC (National Society for the Prevention of Cruelty to Children):** the UK's leading children's charity, works to protect children from abuse, neglect, and harm.
- **Cancer Research UK:** the UK's largest cancer charity, funds research into understanding cancer biology, causes, prevention, diagnosis, and treatment.

End of Block: Charity Preferences

Start of Block: Productivity Task

Stage 3: Online Task

Your task will now be to count zeros in a series of tables.

Such a table looks like follows and once you have counted the number of zeros in a table, you should enter the number of zeros in that table into a field below the table.

How many zeros are in the table above?

1	0	0	1	0
1	0	1	1	0
0	1	1	0	1
1	1	0	0	0
0	0	0	0	1
1	0	1	1	0

(**16** is the correct answer for this table)

Page Break

On the next page you will have **3 minutes to count zeros** in up to **40 tables**.

You earn 10 p for each table where you counted the number of zeros correctly.

Once you finish a table, please scroll down to access the next table.

The remaining time will be displayed. After the 3 minutes have elapsed, all your entered answers will be saved and you will automatically be redirected to the next screen.

Be careful! Do not use the back / forward / reload screen / close the browser / buttons on your browser toolbar.

Doing so will invalidate results, in which case you will not receive payments.

Please press the 'Next' button to move on to the next page.

Page Break

0300

1	0	0	1	0
1	0	1	1	0
0	1	1	0	1
1	1	0	0	0
0	0	0	0	1
1	0	1	1	0

How many zeros in the table **above**?

*40 tables similar to this one

Page Break

You answered <number of correct answers> table(s) correctly.

End of Block: Productivity Task

Start of Block: Task Pleasure

How much do you like the task of counting zeros?

- 5 - Like a great deal
- 4 - Like somewhat
- 3 - Neither like nor dislike
- 2 - Dislike somewhat
- 1 - Dislike a great deal

End of Block: Task Pleasure

Start of Block: Control Group Info

Congratulations! You have completed all Day 1 stages.

Please read the following important instructions about Day 2

On Day 2 of the study (19th December), between **0:00 and 23:59**, you will have the opportunity to count the number of zeros in as many tables as you like.

You will earn a piece rate, that is, a payment for each table in which you count the numbers of zeros correctly.

Number of Correclty Counted Tables	Piece Rate Earning (p)
1 to 50	6.0
51 to 100	5.0
101 to 150	4.0
151 to 200	3.0
201 to 250	2.0
251 to 300	1.0
301 to 350	0.9
351 to 400	0.8
401 to 450	0.7
451 to 500	0.6
501 to 550	0.5
551 to 600	0.4
601 to 650	0.3
651 to 700	0.2
701 to 750	0.1
751 and beyond	0.0

You will need to work on the task in "one go". That is, once you start , **if you are inactive for more than 30 minutes**, the computer will record the number of correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

Below, we provide you with two examples to show you how your earnings are calculated.

Example 1: What if I counted 52 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 52 tables would take approximately __ Minutes __ Hours).
- Your total earnings would be £ 3.10.

Here are the detailed calculations:
For 52 tables: Total earnings: (50*6) + (2*5) = 310p = £3.10

Example 2: What if I counted 467 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 467 tables would take approximately __ Minutes __ Hours.
- Your total earnings would be £ 11.80.

Here are the detailed calculations:
For 467 tables: Total earnings: (50*6) + (50*5) + (50*4) + (50*3) + (50*2) + (50*1) + (50*0.9) + (50*0.8) + (50*0.7) + (17*0.6) = 1180p = £11.80

End of Block: Control Group Info

Start of Block: Goal-setting

Congratulations! You have completed all Day 1 stages.

Please read the following important instructions about Day 2

On Day 2 of the study (19th December), between **0:00 and 23:59**, you will have the opportunity to count the number of zeros in as many tables as you like.

You will earn a piece rate, that is, a payment for each table in which you count the numbers of zeros correctly.

The piece rate varies with the number of tables that you count as follows:

Number of Correclty Counted Tables	Piece Rate Earning (p)
1 to 50	6.0
51 to 100	5.0
101 to 150	4.0
151 to 200	3.0
201 to 250	2.0
251 to 300	1.0
301 to 350	0.9
351 to 400	0.8
401 to 450	0.7
451 to 500	0.6
501 to 550	0.5
551 to 600	0.4
601 to 650	0.3
651 to 700	0.2
701 to 750	0.1
751 and beyond	0.0

You will need to work on the task in "one go". That is, once you start , **if you are inactive for more than 30 minutes**, the computer will record the number of correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

Below, we provide you with two examples to show you how your earnings are calculated.

