Nudging Procrastination Away: The use of simplification and reminders in a dissertation project

Panagiotis Giannarakis, Emanuela Lotti & Jana Sadeh

University of Southampton

DEE 2023

Intro

Introduction

- Literature on procrastination in education established a clear (negative) link between procrastination and grades. [5, 11, 6, 1, 7, 2, 4]
- Clear impetus for educational interventions to encourage students to spread work more evenly over semesters and reduce procrastination on coursework.
- Few attempts to develop interventions, some found success [9] and [8] using in class verbal prompts and financial rewards while others using social norms and information did not [7, 10, 3] similarly use goal setting coupled with reminders and also find no effect of the intervention.
- Procastination driven by anxiety, unfamiliarity & long time frames
- Behavioural literature suggests that simplification and timely feedback interventions can be very powerful tools to influence behaviour [13, 12]

Research Question: Can we improve student grades and reduce submission times by nudging their procrastination?

Introduction

Institutional Context

- University of Southampton, selective Russell Group University in the UK.
- 3rd year undergraduate module. c.a. 150 students.
- Semester-long research project: Literature Review
- Students assigned supervisors based on topic selected.
- Students manage number of and frequency of meetings and how they spread out the work.
- Supervisors mark their own students.
- In 2022 1 in 4 students submitted late (extension) implications on academic staff, professional services staff and students themselves.

Experimental Design

The Nudge

Simplification of long-term assessment: Task List

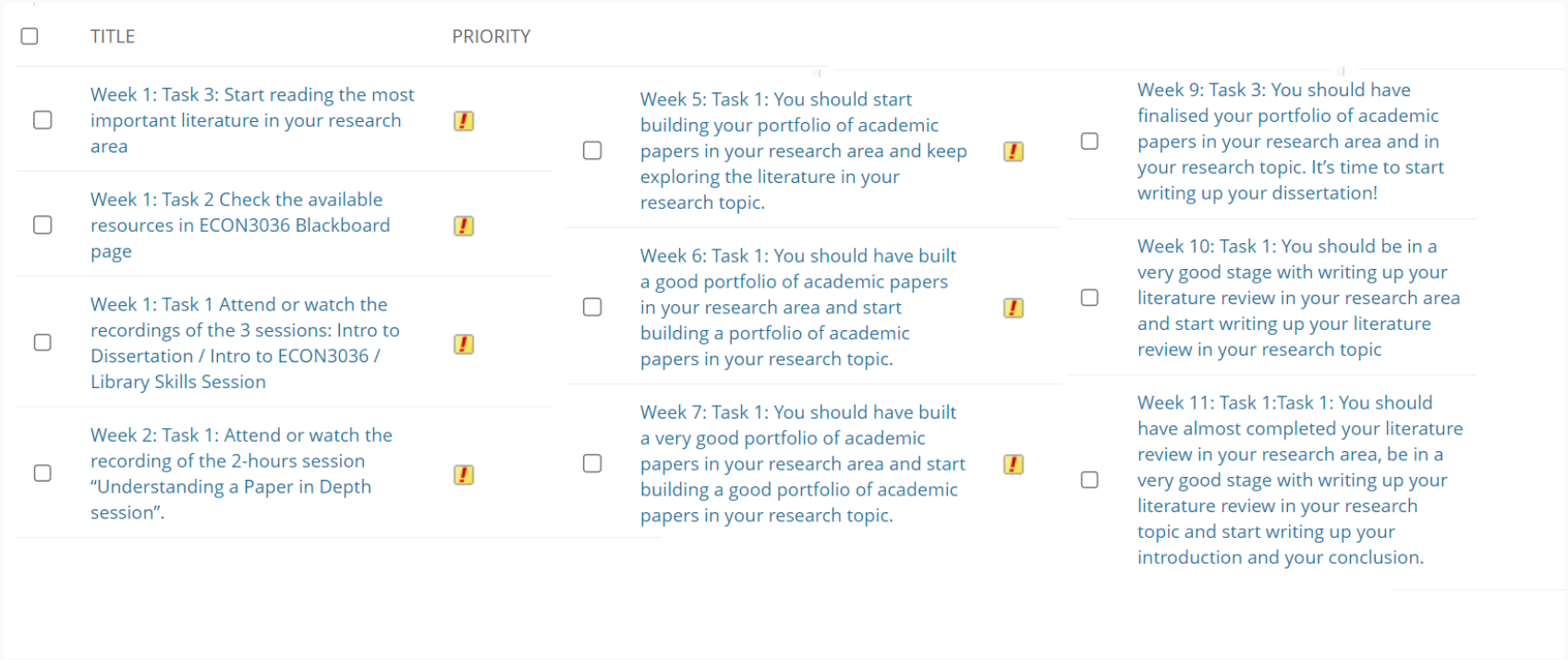
- Forward-feedback design, ideal benchmark of what a student should be achieving each week if they want to do well
- Tool available to all
- Hosted on the VLE/LMS for the module/class

