

BEHAVIOURAL
ECONOMICS



“There are no seats in the Library!” Nudging Students Toward Efficient Seat Reservation Behaviour in Trinity Library

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This paper seeks to apply the theories and concepts of behavioural economics to solve a very simple problem faced by university students: the search for a seat in the library. This is done by examining the impact of both a formal and informal nudge to the student’s choice architecture in the form of a sign on student behaviour within a standard library setting. The primary motivation for this study is the lack of seats in a library at any given time, primarily fuelled by students saving seats by placing their bags/books on the desk. The experiment showed that a formal nudge proved more effective in influencing student behaviour, however present reasoning to suggest an informal nudge may prove useful in a long term setting.

Introduction

Is an informal norm-based nudge more effective in influencing student seat reservation behaviour than a formal nudge based on official Trinity library policy?

The purpose of this research is to evaluate the impact of both formal and informal nudges on student behaviour within a library setting. By changing the student's choice architecture, we wished to test whether an informal norm based nudge is more effective in influencing student behaviour than a formal nudge. Our aim was to quantify the effectiveness of each nudge and compare the results.

This research was primarily driven by our observation of inefficient usage of seats in Trinity library. From our experience, it is common for students to place bags or books on library desks in order to save seats. During busy periods, there is a high demand for library seats and seats can therefore be considered a scarce resource. We believe that it is economically inefficient for students to reserve seats for extended periods of time because this creates a situation where seats are not being used and other students are precluded from using this resource. Consequently, this behaviour has a negative impact on the wider student community. We conducted this research in the hope that our findings may be of use to Trinity Library when considering how to frame signage in the future.

Literature Review

Nudge Theory

Behavioural economists recognise that people and the decisions they make can be greatly influenced by small changes in context (Thaler and Sunstein, 2008). Hahn and Metcalfe (2016) assert that in recent years, there has been an explosion in the use of field experiments to test and understand how humans respond to behavioural interventions in real world settings (Harrison and List, 2004; List and Metcalfe, 2014). There are many ways in which behaviour can be affected. One is to supply people with additional information relevant to making their decision. Another is to change the way in which the information is presented and framed (Hahn and Metcalfe, 2016). By using the above techniques, we attempted to influence student behaviour.

Nudges are about framing choices (John, Cotterill and Richardson, 2011). Thaler and Sunstein use the term *choice architect* to describe someone who has the ability to organise the context in which people make decisions. For our project, we became choice architects. We altered the way in which students thought about their decision to reserve a seat by directing them to consider either college library regulations or alternatively, the opinion of their peers. In both of our nudges, we provided additional information to the subjects (Hahn and Metcalfe, 2016).

The Focus Theory of Normative Conduct

There is widespread research on the behavioural influence of social norms. The findings are clear, an individual's actions are frequently guided by comparing themselves to what they see others doing or believe others to be doing (Cialdini et al, 1990; Cialdini, 2003; Shultz et al, 2007; Slaunwhite et al, 2004). This idea underlies much of the marketing campaigns that currently exist designed to encourage people to take socially desirable actions. These are an alternative to campaigns which are based on information, moral pressure or sanctions (Donaldson et al, 1995; Newell & Siikamäki, 2013). These methods are viewed as so effective that almost half of US colleges and universities in a 2002 study had used them in anti binge-drinking campaigns (Wechsler et al., 2003). However a lack of awareness of underlying social psychology and the theories behind them have, in some cases, increased the levels of undesirable behaviours that they intended to address (Perkins, Haines, & Rice, 2005; Cialdini, 2003).

This issue is addressed by Cialdini et al (1990) in the focus theory of normative conduct. This theory posits that individuals are persuaded by two different types of norms: descriptive norms and injunctive norms. Descriptive norms aim to change behaviour by describing what the typical person does, creating a perception of what behaviours are normal and describing an action which will help the individual to conform. Injunctive norms have a moral focus on what behaviours others approve of; the actions that people should be taking rather than those that others are taking. Critical to this is the finding that individuals are motivated by both types of norms. Cialdini (2003) also emphasises having norm based signs visible at the point-of-decision i.e. exactly where and when the decision is made) to increase the power of nudges.

