

# **Behavioural Economic Insights**

## **Assignment**

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### **1. Title**

“Every deadline needs a plan”: the influence of a study plan aligned with self-imposed pre-deadlines in addition to an externally imposed final deadline on students’ satisfaction

### **2. Summary**

In this interventional study, I aim to investigate the influence of a study plan aligned with binding self-imposed pre-deadlines in addition to an externally imposed final deadline on students’ satisfaction with their study outcome. In a six-week course, students will follow lectures and will also independently work on a research proposal with a deadline one week after the last lecture. Students in the experimental group will be asked to create a study plan including self-imposed binding pre-deadlines corresponding to sub-goals regarding the research proposal. Moreover, students will be asked to turn in what they have been reached so far as preliminary reports not later than the set pre-deadline. Students in the control group will work on their research proposal without being asked to engage in planning and setting pre-deadlines. All students will have to submit their assignment until an externally imposed final deadline. The main research question is if the intervention is effective in increasing students’ satisfaction with the research proposal.

### **3. Objectives, rationale, and background**

#### **3.1 Objectives**

Motivated by the literature on procrastination and deadlines on students’ performance (Ariely & Wertenbroch, 2002; Bisin & Hyndman, 2019; Burger et al., 2011; Norby & Klingsieck, 2017), I aim to investigate the effects of a study plan with binding self-imposed pre-deadlines on students’ satisfaction with the outcome. By early planning of the work and increased commitment due to binding pre-

deadlines, the intervention aims to increase students' elaborated engagement in the assignment, decrease procrastination, and increase satisfaction with their work.

### **3.2 Rationale and background**

Procrastination is a well-known and common problem. It describes people's tendency to voluntarily postpone performing a certain behavioral action even if that means to face negative consequences because of the delay (Steel, 2007). Rozental and Carlbring (2014) showed that around 50 percent of students show continual procrastination. Procrastination can lead to negative affective outcomes. Previous research found that it is linked to depression, anxiety, and psychological distress (Constantin et al., 2018).

Procrastination is viewed as a failure of self-regulation (Steel, 2007). Based on Bandura (1991), self-regulation can be described as people's ability to control their behaviors, feeling, and thoughts. Self-regulated learning is essential to be successful in higher education (Zimmermann, 2008).

According to behavioral decision theory, people discount future outcomes. Because of time discounting, immediate benefits and costs have comparatively more weight than benefits and costs in the future. Based on an economic theory of self-control (Thaler & Shefrin, 1982), researchers applied the insights from behavioral decision theory to time management (Koch & Kleinmann, 2002; O'Donoghue and Rabin, 1999). If people discount future outcomes, people prefer to invest their time for sooner outcomes if they are smaller than other outcomes in the more distant future. Based on this reasoning, I expect students' preferring to invest their time for smaller sub-goals corresponding to pre-deadlines than investing their time for a later goal. Moreover, I expect that the more elaborate a study plan is, meaning setting sub-goals corresponding to pre-deadlines, the more likely students are willing to stay engaged in their work due to loss aversion (Kahneman et al., 1991).

Ariely and Wertenbroch (2002) showed that people are willing to self-impose even costly deadlines to impede procrastination. But they also showed that people do not optimally set deadlines to increase performance. It is unknown if these effects can also be shown if people set not the final

deadline of a project but pre-deadlines within a more complex project. Moreover, it is also unclear if deadlines have positive effects on affective outcomes, e.g. satisfaction.

A wide range of studies have found strong evidence for the impact of time management on academic achievement such as grades (Broadbent & Poon, 2015). The research on other dependent variables such as affective outcomes, e.g., satisfaction, seems to have been neglected by research so far. Liborius and colleagues (2019) showed that the more students planned their study day at the beginning of this very study day, the higher was their satisfaction with their study day. This intervention aims to investigate not the planning of a study day but rather the planning of a major assignment. I still expect the positive effects of planning on satisfaction. Zalazar-Jaime and colleagues (2022) highlighted that academic satisfaction influences students' subjective well-being. Therefore, I think it is important to bring satisfaction judgments about an academic achievement to the center of this intervention.