Nudge: weekly reminders of week tasks

- Email delivered to each student every Thursday for 11 weeks
- Text reminded them to go to the task-list and complete the weekly tasks for the week
- Only treated group received this

The Nudge

Figure 1: Task List



	TITLE	PRIORITY
☐	Week 1: Task 3: Start reading the most important literature in your research area	❗
☐	Week 1: Task 2 Check the available resources in ECON3036 Blackboard page	❗
☐	Week 1: Task 1 Attend or watch the recordings of the 3 sessions: Intro to Dissertation / Intro to ECON3036 / Library Skills Session	❗
☐	Week 2: Task 1: Attend or watch the recording of the 2-hours session "Understanding a Paper in Depth session".	❗
☐	Week 5: Task 1: You should start building your portfolio of academic papers in your research area and keep exploring the literature in your research topic.	❗
☐	Week 6: Task 1: You should have built a good portfolio of academic papers in your research area and start building a portfolio of academic papers in your research topic.	❗
☐	Week 7: Task 1: You should have built a very good portfolio of academic papers in your research area and start building a good portfolio of academic papers in your research topic.	❗
☐	Week 9: Task 3: You should have finalised your portfolio of academic papers in your research area and in your research topic. It's time to start writing up your dissertation!	
☐	Week 10: Task 1: You should be in a very good stage with writing up your literature review in your research area and start writing up your literature review in your research topic	
☐	Week 11: Task 1:Task 1: You should have almost completed your literature review in your research area, be in a very good stage with writing up your literature review in your research topic and start writing up your introduction and your conclusion.	

The Nudge: Treated Group

Figure 2: Task List for the Treated Group

Task 1: Attend or watch the recordings of the 3 sessions:

Enabled: Statistics Tracking

Intro to ECON3036, ECON3037, ECON3038.

Details: in this session you will have the opportunity to understand in depth the structure of the third-year dissertation. You will see the structure of ECON3036: Dissertation Literature Review, ECON3037: Dissertation Research Project and ECON3038 Dissertation Research Topics. You will understand very well what the differences between ECON3037 & ECON3038 are (you need to choose one of those modules in semester 2) and by attending the session you will be able to do a very informative choice between those 2 modules.

Intro to ECON3036 Dissertation Literature Review.

Details: in this session you will have the opportunity to understand in depth the structure of the ECON3036: Dissertation Literature Review. You will understand what a review of past research papers is and how you will need to structure your literature review. You will understand and be able to identify in an economics academic paper what is a research question, motivation, contribution, methodology, empirical findings. What the best literature review strategy is and why is important to be able to review past literature. You will see how to search effectively for academic papers relevant to your topic/area and you will be informed about deadlines and submission procedure of your final report.

Library Skills Session.

Details: in this session you will have the opportunity to understand in depth the available resources in Hartley Library and how these resources can support your dissertation research. This session will demonstrate the use of a wide range of resources appropriate to the subject area. It will show you how to independently find the information needed and to use appropriate quality criteria to critically evaluate information from any source to determine authority, bias, etc. This session will demonstrate how to do accurate and appropriate citing and referencing with appropriate paraphrasing and it will outline the procedure for completing the assessed Online Library Test (5% of your mark).

