

**PAYING ATTENTION TO INATTENTION: evidence from libraries**

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# **PAYING ATTENTION TO INATTENTION**

## **Evidence from libraries**

### **1. Introduction**

Given the increasing amount of information that most people face today, as well as their cognitive limitations, it is not feasible to simultaneously focus their attention on all events they face (Simon, 1955). As a result, inattention behavior may arise in distinct situations, even when people receive constant reminders to behave in a different manner. Although reminders can work in promoting rule compliance (Apesteguia, Funk, & Iriberry, 2013), there is evidence suggesting that individuals may not meet a deadline even when it is profitable to do so (Ericson, 2017).

This paper measures inattention in an information commons (libraries). We want to answer the following question: what is the extent of inattention in a real-world setting? Employing a novel dataset comprising more than 300,000 daily transactions in libraries during a 10-year period, we measure inattention as the number of borrowed books not returned when they are due per library user. Libraries arguably constitute an ideal real-world setting for studying inattention, since they clearly establish specific return dates for items checked out by users, and send electronic reminders before (and after) they are due back.

When testing for the possible occurrence of inattention in our data, we distinguish between two competing plausible explanations: one based on procrastination behavior (Ericson, 2017), and another based on strategic considerations (Guiso, Sapienza, & Zingales, 2013). If the former prevails over the second type of salient inattention, then one should expect a higher proportion of return delays on dates in which procrastination tends to be more frequent, such as days immediately before weekends, for example. Meanwhile, if strategic considerations, such as keeping a book for a longer period in order to prepare for an exam, are more relevant, then one should expect a higher proportion of return delays in days before exams.

As a preview, our main results suggest that inattention, as measured by delays in returning borrowed books, is a procrastination phenomenon. These results contribute to a growing literature on the empirical measurement of inattention, with a fitting emphasis on the impact of reminders (Apesteguia et al., 2013; Ericson, 2017). By measuring inattention as the average number of return delays in libraries, we provide a new proxy for an important behavioral bias (Gabaix, 2017). This measure has the advantage of being directly observable and considerably easier to interpret, when compared to previous measures reported in the finance literature, which could be subject to noise and other types of bias derived from the methodology used to build them (Barber & Odean, 2008; DellaVigna & Pollet, 2009; Hirshleifer, Lim, & Teoh, 2009).

## 2. Data and methodology

We study the behavior of library users covering more than 300,000 transactions during a 10-year period. We have access to confidential daily data related to library users of a private university in the city of São Paulo, Brazil, for the 2005-2015 period. The original data contain detailed information on 17,498 individual users, covering 785,550 daily transactions. We limit our analysis to return delays, only. In doing so, we restrict the original sample to 310,726 transactions, by 8,045 users. We justify this choice based on the quantifiable fact that, once a user has a return delay, he or she starts receiving periodic electronic reminders through the library's electronic system (*Pergamum*)<sup>i</sup>.

The data contain information on users' socioeconomic characteristics – such as their gender, date of birth, and address – as well as library's confidential information, with each user's identification number, category (high school, undergraduate, Masters', graduate student, former student, professor, and employee) and area of study (management, accounting, economics, international relations, advertising, and secretariat). For each user in the data, we are able to identify her department and category. The data also contain the dates when each user checked out specific items from the library, as well as each item's code, and title. To assess the importance of inattention in this setting, we estimate (1) via Ordinary Least Squares (OLS):

$$(1) Y_{ist} = \alpha + \beta(\text{Day of the Week}) + X_{ist}\gamma + Z_{st}\lambda + \delta_t + \theta_{st} + \varepsilon_{ist}$$

Here,  $Y_{ist}$  represents the delay for an individual  $i$ , in library  $s$ , at instant  $t$ . The term “*Day of the Week*” corresponds to an indicator variable, which assumes unity value for each weekday, and 0, otherwise. We include user characteristics and book fixed-effects as controls in the regressions below (captured by the term  $\alpha$ ), as well as time trends ( $\delta_t$ ). We also consider alternative ways to control for the existence of distinct time trends in different libraries, by including monthly and yearly trends for each library in the sample (captured by the  $\lambda$  and  $\theta$  terms). In the case of the term  $\varepsilon_{ist}$ , it has a conditional mean of zero ( $E(\varepsilon_{ist} | s, t) = 0$ ). The parameter of interest in this context is  $\beta$ , which measures inattention. It is important to note that the estimates reported herein do not have a causal interpretation.