It would be insufficient to view the existence of self-regulation problems solely as a phenomenon arising from an intraindividual disposition or failure. Teaching self-regulating skills only targets the individual and neglects the environment the individual learns and performs in. This interventional strategy has an inherently deficient look at individuals and interprets the environment more as a given and less as a powerful and changeable factor.

It is desirable to create learning environments that mimic working and learning experiences after graduation as realistically as possible meaning with externally controlled self-regulation as low as possible. This seems desirable because higher education aims to provide students not only with knowledge but also the ability to regulate their learning. Moreover, this is of immense value not just for graduation but even more for the time after graduation.

Unfortunately, educational institutions do not exploit the potential of web-based learning platforms, especially when it comes to asynchronous studying over a longer period. A considerable number of assignments in higher education must be performed in an asynchronous learning environment. For example, the thesis at the end of a program also continuously demands the ability of self-regulating learning over several months.

As young researchers will be asked to report or present preliminary results of their work, student are asked to turn in preliminary results that will be looked at. The implementation of an element of external control seems justified and meaningful comparing it to scenarios faced by young researchers. Moreover, preliminary reports as part of this intervention can also be interpreted as a personal academic diary that has provides feedback to the students, remind them of sub-goals and their already made progress. Then, met self-imposed pre-deadlines turn into feedback possibilities and small, but immediate rewards for the work already achieved. This feedback is especially important since feedback on the working process are commonly not implemented in asynchronous learning environments.

Based on this background, an important question needs to be investigated: How can we improve self-regulation and guide students' learning besides a commonly used externally imposed final deadline? With applying this intervention, I aim to investigate independent and self-structured learning as a process which involves engaging in planning the assignment aligned with setting pre-deadlines corresponding to sub-goals and the final deadline.

In specific, my intervention aims to provide answers to the following research questions: Is a study plan aligned with binding self-imposed pre-deadlines in addition to an externally imposed final deadline effective in improving satisfaction with the outcome? If so, these could be used as recommendations for non-binding or externally imposed binding or non-binding pre-deadlines in future research and education.

Second, I aim to shed light on the following question: is there a relationship between the number of self-imposed deadlines and percentage of met self-imposed pre-deadlines and satisfaction with the outcome? A high percentage of met pre-deadlines suggests a successful self-regulation towards sub-goals, especially in terms of time management, and a high commitment to the sub-goals aligned to pre-deadlines.

## **4. Methodology**

### **4.1 Approach**

Prior to any data collection, the study will be approved by the Ethics Committee of Leiden University. Moreover, I will pre-register the study on OSF. All data and code will be made available online.

To address my research question, I will collect data from a sample of students in the Research Master's program of Psychology at Leiden University. Participants will not receive a financial compensation but will take part in a lottery to win a voucher for a web shop. I aim to limit extrinsic motivational factors such as financial incentives as much as possible.

Furthermore, I aim to collect data from students following one of six-week long courses taught in the Research Master's program of Psychology. More specific, I will apply the study design in a course that assesses students' competencies in the form of a research proposal due one week after the last lecture. Since the students at this stage of their studies are already more familiar with time management balancing several responsibilities (leisure, learning, part-time job etc.) than in their freshman year, I expect the sample to be more similar to a general population in terms of time management. This might increase the generalizability of the findings.

Students will be automatically enrolled in the course on "Brightspace", the web-based learning management system used at Leiden University. After enrollment students will receive information about the study via e-mail and will be asked if they would like to participate. Students will receive a weekly e-mail until the start of the course to indicate their choice. In the first lecture, students will be asked the last time if they would like to participate.

If students will decide to participate, they will be asked to install the app "Brightspace Pulse" on their smartphones and allow the app to send notifications to their smartphone. The app will ensure that participants will directly receive real-time notifications on their phone. Participants will receive course-related notifications not via e-mail, but separately from information involving other domains in life.