Once you have completed this task don't forget to tick it off your Ckeck List

Task 2: Check the available resources in ECON3036 Blackboard page.

Details: it is very important to check the available resources in ECON3036 Blackboard page. You will find them very useful during the development of your project.

Start your navigation with the tab "Module Information": check the Calendar of Events to get an idea of the ECON3036 plan, read the ECON3036 Handbook to understand in depth what is expected to do in ECON3036, see and get access to the suggested reading. In the Library Skills tab, you will find all the available resources at Hartley Library and also notes for the online test worth 5% of your mark. In the Literature Review resources watch firstly the available videos to understand how to write a literature review. Check all the other resources and especially the literature review examples.

Once you have completed this task don't forget to tick it off your Ckeck List

Experimental Design

The study timeline:

- Experiment eliciting time and risk preferences.

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- Randomisation using VLE/LMS.

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- Check-list tool made available, all students notified.

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- Administration of nudge on treatment group .

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- Marking by supervisors.

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- Data analysis.

Experiment Outline

- Stage 1: Time preference MPL (1 month delay from today)
- Stage 2: Risk preference (Eckel Grossman 6 gamble)
- Stage 3: Time preference MPL (1 month delay in 6 months)
- Stage 4: CRT
- Stage 5: Time preference MPL (6 month delay from today)
- Stage 6: Self-reported procrastination
- Stage 7: Demographic details

Data

Data

For 2022-2023 Academic Year at the University of Southampton:

- Economics dissertation marks
- Time of submission of an online test within a 2 weeks window (proxy for procrastination)
- Submission days/hours from the deadline of the dissertation
- Dissertation supervisors, research topics, programme of study, gender and year-2 average.
- Engagement with the tasks list, with Blackboard page and Panopto recordings.
- For those who participated in the experiment: risk and time preference data, CRT, self reported procrastination.