## 3. Results

Table 1 presents the results of estimations for the 2005-2015 period. The dependent variable corresponds to the number of delays by each library user in the period. In the table's columns, we add covariates to the specifications to control for time-invariant characteristics of users and libraries. Each column reports estimates for a specific day of the week. The last column contains estimates for all days of the week, excluding Sunday. In all cases, we cluster standard errors by the number of courses offered at the university<sup>ii</sup>:

Table 1  
Delays in Weekdays  
OLS Estimates, 2005-2015

VARIABLES	(1) Delays	(2) Delays	(3) Delays	(4) Delays	(5) Delays	(6) Delays	(7) Delays	(8) Delays
Monday	-0.16*** (0.006)							0.10*** (0.008)
Tuesday		-0.11*** (0.007)						0.14*** (0.009)
Wednesday			-0.01*** (0.005)					0.21*** (0.009)
Thursday				0.11*** (0.010)				0.32*** (0.012)
Friday					0.26*** (0.010)			0.45*** (0.013)
Saturday						0.07*** (0.008)		0.29*** (0.012)
Sunday							-0.23*** (0.008)	
User Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	310,726	310,726	310,726	310,726	310,726	310,726	310,726	310,726
Adj. R-squared	0.0764	0.0708	0.0660	0.0704	0.0868	0.0670	0.0705	0.106

Notes: (a) The dependent variable in the specifications corresponds to the average delays (in days) per user in each library studied in this paper. (b) Standard errors clustered by course (reported in parentheses). (c) “User Characteristics” correspond to a set of dummies for users’ gender (female = 1), academic financial support (scholarship = 1), group ages (18-23, 24-30, 31-40, 41-50, 51-60, 60+), category (undergraduate, Masters’, graduate, and former student, employee, and professor), area of study (management, accounting, economics, advertising, international relations, and secretariat), and time at school (0 to 4 years). (d) “Library Characteristics” correspond to a set of dummies for each library in the sample, including their location, and staff size, as well as their books (management, accounting, economics, and law). (e) The terms “Libraries x Months” and “Libraries x Years” correspond to interactions between libraries and months and libraries and years, respectively. (f) Statistical significance: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

The results in the table suggest the occurrence of a “Friday effect”, thus favoring the view that the inattention focused upon here is a procrastination phenomenon. In fact, delays are considerably higher on Fridays, either in the case of estimations for individual weekdays (26% higher than other days of the week), or in the case of all weekdays (45% higher than delays on Sundays).

In table 2, we report the results of estimations based on (1), but considering the influence of exam weeks, only. We do this to verify if alternative events that could possibly proxy for inattention also affect return delays in libraries, favoring the view that inattention can be strategic in nature. Given that we have access to official university information, we can build specific dates for exams, as well as close dates (one day, three days, and seven days before and after each event).

Table 2  
Delays during Exam Weeks  
OLS Estimates, 2005-2015

VARIABLES	(1) Delays	(2) Delays	(3) Delays	(4) Delays	(5) Delays	(6) Delays	(7) Delays
Exams	0.06*** (0.011)						
Exams (t - 1)		-0.02*** (0.009)					
Exams (t - 3)			-0.03*** (0.007)				
Exams (t - 7)				-0.02*** (0.008)			
Exams (t + 1)					-0.02*** (0.006)		
Exams (t + 3)						-0.02** (0.008)	
Exams (t + 7)							-0.02*** (0.007)
User Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	310,726	310,725	310,724	310,722	310,725	310,724	310,721
Adj. R-squared	0.0665	0.0661	0.0661	0.0661	0.0661	0.0661	0.0661

Notes: see table 1 above.

In the case of the results reported above, we cannot find a robust empirical pattern consistent with strategic inattention as intuitively defined earlier. For most specifications in the table, there is not a robust pattern in delays in returning borrowed library books across these dates. In the case of exam weeks, there is a contemporaneous rise in delays, accompanied by reductions in close dates. Clearly, these results are harder to reconcile with inattention explanations fundamentally based on strategic considerations of the kind defined earlier. We conclude that there is a significant effect of Fridays on return delays that seems to be explained by inattentive behavior due to procrastination.

## 4. Sensitivity Analysis

This section contains the results of several tests aimed at checking the robustness of the main results reported in the paper.

In Tables 3 to 6, we present estimates of inattention based on distinct samples. Table 3 reports results for distinct library units (Liberdade, Largo do São Francisco, and Pinheiros). Table 4 contains results by user category (undergraduates, Masters' students, graduate students, former students, employees, and professors), while table 5 contains results for distinct courses (management, accounting, economics, international relations, advertising, secretariat, and other courses). Finally, Table 6 reports the results of estimations for samples based on the time that users have been in the university (0 year, 1 year, 2 years, etc.). In all cases, we want to check whether the main results are robust to minor changes in the original sample.

Table 3  
Robustness: Delays by Library Unit  
OLS Estimates, 2005-2015

VARIABLES	(1) Liberdade	(2) San Fran	(3) Pinheiros
Friday	0.26*** (0.010)	0.23*** (0.025)	0.26*** (0.035)
User Characteristics	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes
Observations	279,043	28,278	3,405
Adj. R-squared	0.0883	0.0748	0.0865

Notes: (a) The dependent variable in the specifications corresponds to the average delays (in days) per user in each library studied in this paper. (b) Standard errors clustered by course (reported in parentheses). (c) “User Characteristics” correspond to a set of dummies for users’ gender (female = 1), academic financial support (scholarship = 1), group ages (18-23, 24-30, 31-40, 41-50, 51-60, 60+), category (undergraduate, Masters’, graduate, and former student, employee, and professor), area of study (management, accounting, economics, advertising, international relations, and secretariat), and time at school (0 to 4 years). (d) “Library Characteristics” correspond to a set of dummies for each library in the sample, including their location, and staff size, as well as their books (management, accounting, economics, and law). (e) The terms “Libraries x Months” and “Libraries x Years” correspond to interactions between libraries and months and libraries and years, respectively. (f) Statistical significance: \* p < 0.10, \*\* p < 0.05, \*\*\* p < 0.01.