In addition, participants will be enrolled in a second course on “Brightspace”. In the additional course “Final assignment”, students can find the information needed for the final assignment. The final assignment will consist of a research proposal on a topic addressed in the course with a total number of around 2000 words. The template will be provided online.

The other course “Lectures” which participants were enrolled in from the beginning relates to the lectures throughout the course and reading material corresponding to the lectures. With creating two separate courses for one overall course (see Fig.1), I aim to create two separate “mental accounts” (Thaler, 1999) for the mental engagement with the content related to the lectures and the content related to the final assignment. A significant challenge is that students are required to follow the lectures and work on the final assignment in parallel. Following the lectures is a face-to-face learning environment extended by engagement in online learning material. Thus, the course “Lectures” can be described as traditional blended learning. In contrast, working on the assignment can be described as one additional element of this blended learning environment but can also be interpreted as a separate online course without personal meetings or reminders to engage throughout the course. The latter interpretation facilitates to distinguish between the final assignment and the lectures with both putting different demands for self-regulation on the participants.

Participants are randomly assigned to the control group or the experimental group. All participants will receive the same fixed final deadline. The fixed final deadline will be announced in the first lecture and on Brightspace. In the experimental group, participants will be asked to choose their own pre-deadlines (see Fig. 2).

Participants are given a short instruction prior to setting their pre-deadlines: “We kindly ask you to plan your work on the final assignment by setting your own pre-deadlines. Please decide on your pre-deadlines prior to the second lecture on “Brightspace”. Turn in a file with a plan describing of what you aim to reach until each of your specified pre-deadlines. The submission of this plan is mandatory. You are allowed to set as many pre-deadlines as you perceive the most helpful guiding your work on the assignment and break it down into smaller segments. We would like you to turn in

what you have reached and worked on so far to fulfil your self-set plan not later than your pre-deadline. It is mandatory to hand in at least 50 percent of preliminary reports. Please choose at least two pre-deadlines. A preliminary report can include everything you have worked on to meet your self-imposed deadline. This will help the course coordinator to get a look at your working process and progress on the assignment and help to improve future teaching. You will receive a reminder to turn in a preliminary report 24 hours prior to the pre-deadline.”

The pre-deadlines announced by the participants will then be implemented in Brightspace by the course coordinators. Participants will receive a notification via Brightspace 24 hours before the deadline to remind them to turn in a report. 24 hours before the final deadline, participants will also receive a notification to turn in the final assignment. Students are used to receive a notification on Brightspace 24 hours prior to deadlines. I aim to stick to this announcement system in the intervention and adopt it for the pre-deadlines.

After successful submission of the assignment, participants will be sent a notification with a link to a short questionnaire: “Thank you for submitting your assignment! Please click on the following link and fill in a short questionnaire. Thank you very much!” The questionnaire will ask for demographic details (age, gender) and include the following questions: “How satisfied are you with your submitted assignment?” (11-point scale), “Did you follow the course for the first time?” (yes/no), “How many credit points are you aiming to achieve during this block of the semester?”.

Participants in the control group will be asked one additional question: “Did you plan your work on the assignment by using pre-deadlines?” (yes/no). This additional question to participants in the control group will be necessary to investigate if participants might have adopted strategies from students in the experimental group. It cannot be ruled out by this study design. However, it would be possible to test the intervention on a sample of students following a six-week course and comparing it to a sample of students following a different six-week course at the same time without an intervention. Then, the study design could not benefit from various advantages of random assignment of

participants to the experimental or the control group. In the data collection, I will also include participants' grade on the assignment.

## **4.2 Analyses and expected results**

First, I will check on the plan and the preliminary reports. Participants who will have reported pre-deadlines without aligned goals in the submitted plan will be excluded. All students who will have submitted a plan including pre-deadlines and aligned goals will be included. This inclusion criterion will be independent from how elaborated participants' aligned goals are. Participants will be excluded from the analysis if they will not have submitted an assignment.