Studies on Library Seating

In the western world, students behavioural patterns have been primarily considered with respect to attendance levels and the attractiveness of library spaces. Any studies addressing seat reservation behaviour were conducted in China. For example, Wang (2010) examined the idea of nudging students in university libraries in China. He proposed that students should be educated at the beginning of their freshman year to be considerate of others and that this would maximize library usage utility. University staff put up official posters in the library urging students not to reserve seats but this did not have the desired effect in the long run. At the beginning of the exam term, first year students were less likely to reserve library seats. In contrast, second and third-year students were more likely to reserve seats as they had seen the posters many times. According to Wang (2010), students argued that even if they themselves did not reserve any

seats, others would do so. Therefore, he concluded that nudging students by using simple education or posters is not effective in the long run.

Ding (2010) similarly empirically proved that it is inefficient to use official rules and sanctions to control student seat reservation behaviour in the library. In this study of Chinese universities, when seats were occupied by students bags or books over a certain length of time, librarians would clear the desk and let other students use the seat. This approach caused conflict between librarians and the students. It also required the librarians to have accurate time management as well as good communication skills. Thus Ding (2010) recommend introducing introduce seat management software.

Qu and Li (2008) suggest that a more efficient way to manage students seat usage in the library is to create an app that works as follows: firstly, if students wish to use the library between 7am - 7pm, they need to reserve seats in the library on the app. Twenty minutes after the reservation, if the student doesn't make it to the seat, the seat will automatically become available to others. Students can use the seat for no longer than 8 hours during daytime from 7am - 7pm. Once a student leaves the library and does not come back within half an hour, the seat will become available to others.

Method

a) Preparation

In preparation for our experiment we spoke to peers to identify whether they believed seat reservation to be an issue in Trinity library. We also researched the current Trinity College Dublin library regulations.

b) Obtain permission

We sent our proposal to the TCD librarians and asked for permission to conduct the experiment. In speaking to the librarians, they found it rather odd that students leave their belongings on seats as they could be stolen. We made a note of the disparity between the opinion of library staff and student perceptions; there is asymmetric information between library staff and students who are not aware of library regulations.

c) Survey Students

Subsequently, we created a survey on SurveyMonkey and distributed this to our peers through a class emailing list and social media. In total, we received 100 responses. 95 of these were from students currently studying at Trinity College Dublin. When designing our experiment, we were especially interested in the following information from our survey:

* 31% of students said that they had reserved a seat in the library in the previous 2 weeks.

* 50 minutes was the average amount of time that students believed to be fair to reserve a seat in the library. We included this information in our informal nudge.

* 50% of the survey participants believed that the seat reservation limit should be below the mean of 50 minutes

* 75% of students said that they believed there should be a time limit for reserving seats in the library.

d) The experiment

After reviewing the experiments by Wang (2010), Ding (2010), Slaunwhite (2008), Shultz et al (2007) and Nolan et al (2004), we designed an experiment that would investigate the effect of point-of-decision norm based nudges on students. We observed the seating reservation behaviour of students on two separate floors of the library. Firstly, we carried out a control observation without any intervention. Secondly, we altered students choice architecture by implementing two separate nudges in the form of PSA paper signs (a formal sign on one floor and an informal sign using normative based messaging on the other). We then compared the result that we obtained from each floor to the control result for that floor to see whether student behaviour had in fact changed. In addition, as it is a between-subject test, we compared the relative effect of each nudge.