Example 1: What if I counted 52 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 52 tables would take approximately __ Minutes __ Hours).
- Your total earnings would be £ 3.10.

Here are the detailed calculations:
For 52 tables: Total earnings: (50*6) + (2*5) = 310p = £3.10

Example 2: What if I counted 467 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 467 tables would take approximately __ Minutes __ Hours.
- Your total earnings would be £ 11.80.

Here are the detailed calculations:
For 467 tables: Total earnings: (50*6) + (50*5) + (50*4) + (50*3) + (50*2) + (50*1) + (50*0.9) + (50*0.8) + (50*0.7) + (17*0.6) = 1180p = £11.80

Your Goal

Use the slider below to indicate different tables. The text above will then explain how much time you would need and what your earnings would be (if you worked at the same speed as when you tried out the task before).

Note: The slider stops at 750 because if you count more tables your earnings do not change.

JS

What if I set a goal of ___ tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching a goal of ___ tables would take approximately ___ hours ___ minutes seconds.
- Your total earnings would be £ ___

JS *

GS4
We ask you to set a goal for yourself. But, of course you will be free to work as much as you want.

We will remind you of your goal in Day 2.

How many correct tables do you aim to submit Day 2 of the experiment (next week)?

_____

End of Block: Goal-setting

Start of Block: Donation Group

Congratulations! You have completed all Day 1 stages.

Please read the following important instructions about Day 2

On Day 2 of the study (19th December), between **0:00 and 23:59**, you will have the opportunity to count the number of zeros in as many tables as you like.

You will earn a piece rate, that is, a payment for each table in which you count the numbers of zeros correctly.

In addition to your payment for counting the number of zeros in the tables, we will also make a separate donation to the **(Selected Charity in Stage 2_D)** based on your performance. You will be notified by email once the donation is made following the experiment.

The piece rate varies with the number of tables that you count as follows:

Number of Correclty Counted Tables	Piece Rate Earning (p)	Donation (p)
1 to 50	6.0	0.6
51 to 100	5.0	0.5
101 to 150	4.0	0.4
151 to 200	3.0	0.3
201 to 250	2.0	0.2
251 to 300	1.0	0.1
301 to 350	0.9	0.09
351 to 400	0.8	0.08
401 to 450	0.7	0.07
451 to 500	0.6	0.06
501 to 550	0.5	0.05
551 to 600	0.4	0.04
601 to 650	0.3	0.03
651 to 700	0.2	0.02
701 to 750	0.1	0.01
751 and beyond	0.0	0.0

You will need to work on the task in “one go”. That is, once you start , **if you are**

inactive for more than 30 minutes, the computer will record the number of correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

Below, we provide you with two examples to show you how your earnings are calculated.

Example 1: What if I counted 52 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 52 tables would take approximately __ Minutes __ Hours).
- Your total earnings would be £ 3.10.

Here are the detailed calculations:
For 52 tables: Total earnings: (50*6) + (2*5) = 310p = £3.10

Example 2: What if I counted 467 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 467 tables would take approximately __ Minutes __ Hours.
- Your total earnings would be £ 11.80.

Here are the detailed calculations:
For 467 tables: Total earnings: (50*6) + (50*5) + (50*4) + (50*3) + (50*2) + (50*1) + (50*0.9) + (50*0.8) + (50*0.7) + (17*0.6) = 1180p = £11.80

End of Block: Donation Group

Start of Block: Goal Meaning

Congratulations! You have completed all Day 1 stages.

Please read the following important instructions about Day 2
On Day 2 of the study (19th December), between **0:00 and 23:59**, you will have the opportunity to count the number of zeros in as many tables as you like.

You will earn a piece rate, that is, a payment for each table in which you count the numbers of zeros correctly.

In addition to your payment for counting the number of zeros in the tables, we will also make a separate donation to the **(Selected Charity in Stage 2_D)** based on your performance. You will be notified by email once the donation is made following the experiment.

The piece rate varies with the number of tables that you count as follows:

Number of Correclty Counted Tables	Piece Rate Earning (p)	Donation (p)
1 to 50	6.0	0.6
51 to 100	5.0	0.5
101 to 150	4.0	0.4
151 to 200	3.0	0.3
201 to 250	2.0	0.2
251 to 300	1.0	0.1
301 to 350	0.9	0.09
351 to 400	0.8	0.08
401 to 450	0.7	0.07
451 to 500	0.6	0.06
501 to 550	0.5	0.05
551 to 600	0.4	0.04
601 to 650	0.3	0.03
651 to 700	0.2	0.02
701 to 750	0.1	0.01
751 and beyond	0.0	0.0

You will need to work on the task in "one go". That is, once you start , **if you are inactive for more than 30 minutes**, the computer will record the number of

correctly counted tables, sign you out, and stop collecting data for Day 2 of the study.