All analyses will be calculated with R 4.0 (RCoreTeam, 2020). First, I will calculate descriptive statistics of the following variables: number of pre-deadlines, distance between pre-deadlines, distance of pre-deadlines to final deadline, number and percentage of met pre-deadlines, age, gender, and satisfaction as well as the following variables: the question "Did you follow the course for the first time?" will be coded as "first-time course participation", the question "How many credit points are you aiming to achieve during this block of the semester?" as "workload".

Hypothesis 1 predicts that participants in the experimental group will report higher satisfaction with their assignment compared to participants in the control group. To test hypothesis 1, I will perform an independent t-test to compare the means of reported satisfaction with the assignment between the experimental and control group. I will also analyze if the result still holds true if participants in the control group who report that they have been using pre-deadlines for the work on the assignment will be excluded from the analysis.

Hypothesis 2 predicts the following relationship: the higher the number of pre-deadlines and the higher the percentage of met pre-deadlines, the higher the satisfaction with the assignment. To test hypothesis 2, I will perform a multiple linear regression with "percentage of met pre-deadlines" and "number of pre-deadlines" as the independent variables and "satisfaction" as the dependent variable. Furthermore, I will calculate if the variables age, gender, and workload serve as a moderator



of the suggested link in hypothesis 2. Moreover, I will calculate correlations between the workload and the number of self-imposed pre-deadlines.

For exploratory purposes, I will analyze if participants in the experimental and control group differ in respect to their grade. Second, I will calculate correlations between the grade and the satisfaction of the participants. Moreover, I will use the variable “percentage of met pre-deadlines” to predict the grade.

## **5. Impact beyond academia**

The educational landscape has fundamentally changed due to the rise of web-based learning environments implemented in the courses taught at traditional universities and massive open online courses (MOOCs). MOOCs have the noble goal to increase access to education worldwide. Moreover, the rapid technological progress will influence and profoundly change the way professionals work, e.g., medical health professionals supported by medical devices. These technological transformations will and already do require structured blended-learning on-the-job opportunities. Unfortunately, the dropout rate in online courses can be high. Ho and colleagues (2014) reported that only 22 percent of students who initially intended to finish the course also did so. This statistic shows that it is not enough to provide knowledge, but learning also needs guidance.

Since a considerable number of people motivated to learn are left alone with an unsatisfactory outcome, knowledge about how to increase completion rates and satisfying outcomes in online educational environments is needed more than ever. This intervention also well reflects the project work professionals in many domains face in their jobs. For chiefs, the intervention can provide a possibility to keep track on the development of a project. For the person working on the project, the intervention serves as guidance and feedback tool without explicit feedback.

This intervention aims to empower not only students, but also professionals by using the own self-regulation to reach a goal by incrementally reaching subgoals. The gift of satisfaction may serve as a future motivational resource and potential buffer against stress and exhaustion.

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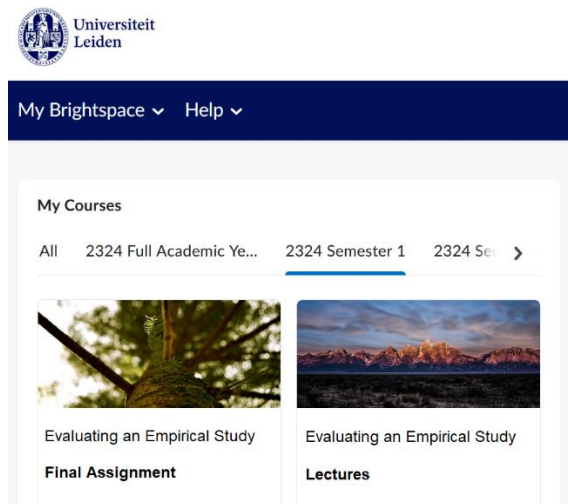
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## Appendix

**Figure 1**

*Exemplary illustration of the two courses “Final Assignment” and “Lectures” for overall course “Evaluating an Empirical Study” on Brightspace*



**Figure 2**

*Timeline of intervention including deadline for submission of plan and available time window for self-imposed pre-deadlines*