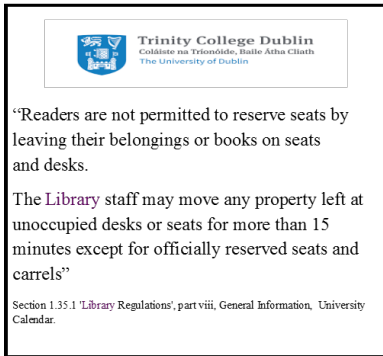
Initially, we intended to record the amount of time that each student reserved their seat for. However, a test experiment was undertaken and demonstrated that this would be extremely difficult due to a lack of personnel. Thus it was decided that if we identified a) the number of students who reserved seats for at least an hour and b) the amount that reserved seats for over one hour, this would allow us to gain an insight into the effect of the nudges.

e) Procedure

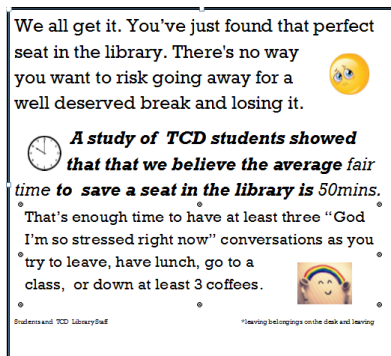
Two members of our research team carried out the observation (one person on each floor).

1. We sat in a central location where we could observe all of the subjects clearly
2. At 1pm we recorded:
 - All of the seats that were reserved (had possessions on them).

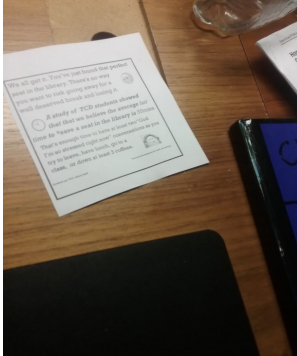
- All of the seats that had students sitting in them.
3. Between 1pm and 2pm we recorded:
- The number of students who returned to the initially reserved seats.
 - The number of students who left and reserved their seat.
 - The number of these students who returned before 2pm i.e they reserved a seat for less than 1 hour.



Ussher 2: Informal Sign



Ussher 1: Formal Sign



e) The signs

Precautions

We did not inform subjects that they were participating in an experiment. We put the signs in place early on the morning of the experiment when few people were in the library and returned at 1pm to carry out our observation. This was to reduce (or eliminate) the chances of subjects changing their behaviour due to being in an experiment (Hahn and Metcalfe, 2016).

time. Thus we posit that once students observe that the sanction is not imposed, this reduction in compliance due to the formal sign may be quite rapid.

Our study was consistent with the effects of normative nudges and the focus theory of normative conduct. Our descriptive-injunctive nudge informing students that their peers considered 50 minutes to be the maximum amount of time that students should reserve seats in the library resulted in a 16% decrease in the number of seats reserved for at least one hour. Nudge strategies work by recognizing that rationality is bounded and then nudging citizens in the right direction (John, Cotterill and Richardson, 2011). We believe that over time the observed effects of the formal nudge would wear off while the informal nudge could become more powerful in influencing student behaviour.

Conclusion

This study demonstrates the practical application of nudge theory and the focus theory of normative conduct in order to change the choice architecture of students in the library. Our experiment successfully nudged students to behave in a way that we believe benefited the wider college community. The data indicates that the formal nudge was more effective in influencing student seat reservation behaviour. However, following studies by Cialdini et al (1990), Cialdini (2003), Shultz et al (2007), Slaunwhite et al. (2004) and Ding (2010), we expect that the effect of strict sanction based nudges would diminish over time. In the long run, we believe that an informal norm-based nudge is a more powerful tool to change student behaviour in a library setting. If students see norm based signs that they themselves believe to be fair, they are more likely to change their behaviour in a positive way, influencing others and leading to a social contagion effect. This is in line with our initial expectations.

Finally, we recommend that Trinity library engages in active dialog with students and considers using norm-based signs to improve both efficiency of library seating and the use of librarians time. However, due to the small scale of this research project and the limitations outlined above, we believe further research to be necessary in order to develop and clarify these claims.