Table 4  
Robustness: Delays by User Category  
OLS Estimates, 2005-2015

VARIABLES	(1) Undergraduate	(2) Masters	(3) Graduate	(4) Former Std.	(5) Employee	(6) Professor
Friday	0.28*** (0.006)	0.03 (0.072)	0.25*** (0.013)	0.27*** (0.021)	0.19* (0.106)	0.03* (0.017)
User Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes	Yes	Yes	Yes
Observations	207,134	9,995	69,716	12,296	1,109	6,223
Adj. R-squared	0.0697	0.113	0.0704	0.0878	0.152	0.111

Notes: see Table A1 above.

Table 5  
Robustness: Delays by Course  
OLS Estimates, 2005-2015

VARIABLES	(1) Managemen t	(2) Accounting	(3) Economics	(4) Int.Relation s	(5) Advertising	(6) Secretariat	(7) Other
Friday	0.26*** (0.015)	0.25*** (0.021)	0.28** (0.010)	0.29* (0.039)	0.32*** (0.004)	0.32* (0.033)	0.18*** (0.057)
User Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	101,547	117,718	42,696	11,722	14,520	6,832	15,691
Adj. R-squared	0.0694	0.0926	0.0706	0.0858	0.0880	0.0767	0.141

Notes: see Table A1 above.

Table 6  
Robustness: Delays by Time at FECAP  
OLS Estimates, 2005-2015

VARIABLES	(1) 0 year	(2) 1 year	(3) 2 years	(4) 3 years	(5) 4 years	(6) 5+ years
Friday	0.29*** (0.015)	0.28*** (0.011)	0.26*** (0.013)	0.24*** (0.007)	0.21*** (0.029)	0.21*** (0.034)
User Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Library Characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Months	Yes	Yes	Yes	Yes	Yes	Yes
Libraries x Years	Yes	Yes	Yes	Yes	Yes	Yes
Observations	69,779	82,025	59,960	46,110	15,599	37,253
Adj. R-squared	0.0925	0.0875	0.0837	0.0733	0.0638	0.103

Notes: see Table A1 above.

According to the results reported in this section, we conclude that the previous results remain qualitatively the same. This lends a great deal of confidence to our inference related to the occurrence of a “Friday effect” in this context.

## 5. Conclusion

This paper measures inattention in a novel setting, an information commons. We report the occurrence of a “Friday effect”: inattention, as measured by delays in returning checked out books, is consistently higher on Fridays, when compared to the other days of the week. The results reported in this paper favor the view that inattention is a procrastination phenomenon, rather than based on strategic considerations.

## References

- Apestequia, J., Funk, P., & Iriberry, N. (2013). Promoting rule compliance in daily-life: evidence from a randomized field experiment in the public libraries of Barcelona. *European Economic Review*, *64*(2), 266–284. <http://doi.org/10.1016/j.euroecorev.2013.08.010>
- Barber, B. M., & Odean, T. (2008). All that Glitters: the effect of attention and news on the buying behavior of individual and institutional investors. *Review of Financial Studies*, *21*(2), 785–818. <http://doi.org/10.1002/9781118467411.ch7>
- DellaVigna, S., & Pollet, J. M. (2009). Investor inattention and Friday earnings announcements. *Journal of Finance*, *44*(2), 709–749. <http://doi.org/10.2139/ssrn.843786>
- Ericson, K. M. (2017). On the interaction of memory and procrastination. *Journal of the European Economic Association*, *15*(3), 692–719. <http://doi.org/10.3386/w20381>
- Gabaix, X. (2017). *Behavioral inattention* (NBER Working Paper Series No. 24096). Cambridge. <http://doi.org/10.3386/w24096>
- Guiso, L., Sapienza, P., & Zingales, L. (2013). The determinants of attitudes toward strategic default on mortgages. *Journal of Finance*, *68*(4), 1473–1515. <http://doi.org/10.1111/jofi.12044>
- Hirshleifer, D., Lim, S. S., & Teoh, S. H. (2009). Driven to distraction: extraneous events and underreaction to earnings news. *Journal of Finance*, *64*(5), 2289–2325. <http://doi.org/10.1111/j.1540-6261.2009.01501.x>
- Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics*, *LXIX*(1), 99–118. <http://doi.org/10.2307/1884852>

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<sup>i</sup> This system provides technology services for several libraries in Brazil. Users receive reminders one day before the return of the book is due, and one day after such a due date. After that period, they start receiving reminders every three days for each library item they have borrowed and not returned.

<sup>ii</sup> There were 219 such courses offered during the 2005-2015 period. These courses differ with respect to areas of study (management, economics, accounting, international relations, advertising, and secretariat) that a student may choose when he or she enrolls in the university.