Descriptive Statistics

Figure 3: Dissertation marks by submission hour

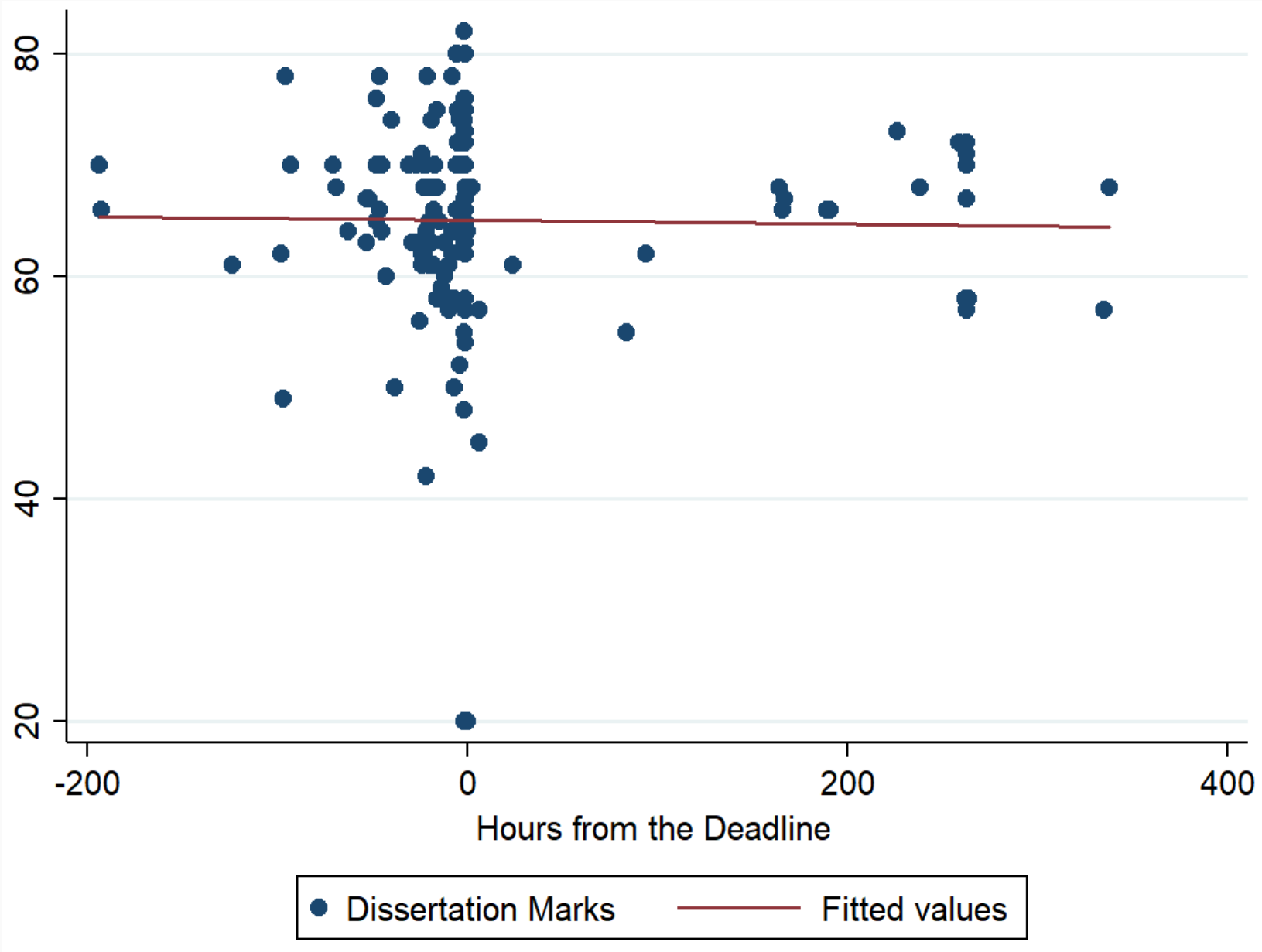

Table 1: Average Dissertation Grade by Submission Day

Submission days	Observations	%	Average Marks
<-1 days	21	14.29	66.86
-1 days	27	18.37	65.19
0 days	75	51.02	64.87
>0	24	16.33	63.75
All	147	100	65.03

Table 2: Descriptive Statistics I

Male	Students	%	Av Mark
Treatment	50	50.00	66.18
Control	50	50.00	63.92
All	100	100	65.05
Female	Students	%	Av Mark
Treatment	23	48.94	65.91
Control	24	51.06	64.08
All	47	100	64.98
Year 2 Average	Students	%	Av Mark
Treatment	73	50.00	65.74
Control	73	50.00	66.03
All	146	100	65.89

Table 3: Descriptive Statistics II

More Risk Averse	Students	%	Av Mark
Treatment	29	51.79	67.00
Control	27	48.21	64.81
All	56	100	65.95
Less Risk Averse	**Students**	**%**	**Av Mark**
Treatment	18	50	65.78
Control	18	50	64.89
All	36	100	65.33
Not Present Bias	**Students**	**%**	**Av Mark**
Treatment	36	53.73	66.53
Control	31	46.27	65.26
All	67	100	65.94
Present Bias	**Students**	**%**	**Av Mark**
Treatment	11	44	66.55
Control	14	56	63.93
All	25	100	65.08

Table 4: Dissertation Marks and Submission Hours by Intention to Treat

Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Treatment	73	49.66	66.10	6.75	10	13.70	175.50
Control	74	50.34	63.97	20.76	14	18.92	202.71
All	147	100	65.03	13.80	24	16.33	191.38

Table 5: Dissertation Marks and Submission Hours by Treatment

Used the task list at least twice							
Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Treatment	31	63.27	66.97	-13.35	2	6.45	225.50
Control	18	36.73	63.61	11.61	3	16.67	200.00
All	49	100	65.73	-4.18	5	10.20	210.20
Not Used the task list or used it once							
Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Treatment	42	42.86	65.45	21.60	8	19.05	163.00
Control	56	57.14	64.09	23.70	11	19.64	203.45
All	98	100	64.67	22.80	19	19.39	186.42