Below, we provide you with two examples to show you how your earnings are calculated.

Example 1: What if I counted 52 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 52 tables would take approximately __ Minutes __ Hours).
- Your total earnings would be £ 3.10.

Here are the detailed calculations:
For 52 tables: Total earnings: (50*6) + (2*5) = 310p = £3.10

Example 2: What if I counted 467 correct tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching 467 tables would take approximately __ Minutes __ Hours.
- Your total earnings would be £ 11.80.

Here are the detailed calculations:
For 467 tables: Total earnings: (50*6) + (50*5) + (50*4) + (50*3) + (50*2) + (50*1) + (50*0.9) + (50*0.8) + (50*0.7) + (17*0.6) = 1180p = £11.80

Your Goal

Use the slider below to indicate different tables. The text above will then explain how much time you would need and what your earnings would be (if you worked at the same speed as when you tried out the task before).

Note: The slider stops at 750 because if you count more tables your earnings do not change.

What if I set a goal of __ tables?

- When trying out the task in stage 3, you managed to complete (Productivity Score) tables in 3 minutes.
- At this speed, reaching a goal of ___ tables would take approximately ___ hours ___ minutes seconds.
- Your total earnings would be £ ___
- Total donation generated £ ___ , separate from your earning.

We ask you to set a goal for yourself. But, of course you will be free to work as much as you want.

We will remind you of your goal in Day 2.

How many correct tables do you aim to submit Day 2 of the experiment (next week)?

End of Block: Goal Meaning

Start of Block: Results

This is the end of Day 1. Thank you for your participation.

Your earnings for today are as follows:

Activity	Earning (£)
Stage 1	(Show up Earning)
Stage 2	(Stage2 Earnings)
Stage 3	(Productivity Earnings)
Total	(Total Earnings Part1)

As mentioned in the invitation email, all your earnings from Day 1 & Day 2 will be transfered to your PayPal account within a week after finishing Day 2.

You will receive a link via email on the 19th of December to gain access to Day 2.

Now you can close the browser.

C Chapter 4

C.1 Additional Analysis

Table C.1: Logistic Regression Analysis on the Impact of Goal-Setting on Practice Task Engagement

	(1) ALL	(1) MALE	(3) FEMALE
AGE	0.97	0.7	1.89
	(0.31)	(0.28)	(1.61)
LOSS AVERSION	1.12	1.06	1.57**
	(0.09)	(0.1)	(0.34)
RISK	0.92	0.83	0.88
	(0.1)	(0.11)	(0.22)
BSCS	1.01	1.01	0.97
	(0.02)	(0.03)	(0.05)
PERCEIVED IMPORTANCE	0.86	0.67**	1.21
	(0.11)	(0.12)	(0.31)
GROUP			
NOGOAL	1.84	2.34	1.76
	(0.94)	(1.54)	(1.69)
GOALSET	2.05*	4.53***	0.36
	(0.79)	(2.26)	(0.29)
_CONS	0.96	2304.42	0.00
	(5.57)	(17382.32)	(0.00)
OBSERVATIONS	140	99	41
R^2	0.05	0.13	0.15

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table C.2: Goal-setting Treatment Effect on Practice and Final Exam Performance

	PRACTICE EXAM		FINAL EXAM	
	(1)	(2)	(3)	(4)
GENDER		-2.31		-3.38***
		(2.04)		(1.09)
AGE		-0.83		-1.64**
		(1.44)		(0.77)
LOSS AVERSION		-0.23		-0.24
		(0.41)		(0.22)
RISK		-1.05**		-0.14
		(0.49)		(0.26)
PERCEIVED IMPORTANCE		0.02		0.07
		(0.63)		(0.34)
BSCS	0.34*	0.39**	-0.18	-0.13
	(0.19)	(0.2)	(0.11)	(0.11)
GROUPS				
NOGOAL	-24.75*	-25.43*	-8.61	-8.76
	(14.55)	(14.57)	(8.4)	(7.8)
GOAL	23.51**	23.03*	-15.45**	-13.52**
	(11.15)	(11.5)	(6.44)	(6.16)
GROUPS * BSCS				
NOGOAL	0.49	0.5	0.18	0.19
	(0.32)	(0.32)	(0.18)	(0.17
GOALSET	-0.53**	-0.55**	0.32**	0.25*
	(0.25)	(0.26)	(0.15)	(0.14)
_CONS	5.51	30.16	27.69***	62.60***
	(8.48)	(28.58)	(4.89)	(15.3)
CONTROLS	NO	YES	NO	YES
R2	0.2	0.28	0.1	0.31
N	68	68	68	68

Note: Standard errors are in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

C.2 Instructions

Start of Block: Welcome

Consent Form

Welcome to our research on students' characteristics and academic performance.