Reference List:

1. Behavioural Insights Team, (2011). Annual update. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60537/Behaviour-Change-Insight-Team-Annual-Update_acc.pdf. [Accessed 24 Nov. 2016]. Cai, J. and Qin, Z. (2008). Causes and Solutions of “Seat Occupied” in Universities and Colleges. *Journal of China Institute of*

We prevented the subjects from learning from experience by conducting the two tests simultaneously (on two different floors of the Ussher library). Subjects were only exposed to our nudge once. Thus, it was a between subject test. This enabled us to avoid students encountering across multiple signs. If this had occurred, we would not have been able to determine whether their apparent change in behaviour was due to the difference in sign or because they had seen two different signs on different occasions.

As far as students were concerned, it was a normal day at college and nothing changed apart from the introduction of our nudge. We did not interfere with the subjects in any other way thus we were confident that the subjects acted independently.

Results

	Usher 1 (124 seats) Formal			Usher 2 (148 seats) Informal			Total		
	Control	Expt	% Change	Control	Expt	% Change	Control	Expt	% change
Number of seats occupied at 1pm	116	120	3%	109	117	7%	225	237	5%
Total number of seats reserved when survey began at 13.00	59	51	-14%	42	46	10%	101	97	-4%
Number of these who returned before 14.00	17	21	24%	17	25	47%	34	46	35%
Percent of initial seats reserved that returned before 14.00	29%	41%	43%	40%	54%	34%	34%	47%	41%
Number reserved for the entire period between 13.00 and 14.00	42	30	-29%	25	21	-16%	67	51	-24%
Total number of students who left the library and reserved a seat between 13.00 and 14.00	25	23	-8%	24	20	-17%	49	43	-12%
Total number of seats reserved at any point between 13.00 and 14.00	84	74	-12%	66	66	0%	150	140	-7%
Percentage of total occupied seats reserved between 13.00 and 14.00	72%	62%	-15%	61%	56%	-7%	67%	59%	-11%

From our data, we can clearly see that both nudges influenced the seat reservation behaviour of students in the library. There was a 24% (overall) decrease in seats that were reserved for over an hour in comparison to the control and there was 7% (overall) decrease in total number of seats reserved. Our expectation based on the literature was that an informal norm based approach would be more effective in positively influencing student behaviour in the library. The assumption was that this would influence student behaviour by directing students to consider the social consequences of their choices. In actual fact, our results showed that the formal nudge had a greater impact on student behaviour than the informal nudge. When noting the percentage of occupied seats that were reserved at anytime between 13.00 and 14.00, the formal nudge resulted in a 15% reduction whilst the informal nudge resulted in only a 7% reduction.

In light of the literature, we believe that in the long term, this effect would reduce and might even wear off as people became used to the signs. This is seen in Walter and Knowles (2008) study of the effect of road signs. A second compounding factor is that the sanction of possession removal has rarely been implemented in the library. Fellner et.al (2011) found that compliance increases when the nudge is in the form of official threats because of the increased risk of detection. However they also found that threat of sanctions significantly reduces with

Industrial Relations.