Table 6: Dissertation Marks and Submission Hours by Treatment and Risk Aversion

Most risk averse students							
Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Treatment	29	51.79	67.00	-9.14	3	10.34	206.00
Control	27	48.21	64.81	4.96	4	14.81	208.50
All	56	100	65.95	-2.34	7	12.50	207.43
Least risk averse students							
Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Treatment	18	50.00	65.78	-2.28	2	11.11	85.00
Control	18	50.00	64.89	51.28	6	33.33	185.83
All	36	100	65.33	24.50	8	22.22	160.63

Models

Models

$$y_i = \beta_0 + \beta_1 Procrastinators_i + \gamma_{ji} X_{ji} + u_i \tag{1}$$

$$y_i = \beta_0 + \beta_1 tasks_i + \gamma_{ji} X_{ji} + u_i \tag{2}$$

$$tasks_i = \beta_0 + \beta_1 treatment_i + \gamma_{ji} X_{ji} + u_i \tag{3}$$

$$y_i = \beta_0 + \beta_1 treatment_i + \beta_2 riskaverse_i + \beta_3 treatment_i * riskaverse_i + \gamma_{ji} X_{ji} \tag{4}$$

- y is either the dissertation grade or the hours that a student i submitted their dissertation from the deadline
- *Procrastinators* is a dummy variable equal to 1 for students who submitted an online test in the second week of a 2 weeks window.
- *tasks* is the engagement with the task list.
- *riskaverse* is the measure of risk aversion (0 least risk averse, 1 most risk averse).
- X_{jit} is a scalar of $j = 5$ control variables: students' gender, year 2 average (as proxy for ability), program of study and the dissertation research topic and supervisor.

Empirical Results

Empirical Results (at a glance)

- Procrastinators perform worse from non-procrastinators (from 4.6-4.8 points) but this measure cannot predict time of the submission.
- Engagement with the task list is positively correlated with better performance, but is not correlated with time of the submission.
- Nudges are associated with 1.5 weeks higher engagement with the task list.
- Risk averse individuals are submitting earlier their dissertation from less risk averse individuals.
- Risk averse individuals, who are getting nudges are submitting even earlier their dissertation from non risk averse individuals.
- Present bias and self beliefs about procrastination do not predict grades or submission time.

Table 7: Empirical results of being procrastinator as determined by the date of the submission of the online test on dissertation mark (columns 2-4) and on submission time (columns 5-7)

	Dissertation Mark			Submission Hours		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Procrastinators	-4.77***	-4.66***	-4.56**	16.74	24.71	23.28
	(1.69)	(1.72)	(1.74)	(18.54)	(19.62)	(19.87)
Gender		0.30	0.18		25.94	26.88
		(1.74)	(1.75)		(19.79)	(19.96)
Supervisor		X	X		X	X
Topic		X	X		X	X
Program		X	X		X	X
Year 2 Av			X			X
Constant	68.73***	49.73***	48.16***	0.82	512.02**	526.02**
	(1.49)	(17.67)	(17.77)	(16.33)	(201.03) (	202.81)
N	147	147	146	147	147	146
r2	0.05	0.65	0.65	0.01	0.60	0.60
F	7.95	2.34	2.28	0.82	1.92	1.88
ll	-523.22	-450.85	-446.93	-875.10	-808.32	-802.41

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Correlation between engagement with the task list on dissertation marks (columns 2-4) and on submission time (columns 5-7)

	Dissertation Mark			Submission Hours		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Engagement	0.30	0.61**	0.60**	-2.72	1.12	1.42
	(0.26)	(0.29)	(0.29)	(2.82)	(3.28)	(3.32)
Gender		-0.31	-0.42		26.91	27.52
		(1.77)	(1.78)		(20.00)	(20.15)
Supervisor		X	X		X	X
Topic		X	X		X	X
Program		X	X		X	X
Year 2 Av			X			X
Constant	64.45***	45.94**	44.42**	19.10**	492.22**	505.05**
	(0.88)	(18.14)	(18.23)	(9.48)	(204.88)	(206.34)
N	147	147	146	147	147	146
r2	0.01	0.63	0.64	0.01	0.59	0.60
F	1.29	2.22	2.17	0.93	1.86	1.83
ll	-526.49	-453.23	-449.25	-875.04	-809.62	-803.48

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Empirical results of the impact of engagement with the task list on dissertation marks (columns 2-4) and on submission time (columns 5-7)