A) Research Method:

The research team will use:

- Survey responses.
- Marks from this module and other modules.
- Other information held by the University of Nottingham (e.g., A Level & IB score).

B) Confidentiality:

- All the information will be made anonymous.
- This means that your name and student ID will never be associated with the findings.

C) Amazon Voucher Draw

- The draw to determine which participant will receive the Amazon Voucher will take place next week.
- The winner will be contacted via email.

Consent Do you give your consent to use the data as mentioned above?

- o Yes
- o No

Skip To: End of Survey If Do you give your consent to use the data as mentioned above? = No

End of Block: Welcome

Start of Block: ID & Email

Enter your University of Nottingham email

_____

Confirm your University of Nottingham email

_____

Start of Block: Stages

This survey consists of 3 stages:

- Stage 1: General Questions
- Stage 2: Attitude Questions
- Stage 3: Study Actions

End of Block: Stages

Start of Block: General Characteristics

Stage 1: General Questions

Please answer the following questions:

1) What is your gender?

- Male
- Female
- Other
- Prefer not to say

2) What is your age (in years)?

_____

3) What is your ethnicity?

- Asian or Asian British
- Black, Black British, Caribbean or African
- Mixed
- White
- Other
- Prefer not to say

Start of Block: Stage 2

Stage 2: Attitude Questions

This stage consists of 3 sections: A, B & C. Please answer the questions carefully.

Please click the 'Next' button to start with section A.

Start of Block: Loss Aversion

Stage 2

Section A

Below are 10 hypothetical lotteries. Please indicate for each lottery whether you would 'accept' it - that is, play the lottery with its chance of winning or losing -, or 'reject' it - that is, not win or lose anything.

	Accept	Reject
50% chance of losing £2; 50% chance of winning £10	○	○
50% chance of losing £3; 50% chance of winning £10	○	○
50% chance of losing £4; 50% chance of winning £10	○	○
50% chance of losing £5; 50% chance of winning £10	○	○
50% chance of losing £6; 50% chance of winning £10	○	○
50% chance of losing £7; 50% chance of winning £10	○	○
50% chance of losing £8; 50% chance of winning £10	○	○
50% chance of losing £9; 50% chance of winning £10	○	○
50% chance of losing £10; 50% chance of winning £10	○	○
50% chance of losing £11; 50% chance of winning £10	○	○

End of Block: Loss Aversion

Start of Block: Self-Control Scale

Stage 2

Section B

In this section you will be presented with 13 statements. From 1 (not at all like me) to 5 (very much like me), please indicate how much each of the following statements reflects how you typically are.

1) I am good at resisting temptation.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

2) I have a hard time breaking bad habits.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

3) I am lazy.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

4) I say inappropriate things.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

5) I do certain things that are bad for me, if they are fun.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

6) I refuse things that are bad for me.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

7) I wish I had more self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

8) People would say that I have iron self-discipline.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

9) Pleasure and fun sometimes keep me from getting work done.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

10) I have trouble concentrating

- 1 not at all like me
- 2
- 3
- 4

- 5 very much like me

11) I am able to work effectively toward long-term goals.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

12) Sometimes I can't stop myself from doing something, even if I know it is wrong.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

13) I often act without thinking through all the alternatives.

- 1 not at all like me
- 2
- 3
- 4
- 5 very much like me

Page Break

End of Block: Self-Control Scale

Start of Block: Risk

Section C

On a scale from (0) to (10), how willing are you to take risks, in general?

- not willing to take risks
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 very willing to take risks

End of Block: Risk

Stage 4

From your perspective, please rank the following study activities (**by drag & drop**) starting from the

(most important = 1), to the (least important = 9)

___ Attend and pay attention in class.

___ Solve homework questions.

___ Solve practice exams.

___ Get extra help when necessary (e.g., tutoring sessions, study groups).

___ Read course material outside of class.

___ Take an actual interest in the material

Day2

Start of Block: Introduction

Dear Econ 1050 student,

A link to a **Practice Multiple Choice Exam** will be available in Moodle **from 13 December to 13 January.**

The **Practice Multiple Choice Exam** will consist of **30 questions** with a maximum **mark of 30** and a time limit of **60 minutes**. It is strongly recommended you use this to familiarise yourself with how the online assessment system works.