2. Cialdini, R. (2003). Crafting normative messages to protect the environment. *Current Directions in Psychological Science*, 12(4), pp.105-109. Cialdini, R., Reno, R. and Kallgren, C. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), pp.1015-1026.
3. Donaldson, S. I., Graham, J. W., Piccinin, A. M., & Hansen, W. B. (1995). Resistance skills training and onset of alcohol use: Evidence for beneficial and potentially harmful effects in public schools and in private Catholic schools. *Health Psychology*, 14, 291-300.
4. Ding, Y. (2010). Analysis on the Phenomenon of Occupying Seat for Self-study in University Library. *Sci-Tech Information Development & Economy* 2010. pp.5-7/
5. Fellner, G., Sausgruber, R. and Traxler, C. (2013). Testing Enforcement Strategies in the field: Threat, Moral Appeal and Social Information. *Journal of the European Economic Association*, 11(3), pp.634-660.
6. Fishman, D. and Walitt, R. (1972). Seating and Area Preferences in a College Reserve Room. *College & Research Libraries*, 33(4), pp.284-297.
7. Given, L. and Leckie, G. (2003). Sweeping the library: Mapping the social activity space of the public library. *Library & Information Science Research*, 25(4), pp.365-385.
8. Gladwell, M. (2000). *The tipping point*. 1st ed. Boston: Little, Brown.
9. Hahn, R. and Metcalfe, R. (2016). The Impact of Behavioral Science Experiments on Energy Policy. *Economics of Energy & Environmental Policy*, 5(2).
10. Halpern, D., Service, O. and Thaler, R. (2015). Inside the nudge unit: How small changes can make a big difference.
11. John, P., Cotterill, S. and Richardson, L. (2011). *Nudge, Nudge, Think, Think*. 1st ed. London: Bloomsbury Pub. PLC.
12. Kerr, J., Eves, F. and Carroll, D. (2001). Can Posters Prompt Stair Use in a Worksite Environment?. *Journal of Occupational Health*, 43(4), pp.205-207. McNeil, B., Pauker, S., Sox, H. and Tversky, A. (1982). On the Elicitation of Preferences for Alternative Therapies. *New England Journal of Medicine*, 306(21), pp.1259-1262.
13. Morsella, E., Bargh, J. and Gollwitzer, P. (2009). *Oxford handbook of hu-*

- man action. 1st ed. Oxford: Oxford University Press.
14. Nolan, J.M., Schultz, P.W., Cialdini, R.B., Goldstein, N.J. and Griskevicius, V. (2008). Normative social influence is underdetected. *Personality and Social Psychology Bulletin*. Vol. 34 No. 7. pp. 913-23.
 15. Organ, M. and Jantti, M. (1997). Academic Library Seating: A Survey of Usage, with Implications for Space Utilisation. *Australian Academic & Research Libraries*, 28(3), pp.205-216.
 16. Patel, M. and Volpp, K. (2015). Nudging Students Toward Healthier Food Choices Applying Insights From Behavioral Economics. *JAMA Pediatrics*, 169(5), p.425.
 17. Perkins, H., Haines, M. and Rice, R. (2005). Misperceiving the college drinking norm and related problems: a nationwide study of exposure to prevention information, perceived norms and student alcohol misuse. *Journal of Studies on Alcohol*, 66(4), pp.470-478. Qu, Kui and Chunli Li. "Probing Of Computerized Management Of The Seats In Library". *Library Tribune* 2008: 75-76. Print. Schultz. (2007). The Constructive, Destructive and Reconstructive Power of Social Norm. *Psychological Science*.
 18. Schultz, P., Nolan, J., Cialdini, R., Goldstein, N. and Griskevicius, V. (2007). The Constructive, Destructive, and Reconstructive Power of Social Norms. *Psychological Science*, 18(5), pp.429-434.
 19. Slaunwhite, J., Smith, S., Fleming, M. and Fabrigar, L. (2009). Using normative messages to increase healthy behaviours. *International Journal of Workplace Health Management*, 2(3), pp.231-244.
 20. Smith, S.M. and Petty, R.E. (1996). Message framing and persuasion: a message processing analysis. *Personality and Social Psychology Bulletin*. Vol. 22. pp. 257-68.
 21. Thaler, R. and Sunstein, C. (2008). *Nudge*. 1st ed. New Haven, Conn.: Yale University Press.
 22. Torgler, B. (2004). Moral suasion: An alternative tax policy strategy? Evidence from controlled field experiment in Switzerland. *Economics of Governance*, 5(3), pp.235-253. Toy, S., Tapp, A., Musselwhite, C. and Davis, A. (2014). Can social marketing make 20mph the new norm?. *Journal of Transport & Health*, 1(3), pp.165-173. Walters, L. and Knowles, J. (2008). Effectiveness of Speed Indicator Devices on reducing vehicle speeds in London. [online] Transport Research Lab-

oratory. Available at: <http://content.tfl.gov.uk/effectiveness-of-sids.pdf> [Accessed 27 Nov. 2016].

23. Zhang, B. (2010). Pareto Optimality for Utilization of University Library Seats. Journal of Dalian Nationalities University.