	Dissertation Mark			Submission Hours		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Engagement	-0.30	-0.51	-0.97	0.61	-3.95	-1.28
	(0.58)	(0.73)	(0.78)	(6.29)	(8.35)	(9.05)
Treatment	0.82	-1.73	-2.50	-5.19	-3.80	0.83
	(1.81)	(1.89)	(1.93)	(19.46)	(21.71)	(22.44)
Engag.#Treat.	0.65	1.34*	1.83**	-3.57	5.79	2.86
	(0.66)	(0.79)	(0.84)	(7.13)	(9.06)	(9.75)
Supervisor		X	X		X	X
Topic		X	X		X	X
Program		X	X		X	X
Year 2 Av			X			X
Constant	64.32***	49.92***	49.37***	20.05	508.71**	512.29**
	(1.22)	(18.20)	(18.06)	(13.16) (	208.63)	(210.42)
N	147	147	146	147	147	146
r2	0.03	0.65	0.66	0.01	0.59	0.60
F	1.23	2.22	2.25	0.53	1.78	1.74
ll	-525.27	-450.64	-444.89	-874.69	-809.19	-803.34

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Empirical Results of the impact of the nudges on the engagement with the task list

Engagement	Model 1	Model 2	Model 3
Treatment	1.58***	1.36**	1.47**
	(0.44)	(0.55)	(0.56)
Gender		0.38	0.41
		(0.65)	(0.65)
Supervisor		X	X
Topic		X	X
Program		X	X
Year 2 Av			X
Constant	1.16***	8.20	8.09
	(0.31)	(6.59)	(6.60)
N	147	147	146
r2	0.08	0.50	0.51
F	13.05	1.29	1.27
ll	-350.68	-305.82	-302.34

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Empirical results of the interaction of being Risk Averse (0 least risk averse, 1 most risk averse) and being nudged (treat) on dissertation marks (columns 2-4) and on submission time (columns 5-7)

	Dissertation Mark			Submission Hours		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Treatment	0.89	1.55	1.58	-53.56*	-47.94	-56.54
	(2.75)	(3.41)	(3.54)	(31.36)	(40.20)	(38.31)
Risk Averse	-0.07	-0.33	-0.35	-46.31	-130.93***	-155.21***
	(2.51)	(3.36)	(3.71)	(28.63)	(39.69)	(40.08)
Risk Av. #Treat.	2.11	0.67	0.80	-60.42**	-84.78**	-94.86**
	(2.47)	(3.23)	(3.48)	(28.23)	(38.13)	(37.57)
Supervisor		X	X		X	X
Topic		X	X		X	X
Program		X	X		X	X
Year 2 Av			X			X
Constant	64.89***	56.86***	56.94***	51.28**	529.50***	546.94***
	(1.94)	(16.02)	(16.44)	(22.18)	(189.14)	(177.71)
N	92	92	91	92	92	91
r2	0.01	0.63	0.63	0.05	0.63	0.69
F	0.40	1.24	1.14	1.67	1.20	1.47
ll	-322.49	-276.82	-274.09	-546.57	-503.91	-490.70

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Conclusion

Summary

- We attempt to reduce student procrastination by creating a simplified forward feedback mechanism and weekly nudges.
- We attempt to understand the impact of time and risk preferences on submission times and grades.

- Procrastination hurts students.
- Students self-beliefs on their procrastination are imprecise.
- Sending weekly email reminders works: it increases engagement with task list.
- Concerns about more risk averse students, who are already submitting earlier, being nudged unnecessarily.
- Further research is needed to investigate how to tailor nudges specifically to the subgroup of students who are less risk averse to decrease submission times.

Questions?