You can attempt the Practice Multiple Choice Exam multiple times.

On the next page, you will log in to the online assessment system where we show you a sample of 3 questions to give you an idea of the type of questions you might expect.

End of Block: Introduction

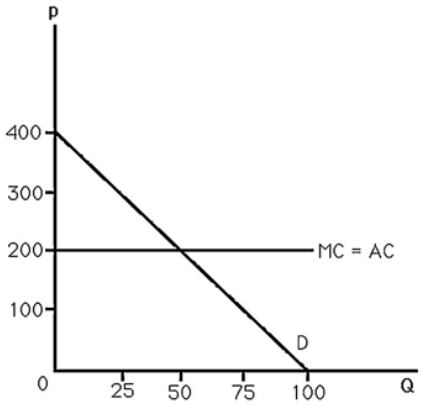
Start of Block: Quiz

1) A firm uses a single input, labour, to produce widgets according to the production function q=100 L0.5, where q is the number of widgets produced and L is the hours of labour employed. The wage is £10 per hour and the firm employs 100 hours of labour. Based on this information, Marginal Cost is

   a. £10 per hour
   b. £1 per hour
   c. £1 per widget
   d. £2 per widget
   e. none of the above

2) Assume that a consumer only consumes two goods and these are perfect complements. Which of the following statements is true?

   f. The marginal rate of substitution between the goods is constant.
   g. The indifference curves are upward sloping.
   h. The indifference curves are downward sloping.
   i. The indifference curves are L-shaped.
   j. The demand for each good is perfectly inelastic.



The figure above shows the demand and cost curves facing a monopoly. The deadweight loss of this monopoly is

k. a) 100

l. b) 250

m. c) 1250

n. d) 2500

o. e) none of the above

End of Block: Quiz

Start of Block: Goal-Setting Group

Thank you for submitting your answers.

For your personal study preparation, we ask you to set **a goal for the mark** you aim to achieve in the **Practice Multiple Choice Exam.**

The Lecturers and tutors will NOT see your goal. However, you will be reminded of your goal when you attempt the Practice Multiple Choice Exam.

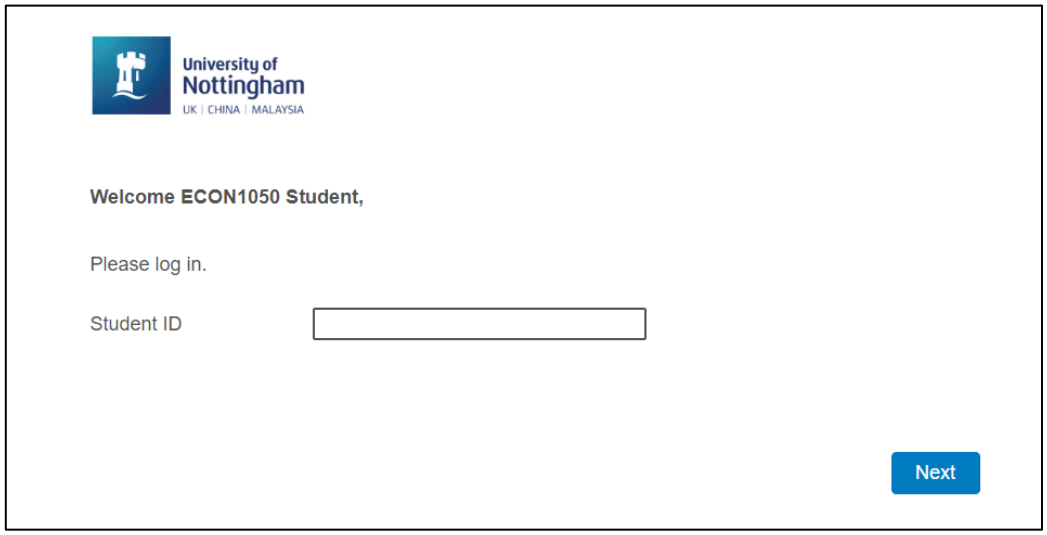
- What mark (**out of 30**) do you aim to achieve in the **Practice Multiple Choice Exam**

————————————————————————————————

End of Block: Goal-Setting Group

Day3

Start of Block: Login



End of Block: Login

Start of Block: Goal Reminder (Only Treatment Group)

End of Block: Goal Reminder (Only Treatment Group)

Start of Block: Practice Exam Page

End of Block: Practice Exam Page