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Table 12: participation to the Experiment: Average Dissertation Marks and Submission Hours from the deadline

Participation	Students	%	Av Mark	Av Submission Hours
Experiment	92	62.59	65.71	8.16
No Experiment	55	37.41	63.89	23.24
All	147	100	65.03	13.80

Table 13: Students in the treatment and control groups by experiment participation

	Control	Treatment	Total
Experiment	45	47	92
%	48.91	51.09	100
No Experiment	29	26	55
%	52.73	47.27	100
Total	74	73	147
%	50.34	49.66	100

Table 14: Dissertation Marks and Submission Hours by Gender (all sample)

Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
Male	100	68.03	65.05	6.70	15	15.00	174.40
Female	47	31.97	64.98	28.91	9	19.15	219.67
All	147	100.00	65.03	13.80	24	16.33	191.38

Table 15: Dissertation Marks and Submission Hours by Ethnicity (only for the experiment)

Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
White	37	42.05	68.35	5.70	4	10.81	232.50
BAME	51	57.95	63.96	6.76	10	19.61	154.80
All	88	100.00	65.81	6.32	14	15.91	177.00

Table 16: Direct measure of procrastination (online test with a 2 weeks window) by gender (all sample): submission in week 2 implies procrastination

Gender	Week 1	Week 2	Total
Male	27 27%	73 73%	100 100%
Female	6 12.77%	41 87.23%	47 100%
Total	33 22.45%	114 77.55%	147 100%

Table 17: Direct measure of procrastination (online test with a 2 weeks window) by ethnicity (only experiment): submission in week 2 implies procrastination

Ethnicity	Week 1	Week 2	Total
White	16	21	37
	43.24%	56.76%	100%
BAME	12	39	51
	23.53%	76.47%	100%
Total	28	60	88
	31.82%	68.18%	100%

Table 18: Empirical Results of the Impact of completed tasks from the task list on ECON3036 Dissertation Grades (columns 2-4) and on submission time (columns 5-7)

	ECON3036 Mark			Submission Hours		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Compl. Tasks	0.20**	0.18*	0.17*	-2.11**	-0.02	0.04
	(0.09)	(0.10)	(0.10)	(1.01)	(1.12)	(1.13)
Gender		0.18	0.08		27.48	28.34
		(1.78)	(1.79)		(19.97)	(20.13)
Supervisor		X	X		X	X
Topic		X	X		X	X
Program		X	X		X	X
Year 2 Av			X			X
Constant	64.07***	49.50***	47.97**	24.11***	502.69**	517.34**
	(0.85)	(18.11)	(18.21)	(9.08)	(203.23)	-204.76
N	147	147	146	147	147	146
r2	0.03	0.63	0.63	0.03	0.59	0.6
F	4.34	2.17	2.12	4.40	1.85	1.82
ll	-524.97	-454.33	-450.33	-873.31	-809.73	-803.65

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3 different measures of procrastination

- Economic measure (experiment: present bias)
- Direct measure (online test with a 2 weeks window)
- Self-reported measure (questionnaire: 6 different questions).
  - "I often procrastinate on university work."
  - "Deadlines make me feel anxious."
  - "I often leave working on something too late and regret not starting it sooner."
  - "I live for today and do not think about tomorrow."
  - "I sometimes put something in place to stop myself from procrastinating and ensure that I complete my work by a given date."
  - You have just received an assignment that is due in 7 days. Which days are you likely to work on it (assuming you have no other coursework at the same time)?

Table 19: Dissertation Marks and Submission Hours by Ethnicity (only for the experiment)

Group	Students	%	Av Mark	Av Hours	Late	%	Av. Hours
White	37	42.05	68.35	5.70	4	10.81	232.50
Asian	38	43.18	62.58	-2.03	7	18.42	151.00
Black	6	6.82	68.83	77.17	2	33.33	244.50
Other	7	7.95	67.29	-5.86	1	14.29	2
All	88	100.00	65.81	6.32	14	15.91	177.00

Asian includes Asian/Asian British, *Black* includes Black/African/Caribbean/Black British

Table 20: Direct measure of procrastination (online test with a 2 weeks window) by ethnicity (only experiment): submission in week 2 implies procrastination

Ethnicity	Week 1	Week 2	Total
White	16 43.24%	21 56.76%	37 100%
Asian/Asian British	10 26.32%	28 73.68%	38 100%
Black/African/Carribbean/Black British	2 33.33%	4 66.67%	6 100%
Other	0 0%	7 100%	7 100%
Total	28 31.82%	60 68.18%	88 100%